Putting the human into human capital
A human capital index based on competences

A thesis presented in partial fulfilment of requirements for the degree of

Doctor of Philosophy

Human Resource Management

Massey University
Palmerston North
New Zealand

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2003

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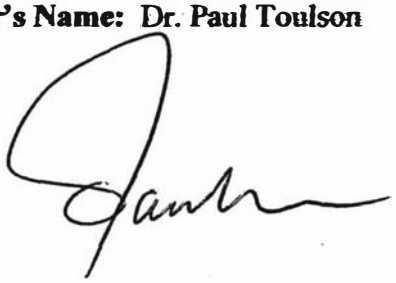
Signature:  **Signature:** 

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Abstract

The world of work is increasingly more global and knowledge-based and there is a developing awareness of the importance of human capital. An individual's performance against a comprehensive competence profile will capture, I suggest, the substance of human capital. A review of existing theories and measures directly or indirectly associated with measuring the value of people in the workplace reveals a gap. There has been no simple measure that captures the substance of human capital.

A human capital measure was developed in an attempt to address this omission. Various procedures and concepts from the literature were initially tested in a pilot case study in an engineering firm. From this an original human capital index measure was developed and applied in subsequent case studies. The human capital index is derived from the performance ratings of competences which are correlated with productivity measures. Nordhaug's (1993) typology provided a consistent framework for job role coverage, in competence profiles that either already existed or more commonly, were developed during this research. Performance scores for competences were gathered through 360-degree feedback. Productivity measures were specific to each case study.

This human capital index was developed with and applied to seven samples in five organisations: customer service representatives and customer service officers in a bank, two groups of lawyers, managers in a supermarket, engineers in the armed forces and technicians in the gaming industry.

There were very strong correlations between the human capital indexes and organisational productivity results for several of the samples. Against these same productivity measures the OECD measure of human capital (equivalent years of tertiary education) correlated weakly.

This study contributes to the constructs of competences and productivity and their relationship in a human capital measure. It also describes a case study process for human capital measure development and raises issues of human capital measurement acceptability. Results suggest that under certain conditions an human capital index based on competences is feasible as a human capital measure; although it involves a number of subjective processes and is organisation specific. Further development and areas of research are suggested.

Acknowledgements

Full time doctoral studies gave me the luxury of in-depth exploration of an idea. The idea could never have been developed into this thesis without the help of many people.

A number of Massey University staff have contributed to this thesis development. My supervisors, Dr. Paul Toulson, Dr. Su Olsson and Professor Mary Mallon who gave me the freedom to follow my original approach, but also provided the scholarly guidance required. The University Ethics committee approved my research. Dr Denny Meyer's advice on statistical analysis of small samples has been gratefully followed. Ted Drawneek has assisted me with the use of the SPSS software. Celia Brockett in the Palmerston North library kept me up to date with new database availability and all the team in the library's extramural division have provided an outstanding sourcing and delivery service. Thank you Margaret Gilbert and the doctoral committee for the generous doctoral scholarship. It made a great contribution to the costs of air travel required to see my supervisors, the applied research process and research materials.

Applied research in workplace settings cannot happen unless you have a contact person and staff who agree to participate. I am very grateful to those people in the bank, law firm, defence organisation, supermarket and gaming organisation for supporting my studies including over two hundred staff who consented to participate in the 360-degree feedback process. Thank you for your involvement. My pilot case study contact person deserves a special mention. Using his staff data he was the first to allow me to explore the development of a human capital index. The pilot report was a very helpful in convincing other companies to participate.

I am blessed with great family and friends. However there are not many friends and relatives who would want to read a doctoral thesis. I very much appreciated impressions and feedback from my friends, Christine Hillier and Margaret Mc Gavin and uncle, Tony Sage. Trish Franklin and Beryl Oldham listened to what I was doing along the way and kindly carried out the reliability checks on the classification of competences into the Nordhaug domains.

Doctoral studies are often described as a journey: I have had a special companion during the smooth and few rough patches of my journey. I had the enthusiastic encouragement of my husband, David Sage, to begin a doctorate, his support along the way and his unfaltering belief in a successful outcome.

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List of Abbreviations

ASTD	American Society of Training and Development
BA	Bachelor of Arts
BCA	Bachelor of Commercial Accounting
BCom	Bachelor of Commerce
BMgt	Bachelor of Management
CSR(s)	customer service representative(s)
CSO(s)	customer service officer(s)
ECP	existing competence profile
ECPs	existing competence profile lawyers
EVA	economic value added
GNVQs	General National Vocational Qualifications
HCI	human capital index
HCIW	weighted human capital index
HCMV	human capital market value
HC ROI	human capital return on investment (Deloitte & Touche)
HCVA	human capital value added
HR	human resources
HRA	human resource accounting
HRINZ	Human Resource Institute of New Zealand

HRM	human resource management
HR&T	human resource and training (manager)
IIP	Investors in People
ISS	In-service support (engineers)
KPIs	key performance indicators
LC	Lieutenant Commander
LLB	Bachelor of Law
MHRI	manager human resource information
NCP	new competence profile
NCPs	new competence profile lawyers
NES	National Employee Survey
NIESR	National Institute of Economic and Social Research
NQF	National Qualification Framework
NVQs	National Vocational Qualifications
NZCE	New Zealand Certificate in Engineering
NZQA	New Zealand Qualification Authority
OECD	Organisation for Economic Co-operation and Development
O/O	owner/operator
OPDEF	operational defect
ROsCE	Return on skill capital employed
ROI	return on investment

ROI_w	Return on investment workplace index (Davenport)
sAUR	skill asset utilisation ration
SHRM	strategic human resource management
SIG	special interest group
SOSPP	staff officer, strategic planning
SPSS	statistical package for the social sciences
SOSPP	staff officer strategic personnel planning
YTD	year-to-date

Chapter 1

Introduction

Background

> *It will not be surprising to most readers that knowledge has become the most decisive factor in economic growth and competitiveness....*
>
> (Garden, 1997, p.1)

We have been bombarded over the past few years by planners' policy statements and media articles reiterating that knowledge is the key to economic success. Yet there is a lack of measures and methods for capturing what workplace knowledge is. Only a small number of New Zealand companies have attempted any knowledge management strategies[1]. Confusion about what a knowledge economy actually means in reality for a company's workforce is such that we now get articles like that of Cowey's (2000) 'Knowledge Economy: Fact or Fad?'

The all-embracing notion of a 'knowledge economy' suggests that more knowledgeable and skilled people are and will be required. From this we can deduce that the workforce, their competences and training and development, are central to economic development. In the past, training and development provision has tended to occur usually in isolation from strategic company planning (ASTD, 2000; Pfeffer, 1998; Phillips, 1999). Training and development have occurred because of the vision of some particular stakeholder or as a necessary expenditure in particular cases. The time and resources available to evaluate the value of training and development initiatives in New Zealand organisations have been scarce. Attempts to measure workforce competences have been an even rarer event.

There is a growing awareness of the importance of people and of human capital as exemplified by interest in workplace competences. However there has no been any practical, easy-to-use, measurement of the substance[2] of human capital. Currently there is a mismatch between the level of importance ascribed to human capital and the

[1] Later in this chapter: pp 18-22 describes surveys that support this
[2] Entity, what human capital is comprised of

frequency and nature of measurement and subsequently of strategic consideration by organisations. Consequently the drive to recognise, increase, manage and value the competences of the workforce for competitive advantage is hindered by a lack of user-friendly, simple measures that can be used for planning and management of the workforce.

I started this thesis with a vision of creating a framework and measures that would make it simple and practicable to evaluate the benefits of a competence-based approach to training and development in an organisation. Early in my provisional year I altered my focus. I originally thought that the New Zealand Qualification Framework would be comprehensive enough in approach to identify a procedure to link competence attainment to productivity. However I found it did not provide a sufficiently holistic approach to worker performance and outcomes in an organisation.

The focus of this thesis is exploration of how employees' competences can be incorporated into a measure of human capital. I equate competences[3] with the substance of human capital. My premise is that a competence-based human capital measure linked to productivity would be a useful tool for identifying and measuring the stocks and changes in the knowledge and skills of groups and individuals within an organisation.

If a measure can be created that is simple and practical to use, and which produces valid and reliable results, one of its uses could be to identify the human capital changes and benefits that result from training and development initiatives. A key objective of training and development is to develop individuals' competences. In addition, a human capital measure based on the performance of competences could contribute to an organisation's strategic planning and reporting as well as provide information for the operational management of its workforce.

This chapter describes the background to my research. The term human capital and how it links with knowledge and skills is defined. Human capital development and measurement is becoming increasingly more important to New Zealand within a global knowledge economy. Why this is so is described and New Zealand and overseas

[3] Defined in the terminology definition section p 27

surveys that encompass identification and/or measurement of human capital are outlined. My research objective, sub-questions, terminology definitions, key conceptual influence and research parameters follow.

Economists Mincer (1958), Schultz (1961) and Becker (1962) introduced the term 'human capital' to connect the contribution of the workforce to organisation output. The meaning of the term has evolved and it is now defined by the Organisation for Economic Co-operation and Development (OECD) as:

> *the knowledge, skills, competences and other attributes embodied in individuals that are relevant to economic activity*
>
> (Johnston, 1998, p.9)

The connection between knowledge and human capital has been described as follows:

> *It is easily understood if one realises that capital is formed by investment, that investment in human resources is designed to increase their capacity (to produce, to earn, to enjoy life etc.) and that improvements of capacity, as a rule, result from the acquisition of 'knowing what' or of 'knowing how'.*
>
> (Machlup, 1984, p.8)

Human capital is an intangible[4] asset with the capacity to enhance or support productivity, innovation, and employability. A company's human capital may be augmented, may decline or become redundant (Johnston, 1998). Investments in human resource management practices, including training and development, are therefore prime considerations for maximising and developing the human capital required for organisational and economic success.

New Zealand is a small, open economy, therefore increasing globalisation and international flows have major direct and indirect influences on the business environment (Department of Labour, 1999). Jesson (1999) describes the development of New Zealand into an open economy more forcefully. He refers to the radical application of rapid deregulation of commercial, professional and social services to allow the competitive marketplace to become the prime regulating force.[5] The

[4] Intangible = invisible in the balance sheet of a company with traditional accountancy reporting
[5] This is what a market forces policy involves

enactment of a market forces policy over the fifteen years to 1999 was so extreme that economists throughout the world closely observed what they call the New Zealand experiment (Kelsey, 1995).

The Department of Labour's (1999) 'human capability framework' outlines the technological, demographic, and global marketplace influences on our current workforce that impact on existing and required knowledge, skills, competences and attributes. There are a number of key influences. These include our few remaining tariff protections in our relatively small domestic market causing businesses to compete with the large multinationals and the rest of the world. Constant technological development requires changing skill levels in industry. There is also a move away from low skill manual labour of the primary production and manufacturing industries to more service industries jobs. In addition, most job and income growth is occurring in the high skilled market and the majority of job losses are occurring in the low skilled manual labour market. All of this is in the context of the ageing New Zealand workforce and increasing proportions of Maori, Pacific Islands and other ethnic groups, who have historically achieved relatively low general educational attainment, which limits their adaptability.

For New Zealand the advent of a knowledge economy is desirable[6] and therefore the need for investment in human capital and effective ways to value our workforce is essential. Although there has been an increase in the skill levels and qualifications of New Zealanders, coupled with this rise in educational standards has been an increase in the skills, knowledge, competences and attributes required to gain employment in many sectors. There is therefore a rising need for further training in the workforce to meet the changing needs (Department of Labour, 1999).

The National Qualification Framework (NQF) is a major government initiative to address the need for a more skilled workforce. There is a steadily increasing uptake by members of the workforce of opportunities to enhance their competence standards and qualifications. By August 2002 there were in excess of 775,000 learners registered and

[6]Knowledge Wave Conference 2002 and 2003 with an emphasis on the global economy, research and development investment and leadership development

nearly two million credits and ninety-eight qualifications had been awarded[7]. However there is a lack of clarity on the benefits of this initiative. Evaluation of the NQF investment is limited to the statistics of uptake such as those above, supplemented by occasional anecdotal feedback from organisations involved. There are currently no data on the increase in organisations' human capital as a result of the NQF and a limited number of anecdotes that link it to organisational success. Herein lies a major challenge for our government statisticians and policy makers, because as Kaplan says:

> *If you can't measure it, you can't manage it.*
>
> (Kaplan & Norton, 1996a, p.21)

There is reluctance by government bodies to become involved in measuring the benefits to organisations of an increase in human capital[8]. This is possibly attributable to the OECD (Johnston, 1998) practice of equating human capital with formal education, as formal education is internationally comparable and easy to measure. However the stakeholders of organisations who are the consumers could manage their investment in people more effectively if there were available measures of human capital itself. Such information would promote effective strategic planning for success in local and global marketplaces.

At the organisational level, reporting of business results has been dominated by the annual return on tangible assets required by the Inland Revenue Department. Intangible assets by nature are not easily made visible; therefore human capital is more often ignored in annual reports. Recently some knowledge management focused organisations have introduced simple statistics, such as number of training days, organisational climate, training budget, and occupational health and safety records[9] (Johnson, 1999b; Toulson & Dewe, 2001), to infer human capital stocks and flows in their intellectual capital and balanced scorecard reports. These measures however provide very limited data in terms of human capital.

There is a lack of data available to managers in organisations about the knowledge, skills, competences and attributes of their staff. The lack of relevant data for managers

[7] NZQA website
[8] Personal communication David Lythe NZQA
[9] Personal communication: Heather Miles, Human Resource Manager, Carter Holt Harvey, May, 1999

can inhibit effective human capital investment and performance management. The measures that are used tend to be piecemeal and only indirectly imply human capital. A valid measure for workforce competences would enhance the management of an organisation's human capital. To be practical and acceptable to organisations the measure needs to be user-friendly and simple to use.

New Zealand surveys

What little is known about the measurement of human capital in New Zealand organisations comes from a number of surveys. There are the OECD reports (Johnston, 1998; O'Connell, 1999; OECD, 1999b), the Cranfield Project Survey (Johnson, 1999b; Johnson, 1999a), the New Zealand Employers Federation Survey (Decision Research Ltd, 1997), a survey on the attitudes of New Zealand companies towards management development training (Selvarajah, Lau, & Taormina, 2000), a national baseline survey on valuing human resources (Toulson & Dewe, 2001) and a survey of high-involvement work practices, turnover and productivity (Guthrie, 2001).

The OECD (Johnston, 1998) report three approaches to measuring human capital stock. First is educational attainment in terms of years of schooling and educational qualifications. Second is direct testing of adults to see if they have certain attributes relevant to economic activity. An example is the 'international adult literacy survey' that has three domains and five levels. The third method is differential earnings. An example of this is the labour-income-based measure that is based on earning differentials associated with levels of educational attainment. A fourth measure, which has gained international acceptance, is research and development investment. This latter is included as it is a tangible activity that helps influence the degree to which human competence can be translated into productive economic activity. However it is the first of these, educational attainment, that is primarily used in research. The OECD acknowledges that it is at best a proxy measure since it does not look at the components of human capital directly. Educational attainment is only broadly associated with economically relevant knowledge and competence. It does not take into account skills or competences gained or lost (through lack of use) after the completion of formal education.

The measures primarily used by the OECD fall far short of its own definition of human capital. Years of education, differential earnings and research and development investment are objective and readily available. They make international comparison at the macro-level possible. Only one measure, the direct testing of adults, involves any of the actual components of current workforce human capital i.e. a sample of their knowledge, skills, competences and attributes. However this measure is costly to implement, has no built-in comparability from study to study and is therefore used less frequently than the others.

OECD statistics on New Zealand's human capital are not favourable. In the 1995 OECD comparative statistics, New Zealand was lower than the OECD average on the percentage of the population between 25-64 who completed secondary school. The workforce also had lower literacy attainment in the 'international adult literacy survey' for the 16-64 age groups, particularly in the primary and manufacturing industries. However the percentage of participation in on-job training was above the average for those recorded. But there were no studies of how this on-job training impacted on worker performance (Johnston, 1998). New Zealand firms also spent less than average across OECD countries on research. But it was unclear whether this was a reflection of the predominance of small firms, a reflection of the particular industries, or whether New Zealand's productive capacity was not being effectively utilized (Department of Labour, 1999).

Between 1986 and 1999 there was a significant increase in the proportion of New Zealanders with post-school qualifications and an even more pronounced drop in the proportion with no qualifications from secondary school. Since the mid-1980s New Zealanders have been improving their capacity by participating in tertiary education at a steadily increasing rate. In 1985 there were 150,000 tertiary students and by 1998 this had increased to 214,000. In addition, by 1997, 208,000 were taking community education courses. These include some academic subjects, life skills and work-related skills (Department of Labour, 1999).

O'Connell (1999) draws on the New Zealand data from the OECD, 1994-1995 'international adult literacy survey for adults'. Those sampled were between 25 and 64

years of age and classified by economic status as 'employed', 'unemployed' or 'inactive'. In New Zealand 4,223 were surveyed with a response rate of 74 per cent. Results showed that in New Zealand most training for the employed was job related and sponsored by the employer (with the exception of firms with less than twenty employees). Forty-seven per cent of the employed participated in training in 1994-1995 for an average of 151 hours. Of this group a greater participation rate was associated with firms of twenty or more, younger people, males, tertiary qualifications, and higher literacy levels. The most training was given in descending order to technicians, managers, clerical sales people, skilled workers and machine operatives. Participation rate in training, according to type of industry, was in descending order: personal services, finance, trade, construction, manufacturing and agriculture (O'Connell, 1999). This survey provided valuable descriptive data on the participants and the duration of training but no measures of the processes and benefits of developing staff performance in New Zealand organisations.

The Cranfield Project (Johnson, 1999b; Johnson, 1999a) surveyed strategic human resource management practices in New Zealand in 1997. One thousand nine hundred organisations with at least fifty-one employees in both the public and private sectors, in all industries and in all regions of the country were approached. The response rate was thirty per cent (570 organisations) and the median employee size of the respondents was one hundred and forty.

Human resource strategies had been developed by 69 per cent of these organisations although 27 per cent of them were unwritten strategies. A third of this sample had a policy for 'high-fliers' (those targeted for success and career progression) whom one could reasonably expect to be key sources of human capital.

Human resource evaluation in these organisations tended to emphasise the cost of the human resource functions in relation to the performance of qualitative objectives. Half reported qualitative feedback and budgetary performance evaluation of the human resource department's performance, and a quarter used direct performance measures such as number of employees trained, cost or ratio of human resource function per employee and numbers recruited (Johnson, 1999b; Johnson, 1999a). There were no

measures in this survey that linked staff competence development and performance with the company's performance or a changed skill base.

There was a wide range in organisations' involvement in training and development. The proportion of employees trained ranged from one to 99 per cent, with a median of 40 per cent. Eighty-two per cent of this training was contracted out to external providers and courses: other delivery methods were internal training courses, on-the-job training, line managers and, more rarely, coaching, computer based packages, mentoring and open learning programmes. Professional and technical staff received the most training days per year - a median of five, and manual workers -a median of three days. The cost of training, for the two thirds of the respondents who knew, was a median of two and a half per cent of payroll (Johnson, 1999a; Johnson, 1999b).

There were no formal statistics on the outcomes of training and development. Most used informal feedback from the trainees and line managers, and a smaller majority written feedback immediately after the training to evaluate its effectiveness. One third had a follow-up evaluation some months later and one tenth had testing to assess learning (Johnson, 1999a; Johnson, 1999b). Those companies that collected workforce data included staff turnover, absenteeism, and age structure of employees.

The response rate of the Cranfield project survey was low (although greater than some surveys). Because only 30 per cent of the random sample responded, it is highly likely that this was a skewed sample of organisations with more policies and systems for their workforce than non-respondents. Therefore the documentation of human resource strategies in only 42 per cent of this sample suggests that this is uncommon. The absence of a link between investment in human capital through training and development and organisational outcomes is consistent with the writer's experience[10]; similarly the predominant reliance is on informal course reaction feedback and a lack of measures for human capital stocks and flows (Enderwick & Research, 1996).

The New Zealand Employers' Federation 1997 survey on training (Decision Research Ltd, 1997) sampled 851 member organisations, excluding central government and educational institutions. There was a response rate of nearly 55 per cent (467). Over a

[10] The researcher has worked in the training and development field in New Zealand for twenty years

third of respondents reported having a specific training budget, while a quarter said they spent 'a lot more' on training than they had three years earlier. The average recorded expenditure on formal training was one point three per cent of payroll, which equated to an average of $900 expenditure per employee per year. White-collar workers had a higher proportion of the training dollar than others.

The objectives of the formal training were primarily to improve employees' performance and improve product or service quality. Evidence of achieving these objectives was primarily informal feedback from the trainees and their managers or supervisors (61 per cent and 51 per cent respectively). Thirty per cent of the respondents in addition said they used formal performance improvement measures, but did not elaborate. The skills for which formal training was provided were primarily computing skills and health and safety, followed by induction and negotiation skills. A couple of companies provided English, literacy and numeracy training.

In general most organisations favoured informal training. Eighty-seven per cent of businesses said they encouraged informal training and fifty-seven per cent of these considered it more important than formal training. The comments offered by respondents tended to support the conclusion of the 1994 survey (Decision Research Ltd, 1997) that informal training was the main way people learned on the job and formal training was regarded as a cost rather than an investment with economic returns. The response rate of the 1997 survey was better than the previous one but because it was a smaller survey there were fewer respondents. Neither survey provided any data on the benefits of training and development or any measures of human capital that could be linked to changes in organisational processes or outcomes.

In 1998 a survey was conducted on the attitudes towards management development training in New Zealand organisations (Selvarajah et al., 2000). Ten thousand and sixty Auckland organisations were approached with a response rate of only 14 per cent (146). Fifty-eight per cent of the respondents had a separate personnel or human resources department and 67 per cent had staff dedicated to training. The survey found the most powerful influences on an increase in management development training expenditure to be whether the chief executive officer encouraged and supported it and whether it was a

strategic priority. Sixty nine per cent of the respondents provided formal management training, most of this being conducted off the job. Thirty-seven of the 45 companies that did not provide any management development training did not plan to introduce any. Again no data on measures of the effectiveness of management development training in terms of company processes and outcomes was forthcoming.

The OECD (1999) benchmarked knowledge based industries within and between its member nations. New Zealand's overall proportion of knowledge-based industries was 39.9 per cent, which placed it in the lowest quartile. Finance, insurance and other business services were the greatest contributors to the knowledge-based industry statistics. Compared with greater knowledge economies, we had much lower proportions of high and medium-high technology manufacturers.

In 2000 Toulson & Dewe (2001) administered a survey on valuing and measuring human resources in New Zealand organisations. A sample of 517 responded from organisations that were members of the Institute of Directors, the Human Resource Institute of New Zealand, or the Institute of Chartered Accountants. Approximately three-quarters of the sample either agreed or strongly agreed with the following statements:

> *The knowledge and skills of the organisation's people are the most important source of sustained competitive advantage. (84.7 %[11])*
>
> *Understanding the value of their people focused them on future human resource needs crucial both for setting long-term strategies and for helping them achieve them. (74.3%)*
>
> *Measurement of human resources gives management needed information about the people resources in the organisation and if the resources are there to support the business strategies. (74.3%)*

Only half believed that measuring human resources was extremely important to their organisation (47.6%). The results across the range of levels within the organisation were: human resource managers 50 per cent, chief executive officers 44.4 per cent,

[11] (Toulson & Dewe, 2001, p. 3) % = Per cent. I use this symbols in bracketed results and tables

partners 33.2 per cent and senior management 32.8 per cent. More than half (58.8 per cent) surveyed said that current human resource measures lacked precision and were not widely accepted (50.56 per cent). The lack of precision was given as one of the principal justifications for organisations not to measure human resources. Other reasons given were: human resource measures are difficult; and human resource people lack the relevant expertise.

When given a list of thirty-two possible measures that organisations may use to measure their human resources the six most frequently used measures were: accident frequency rates, client satisfaction surveys, absenteeism rates, training and education costs, cost of people and competences. However, they did not say how they measured competences or how they used the other measures.

Guthrie's (2001) survey of New Zealand organisations found firms with high involvement work practices had greater skill requirements of their employees, which was associated with greater productivity. Work practices, not competences, were found to be the basis of the association with productivity however.

If New Zealand is to increasingly become a knowledge economy to meet the demands of global competition, investment in human capital needs to be more visible and the measures manageable enough to connect to business performance.

Overseas surveys

A number of overseas studies have researched investment in human capital and its links to productivity and other measures of effectiveness. One of the earliest studies was not long after training had been introduced into mass production in North America to increase productivity. In 1944 the Lindahl disc-cutting-operation training programme resulted in trainees breaking fewer discs by their third week on the job than operators with nine months experience (Dunnette & Fleishman, 1982). Recent surveys in the United States with subjective self-reported measures of productivity change concluded that employer provided training raises productivity by 16 per cent (Bartel, 1989; Bishop, 1994).

In 1994 a USA national employer survey (NES) of 2,945 private sector businesses (representing a 64 per cent overall completion of the survey) with twenty or more employees showed there was a correlation between workers' education level and increased productivity (Black & Lynch, 1996; Lynch & Black, 1996). It found that a 10 per cent increase in the educational attainment[12] of a company's workforce resulted in an average 8.5 per cent gain in productivity for manufacturing companies and a 12.7 per cent increase for non-manufacturing companies. In comparison, a ten per cent increase in the value of the capital stock resulted in only a 3.4 per cent productivity increase.

The NES identified the impact of training on productivity. It found that the amount of training varied between industries. Eighty-one per cent of organisations provided some formal training and 57 per cent had increased the amount they provided over the past three years. Ninety-seven per cent provided informal training (National Center on the Educational Quality of the Workforce, 1995). Current training lowered productivity while past training raised current productivity. Similarly, capital equipment lowered productivity if it was less than a year old and raised it when one to four years old. In manufacturing companies, the greater the time spent in formal off-the-job training, the greater the productivity. In non-manufacturing organisations the content of the training programmes was a determinant of the degree of impact on productivity with the greatest increase in productivity arising from computer skills.

Between 1983 and 1991 the British National Institute of Economic and Social Research (NIESR) compared productivity levels and the quality and utilisation of physical and human capital inputs in manufacturing plants and service industries. Plants in Britain were matched with plants in other countries. Industries studied were engineering, clothing, wood furniture, food manufacturing and hotels. British plants were matched with their German counterparts in every industry study and with the Netherlands, France and the United States for selected studies. In all cases the bilateral comparisons pointed to important links between relative productivity performance and workforce qualification and skill levels (Daly, Hitchens, & Wagner, 1985; Mason, Prais, & Ark, 1992; Prais, 1995; Steedman & Wagner, 1987; Steedman & Wagner, 1989).

[12] A 10% increase in the average education of workers within an establishment is equivalent to slightly more than one year of schooling

One NIESR matched sample study was in the food manufacturing (biscuit making) industry. Companies in Britain, Germany, the Netherlands and France were compared for their vocational training and qualifications and productivity. German companies had the highest productivity and also the most qualified workforce and Britain the least. Plants in Germany had more value added processes, more flexible and qualified staff, more qualified managers, and were more profitable (with the exception of mass produced, simple-skill-level manufacturing where the bigger factories of Britain were more profitable). When machinery was equated, it revealed that the German workers were able to produce more complex (higher value-added) biscuits with fewer machinery breakdowns. They also made more adaptations to basic machinery to minimise the numbers of unskilled workers required (Prais, 1995).

The amount of vocational training required in the four countries differed. The German workforce had the most formal qualifications for both production workers and their managers, gained through their dual system of employment-based training and part-time attendance at vocational schools. French and Netherland workers with their characteristic pre-workforce training followed, while Britain had the least formally vocationally qualified workers (Mason, van Ark & Wagner, 1994).

An Australian study (Pearson, 1996) showed significant gains in productivity and economic competitiveness linked directly to workplace English language, literacy and numeracy inclusive training. The sample included 500 respondents in over thirty different Australian workplaces representing 13 different industries across 5 states. Five different measuring instruments were used to focus on aspects of the workplace, which the workplace interviewees themselves had identified as the areas in which effects of the training had been most keenly felt. The aspects measured were: direct cost savings, access to and acceptability of further training, participation in teams and meetings, promotion and job flexibility and the value of training.

Identified measures varied for each organisation: direct cost savings (the nature of the savings made across the workplace) included cost/benefit analysis, savings in unproductive labour costs, recovered equipment costs, jobs saved, avoided redundancy payments, savings in annual salaries, reduced maintenance costs, increase in

productivity, increase in government funding, reduced downtime and reduced wastage. A change in perceived ability to access further training was measured by the completion rates of safety and hygiene modules, and job content modules. Participation in teams and meetings was greater with the exception of the skill of minute taking. Promotion and job flexibility were greater, identified by the increase in staff moving to other jobs and tasks, and being promoted. The value of training measures reported were improved worker morale and better interpersonal communication. When language and literacy programmes were integrated with the specific agenda of their particular workplace, higher improvement ratings generally resulted (Pearson, 1996).

All of these overseas studies provided evidence of an increase in productivity associated with increased levels of human capital. Education and training were the critical difference. The European and Australian studies used vocational qualifications or knowledge, skills and competences as the stock of human capital. National Employer Survey study measures of human capital are primarily inferred from pre-employment educational qualifications. However they also identified the impact of training and development on productivity. They highlighted the lag time before new skills (as a result of training and development) led to improvements.

What the studies do not have is a common human capital measure that can represent the qualitative differences of worker performance that are associated with higher productivity. Quality of education and vocational training courses need to be considered as well as quantity. The lag effect of training and development benefits is a reminder that the long-term performance of workers needs consideration in terms of their competences and not just their productivity.

There is a pressing need for knowledge management by organisations in knowledge economies and renewed interest in competence frameworks for vocational training. An opportunity and a need exist now to create a measure of human capital that represents the substance of human capital and can be used for business planning. Competences can represent the substance of human capital. Therefore, a simple, practical measure of human capital, associated with productivity, that includes a comprehensive approach to

competences, has the potential to make a positive contribution to company systems and reports.

In the past the multitude of competences and their descriptive presentation have not been manageable enough for a succinct measure. Two processes are used in this research as an attempt to make competences manageable. The first process is the use of Nordhaug's (1993) competence typology to classify the myriad potential competences into six categories or domains applicable to all organisations. The second process is to obtain performance ratings of each competence so that a numerical representation is connected with the competence description.

Research objective:

My over-arching research objective is:

> *To develop a practical valid measure of human capital based on competences, that correlates strongly with productivity measures.*

The research objective encompasses the development of a human capital index procedure incorporating the Nordhaug[13] typology for competences profiles, and productivity measures for correlations. The following four sub-questions are addressed in the research.

> *Should the HCI include any other workforce characteristics, in addition to competences, because of their strong correlations with productivity results?*
>
> *How practical is the Nordhaug (1993) framework in accommodating all types of competences in profiles that give comprehensive coverage of job roles?*
>
> *Are any of the Nordhaug (1993) competence domains associated with superior productivity results?*
>
> *What attributes of organisation productivity measures foster a reliable, valid association with workforce competences?*

[13] Nordhaug's typology is described in detail in Chapter 2

Validity is ascribed to HCIs that incorporate competence coverage of the Nordhaug (1993) typology domains, have strong[14] correlations with the productivity measure(s) and higher correlations than tertiary education with the same productivity measures.

Terminology definitions

The definitions upon which this research is based follow:

I have defined competence broadly to encompass the various definitions for a worker's competence. (See the literature in Chapter 2 for a discussion of the various approaches to competence.)

> *A competence[15] is a cluster of related knowledge, skills, aptitudes and attitudes that are needed to effectively perform a role in an organisation.*

For each workforce role there will be a number of competences required, both technical and non-technical. In this research the typology devised by Nordhaug (1993) will be used. These are the three technical competence categories of standard technical, trade technical and unique technical; and the three non-technical competence categories of meta-cognitive, intra-organisational and industry.

Productivity, as I have used the term in this study, includes more than efficient use of resources. The traditional definition is 'goods and services produced over inputs' (Sutermeister, 1976). Productivity in this study includes the changes in organisational processes that will lead to future benefits. Research suggests that there is often a lag between the training and development for competence development and the observable changes in company measures (Lynch & Black, 1996). The following comprehensive definition of productivity can encompass both the changes in processes, the competences that lead to future benefits and the outcomes that an organisation can observe as a direct result of a change in competence:

> *The optimised utilization of all available resources, investigation into the best known resources and generating new resources, through creative thinking,*

[14](+/- .7 or more)

[15] In the literature competences may be spelt as 'competencies' as the plural of 'competency'. I have chosen to spell 'competences' as the plural of 'competence'. The 'competency' spelling has traditionally been associated with the input paradigm for competences that emanated form the United States of America and is associated with the field of psychology. 'Competence' is associated with the output paradigm of competence that is associated with training and development and is used widely in Europe.

research and development and by the use of all possible improvement techniques, methods and approaches for the production and distribution of quality goods and services.

(Ramsay, 1995, p.4)

My research uses the OECD definition of human capital:

The knowledge, skills, competencies and other attributes embodied in individuals that are relevant to economic activity.

(Johnston, 1998, p.9)

This OECD definition of human capital (Johnston, 1998) is very similar to my definition of competences. For a worker in the workplace, all of the components of the OECD definition of human capital are included in my broad definition of competence. Therefore in this study these respective definitions (above) for human capital and competences lead me to postulate that 'human capital' is synonymous with the substance[16] of competence.

Evidence of attributes, aptitudes, knowledge and skills, the substance of human capital and competences is visible in an individual's work performance in the workplace (Fletcher, 1993; Spencer Jr, 1993). Hence measures of work performance in the form of productivity measures and performance ratings for competences were used to develop a measure of human capital. Performance ratings on competences are collected in a 360-degree feedback process from the confidential rating of an individual's performance by him/herself, peers, subordinates and superiors. Individual productivity measures that covered the span of the work role competence profile were requested from their organisation.

Research parameters

Flexibility and a developmental approach were required to create a measure of human capital based on competences using the Nordhaug (1993) competence typology[17]. A number of human capital measurement development processes were required. I started the development of the measure with a pilot case study and analysis. The measure used

[16] What human capital is comprised of
[17] 'Typology' and 'framework' are used interchangeably in this thesis

borrowed concepts and processes from a number of sources (Becker, 1962; Brown, 2000; Flamholtz, 1972a; Nordhaug, 1993) that I combined with my own ideas. Review, analysis and extrapolation from the results led me to develop a less complex original process and formula for individual and group human capital in the subsequent case studies. Because development of a human capital measurement process requires repetition and verification of the process a case study approach with small numbers of individuals in each one was chosen as practical and appropriate.

There are a wide range of work roles and organisations in the case studies. They have differences in the type and quality of data available. This provides the opportunity to look at the impact upon results of a number of factors including experience, quality of productivity measures and years of tertiary education. The favourable circumstances for the process of developing an effective human capital index as a measure of human capital are identified.

The OECD measure of human capital, years of education, is currently an (if not the most-widely) accepted macro-economic human capital measure. Thus it is appropriate to compare the human capital measure developed with this established measure.

The research basis, application and analysis follow. In Chapter 2, theoretical bases of and models for human capital and associated definitions and measures are reviewed. Chapter 3 outlines the methodology for the original research including the pilot case study. Chapters 4, 5 and 6 give descriptive details of the case studies in a law firm, a bank, a not-for-profit organisation in the defence industry, a supermarket and a gaming company. A comparative analysis of these case studies is given in Chapter 7. Discussion of the results and conclusions completes the thesis.

Chapter 2

Literature Review

The scope of literature that contributes a theoretical and applied research context for this original research is so wide I have had to be selective. My thesis focus is on the substance[18] and measures of human capital, productivity measures and competences, therefore it is these aspects of the extensive literature and associated theories and models that are included.

Literature is presented according to time order and within disciplines or paradigms where possible but there is evident ambiguity in the boundaries from one area to another for the following reasons. Many of the cited references do not belong exclusively to one approach. Within any one approach there has been parallel development of alternative approaches and interdisciplinary influences may include the combination of an earlier concept with current concepts. In addition, the theoretical origins of institutionalised practices relevant to this study, such as 360-degree feedback (also referred to as multi-rater feedback), balanced scorecard and intellectual capital reporting are elusive. Hence references do not always fit an integrated time order of sequential development. The sheer range of related literature also means that the depth and comprehensiveness of fields included had to be limited to retain the focus on the context in which I developed the procedure for a human capital measure.

Although this study is based in the discipline of human resource management, the origins of the key concepts of human capital, competences and productivity lead to selective inputs from associated disciplines. This is consistent with the eclectic nature of human resource management and its central role within an organisation.

This chapter begins with a review of the relevant literature on the economic theory of human capital, productivity and work experience constructs. It then goes on to outline briefly the development of the discipline of human resource management, its associated measures of human resource accounting and return of investment. Theoretical bases of

[18] What human capital is comprised of

strategic human resource management, the resource-based view of the firm and cybernetic theory are examined. The alternative approaches to competences are described followed by the two key business-planning approaches: balanced scorecard and intellectual capital reporting and associated human capital measures. See Figure 2.1 following for an outline of the literature review.

Figure 2.1

Outline of the literature review topics

Economic theory of human capital			
Productivity	What it is		
	Criteria for an effective measure		
Work experience	Quantitative & qualitative measures		
Development of human resource management			
	Key measures	Human resource accounting (Flamholtz)	
		Utility Analysis	
		Return on investment	
Theoretical basis of strategic human resource management			
	Resource-based view of the firm		Watson & Wyatt HCI
			Deloitte & Touche HC ROI
			Davenport ROI_w
	Cybernetic systems theory		Wright & McMahan
			Human performance technology
Competences	Types	Management science	
		Differential psychology	
		Strategic human resource management	
		Educational and behavioural	
		Training and development	
	Frameworks/models		
	Typologies	Nordhaug	
Business reporting for the 21st century	Balanced scorecard		
	Intellectual capital		
	Browns HCI		
Conclusion			

The earliest reference to the concept of human capital is the increased monetary value, hence greater wages, of workers with more training and superior skills. In 1776 Adam Smith stated in, *The wealth of nations*:

> *It is reasonable therefore that in Europe the wages of mechanics, artificers and manufacturers, should be somewhat higher than those of common labourers. They are so accordingly, and their superior gains make them in*

most places considered as a superior rank of people. Their superiority, however, is generally very small. Their employment is indeed more steady and uniform, and their superiority of earnings, taking up the whole year, may be somewhat greater. It seems evident, however, to be no greater than what is sufficient to compensate the superior expense of their education.

(Smith, 1776, p 204-205)

Smith also proposes a direct link between the productivity of a company and the human capital investment of skills and knowledge when he observes:

The improved dexterity of a workman may be considered in the same light as a machine or instrument of trade which facilitates and abridges labour, and which though it costs a certain expense, repays that expense with a profit.

(Smith, 1776, p 377)

Since Smith, the intangible aspect of the workforce's contribution to economic activity has engaged economics, accountancy, management science, human resource management, training and development, organisational development, and industrial psychology.

Economic theory of human capital

The contribution of economics to understanding the differential value of people in the workforce has been significant. Human capital was first and foremost an economic term that was subsequently adopted by other disciplines. In the late nineteen-fifties and early nineteen-sixties the economists, Shultz (1961; 1963), Becker (1962; 1964) and Mincer (1958; 1962), led the way for the inclusion of human capital as an identifiable economic consideration. Hartog (1999, p37) describes them as having 'kissed awake' the concept that had lain dormant for the two centuries since Adam Smith.

Schultz (1961) suggests that skills and knowledge are a form of capital (termed human capital) and increasing investment in human capital is the most distinctive feature of the economic system. Knowledge and skills are primarily products of investment. Combined with other human investment, they account for the productive superiority of the technically advanced countries. Human capital is measured in terms of investment and return. Schultz argues more educated and more skilled workers have a steeper

curve of wages with age, brought about by the initial longer period of investment in education and training, and subsequent higher salaries for the more qualified. Human capital concepts explain the relationship between training costs and benefits and therefore the increase in investment in human capital in the form of training by organisations during the twentieth century.

Becker develops and extends Shultz's concepts into a theory of human capital (Becker, 1962; 1964; 1993; 1993a; Febrero & Schwartz, 1995). His general theory of human capital includes firms as well as individuals. Becker theorises that investments in human resources result in a good part from the returns expected and both individuals and organisations decide on these investments by weighing the benefits and the costs. Benefits for an individual encompass cultural and non-monetary gains along with improvement in earnings and occupation, whereas costs predominantly depend on the foregone value of the time spent on these investments. Similarly firms decide on what human capital they will invest in by linking human capital investment to productivity improvement: so marginal profits equal marginal expenditure (wages). The single most important determinant of the amount invested in human capital is the profitability or rate of return. Becker equates this profitability/rate of return with observed earnings. Within this framework some people earn more than others simply because they invest more in themselves and are therefore more productive. More able people tend to invest more in themselves i.e. they educate themselves more, whether through formal education, or on or off-the-job training.

Becker (1964) distinguishes between specific and general training to explain the differences in firm and employee investment and return. Specific training is training that increases productivity in the firms providing it. Completely specific training has no transportability. If an employee leaves and goes to another firm it has no positive impact on their productivity in the new job. Examples are induction, recruitment costs, and specific skills needed in the firm. A firm pays for specific training costs because it gains the return on investment, (with labour turnover and the level of the wages as employees train, taken into account). General training is training that increases the employee's productivity in the firm, but this benefit is transportable. If the employee changes employer the general training will also benefit their new firm. Therefore

Becker argues an employer does not pay general training costs because they will not get the return. Hence the employees bear the cost of general training and profit from the return. For example, the individual pays for general training by accepting lower wages and late entry into paid employment. They are older when they begin to earn because of their greater number of years in general education, completing secondary and tertiary qualifications.

Human capital theory explains the typical employee concave age/earning profile (Becker, 1964). Incomes tend to be low at the beginning of labour force participation, which is the major investment period. Earnings then rise steadily with age with a peak reached in the forty-five to fifty-four age group, and then a decline. The theoretical explanation is that earnings are depressed artificially during the investment period, because training costs are written off, therefore they rise rapidly, immediately afterwards. Younger people have a greater incentive to invest because they can collect the return over more years. A slight drop of the wage curve when older, associated with a reduction in the amount of training, is conversely related to less time for a return on investment. The average income at each age group is strongly related to education and training. Actual return varies around the expected return because of the uncertainty about factors such as the length of life, people's uncertainty about their ability and numerous unpredictable events.

Mincer (1974) extended Becker's regression analysis that relates earnings to years of schooling. His mathematical model includes income distribution and human capital investment including on-job-training and experience (years after finishing school). This has subsequently been used in research in many countries (Johnston, 1998; Miller, 1996a; OECD, 1997).

Many researchers (Asplund, 1994; Blaug, 1976; Chapman, 1993; Katz & Ziderman, 1990) dispute aspects of Becker's theory of human capital. Human capital cannot be measured and explained entirely in terms of investment and return. The theory under-emphasises the role of 'costless learning by doing' as a simple function of time (Blaug, 1976). Benefits of informal training are excluded as only formal skills are considered and the different types of skills required in a job role are ignored (Chapman, 1993). In

addition, it doesn't take any impact of workplace systems into account (Chapman, 1993). Moreover training is not always directly linked with productivity, because it may be used as a screening process (Chapman, 1993; Koning, 1994) or a form of (tax free) reward intended to retain present staff or recruit new staff (Koning, 1994). Koning (1994) found the effect of training on productivity in his survey of companies was minimal; on average small companies grew faster than larger, but showed much lower participation rates in company training. Strober (1990) reminds us of the real power of managers to influence the performance and earnings of staff independently of the economics of supply and demand. Human capital theory also plays down the influence of pre-school factors on lifetime earnings. Advantaged backgrounds are known to lead to best use of educational benefits (Fagerlind, 1975).

The investment and benefit differences for general and specific training are also debated. Blaug (1976) queries Becker's distinction between general and specific training on the basis that it is difficult to clearly separate training that is exclusively focused on increasing productivity within the firm from training with a more general application. Katz and Ziderman (1990), Asplund (1994) and Koning (1994) say Becker's prediction for the financing of specific and general training is incorrect. A firm may find it feasible to finance part or all of a worker's general training. The Agency for Strategy Labour-Market Research survey of 2,000 Netherland companies and agencies found that companies' training is primarily general and financed by them in whole or in part (Koning, 1994). Smith and Hayton's (1999) national survey of 1,760 Australian enterprises and 42 case studies from five industry sectors found employers invested in general training as much as specific and the two types of training were usually intertwined. They argue investment in training is driven by workplace change, new technology and quality assurance and moderated by enterprise size, industry training, occupational structure, industrial relations, management attitudes and government training policy.

Mailath and Postlewaite (1990), Chillemi and Gui (1997), and Aoki (1984) point out another limitation of human capital theory. They say the value of team contributions in organisations is not accounted for in human capital theory. Aoki (1984) for example, cautions that the concept of human capital is excessively individualistic. It is unable to

capture the skills and knowledge that are embodied within a team of employees and formed within the organisational context.

In spite of all the limitations above, this economic theory of human capital continues to provide the conceptual framework for much research into the measurement and benefits of investing in training and development, (Black & Lynch, 1996; Greenhalgh & Stewart, 1987; Johnston, 1998; Mason, van Ark & Wagner, 1994; Snell, Youndt, & Wright, 1996) and career management (Parker & Inkson, 1999). On the one hand the economists' theory of human capital has in its broadest sense been an excellent basis for micro-level and macro-level acknowledgement of the value of competent people. But conversely, as literature cited above has illustrated, many of its concepts are inadequate in predicting or explaining investment in and the value of the workforce in companies today.

The human capital measure rate-of-return ignores the many other variables involved in the realisation of human capital. At a macro-level of analysis, countries with a more highly educated workforce are richer. However at an organisational and individual level the most highly educated people do not always make the most money for themselves and their organisations. Lifelong learning is a necessity in a knowledge economy where change and continuous improvement are a reality. People learn formally and informally throughout their working lives. There is no evidence that more costly formal learning opportunities when young, guarantee greater remuneration throughout the rest of an individual's working life. Therefore, focusing primarily on the pre-employment secondary and tertiary education and training budgets gives an inaccurate perception of human capital and of the relationship between wages, education and training, and workforce performance and age.

Productivity

Productivity is a key construct in a review of the human capital literature and in the development of the human capital measurement procedure in this study. It is present in the economic theory of human capital, competences, human resource management, human resource accounting and the business reporting models and measures of balanced scorecard and intellectual capital. In this research I use productivity measures to

differentiate between two groups of competences and to validate the human capital measure developed. The literature on productivity measures also provides criteria against which my human capital measure can be judged.

Productivity changes are commonly cited as evidence of any change in human capital. Inclusion of productivity measures is appropriate in this research because they can be organisation and role specific and comprehensive enough to encapsulate individual work performance. So it seems appropriate at this point to clarify what is meant by productivity, the interpretation appropriate for this research and considerations for effective measurement.

The use of productivity as a measure of organisational effectiveness is extensive. A common meaning is the logical, unsophisticated relationship of the inputs to the outputs. However, the input/output variables and measures are frequently not defined, making resource relationships and comparative studies difficult to interpret.

Tuttle's (1983) description of different perspectives of productivity explains the different types of productivity measures, analyses and results. Economists and accountants view productivity as the relationship of inputs to outputs. Engineers conceptualise productivity in terms of the efficiency of a machine, the outputs and inputs being expressed in real (physical volume) terms. Accountants concern themselves with the financial performance of the organisation expressed in ratios. Industrial and organisational psychologists focus on the dimensions of organisational effectiveness, profit, quality, absenteeism, satisfaction, motivation, morale, control, conflict/cohesion, goal consensus, flexibility/adaptation, role and norm congruence, managerial skills, information management and communication, readiness, external forces, stability, values and the like. Finally, for a manager, productivity is a number of situations and functions, such as quality and quantity, output per man-hour, efficiency, employee absenteeism and turnover, customer satisfaction, loyalty, morale, job satisfaction, corporate growth, competitiveness, profit motivation, government policies and incentives, financial assistance, education and training and the like. The definition of productivity for this research[19] is congruent with the manager's perspective but other

[19] See Chapter 1 terminology definitions

human capital measures reviewed and the factors in the case studies considered in the applied research also draw on other perspectives.

A number of researchers qualify the components of productivity measures. Productivity always measures the output of an operation against the resources needed to operate, and is thus a measure of the efficiency with which these resources are utilised. A generic productivity ratio is goods and services produced (outputs) over inputs. Sutermeister (1976) adds, 'quality considered', to the ratio. Brinkerhoff (1990) elaborates on this by defining outputs as the number of goods and services produced, that are useable, saleable and of acceptable quality.

Productivity measures need credibility and reliability in order to be effective tools for workforce management and for the development of my human capital measure process. Dunette (1982) outlines a comprehensive list of considerations for the measurement of productivity, several of which are qualified by Brinkerhoff and Dressler (1990). Productivity measurement by its nature is an evaluation of worker performance. It will meet with resistance, unless the worker perceives the measure as valid and even then care must be taken in how the data is used. In order to be a motivator, the workers need to perceive that increasing their productivity will not penalise them. Productivity data is effective as feedback on performance therefore ideally the measurement of productivity is a diagnostic tool for changing productivity. Furthermore valid productivity measures collect data that is related to phenomena that can be controlled. So a stable system of measurement is required, that clearly identifies and assesses the outputs and their relationship to inputs (Brinkerhoff & Dressler, 1990). Finally, the methodology for any productivity measurement needs to specify the duration, frequency and depth of measurement and data collection (e.g. system outputs, worker self-reports, observation). Productivity measures that meet these stringent standards are difficult to develop at best, as the work context is complex and control of all the variables that impact on performance impossible. The credibility and reliability of productivity measures used in this research are an issue.

The organisational context also impacts on the suitability of productivity measures. In this case study research to develop a practical simple human capital measure it needs

consideration. Dunette (1982) and Brinkerhoff (1990) advocate that to be effective productivity measures also need the following criteria. First, they should have the commitment of the organisation and suit the purpose and mission. Qualitative and quantitative measures that are integrated with the organisational mission and strategic goals should both be included to assess outputs and services. Second, they must be feasible, achievable, and acceptable, so management will provide the resources to collect them. Third, because there is a tendency for the measuring process to influence what it measures, available data is far better than data manufactured for purposes of measurement. Existing data is also cheaper and less subject to misrepresentation. Fourth, value for money should be a consideration, hence productivity measures should be quantified in terms of quality, quantity, time and cost. Finally, productivity measures need to be adaptable and flexible enough to cope with changes in the organisational environment and in management needs.

Brinkerhoff and Dressler (1990) introduce identification and classification of the measurement scope into the construct of productivity. They emphasise the importance of identifying the productivity measure's scope or level of analysis. Measures can be either total (i.e. describe productivity at the organisational level), or partial, (i.e. the ratio denominator contains less than all the resources to create the output). A single measure or a family of measures can represent productivity goals. Intermediate measures that are not whole year, or are partial measures, can provide valuable information for decision making in a context where trade offs are common. However, they caution that there is a danger of sub-optimisation if the scope of analysis is not identified, with the result that a process that does not have a significant impact on the bottom line is measured. These productivity constructs of total, partial, family and intermediate measures provide parameters for comparing the very different organisation-specific productivity measures in the case studies.

Sutermeister (1976) has an organisational psychologist's perspective of productivity and directs attention to the many variables that impact on productivity. His 33 different variables affecting job productivity include technological development, raw material, job layout, methods, motivation, ability, employees' job performance, physical conditions, social conditions, individuals' needs - including physiological, social and

egoistic, skill, knowledge, time and changing values of society. He argues the human contribution to productivity is ability times motivation. Ability results from knowledge and skill. Knowledge is affected by education, experience, training and interest, and skill is affected by aptitude and personality as well as by education, experience, training and interest. Motivation results for the interacting forces in physical and social conditions of the job, and the individual's needs.

In this research it is assumed that ability and motivation and the many variables outlined by Sutermeister are encapsulated in competence performance that is linked to productivity. However case notes attempted to capture any other factors that came to my attention.

Productivity measures, however, are limited as a business planning tool, because they measure realised human capital and are inherently historical accounting. They cannot assess current and future value. Speakers (Tucker & Clark, 1999) at the 1999 Edinburgh conference on productivity showed awareness of the limitations of only focusing on traditional productivity measures, when they emphasised the need to include the soft data of businesses. Michael Porter, as keynote speaker, challenged measures to go beyond increased productivity to innovation. In this research competences include data on future orientated capabilities such as innovation that are undetected in productivity measures like key performance indicators.

Kearney's seven criteria for effective productivity measures (Kearney (1978) as cited in Ramsay, 1995)[20] are used to review the effectiveness of the productivity measures and human capital measure developed in this research. First, they must be valid and therefore accurately reflect changes in real productivity. Second, they should encompass a wide coverage of the input resources, because the more completely the output accounts for all uses of an input resource, the more accurately input can be tracked. Third, in order for the measures to be compared across time, they must be reduced to a common denominator. Fourth, all significant inputs should be included in the measure for completeness. Fifth, the measure should be useful in that it could be used towards some effective action. Sixth, it should have compatibility, with the data

[20] An extensive search could not locate the original reference with the reference details provided by Ramsay. However the endorsed criteria make a useful contribution to this research and are therefore included.

for the measure available from existing sources and management information systems whenever possible. Finally, it should be cost effective in that the benefits gained from the measure must exceed the costs associated with collecting the data.

Hauser (1998) identifies pitfalls that lead to counter productive statistics and considerations to get them right. Pitfalls include measures with a short-term, or non-strategic organisational goal focus and measuring what is easy, inexpensive and precise, rather than what is important. He asserts that vaguely right measures are better than precisely wrong measures. Therefore the design of effective measures should involve understanding the job, its inter-relationships and linkages, testing managers and employees' reactions to the measure and testing any correlations with the measure.

Productivity measures play a key role in this research into developing a procedure for a human capital measure. Clarification of the construct of productivity and the features of effective measures provide a reference point for later discussion of case study productivity measures and subsequent human capital measure results.

Work experience

The construct of work experience requires clarification so that the relationship between work experience and productivity can be considered in this study. Work experience is a multi-dimensional, multi-level and temporally dynamic construct (Tesluk & Jacobs, 1998). Traditionally, it is measured in terms of tenure (defined as years in the job), years in the organisation, years in a position or the number of times an individual has completed a certain task or operation (Quinones, Ford, & Teachout, 1995).

Tesluk and Jacobs (1998) built on Quinones et al's (1995) framework of work experience and included the following propositions. First, differential experience results from qualitative aspects of work, such as the type of assignment or its complexity. Second, interactive aspects of density and timing lead to differential experience. Third, individual differences, human resource management practices and feedback and reflection influence work experience. Fourth, initially contextual factors exert a stronger influence over accrued work experience than individual factors. Fifth, quantitative measures of work experience are more strongly related to performance on consistent tasks, while qualitative measures are more strongly related to performance on

more inconsistent tasks. Also, as job complexity increases, the quantitative aspects of experience are less predictive for performance and need to be supplemented by the qualitative and interaction components of the experience model. Finally, as a function of individual and contextual factors, on-the-job experience accrued over time contributes to the development of pragmatic intelligence (defined as procedural work-related knowledge and context-bound problem-solving abilities). This compensates for age-related declines in fluid abilities (e.g. information processing and fine co-ordination).

A number of studies looked at the impact of experience on work performance and hence productivity. Some studies found evidence of a positive impact of years of experience on job knowledge early in a career and in jobs of low to medium complexity, (McDaniel, Schmidt, & Hunter, 1988; Mc Enrue 1988; Schmidt, Hunter, & Outerbridge, 1986). Other studies found no relationship between years of experience and performance (Tubbs, 1992) or only a minor relationship (Morrison & Brantner, 1992).

Doeving (2000) identifies a significant relationship between years of experience and increases in competences. Non-technical, intra-organisational competence increases until a plateau that occurs between six to ten years in the job is reached. This is followed by a decrease. Van Scotter et al (2000) similarly found that non-technical aspects of performance, what they called 'contextual performance', increase with tenure. However, there was no trend of diminishing returns with years of experience.

Ericsson and Lehman (1996) argue the level of expertise is greater with deliberate practice than with just a greater number of years of experience. In complex jobs where the highest levels of human performance are required, for example, medical diagnosis, expertise can only be attained after around 10 years of extended, regular, amounts of deliberate practice activities. It is the deliberate practice and not years of experience on its own that sets up the physical and neurological processes that constitute expertise. This notion of expertise is similar to Tesluk et al's (1998) concept of pragmatic intelligence.

Work experience in this research is primarily reported in quantitative measures such as years of experience and the number of different jobs in the organisation. It is these aspects of experience that are most accessible. However a case study approach also enables the collection of some contextual anecdotal data that touches on the qualitative aspects of experience. Furthermore, some of the qualitative and interactive dimensions of experience associated with expertise may be captured within a competence-based measure of human capital.

The development of human resource management

Human resource management is the management of people in an organisation. As organisations are established to meet goals, human resource management is about managing people, whether paid or voluntary, to meet those goals. Productivity goals are outputs and the human resources or people and associated systems of management are inputs. Human resource management has throughout its history made many attempts to find and use measures that are effective at identifying and increasing the value of the people in an organisation and measuring this input of resources in relation to output, both retrospectively and as a prediction of future service. Thus a brief history of human resource management is appropriate to give the context of these measures.

The terms for people in the workforce have changed over time, as have the understanding of the components of workforce performance. This study attempts to encapsulate what it is that people in an organisation contribute to its success. Terms and phrases for this contribution - human capital[21], human resources, and value of the workforce or employees or personnel are all used interchangeably in this research.

Measures used to put a monetary value on the contribution of human capital, include productivity measures, human resource accounting (HRA), utility analysis and return on investment calculations for training and development, as well as a number of other statistical measures for monitoring costs and benefits.

The following brief sketch of the history of human resource management suggests linear development and simultaneous mass adoption of each stage of advancement. However,

[21] Defined in Chapter 1 - terminology definitions

this was not the case in reality - uptake of personnel and human resource activities and strategies varied tremendously in timing and extent.

The industrial revolution in the mid eighteenth century was the source of personnel management. Business profits versus employee welfare became a major issue. Taylor's scientific management theory and applications focused on improving productivity and efficiency through better management of the way people work. Job design, training and development, labour relations, quality standards for appraisal, and the associated administrative records are all an integral part of scientific management. The techniques and methods used in personnel management developed but the value of people was measured in terms of productivity improvement.

By the 1960s there was a more competitive business environment with increasing international competition. A more flexible, skilled, self-reliant workforce was needed to provide a more specialised product at a premium price. Two key influences at this time were systems theory and Drucker's (1955) concept of visionary, goal-directed leadership as the key to maximising human resources. Systems theory provides a construct for managers in all parts of an organisation to appreciate how its various parts and functions related to each other (McGregor, 1960). Human resources were seen as too important not to be measured and this spawned the many models of human resource management reviewed later in the chapter.

By the 1980s there was a crisis in American management because of their failure in the face of Japanese competition, particularly in the automobile industry. Organisational culture was seen as the key to restoring competitiveness (Hendry & Pettigrew, 1990). Much of the success of excellent companies was attributed to powerful cultures, and mutual employer/employee values (Peters & Waterman, 1982). This renewed emphasis on human resources was associated with the term 'human resource management' (HRM) (Beer, Spector, Lawrence, Mills, & Walton, 1984; Dessler, 2000) to differentiate the new strategic, systematic focus to managing the organisation's workforce from the traditional personnel management approach. The latter now being regarded as:

a collection of incidental techniques without much internal cohesion... a hodge podge

(Drucker, 1968, p.243)

Because of the emphasis on culture, common measurements of human resources are cultural surveys and environmental scanning along with an emphasis on efficiency and effectiveness (Baird & Meshoulam, 1988a; Baird & Meshoulam, 1988b). However human capital is not directly measured.

Although organisations changed the name from personnel management to human resource management there were varying degrees of accompanying systematic, organisational integration in approach to people management. Some researchers suggest that it was purely a change in terminology (Kamoche, 1991; Scarpello & Ledvinka, 1988), others that it was a significant difference in approach (Armstrong, 1987; Torrington, Mackay, & Hall, 1985).

In the past ten years the rate of change has increased in a global knowledge economy. Strategic management is seen by some business leaders as the key to success. Strategic management emphasises the importance of innovation, flexibility and strategic planning. The central idea underlying strategic management is that firms must adjust their capabilities, i.e. their resources and skills, to a constantly changing environment; therefore, they need to make strategic choices (Teece, 1985). All companies must make choices but strategic choices are those that are critical to the successful attainment of the organisation's economic goals and continued survival. These choices involve investing in physical and human resources. Although technology can give an initial competitive advantage, the trend is for technological leadership in an industry to have an increasingly shorter durability. This puts more emphasis on the human resources and their strategically aligned competences, innovation and flexibility in an organisation.

Strategic human resource management is described below.

SHRM addresses broad organisational concerns relating to changes in structure and culture, organisational effectiveness and performance, matching resources to future requirements and the management of change. Overall, it will consider any major 'people' issues, which affect or are affected by the

strategic plan of the organisation (Armstrong & Long, 1994). Thus it is defined as: the pattern of planned human resource deployments and activities intended to enable an organisation to achieve its goals.

(Wright & McMahan, 1992)

The measures associated with strategic human resource management are described later in this chapter in the discussion of the theoretical bases for strategic human resource management and twenty-first century business planning.

Productivity measures were used to put a value on the workforce throughout the evolution of human resource management. Examination of the more sophisticated measures of determining human capital that were developed and adopted in varying degrees at different stages of human resource management follow.

Human resource accounting (HRA)

It was in 1964 that Hermanson (Applebaum & Hood, 1993) first expressed concern that accountancy, by not including the value of people in the balance sheet, did not give a valid picture of the business status of an organisation. Statistical measures and monetary values for the workforce were seen as integral to achieving controlled growth. Human resource accounting has spawned many measures of human capital.

The American Accounting Association's Committee on Human Resource Accounting defined human resource accounting as:

The process of identifying and measuring data about human resources and communicating this information to interested parties.

(Flamholtz, 1985, px.)

In essence human resource accounting includes an organisation's employees among its assets by measuring both their cost and value.

Three disciplines contribute to human resource accounting. The central concept of 'human value' is derived from the general economic theory of human capital. Like all resources, people possess value because they are capable of rendering future services. The second discipline, traditional accounting, puts a monetary measure on this value on the basis that money is the common denominator of business decisions. Accounting

capitalises and amortises[22] historical costs to match costs and incomes better. Finally, the third discipline, social psychology, through psychological data gives insight into hidden costs, productivity and profitability (Gleeson, 1975).

Human resource accounting has a number of functional objectives. The first of these is to furnish cost/value information for making management decisions about acquiring, allocating, developing and maintaining human resources in order to attain cost-effective organisational objectives. Secondly, it enabled managers to effectively monitor the use of human resources and to determine asset control (i.e., whether assets are conserved, depleted, or appreciated). Furthermore, it aids the development of management principles by clarifying the financial consequences of various practices (Work in America Institute, 1978).

Hermanson (Applebaum & Hood, 1993) proposes two techniques for the monetary valuation of human resources: the 'un-purchased goodwill method', and the 'adjusted present value method'. For the former, any excess above normal expected earnings for an industry is allocated to human resource valuation. The later is calculated from weighted averages of the last five years' performance, the expected wage payments over the next five years and adjusted by a performance efficiency ratio factor. However, both these techniques are limited by their subjectivity and imprecision of calculation (Baker, 1974; Flamholtz, 1974).

Likert (1969) developed the concept of human resource accounting as a behavioural scientific approach to assess group resource value. He argues this reveals the organisation's structure, principles, and methods of leadership and management, which result in optimal organisational performance. Estimates are three to five times the annual payroll of a firm to cover the cost of rebuilding a human organisation to the performance capabilities of the present staff. Two dimensions to human asset accounting are identified: the current value of the human organisation and customer goodwill. Periodic measurement of the key causal, intervening and end result variables provides a value for the human assets (Sutermeister, 1976). For example, his social-psychological human valuation model results show a significant correlation between the

[22] Amortises= extinguishes value by periodic writing off of indebtedness

extent to which subordinates see managers as behaving supportively and lower performance costs. Robinson's (1974) 'constructive participant involvement' (CPI) and Myers and Flowers' (1974) model has a similar purpose to that of Likert; neither of these measures put a direct value on employees however.

Flamholtz (1971; 1972a; 1972b; 1974; 1975; 1981; 1985; 1986; 1987; 1989; 1996; 1998) was the leading researcher in HRA in the 1970s and 1980s and developed and publicised various models of human resource accounting. He argues that the concepts of human capital and human resource value will stimulate a new way of thinking about the management of people in organisations. Flamholtz's models for calculating the value of people in the workforce are a significant reference point for planning the degree of complexity, the variables and the individual focus of the human capital measure in this research.

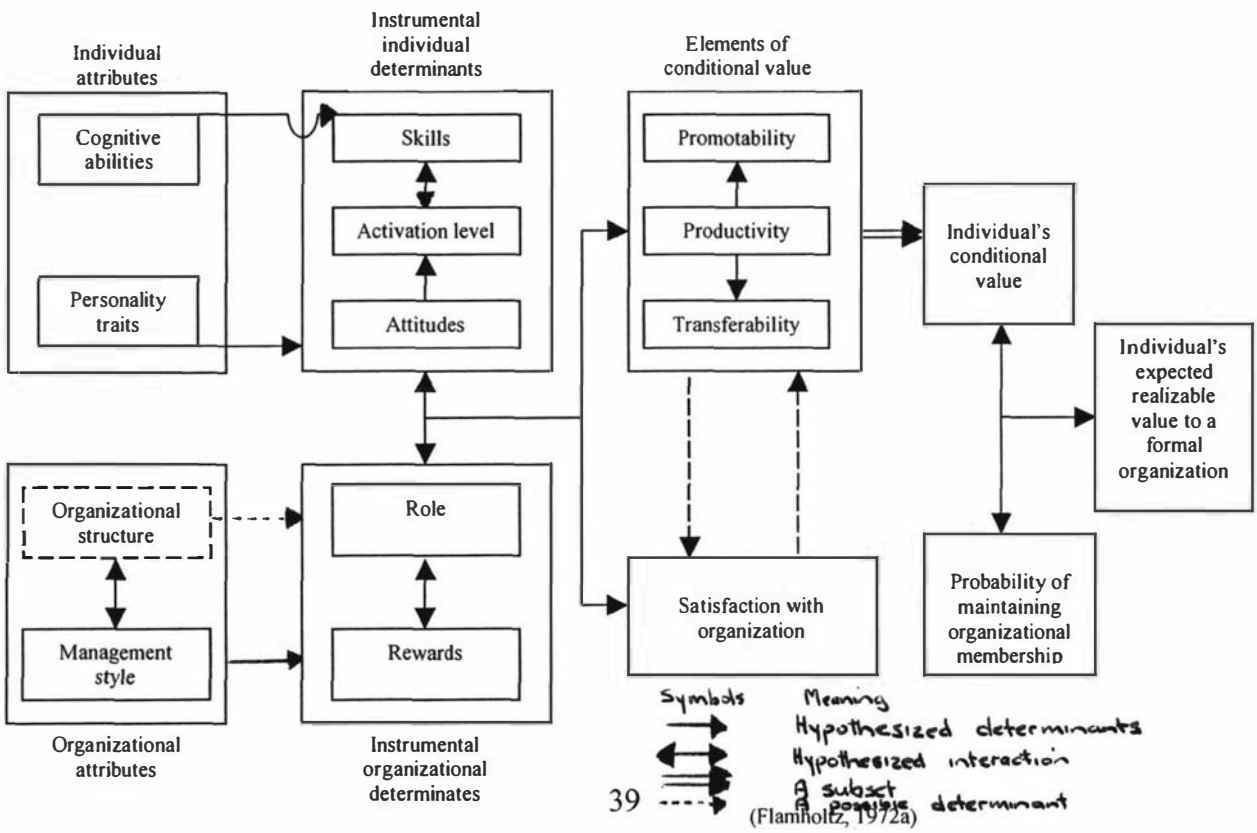
Whether the human resources can be treated as an asset has been a pivotal debate among accountants. Flamholtz (1974) lists three criteria for consideration of them as an asset, all of which, he says, the employees in a company meet. These criteria are that an asset must possess future service potential, be measurable in monetary terms, and be subject to the ownership or control of the accounting entity. It is this third criterion, the legalistic nature of ownership or control, that is controversial. Flamholtz maintains asset control will suffice. Robinson (1975) considers it more realistic to regard the employer as having a stewardship. More recently, Davenport (1999) controversially suggests employees are the owners and controllers of their own assets of human capital that they lease to the employer.

Flamholtz's (1974) human resources value model addresses some of the concerns expressed by the critics of Becker's human capital theory. Contextual, social and psychological variables are included in the determination of the future economic value of human capital. Organisational factors lead to differential application of an individual's skills to create a human capital measure linked to productivity. Non-monetary measures of human resource value include attitude measurements, skill inventories and performance evaluations.

In Flamholtz's model, human resource value is the value that people possess because they are capable of rendering future service. Realisable value and the conditional value are distinctive. Individual and organisational determinants and elements result in the conditional value of an individual to an organisation. Conditional value considered in conjunction with the probability of the employee remaining in the organisation gives the realisable value. Probability of an individual staying with a firm depends upon satisfaction of both the individual and the organisation.

After field-testing his model Flamholtz revised and expanded it to include four additional determinants that influence an individual's perceived organisational value. These four determinants are attitudes, abilities, traits and the individual's manager. The individual brings to the organisation certain attributes inherent in their personality, traits (for example, the need for affiliation), and cognitive abilities (for example, intelligence). These attributes are the basis of the individual's attitudes, activation level, and skills. See Figure 2.2 for this revised model of the determinants of an individual's worth to a formal organisation.

Figure 2.2
Flamholtz's revised model of the determinants of an individual's worth to a formal organisation



(Flamholtz, 1972a)

Flamholtz's model is criticised for its focus on individual value on the basis that an organisation needs to know the costs and value of the total workforce for decision-making. Flamholtz defends his reasons for selecting the individual as the measurement unit, by asserting that measures of individual value can, in principle, be aggregated in order to value larger units of people. He maintains that individuals are a central focus for much operational decision-making (Flamholtz, 1971). From an economic perspective, individual values aggregated to the level of the firm's workforce level do not produce a measure that can be used for macro-level inter-organisational and inter-country comparison. However, from a day-to-day management and human resource management perspective, the individual is the fundamental unit of the organisation or the teams in the organisation. Implementation of any intra-organisational activities and strategies is reliant upon individuals.

Flamholtz's models are not widely accepted in practice, yet they contain the components of individual human capital, with the determinants of current as well as predictive value. Fitz-enz (2000) criticises the models as too complicated and based on 'maybes'. For example, the uncertainty in the length of time an employee will stay in a firm has a major impact on the reliability of the calculated individual's value. What Fitz-enz says is needed instead of the probable individual's value of Flamholtz's model, is factual data on human capital. Furthermore, senior management in an organisation are still more familiar with using organisational measures that can be benchmarked against other organisations, than delving into the minutiae of the components of human performance. In addition, at the time that Flamholtz's model was first proposed, computers with the software to chunk up multiple variables in formula calculation were not commonly available. However, I like the comprehensive representation of what human capital is comprised in Flamholtz's model of human value because of its construct validity. It appears to represent the substance of human capital and the influences on individuals' performance. I do not think his human resource value calculations are practical or simple enough for acceptance.

There are three different methods for measuring human resource costs: original or historical cost, replacement cost and opportunity cost. Original or historical cost is calculated when all the costs associated with preparing an employee for providing services are capitalised. The costs incurred in training, hiring, recruiting and so forth, are treated as assets and expenses because human resources perform the services. A firm's total value of human resources is represented by the accumulation of all such original costs.

Flamholtz developed a model for measuring original human resource costs based on the two cost components of acquisition (recruitment, promotion or selection) and learning. The learning cost is the differential cost incurred until an individual achieves the level of productivity normally expected in a given position (Flamholtz, 1974). This has the advantage of objectivity, but the disadvantage of narrowing down the elements included by considering cost to be a full measure of the value of an employee, which of course it is not.

Flamholtz also developed a model for measuring human resource replacement costs. In addition to the cost components of acquisition and learning in the previous model this includes separation costs. Separation costs are the costs incurred as a result of the position holder's departure. This model is criticised for its subjectivity (Baker, 1974; Likert & Bowers, 1969) and the assumption that a replacement of similar value will always be available (Hekimian & Jones, 1967). There are inadequacies in the scope and predictability of the replacement cost value. These inaccuracies are evident if the replacement worker is more or less skilled and therefore requires more or less training to do the job. Therefore, this measure of individual human value, although in use, also had its limitations in representing the worth of human capital on its own.

Hekimian and Jones (1967) use opportunity costs to measure human resources. This was based on the assumption that assets have value only when there is an alternative use for them. Human resources' value is determined by the amount the needed human resources can earn if used in an alternative function. This is also a very subjective measure. It is not helpful in assessing the value of human capital in a firm that has

unique processes, yet these same processes could be the key to the firm's competitive advantage.

Flamholtz (1971) went on to develop a monetary method for individual human resource valuation entitled, 'stochastic[23] rewards valuation model'. It does not contain all of the earlier identified elements affecting an individual's organisational value but is easier to compute. The model is based on the assumption that employees are engaged in a probabilistic movement among organisational service states over time. Employee value is derived from the expected services they would perform in each service state and the associated rewards (which are the benefits the employee derives from the system), for example, salary. Thus the measure of an individual's monetary organisational value requires an estimate of the following: the time period the person is expected to render services, identification of the service states, a measure of the value derived by the organisation if the individual occupies these states for specified time periods and an estimate of the probability that a person will occupy each state at specified future times.

Flamholtz and Lundy (1975) applied this stochastic model at Lester Witte and Company where the information was used for individual career planning, human resources planning, and an evaluation of management's development of the firm's human resources. This model takes a company perspective in career path planning. It considers the company's investment in the individual in relation to the subsequent return. However, it is limited by uncontrolled variables and assumptions about a career path. It does not identify what individuals have to offer that should be encouraged.

Flamholtz's (1974) framework of human resource accounting systems includes a wide range of measures, not just the ones reviewed above. The five types of human resource accounting systems are defined by their comprehensiveness, which increases in relation to the different capabilities and needs of different business organisations (See Table 2.1). The greater the human capital intensity, in other words, the greater the number of highly trained or educated personnel occupying similar positions, the more comprehensive the system should be. An organisation's size and structure, existing human resource accounting capability and willingness to invest in a resource accounting

[23] Stochastic = probabilistic

system, also influence the selection of a system. These stages of human resource accounting illustrate the appropriateness of considering the features of the organisation when determining human capital measures and they also reflect the history of measurement of human resource management up until strategic human resource management. They position many of the measures currently in use, albeit within a human resource accounting framework.

Table 2.1

Capability provided by human resource accounting systems 1 – 5

Human Resource Management Functions	System 1	System 2	System 3	System 4	System 5
	Prerequisite personnel system	**Basic HRA system**	**Intermediate HRA system**	**Advanced HRA system**	**Total HRA system**
1. Human Resource Planning	Manpower skills inventory Replacement tables	Estimated costs of recruiting, training etc.	Replacement costs	Standard and actual personnel costs Stochastic manpower mobility models Manpower simulations	Stochastic rewards valuation model Human resource value simulations
2 Human Resource Decision making Budgetary	Personnel costs included in "general and administrative" expense	Personnel costs budgeted separately	Budgetary system for recruitment, training etc. Budget replacement costs	Budget standard and actual costs Original and replacement costs	Human capital budgeting Budget ROI on human capital investment
Policy	Traditional selection, training and replacement methods	Value-orientated selection decisions	Recruitment vs. training trade – off analysis	Manpower assignment optimisation models	Value-based compensation
3 Human Resources Conservation After the fact	Turnover rates	Turnover costs	Replacement costs	Opportunity cost	Human Resource value depletion
Before the fact	N.A	Attitudinal data	Expected turnover cost (replacement)	Expected opportunity costs. Human re-accountability	Expected conditional and realisable value depletion
4 Human Resource Evaluation	Performance and potential ratings	Perceived value rankings	Psychometric predictions of potential value Interval scaling of value	Measurements of economic value of group	Measurement of economic value of individuals
5.Human Resource Efficiency Management Control	N.A.	Comparison of actual costs with historical costs	Comparison of budgeted and actual costs Variance analysis	Comparison of actual costs against standard Variance analysis	Inter-unit comparison of costs

(Flamholtz, 1974, p.272)

Although there is much debate on the measures and processes, few companies adopt applications of human resource accounting (Alexander, 1971; Benjamin & Benson, 1986; Woodruff Jr, 1970). Sheedy-Gohil (1996) reports that the interest in human resource accounting appeared to reach its height in the 1970s but subsequently there was a lack of interest until a revival in the mid nineties. This lack of interest in the earlier formulae for HRA is due to their limited comparability and their complexity. Formulae do not produce meaningful data for the business adopting them until a number of years of data collection have been completed. They also have no value for inter-business comparison unless other businesses adopt the same measures. The main blocks to the adoption of these HRA techniques consequently are the level of skill required, the lack of available time for the managers who might be expected to implement them, plus the difficulty of justifying the benefits against the cost of implementation. To this list of disadvantages I would add the lack of computer technology to simplify the input of data and subsequent calculations.

More recently Sheedy-Gohil (1996) proposed two human resource accounting measures for skill-based organisations. The two measures focus on the core business activity skills and are geared at including the value of people in the balance sheet. The first measure is 'skill asset utilisation ratio' (sAUR) and the second is 'return on skill capital employed' (ROsCE). They make visible the changes in the structure of a business, the return on skills capital, and total capital, and therefore how well a business is managed. Skill asset value is equal to (cost of skills) times (average years of service) times (retention rate), where the cost of skills equals the total payroll cost for the relevant accounting period, where the average years of service equals the average number of months of service of all employees employed at the end of the period, expressed in years and the retention rate equals 100 per cent minus the number of staff who have voluntarily left the business, as a percentage of the average number of staff employed in the accounting period. ROsCE is an adaptation of the traditional 'return on capital employed'. By identifying the skill assets this measure reveals their part in a return on investment.

These two measures are certainly not as complex as Flamholtz's models for determining the value of the workforce but do not reveal what individuals or what skills are

responsible for changes in value. Despite their names, the two measures have moved right away from considering what skills influence the performance of the workforce. They do not differentiate between skills for allocating cost or value. Thus they have limited value as meaningful measures of the substance or components of human capital.

Utility analysis

Utility analysis is a cost accounting method for measuring the value of different staff management approaches. It arose out of decision theory, which espouses the need for management to be able to estimate the profitability or usefulness (utility) of a number of outcomes in order to choose the best strategy. Cascio (1998) defines utility analysis as a method of converting measures of staffing or training outcomes into monetary values to determine the loss or gain (outcomes) anticipated from various courses of action.

Hunter (1983) identifies two stages in the process of utility analysis. Quantifying the size and variability of the resulting increase (or change) in job performance and giving an economic value to the increase (or change) in job performance. Methods of meta-analysis allow attainment of the first of these, and for the second, utility analysis methods translate job performance increases into estimates of the economic value of the programme

There are four dominant models of utility analysis: the Taylor-Russell, Naylor-Shine, Brogden-Cronbach-Gleser (Cascio, 1991) and Raju-Burke-Normand (Law & Myors, 1999) models. They are primarily used to show predictive validity of selection procedures and less frequently for evaluating the effectiveness of training and development programmes. In the area of personnel selection many meta-analytical studies have been conducted, resulting in a precise and generalisable estimate of the validity of cognitive ability tests and other selection procedures. Utility analyses have shown that job performance increases with the employment of valid selection methods. Hence selection methods have substantial economic value (Cascio, 1991; Hunter & Schmidt, 1983). An example of a utility analysis application in training and development is the four-year study in a Fortune 500 pharmaceutical company. The effect and utility of eighteen managerial and sales/technical training programmes was

calculated. Results of the utility analysis revealed significant differences in the effectiveness of these programmes (Morrow, Jarrett, & Rupinski, 1997).

The utility analysis models however focus on the predictive validity or the value of the change in the performance of intervention decisions: i.e. the cost benefit of the intervention rather than the value of the employees themselves. The formulae rationales contain some generic employment assumptions, subjective estimates and arbitrary values. They also fail to take into account the individual differences between workers and their context, and subsequently lack face validity. Furthermore, they require several steps to the process and hence are time consuming. Some also require the use of tables and appear too complicated for use in everyday management situations. Because of the assumptions and estimates Cascio's (1991) warning, 'Garbage in – garbage out', is as true in this context as it is in the context of any information system.

Return on Investment (ROI)

Return on investment (ROI), a form of cost/benefit analysis, has been put forward as a measure of human capital. It gained popularity in evaluating the effectiveness of training and development interventions because it is simple (compared with utility analysis), relatively economical to develop and was already widely accepted for monitoring other business investments. It has its origins in the 1920s, in the early issues of the Harvard Business Review, when it emerged as a tool to calculate return on investments.

The advantage of the return on investment measure is that it blends all the major ingredients of profitability into one number. The ROI statistic can therefore be compared with other investment opportunities inside or outside a company. In reality it attempts to account for any investment in people, not in terms of the value of their skills/human capital, but like utility analysis, as a performance outcome. It is expressed as a cost/benefit ratio. Whereas utility analysis tends to be adopted for evaluating recruitment and selection strategies, ROI is used more in education and training and productivity/quality improvement programmes (Fuller & Farrington, 1999; Phillips, 1998b). In addition, ROI has been used for evaluating a range of human resource

initiatives including competence systems and skill-based/knowledge-based compensation (Fitz-Enz, 1990; Morrow & Wurtz, 2000; Phillips, 1998b).

Phillips (1994; 1997; 1998a; 1998b) reports extensive use of ROI to evaluate HRM and training and development in North American companies. On the other hand, the American Society of Training and Development survey of organisations in the United States does not support this (Bassi & van Buren 1999). Similarly, surveys in the Netherlands (Koning, 1994) and New Zealand (Johnson, 1999b; Toulson & Dewe, 2001) report little evaluation at all. However, increased awareness of evaluation suggests that ROI and other measures will receive more attention in the future (Bassi & van Buren1999; Fitz-Enz, 1990).

Return on investment has several limitations. It is not a measure of the economic value of individuals. This is why Flamholtz (1974) positioned it as a budgetary decision-making tool within a human resource accounting system (see Table 2.1). The selection of variables in an ROI is subjective (Terborg, 1988). Soft data selected as variables are converted into monetary values where possible. This can lead to inaccuracy in the conversion process or a lack of validity if variables are omitted because they are too difficult to convert. Furthermore, the timing and duration of data collection may distort the extrapolated benefits as people's attitudes and performance change over time.

Fitz-enz (2000) revisits ROI paradigm and presents the ratios in terms of the economic value of individuals in the workforce. Return on investment is integrated with the business planning paradigms, balanced scorecard and intellectual capital reporting reviewed later in the chapter. Fitz-enz's return on investment enterprise measures are in fact indexes of 'economic value added'[24] that identify profitability that can be ascribed to the workforce/human capital. He calls his measures: human capital value added (HCVA), human capital return on investment (HCROI) and human capital market value (HCMV). HCVA is an index of profitability per full-time equivalent employee: revenue minus (expenses minus the pay and benefits) divided by the number of full time equivalent staff. HCROI looks at the return on investment in terms of profit for monies spent on employee pay and benefits: revenue minus (expenses minus pay and benefits)

[24] Economic value added is described in the intellectual capital reporting section towards the end of this chapter

divided by pay and benefits. HCMV gives a market value premium per full time equivalent employee: market value minus book value is divided by the number of full-time equivalent employees.

Fitz-enz's measures address the previously mentioned lack of individual economic value in ROI measures and provide less subjective organisational (enterprise-level) measures. However, they provide even less information than other ROIs on the competences or what it is that creates the individual's economic worth.

Flamholtz's models of individual worth are complex and include assumptions that have deterred their uptake. Utility analysis and the traditional ROI however, also have limits and require numerous assumptions. Fitz-enz's development of the 'human capital return on investment' does produce an asset value for human capital. Yet, although these measures shed light on the return on human resource management activities and the workforce, none of them illuminate exactly 'what' is of value or, 'who' is of more value.

Theoretical basis for strategic human resource management (SHRM)

The theoretical basis for strategic human resource management explains the source of a number of human capital measures of more recent origin than ROI. This is why this section is positioned after the return on investment literature review. Wright and Mahon (1992) highlight the key role of human capital in successful organisations when they describe the parameters of SHRM theory. They argue that SHRM theory should be concerned with the determinants of decisions about human resource practices, the composition of the human capital resource pool (i.e. skills and abilities), the specification of required human resource behaviours, and the effectiveness of these decisions given various business strategies and/or competitive situations. Two theories in particular, the resource–based view of the firm and the cybernetic systems theory, contribute to an understanding of current measurement of human capital.

Resource-based view of the firm

The resource-based view of the firm theory evolved from organisational economics and strategic management literature. It focuses on the internal resources of the firm, which

include human capital (Barney, 1991; 1995; 1998; Wright, McMahan, & McWilliams, 1994). Proponents of a resource-based view of the firm attribute any sustained competitive advantage of an organisation to the internal resources (Barney, 1995; Wright & McMahan, 1992). They argue that this explains why there are firms that are successful in an unfavourable environment. This is contrary to earlier industry environment focused strategic management paradigms (Porter, 1980; Porter, 1985). In reality, I suggest that to propose that either paradigm explains all successes is too simplistic. The external factors and the internal resources and the interaction between the two all contribute to explaining the performance of organisations. Nevertheless, why the resource-based view of the firm is important is because it shifts the previous focus on external factors only, to the importance of staff and systems in the organisation.

Internal resources are described as all the financial, physical, human and organisational assets used by a firm to develop, manufacture and deliver products or services to the customers (Barney & Wright, 1998). The internal resources that contribute to sustained competitive advantage meet four criteria: the resource adds positive value, it is unique or rare among current and potential competitors, it must be imperfectly imitable, and not able to be substituted (Barney & Wright, 1998).

Organisations can buy the same equipment; therefore, it must be the staff skills and human resource management practices that make the difference between firms (Barney & Wright, 1998; Pfeffer, 1998; Wright et al., 1994). Barney (1998) emphasises the importance of human resource management practices in sustained competitive advantage. Wright et al (1994) separate knowledge and skills of the people from the human resource practices. They claim all four criteria that identify an internal resource that gives an organisation sustained competitive advantage apply to their approach.

Because Wright et al (1994) focus on human capital as a separate entity from human resource management systems for competitive advantage their application of Barney's four criteria for competitive advantage is more relevant to this study. Wright et al argue that the utility analysis literature is the source of measurement and evidence that human capital resources provide value to firms. Cognitive ability measures, available from

recruitment cognitive ability tests, is their measure of the unique abilities of individuals. What is more they reason human resources with high ability levels are by definition rare. Cognitive ability has a strong positive relationship with individual job performance (Hunter & Hunter, 1984) and is normally distributed in the population (Jenson, 1980). Although in theory the actual skills of a human resource pool can be duplicated in other organisations, or individuals can move to them, any human resource advantages are most frequently characterised by unique historical conditions, causal ambiguity and social complexity and thus are almost always inimitable. Finally, human resources are non substitutable because, unlike technology, they are one of the few firm resources which have the potential not to become obsolete because they are transferable across a variety of technologies, products and markets. High cognitive ability is generalisable and able to be constantly trained for new circumstances.

Wright et al (1994) congruent with the Flamholtz and Lacey (1981) model equate the human capital pool with knowledge, skills and abilities inherent in individuals. But they went beyond this model to consider the human resource practices that impact on employee behaviour. However, they still come back to the importance of human capital. Much of the SHRM literature they argue focuses on employee behaviour at the cost of ignoring the human capital pool. Although employee behaviour is the most direct way in which strategies are implemented, employees must have the competences necessary to exhibit the behaviours.

I agree with Wright et al.'s (1994) construct of human capital as a critical resource in an organisation's success but not their application of the four criteria for competitive advantage. Although they acknowledge competences, their measure of the competences of individuals in the workforce is inadequately represented by cognitive ability test results. Intelligence test scores do not account for at least three quarters of job performance variance (Sternberg, Wagner, Williams, & Horvath, 1995). Intelligence scores are readily available, simple to use, but are not a sufficiently relevant representation of the substance of human capital. Wright et al., also refer to high performers only. It is commonly asserted that top performers and top management teams are the sources of competitive advantage (Barney, 1991; Castanias & Helfat, 1991; Lado & Wilson, 1994; Peters & Waterman, 1982). This neglects the rest of the

workforce's abilities, knowledge and skills (total human capital pool). I maintain all the workforce should be considered. Managers may create conditions under which the remainder of the human capital pool becomes a source of sustained competitive advantage. They may decide strategic direction, but it is the ability and adaptability of the entire human resource pool that make it happen (Hendry & Pettigrew, 1990). Wright et al. (1994) later advocate that the organisation's total human capital pool contributes to sustained competitive advantage. This suggests to me that it was the lack of an appropriate human capital measure that led to their utilisation of cognitive ability test results for high performers in the first place. Similarly, their choice of utility analysis, which is complex and limited, as previously reviewed in this chapter, may have been made in the absence of an appropriate human capital measure.

The importance of competences and skills, of which human capital is comprised, tends to get eclipsed by business and human resource management practices both theoretically and in practice. An example of practice is the response to the European comparative studies that found that United Kingdom industries had lower skill and training levels (Hendry & Pettigrew, 1990). Hendry and Pettigrew (1990) advocate skills be the organising concept for human resource management to raise productivity and skill levels. The British government response was to establish the 'Investors in People' standard (IIP) and continue to support it (Wigham, 2002a). The standard consists of a list of business management practices that foster the upskilling of the workforce to secure measurable, improved, organisational performance (Investors in People UK, 1997). This standard has been adopted extensively throughout the UK over the past twelve years and has been introduced in a number of other countries of the world including New Zealand.

There are studies that show a clear picture of the links between the various IIP managerial practices and company performance (Down & Smith, 1998; Institute of Work Psychology, 1997). However, recent surveys acknowledge that IIP improves the quality of training and the link between training and business needs, but there is no evidence that it impacts on the bottom line for most organisations (Mahony, 2000; Wigham, 2002b). Possibly if the IIP standards included a procedure for a human capital

measure based on competences this could capture the change in the organisation's human capital and the relationship with productivity measures and the bottom line.

Human resource management practices dominate research into the role of human resources in sustained competitive advantage. Schuler and Mac Millan (1984), Ulrich (1991), Huselid and Becker (Becker & Huselid, 1998; Huselid, 1995; 1996), Koch (1996), Barney (1998), Lado and Wilson (1994) and Boxall (1996) all emphasise human resource practices, their alignment and fit, as the source of sustained competitive advantage. A number of studies have successfully shown the positive link between particular human resource practices and superior company performance (Becker & Huselid, 1998; Becker & Huselid, 1999; Business Europe, 2001; Delery & Doty, 1996; Koch & McGrath, 1996; Pfeffer, 1998; Watson Wyatt, 2002).

Watson Wyatt's human capital index (HCI) links the way a company manages its human capital to financial performance. Their 1999, 2000 and 2001 surveys identified nineteen human resource practices categorised into five groups associated with above-average shareholder returns (Watson Wyatt, 2002). Each group of practices has associated percentages, to represent their relative impact on market performance. A summary scale of 1 to 100 is calculated from the scores and then correlated with the firm's stock market performance. The higher a company's HCI score, the higher its shareholder value.

Swedish-Swiss ABB group's UK unit's commercial manager applied the Watson and Wyatt HCI and found that it was well received at managing director level because it was a simple and effective tool. Although he said that nothing surprising came out of the exercise it did point to the specific actions that needed doing or stopping, to enhance shareholder value. Specifically they needed to identify key staff, key knowledge workers and succession plans much more robustly (Business Europe, 2001). The Watson and Wyatt HCI does not identify or measure these required specifics of human capital.

The Deloitte and Touche (2002) human capital ROI study although featuring the phrase 'return on investment' actually consists of an index measurement. Similar to the Watson and Wyatt index it bases its measurement on the results of a survey of the

human resource practices of North American organisations and the associated financial returns to shareholders. The measure includes 17 critical human resource management practices of which three universally drive financial success. These are: managing talent, rewarding performance and communicating strategically. What makes their index different to the Watson and Wyatt index is the consideration of business strategy and market orientation. These considerations are reminiscent of those in Flamholtz's classification of organisations in his framework for human resource accounting systems. Deloitte and Touche's index identifies the importance of the talent or key human capital in the organisation but does not provide any measure that encompasses the substance of the human capital. They found the inconsistencies in application of competences and 360-degree feedback resulted in no clear positive links with financial results in this survey. I suggest their results were affected by the lack of a common comprehensive approach to competences and 360-degree feedback.

Competences and measures of human capital are identified as critical to successful organisations by a few researchers. Becker and Huselid (1999) found high performing firms all had a model of core leadership competences integrated into the entire human resource system. They either hired according to the prescribed values or developed their people extensively. Furthermore they recruited using a competence model, performance management systems with multi-rater feedback were a priority and performance was linked to pay (Becker & Huselid, 1999). Lingle (1996) found employee measurement was the biggest single measurement area that separated successful firms from less successful firms.

Although strategic human resource management theories and approaches are concerned with human capital, the emphasis has been on the impact of business and human resource management practices and key individuals on business performance. Skills have been espoused as the central organising concept for managing human resources but there has been little identification of the actual types of competences expected and measured. An organisation's stocks and flows of individuals' human capital are not evident.

Davenport (1999) presents a practical model to manage the human capital in a company. His model of the psychological contract between the workers and the organisation emphasises the interaction required between human resource practices and individuals in the workforce. The idea of a psychological contract is not new. Psychological contracts gained currency in the early 1960's when writers such as Argyris, Levinson, and Schein used the term to describe the employer employee relationship (Hall & Moss, 1998). More recently Fitz-Enz (1990) and Sveiby (1997) refer to this inter-relationship.

What distinguishes Davenport's (1999) approach from those of other contributors in the field is his fundamental premise that workers should be regarded not as assets, but as human capital owners and investors of their own assets. If workers are viewed as investors, it highlights the two-way exchange of value for mutual benefit, rather than a one-way exploitation of an asset by its owner. The individual's negotiated psychological contract at selection and the subsequent match with reality become pivotal to the realisation of human capital. How much human capital a worker decides to invest depends upon their commitment to the organisation and engagement in the job. Effort is activated according to how they perceive their psychological contract: Davenport's ROI_w[25] profile. Measurement to give feedback on performance is integral to this contract.

By separating human capital from the worker Davenport encourages identification of the substance of human capital. His ROI_w therefore puts development of an individual's competences back into the picture of human capital and human resource management practices. However, he offers an individual psychological contract profile, not a measure of human capital. Davenport's ROI_w approach also fits comfortably into the theoretical constructs of cybernetic systems theory, the other relevant theoretical basis for strategic human resource management.

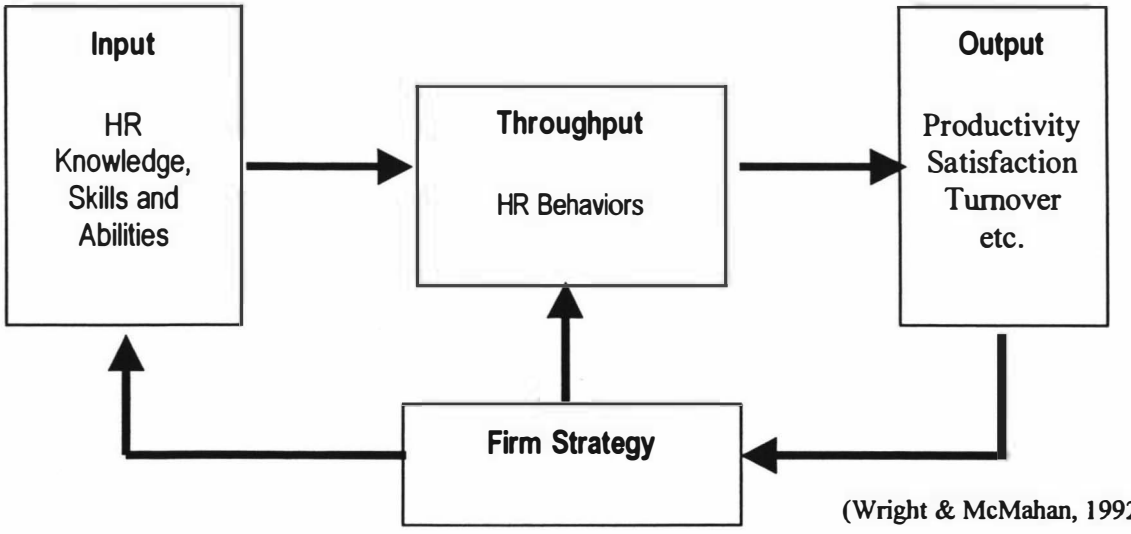
Cybernetic systems theory

The second theory of strategic human resource management that contributes to this research into a human capital measure based on competences is cybernetic theory. Competences are central to cybernetic systems theory. The substance of human capital

[25] Return on investment workplace index

is represented by competences and competence performance is linked to productivity. Cybernetic theory examines the relationships among strategy, human resource practices, the human resource capital pool and human resource behaviour (Boulding, 1956; Katz & Kahn, 1978; Wright & McMahan, 1992), (See Figure 2.3.). The input is human resource knowledge, skills and abilities (competences), the throughput is human resource behaviours in the organisational system and the outputs consist of both performance (e.g. productivity, turnover etc.) and affective outcomes (e.g. job satisfaction), all of which are linked to firm strategy (Wright & McMahan, 1992). Cybernetic theory connects competences with productivity. I also associate competences with productivity in a human capital measure.

Figure 2. 3
Cybernetic model of a human resource system



(Wright & McMahan, 1992, p.306)

In cybernetic theory strategic human resource management consists of two general responsibilities; competence management and behaviour management (Wright & McMahan, 1992). Competence management deals with those things that the organisation does to ensure that the individuals in the organisation have the skills required to execute a given organisational strategy. Behaviour management is concerned with ensuring that once individuals with the required skills are in the organisation, they act in ways that support the organisational strategy. Human capital is described by competences rather than inferred and feedback on performance can be linked back to individuals.

Wright and McMahan (1992) argue that because this theory cuts across the traditional human resource management function lines it promotes the research and practice of integrated, aligned people management, which is the nature of strategic human resource management. I aim to develop a measure of human capital aligned with strategic goals that is also useful for the management of the workforce. McLagan's (1990) flexible job design process is an example of a competence approach within a strategic human resource management paradigm. She argues that flexible job models[26] support the most appropriate human resources being available and fully employed. They also foster continuous improvement and help management better describe and assess the cost/value equation because emphasis is on outputs. Although human capital is represented by competences, McLagan's flexible job model does not go as far as producing a measure that can be used strategically to represent the value of human capital.

Cybernetic systems theory has a considerable influence on the training and development in the United States. It is also the basis for the growing practice of and literature on human performance technology[27] (Brethower, 2000; Fuller & Farrington, 1999; Stolovitch & Keeps, 1992). Human performance technology is an approach that views the substance and realisation of human capital in the form of competences and links them to company outcomes. Return on investment (Fuller & Farrington, 1999) is commonly used as a measure[28]. Practitioners of this approach still do not have and would benefit from a human capital measure to communicate when there is a need for and benefits from, competence development.

There are critics of both these strategic human resource management theoretical bases; the resource-based view of the firm and the cybernetic systems model. Bontis (1999) criticises the excessive internal focus of the resource-based view of the firm, and the confusing shifts in the jargon used by myriad researchers. To this I would add the lack of a clear measure of human capital a key, if not the key, internal resource for sustained competitiveness. Cybernetic theory also lacks a human capital measure and is limited to an internal focus. It also has a multiplicity of meanings for terminology. The

[26] 'Model' is used here in a similar way to how I have used 'profile'
[27] A cross-functional, integrated approach to training and development that aims to increase the achievement of valued human performance in the workplace (Fuller & Farrington, 1999)
[28] The limitations of ROI have been discussed previously in this chapter

primary jargon confusion is caused by the numerous descriptive terms for and concepts of competence.

Competence

Competence has a central role in this research; therefore, it is appropriate to review the differences in competence definitions and scopes. It is a central if sometimes glibly treated concept in any exposition on human capital. Although competences are a descriptive component of human capital as used by economists, both Hartog (1999) and Nordhaug (1993) illustrate how economists fail to describe what it consists of. Hartog says of the economists' approach to human capital:

> *Human capital is like a mystery bag of groceries, we know the price (what we paid for in forgone earnings), and the rewards (higher wages), but we do not quite know what groceries are in the bag. In other words, we are not sure what it is we learn at school that makes us more economically valuable.*
>
> (Hartog, 1999, p.38)

Nordhaug (1993) describes how previous theorists have treated the substance of human capital as a black box with discussions being limited to the means of generating human capital. Hence he emphasised the importance of supplementing human capital theory by illuminating the black box with the focus and exploration of the nature of competences. I think that a human capital measure based on competences will create a connection between the strategic human capital measure desired by decision makers and visible human capital substance in the form of competences.

The literature on competence is diverse and potentially confusing because it has evolved from three conceptually different backgrounds. It uses the same terminology, 'competence' and its extensions, to mean different things. Leadership and training and development literatures, for example, both actively use the term competences but they define it quite differently. McLagan (1997) classifies the research and practices on competences into the three schools of management sciences, differential psychology and educational and behavioural psychology. To this I would add a fourth approach, strategic human resource management. The latter differs from the first three approaches in that it is not confined to people. Strategic resource management competences have a

resource-based view of the firm theoretical base and also draw on the management sciences and differential psychology.

All of the competence approaches contribute to the understanding of the human capital contribution that people make in the workplace but none of them on their own span my definition of competences[29]. Nor do they on their own provide the answer to identifying and measuring human capital in a knowledge economy organisation. Hence the need to describe each of these competences approaches. Human capital in this research is equated with a comprehensive approach to workplace[30] competences. Human capital, competences, performance and work performance or job performance are all intertwined.

Management science

Management science originated from Taylor's studies of work performance (Taylor, 1947; 1967, 1972, 1998). Competences feature in the context of job descriptions for work performance. Work analysis and task analysis produce task lists, activity lists, and descriptions of tools and processes for effective work performance. This is an output approach to competence that focuses on the activities for which human capital is needed and does not describe human capital.

The management science concept of work performance has a major influence on the wider field of competences and on the evolution of training and development competence typologies. Work performance requires further elaboration. Work or job performance is defined as:

> *the actions or behaviours relevant to the organisation's goals that can be measured in terms of their contribution and are under the control of the individual*
>
> (Campbell, Gasser, & Oswald, 1996)

The work performance focus in management science tends to be on components of task performance.

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[29] Defined in Chapter 1

[30] See Chapter 1 for the similarities in the definitions of competence and human capital

Work performance taxonomies usually contain at least the two dimensions: task specific components and non-task specific components. Task specific components are variously categorised as technical or task performance (Borman, Hanson, & Hedge, 1997; Kozlowski & Farr, 1988; Motowidlo & Scotter, 1994; Murphy & Shiarella, 1997). Cognitive ability is associated with both and may also be identified separately (Murphy & Shiarella, 1997). Some taxonomies separate task performance into technical tasks central to the job and technical tasks that support the technical service/activity (Campbell et al., 1996; Motowidlo & Scotter, 1994). Non-task specific components are given a variety of terms: administrative skills (Kozlowski & Farr, 1988), extra-technical proficiency (Borman et al., 1997), contextual performance (Murphy & Shiarella, 1997), extra-role behaviour, non-prescriptive behaviour and organisational spontaneity (Van Scotter 2000).

Campbell's (1996) eight-component taxonomy is the most relevant to my research because it gives a comprehensive coverage of job role dimensions. It assumes competences although it is not a competence typology. All jobs do not have all eight factors but Campbell argues that all the components of job performance can be clustered within the framework of eight general factors. The first two are job-specific task proficiency, which relates to the technical tasks central to a job and non-job specific task proficiency, which encompasses the associated non-technical activities. For example, for an accountancy lecturer, conducting lectures is job specific, but his/her involvement in student enrolments is non-job specific. The third factor is written and oral communication task proficiency. Demonstration of effort is the fourth and maintenance of personal discipline at work is the fifth. Facilitation of peer and team performance and supervision/leadership of subordinates are the sixth and seventh respectively. The final factor is management/administration, which covers articulating goals and facilitating their achievement.

As management science evolved it was influenced by competence approaches. Job descriptions in addition to listing the task and non-task performances required, included generic lists of traits. Hunt (1996), for example, includes personality traits in his job performance taxonomy.

A management science focus on tasks inherent in fixed jobs and work roles has limitations in a globally competitive changing environment (Arvey & Murphy, 1998; Lawler111, 1994). Instead of job descriptions and skill and person descriptions, there is a need for more flexible definitions where jobs are viewed as dynamic and interchangeable. There are other approaches to competences more adaptable to change than a list of activities (Lawler111, 1994).

Differential psychology competences

A differential psychology competence (spelt 'competency' and the plural 'competencies') unlike the activities of management science is job/role specific but not firm or industry specific. It is defined as:

> *an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job, or situation*
>
> (Spencer Jr & Spencer, 1993)

In this definition, 'characteristics' are motives, traits, self-concept, knowledge, and skill (Spencer Jr, 1993). 'Underlying characteristic' positions the competence as a fairly deep and enduring part of a person's personality that can predict behaviour in a wide variety of situations and job tasks. 'Causally related' refers to how a competence causes or predicts behaviour and performance, while 'criterion referenced' means that the competence actually predicts who does something well or poorly, as measured against a specific criterion or standard. The two criteria most frequently used in competence studies are: superior performance, which is one standard deviation above average performance (1 in 10 in a given working situation); and effective performance, which is the minimally acceptable level of work (the lower cut-off point below which an employee would not be considered competent to do the job).

Differential psychology competences are hard to develop and are identified primarily through aptitude and intelligence tests. They originate from the critical incident interview technique first used in World War Two to identify people with the appropriate skills for senior ranks (Flanagan, 1954; Lucia & Lepsinger, 1999). Subsequent development by McClelland and Berlew, Boyatzis, Spencer Jr. and Spencer (Green, 1999; Lucia & Lepsinger, 1999; Spencer Jr & Spencer 1993) resulted in McBer

competence tests and a competence dictionary. Differential competences are commonly used in companies that focus on leadership and values, particularly in recruitment and performance management. The following quotation encapsulates the differential psychology emphasis on inherent characteristics.

> *You can teach a turkey to climb a tree, but it is easier to hire a squirrel.*
>
> (Spencer Jr & Spencer, 1993, p.12)

Spencer Jr. and Spencer (1993) argue that there is a causal relationship between competence characteristics and job performance. Their competence causal flow model describes a competence with an intent causing action toward an outcome. Motive, trait and self-concept competences predict skill behaviour actions, which in turn predict job performance outcomes. This model, like most competence models, excludes the external influences on job performance as well as the interaction between the internal resources. Differential competences provide only a partial representation of some of the human capital of the workforce.

A differential psychology approach to competences has several other limitations. The predictive validity of the behavioural event interview methodology used for determining competences related to superior performance has been seriously questioned, as has the development of population norms (Barrett & Depinet, 1991). Differential competences do not cover the total human capital pool for an organisation. They have a narrow focus on underlying characteristics that identify superior performance (Barrett & Depinet, 1991). Thus they cannot on their own be used to represent the substance of human capital. However, the type of characteristics included as competences and the concept of identifying competences associated with superior performance influenced the development of my human capital measure. Differential psychology competences make visible that part of the substance of human capital associated with superior performance.

Strategic human resource management (SHRM) competences

The parameters of SHRM competences go beyond human capital. They are very broadly focused on the competitive capabilities of an organisation and the work processes that distinguish successful organisations. The human capital of the individuals in the workforce is conflated with processes and physical resources to

become unique entities: competences that produce a competitive edge. An example of a SHRM competence is Motorola's competence in fast cycle-time production (Hamel & Prahalad, 1994).

Competences are referred to in a number of different terms in the strategic human resource literature: 'distinctive competence' (Fiol, 1991; Gronhaug & Nordhaug, 1992; Reed & De Fillippi, 1990; Selznick, 1957), 'dominant competence' (McKelvey & Aldrich, 1983), 'organisational competence' (Lado & Wilson, 1994; Westley & Mintzberg, 1989), 'firm specific competence' (Pavitt, 1991), 'organisational capital' (Prescott & Visscher, 1980) and most commonly since the 1990s, 'core competence' (Hamel & Prahalad, 1994; Prahalad & Hamel, 1990). Distinction between 'core' and 'non-core competences', it is argued, is essential for senior management who cannot focus on everything and therefore need to focus on the competences that lie at the centre, rather than the periphery, of long-term competitive success (Barney & Wright, 1998; Hamel & Prahalad, 1994). The terms 'capability', 'competence' and 'core competence' tend to be used interchangeably (Lado & Wilson, 1994; Stalk, Evans, & Shulman, 1992; Ulrich, 1997; Ulrich & Lake, 1990).

Path dependence and causal ambiguity are used to explain why the purchase of identical training and technology does not result in SHRM competences rapidly diffusing to all competing organisations. Path dependence refers to the benefits of training and internal promotion that accumulate over time, creating 'bundles' of routines that are difficult to understand or imitate (Becker & Huselid, 1998; Koch & McGrath, 1996; Prahalad & Hamel, 1990). Causal ambiguity arises because the content and essential ingredients of these resources are so subtle and difficult to comprehend fully that observers outside the firm are not able to reproduce these resources in their own organisation (Becker & Huselid, 1998; Lippman & Rumelt, 1982; Reed & De Phillippi, 1990).

Strategic human resource management competences and the associated path dependence and causal ambiguity concepts contribute to the understanding and awareness of the potential impact, hence importance of firm-specific unique interactions, culture and techniques that develop over time in any workforce. I suggest that these dimensions are

not addressed by differential psychology competences or management science task lists, yet they need to be considered in any competence description of human capital.

A competence that comprises a combination of workforce skills, technology and organisational systems and processes makes the identification of human capital more difficult than the previously mentioned competence concepts. The dividing line between particular skills and the core competence to which they contribute can be difficult to define. And although it is suggested that management must be able to disaggregate core competences into their components, all the way down to the level of the specific individuals with specific talents (Hamel & Prahalad, 1994), outside a selective focus on managers and leaders (Lado & Wilson, 1994), there is little evidence of this in practice in the SHRM literature. Hamel (1994) argues that there should be identification of each individual's human capital in an organisation in order to select what is of importance. However, the aggregation of human and non human resources and processes in strategic human resource management competences submerges the interest in any clarification of the substance of human capital. In practice strategic human resource management competences do not clarify the value of individuals in the workforce. Furthermore, there is no conceptual basis in strategic human resource management (with its emphasis on attention to the core/strategic only) to consider details of individual competences for a total workforce.

Strategic human resource management requires competences that capture the unique non-technical interactions and unique technical skills. If a practical strategic measure for individual human capital that can be aggregated included these dimensions, this might encourage followers of strategic human resource management to give more attention to the human capital contribution of all members of the workforce.

Educational and behaviour competences

Educational and behavioural psychology competences originated from behaviour management, behaviour modification and assertiveness training and have been adopted with varying degrees of rigour in training and development. I consider they have a very different but complementary focus to those of differential competences. Whereas differential competences identify the inherent generalisable characteristics of superior

performing individuals, educational/behavioural competences are presented in terms of specific outputs, which state the required behaviour, conditions, standards and consequences. The performance environment is regarded as a more powerful determinant of an individual's behaviour than genetics, so that educational/behavioural competences are not unconditionally generalisable to other contexts. The purpose of educational/behavioural competences is to shape and develop all people so that they can all be successful. Furthermore, all competences that are important to quality performance are included whether or not they distinguish superior performance (McLagan, 1997).

This educational/behavioural output approach to competence identifies an individual's current, directly visible human capital within a context. Performance to standards and conditions is relatively easy to assess reliably and validly and therefore manage, within an organisation. However comparison between performances in different organisations is not possible and any underlying characteristics that are generalisable to other contexts are not accommodated.

In practice, how educational/behavioural competences are used in training and development is seldom as rigid. Knowledge and attitudes, to varying degrees (underlying characteristics in differential psychology competences) are included. Subsequently, the precision in the standards and conditions is correspondingly diminished, but flexibility is increased. The latter is a considerable advantage when I use competences to represent human capital. Accompanying the variations in how educational/behavioural competences are applied is some confusion in understanding and practice (Briegal, 1999; Green, 1999; Parry, 1998). This impacts on the acceptability of training and development competences.

Parry's (1998, p 60) definition of a competence captures a widely accepted meaning of competence in the training and development area, if not always the practice. It illustrates the adaptations to educational/behavioural competences with the inclusion of knowledge and attitudes. He defines a competence as:

> *a cluster of related knowledge, attitudes and skills that affects a major part of one's job (i.e. one or more key roles or responsibilities); that correlates with*

performance of the job; that can be measured against well-accepted standards, and that can be improved via training and development

There are strong supporters of and strong opponents to the use of educational/behavioural and or training and development competences. The supporters come mainly from the vocational sector where training and development competences have primarily been incorporated as an extension of the functional and task analysis of management science (Becker & Huselid, 1999; Brethower, 1995; Fitzpatrick, 2000; Fletcher, 1997; Fletcher, 1998; Green, 1999; Nordhaug, 1993; Parry, 1996; Zemke & Zemke, 1999). The opponents are found in education, particularly the universities (Barnett, 1994).

A number of countries including the United Kingdom and New Zealand have established competence-based national, vocational qualification systems to foster consistency and transportability in qualifications. In an endeavour to remove many of the boundaries between vocational application of competences in the workplace and formal secondary and tertiary education some secondary school and tertiary institutions in these same countries have also adopted the competence approach.

Debate arising from the introduction of this competence approach to formal education has raised a number of issues associated with training and development competences. These include the restrictions of prescribed workplace assessment criteria versus the requirement for consistent standards, the validity of simulation and indirect evidence, sufficiency of evidence, the degree of knowledge evidence required in the assessment processes, the adequacy of the moderation systems for national standards and superior performance not being encouraged by a set standard (Lees, 1996). The development of the British general national vocational qualifications (GNVQs) as a separate framework of standards for secondary schools is an attempt to resolve some of the issues arising from the use of tightly prescribed assessment criteria in the national vocational qualification standards (NVQs). But perhaps at the heart of the opposition to competence is the concept that education differs from training in that it is an open-ended, developmental exploration of a subject where the process is as important as the content and hence prescribed competences are inappropriate (Barnett, 1994).

Training and development competences

Training and development competences have their base in educational/behavioural competences, but also incorporate concepts from management science and differential psychology. Hence they provide a framework for a more comprehensive consideration of individuals' human capital in a total workforce than any of these approaches on their own. However, one of the strengths of the strategic human resource management competences, the unique non-technical systems and processes, are not well represented in training and development competences. I argue that all four types of competences contribute to representing human capital.

In addition to the national examples listed previously, competence frameworks are also used by many organisations for workplace roles to support an integrated human resource system of recruitment, performance management, training and development, career planning and remuneration (Becker & Huselid, 1999; Bish, 1999; Briscoe & Hall, 1999; Fletcher, 1998; McLagan, 1990; Parry, 1996). They are developed in different ways according to their purpose and the competence type.

Competence frameworks/models

Briscoe (1999) outlines four approaches to developing competence frameworks. First is the research-based study of high achievers that is described by Spencer Jr. and Spencer (1993) and typified by the McBer competence systems. In this review they are in the section on differential competences. Another approach is the strategy-based approach, which is used for training and development. The competences are what are forecasted to be strategically important, based upon an anticipated future. The third approach is values-based. It is used in both selection and in training and development where competences are based formally or informally upon organisational norms and/or cultural values. The values approach is followed by Quantum (Becker & Huselid, 1999) and in New Zealand by Blue Star[31] Office Products. The fourth approach is a hybrid system where one or more of the previous approaches are combined.

[31] Blue Star values competence system described at HRINZ special interest meeting by Peter Leathley, HR Manager, BlueStar Office Products on 20th July, 2000

Each of the approaches to developing competence models has strengths and weaknesses. The research-based approach has the advantage of being grounded in actual behaviour and therefore has an air of legitimacy. Executives also have considerable involvement via the interview process. Disadvantages are that it is based upon past not future competences, may omit intangible and immeasurable competences and requires extensive financial, temporal and human resources to develop (Briscoe & Hall, 1999; Green, 1999). A strategy-based approach has the advantages of competences being grounded in the future not the past. It focuses participants on learning new skills, and can support organisational transformation efforts. The disadvantages are that the future expectations may prove to be inaccurate or misguided: the competences are based upon speculation instead of actual behaviour. In national qualification frameworks such as New Zealand's, the quality of the representation of the industry and widespread consultation are critical to the acceptance of the competences.

Values-based approaches can provide strategic stability and direction across long periods of time because of the strong motivating power of values competences. They have several pitfalls however. The 'wrong' values may lead to misguided competences, they are difficult to translate into actual behaviour and the development process can lack rigour (Briscoe & Hall, 1999).

All of these competence frameworks are likely to lead to some negative feedback and this can be hard for people to accept. Although negative feedback is potentially beneficial, there may be resistance to overcome (Green, 1999). Similarly, all of these competence frameworks are limited to collecting job-related data that is relevant to the competences. As I have argued earlier, none of the competence types on their own gives a holistic view of their human capital (Green, 1999).

Competence typologies

A number of typologies have been developed to promote consistency, comprehensiveness and comparability in competence approaches to job roles (also referred to as profiles) (Arnold & Davey, 1992; Campion, Cheraskin, & Stevens, 1994; Fitz-Enz, 1990; McLagan, 1990; Nordhaug, 1993; Parry, 1998; Sonntag & Schafer-Rauser, 1993; Sveiby, 1997; Yukl, 1998). They all include technical competences and

non-technical competences such as cognitive, administrative, company know-how and interpersonal skills in some form. Knowledge mediated through skills and knowledge, not mediated through skills, tacit and explicit knowledge (Nordhaug, 1993; Sveiby, 1997), are included as are the impact of experience, practice and values by association. Inclusion of generic meta-competences such as learning skills, communication, self-management skills and adaptability are considered important for a typology of workplace competences (Carnevale, 1991; Hall & Moss, 1998) as job requirements and the environment change. I maintain that a training and development typology needs sufficient flexibility to encompass the positive aspects of all the competence types and the dimensions above in order to encapsulate the substance of human capital.

Nordhaug's typology

I think Nordhaug's (1993) typology for competences is the most comprehensive, flexible and logical for a wide range of job roles, yet it is practical and simple to use. It goes beyond Campbell's (1996) eight general factors typology, captures the concepts of path dependence and causal ambiguity (Becker & Huselid, 1998) and accommodates the various approaches to competences. As a competence typology depends upon the definition of a competence, Nordhaug's definition of a competence needs to be stated. He defines work-related competences as:

> *the composite of human knowledge, skills and aptitudes that may serve productive purposes in an organisation*
>
> (Nordhaug, 1993, p.50)

Knowledge is specific information about a subject or a field and skill is a special ability to perform work-related tasks. Aptitudes encompass natural talents that can be applied in work and that form a basis for the development of knowledge and skills. Aptitude is included to focus on the significance of natural talent as part of competence. Attitudes, motivation and commitment are excluded. Nordhaug argues these three constitute the intermediary variables in the causal connection between competence and work performance. I include attitude in my definition of competence for this research because I think it cannot be clearly separated out from knowledge, skills and aptitudes. For example, for the competence 'adaptability', attitude, aptitude, knowledge and skill all play a role. However, motivation and commitment are intermediary variables

between the competence and work performance because they are more influenced by external factors in the environment. Different environments foster differences in motivation and commitment. All three (attitude, motivation and commitment) influence competence performance, which equates to work performance.

Nordhaug's competence definition and typology encompass the human capital components of all the competence approaches. His definition of competences and competence performance is sufficiently broad to encompass the underlying characteristics of the differential psychologists, the human capital components of the strategic human resource management competences, the task output approach of management science and training and development (interpretation of educational/behavioural) competences. His typology is a hybrid competence approach, because all of the three approaches to competence frameworks development outlined earlier are accommodated. The typology structure is consistent with the task and non-task work performance approach of management science and human capital theory. Criticisms of the static, narrow task-related focus of the output competence approach are addressed by Nordhaug's competence typology. Similarly, the narrow focus on underlying characteristics of superior workforce members is overcome.

Nordhaug (1993) developed his competence typology to address the gaps in Becker's (1964) human capital theory of general and firm-specific training. He was conscious that a primarily technology-focused approach overlooked important classes of firm and industry specific competences. Firm specific competences are those not connected to a single task but broadly applicable across a number of different tasks. Examples are political processes, organisational culture and interpersonal networks. Industry specific competences are skills used in firms only within a particular industry. In a knowledge economy, non-technical tasks predominate.

This clarification of firm specificity, industry specificity and task specificity makes Nordhaug typology different from other typologies (See Figure 2.4). It adds clarity to a competence-based approach to the human resource functions of recruitment, training and development and career planning. I maintain that his typology provides a framework for description of the substance of human capital. Furthermore his re-

connection of competences with the general and specific training concepts of the economic theory of human capital enables his framework to guide decision-making in human resource functions.

Figure 2.4
Nordhaug's competence typology

		FIRM SPECIFICITY		
		LOW		HIGH
		INDUSTRY SPECIFICITY		
		LOW	HIGH	
TASK SPECIFICITY	LOW	I Meta-Competences	II Industry Competences	III Intra-organizational Competences
	HIGH	IV Standard Technical Competences	V Technical Trade Competences	VI Unique Competences

(Nordhaug, 1993, p 58)

Nordhaug (1993) typology is comprised of six categories/domains of competences in the context of the three dimensions of task specificity, firm specificity and industry specificity. The six competence categories consist of the three task non-specific categories: meta-competences, intra-organisational and industry, and the three task specific categories: standard technical, technical trade and unique.

Meta-competences are firm non-specific, industry non-specific and can be utilised in the accomplishment of a variety of different tasks. Although they are of low task specificity they are important because they represent an infrastructure of knowledge and skills that are broadly applicable and crucial for work performance in general. Examples are literacy, learning capacity, analytical capability, creativity, knowledge of foreign languages and cultures, ability to perceive and process environmental signals and events, capacity to tolerate and master uncertainty, ability to communicate, ability to co-operate with others, negotiation skills and ability to adjust to change. Their

broadly applicable nature makes them especially important in regard to the adaptability of firms. They have the potential to facilitate organisational and strategic change and many of them, such as creativity, analytical capability and social abilities, are learnt in the workplace (Morrison & Hock, 1986). Reading, writing and computational skills are increasingly required for flexibility and upskilling, which are features of today's knowledge economy. Lowendahl and Nordhaug ((1994) cited in Doeving, 2000 p17)[32] suggest anecdotal evidence points to meta-competences as the largest and most influential type of competences for the work place.

The second competence domain is industry competences, which encompass industry knowledge. These competences are characterised by low task specificity, low firm specificity and high industry specificity. Familiarity with the industry is developed mainly through experience while working within it and by participating in industry association meetings and seminars. Examples of industry competences are familiarity with the history of the business, knowledge of the industry structure, knowledge of the current industry developments, ability to analyse the operations and strategies of competitors, knowledge about key persons, networks and alliances in the industry, and capability to form co-operative ventures and alliances with other companies in the industry. Nordhaug refers to the debate (Shetty 1976) around managers requiring industry specific skills in addition to managerial meta-competences. The industry domain highlights the advantages of industry specific competences for all members of the workforce.

The third type of competences is intra-organisational. They have low task specificity and high firm specificity and constitute a kind of internal meta-competence in an organisation. Intra-organisational competences are inextricably linked to the organisational culture of the firm and vice versa. Acquisition and development is mostly by everyday learning in the workplace through interaction with and observation of colleagues and groups of colleagues. They can be fostered by job rotation, trainee programmes, internal executive development programmes, campaigns aimed at disseminating core values and information about organisational goals and strategy, induction programmes and mentoring.

[32] Original reference in Norwegian language

Examples of intra-organisational competences are knowledge about colleagues and knowledge about elements in the organisational culture such as symbols, subcultures, history, norms and ethical standards, overviews of communication channels, informal networks and alliances within the firm, mastery of the organisational dialect or code, familiarity with political dynamics in the organisation and knowledge about the firm's strategy and goals.

The importance of the identifying and including intra-organisational competences in any consideration of job performance is evident when considering their impact. Carnevale (1991) points out that competence in certain meta-competences may be useless unless combined with relevant intra-organisational competences. For example, it is necessary to understand an organisation's power structure (an intra-organisational competence) to be able to effectively apply leadership skills (a meta-competence). Sveiby (1997) comments on how a person loses competence when they move to another environment. The lack of the organisation-specific competences such as intra-organisational and unique competences (yet to be more fully described) could account for this. Williams and Levy (1992) compared employee self-ratings and supervisor ratings. They found that employees with high perceived system knowledge rated themselves congruently with supervisor ratings and those with low perceived systems knowledge had a lower compatibility with supervisor ratings of their ability. This knowledge of the system, which is the substance of intra-organisational competences, has an impact on the compatible perceptions of work performance between these two roles.

The fourth type of competences, standard technical competences, has high task specificity, low firm specificity and low industry specificity. They embrace a wide range of general technical competences in the sense of operatively oriented competences. Examples are typing and stenography skills, knowledge of generic budgeting and accounting principles and methods, skills in computer programming, knowledge of standard computer software and craft skills and technical professional skills that can be applied across industries. These skills are usually sourced from the education system, vocational education and training, in-house personnel training programmes, apprenticeships and suppliers of technology. Standard technical skills are

very visible and easy to assess and, subsequently, often play a bigger role in human resource decision making than is merited in a knowledge economy.

Type five competences, technical trade competences, are task specific, industry specific but firm non-specific. They can be developed through vocational education that is limited to one industry only and consequently are portable across firms within that industry. Examples are skills in building automotive vehicles, skills in building aircraft, skills in assembling computer hardware, skills in haircutting and bartending skills. To these examples I would add the professional and service skills, for example, lawyers, managers and sales persons. I think it is more appropriate to knowledge economy organisations to refer to this domain as the professional/trade technical competences.

The sixth type is unique competences, which are highly firm specific and task specific. They apply to one task or to a very few tasks within one firm only and include knowledge and skills related to the operation of unique technology and routines. Examples are skills related to the use of specialised tools crafted in the firm, knowledge about rationalisation devices that have been developed exclusively within the company, skills in repairing tailored technology, skills in operating specialised, local filing or data systems and skills related to the administration and maintenance of organisationally idiosyncratic routines or procedures.

This typology has a number of advantages over other competence models and typologies. Nordhaug (1993) argues that if his typology is used for a national competence system of skills, it will make human capital visible, thereby making comparative studies possible. It can clarify what categories of competences are being compared and reveal any trends in the impact of specific domains on work performance for different organisations and industries. I suggest that if this typology was used to categorise the New Zealand qualification framework standards banks, then it would identify in what domains the existing unit standards belong and, therefore, highlight what dimensions are not addressed but are important to a workplace. The outcome of such a review could provide guidance to policy-makers, developers, and users and make the expectations and application of the existing framework more realistic. However the typology would not be a sufficient framework on its own. Nordhaug's typology does

not include dimensions to distinguish between the size and complexity of competences, both important in a national qualification system.

Nordhaug typology can provide a basis for deciding whether to hire in, conduct on-job-training, or to contract it out. The appropriate delivery of training depends on the category of competence wanted as an output. Firm-specific competences require firm-specific training whereas industry specific training could be more easily outsourced. Non-task specific meta-competences are easier to hire than to develop. This is an alternative to the simplistic, commercial approach frequently used by companies to make, buy or contract competences, based on comparisons of the transaction costs alone (Nordhaug, 1993).

The Nordhaug typology's emphasis on the non-technical competences makes organisation specific job roles dynamic rather than static as in management science. Non-technical categories of the typology also illuminate why people successful in one company or industry may not be successful in another (Shetty 1976; Sveiby, 1997). The typology can also help identify what differences in competences could be required in the new situation.

Role specific lists of competences that cover the breadth of these categories have the potential for overcoming many of the criticisms of existing, primarily technical, competence frameworks (Baker, 1991; Barnett, 1994; Bell, 1997). This typology has flexibility and comprehensiveness for job roles in all organisations at all levels. It also fosters consideration of the many non-technical workplace competences required for organisational success in addition to the technical competences. Gooderham (1995) describes the original contribution of Nordhaug's typology with its fuller conceptualisation of competence as:

> *entering the black box of human capital theory and distinguishing competences that ensure more than just simply an internal fit between human resources and tasks*
>
> (Gooderham, 1995, p. 531)

Because Nordhaug's typology provides a very comprehensive approach to job competences, the potential for linking competence performance to productivity

measures is increased. However, his model of competences does not include competence performance links to productivity.

Application of Nordhaug's typology has produced some amendments and implications. When Lowendahl and Nordhaug[33] (1994) (as cited in Doeving, 2000, p17) developed a list of generic competences for the Lillehammer Olympic organising committee, competences did not all belong clearly in only one domain. Twelve competences, including social and political skills, were identified. Political skills could be classified in two domains namely general political skills and organisation-specific political competences. Social skills could be classified as: general social skills, co-operative skills and thirdly communication. However I consider this duality of classification arises from a generic list of competences. In the attempt to make the list of competences short, simple and generic, competences are not described clearly. The social skills and the political skills competences above, for example, can be written with more detail, as three and two separate competences respectively. These five competences are classified clearly as only one domain.

Doeving (2000) used Nordhaug's typology with a sample of nearly one thousand at Statoil in his study of the acquisition of competence. He identifies another level of analysis for intra-organisational competences - 'intraunit' competences. Intraunit competences relate to the specific structural and cultural features of a particular organisational unit, including the routines and workflow interdependences within the unit. He found the greatest predictive information on work performance was related to intra-organisational and intraunit competences. Like other researchers, he notes that the division of work performance into technical and non-technical dimensions distinguishes the differential relations of these domains with determinants and consequences of work performance (Conway, 1996; Doeving, 2000; Motowidlo, Borman, & Schmit, 1997).

For all the merits of Nordhaug's typology exceptions noted above, managers and researchers have not adopted it. This could be for a number of reasons. Although it provides a comprehensive framework for training and development most companies are not approaching their workforce development in a holistic way. For example, in spite of

[33] Original reference in Norwegian language

much rhetoric about upskilling the workforce of New Zealand (Department of Labour, 1999), the predominant types of training in New Zealand companies emanate from occupational health and safety legislation and the requirement for technical skills. When non-technical competences are considered, competence models used currently tend to be restricted to one of the approaches described earlier- a differential psychology approach particularly for leaders and managers, an educational/behavioural approach or a values approach. Furthermore, even if a company has a training and development specialist, who understands the benefits of a comprehensive typology, they would be likely to report to the human resource manager whose prime focus is likely to be strategic activities in the areas of knowledge management and intellectual capital. This typology currently does not translate into strategic human resource management measures in its current form. It would be more useful if it was aligned with business planning and reporting systems associated with knowledge management and intellectual capital.

Ulrich reminds us.

> *Competence in the absence of strategy is like acting without an audience. Competence is a component of the intellectual capital of an organization: competence times commitment is equal to intellectual capital. All companies need to consider their intellectual capital in managing an organisation's resources.*
>
> (Ulrich, 1998)

Business reporting for the 21st century

Two current business-reporting approaches address the integration of human capital into business planning and reporting for strategic advantage. They are the balanced scorecard and intellectual capital reporting. Both business-reporting methods emphasise the value of intangible[34] assets in a company, have a strategic human resource management theoretical basis and attempt measures of human capital. Employee measurement is commonly regarded as the biggest single feature that separates successful from less successful firms (Lingle & Schiemann, 1996).

[34] Employee knowledge, goodwill, quality of management, customer relationships, information infrastructure, trade secrets and patents)

Traditional double-entry bookkeeping, developed by Paciola in 1494, for a business to keep track of its asset base has lost credibility as the sole method for monitoring the financial viability of a firm. It deals primarily with tangible assets such as cash, inventory, accounts receivable and factory plant and equipment but ignores intangible assets such as human capital and only historical profits based on changes in tangible assets are reported (Davidow, 1996). Company shares often trade at considerably more (Edvinsson & Malone, 1997) or less (Davidow, 1996) than their book value. The historical profit reports can make companies appear financially successful when in fact their businesses are falling apart, for example, the Andersen Consulting audited companies of Enron and Worldcom. In the twenty first century intangible assets are subject to increasing returns, in contrast to the decreasing returns typical of traditional tangible resources. The most successful companies are those that use their intangible assets better and faster (Bontis, Dragonetti, Jacobsen, & Roos, 1999). Hence the reporting of intangible assets approaches are different from human resource accounting, but the concerns are the same. People and other intangible assets are too important to remain invisible; they need to be measured.

Balanced scorecard and intellectual capital reporting are the two key ways intangible assets are included in business reporting. Both have been influenced by the measures arising from the quality movement and competitive benchmarking and are aided by information technology. The latter has made it possible to generate, disseminate, analyse and store more information from more sources, for more people, more quickly and cheaply than previously (Eccles, 1991). Both promote the development of a coherent company-wide grammar, so terms are all understood and on an equal footing with financial measures. Human capital and training and development concepts are prominent, due to the emphasis on knowledge as a source of competitive advantage.

Balanced scorecard

The balanced scorecard originated in the United States in the nineteen nineties. It is similar to a tool called the 'tableau de bord' that emerged independently in France in the 1950s and 1960s (Bontis et al., 1999; Epstein & Manzoni, 1998). Kaplan and Norton's (1992; 1993; 1996a; 1996b) balanced scorecard was developed as a result of a study over several years sponsored by the Harvard Business School in association with

KPMG and twelve of their client companies. The purpose of the balanced score card is fourfold: to clarify and translate vision and strategy; communicate and link strategic objectives and measures; plan, set targets and align strategic initiatives and enhance strategic feedback and learning. The exercise of creating a balanced scorecard forces companies to integrate their vision and strategic objectives into measures that support short and long term goals (James & Hoque, 1997; Kaplan & Norton, 1996b; Silk, 1998).

The balanced scorecard involves the systematic measurement of financial and non-financial measures that are linked in a coherent system to translate strategy into operational terms for strategic decision-making. Involvement of employees at all levels of the organisation is encouraged. Front-line staff must understand the financial consequences of their decisions and actions and senior executives must understand the measures that are the drivers of long term financial success (Kaplan & Norton, 1996a; Thorne, Gurd, & Southwick, 1995).

A company's business mission and strategy is translated into four quadrants. The four quadrants are financial, customer, internal business process, and learning and growth. Each quadrant has tangible objectives, measures, targets, and initiatives with cause and effect links and correlations between systems and data. The intention of the model is to create a balance in business orientation and measurement. It includes both external and internal focus; the outcome measures include the results from past efforts (lag measures) and the measures that drive future performance (drivers). Objective, easily quantifiable measures as well as subjective, somewhat judgmental drivers of the outcome measures are advocated.

The component of the balanced scorecard model that is of particular relevance to this study on human capital is the 'learning and growth' quadrant, which is where one could expect human capital to be addressed. Objectives in this quadrant are described as the drivers for achieving excellence in the other three scorecard quadrants. Three principal components are described for the learning and growth quadrant. These are employee capabilities, information system capabilities, motivation, empowerment and alignment. The employee capability measurements recommended are employee satisfaction (because satisfied employees have the most satisfied customers), employee retention,

employee productivity (measured as the ratio of the output produced to a denominator of employee compensation i.e. the return on compensation), economic value added (EVA) per employee[35] and strategic job coverage ratio (the number of employees qualified for specific strategic jobs relative to the anticipated organisational needs) (Kaplan & Norton, 1993; 1996a). Information system capabilities are accounted for in terms of the capacity for distribution of information on the three other perspectives to all employees. Motivation, empowerment and alignment are reflected in organisational climate surveys, the number of suggestions per employee, the number of suggestions implemented with feedback to employees and employee development measures of improvement.

Many companies have adopted the balanced scorecard (Chesley & Wenger, 1999; Chow, Ganulin, Haddad, & Williamson, 1998; Fleisher & Mahaffy, 1997; Hoffecker & Goldenberg, 1994; Kaplan & Norton, 1993; Kurtzman, 1997; Lingle & Schiemann, 1996; Maisel, 1992; Newing, 1994; 1995; Silk, 1998; Thorne et al., 1995; Vitale, Mavrinac, & Hauser, 1994b; 1995). This is possibly due to its seemingly logical, conceptual simplicity, everyday terminology and flexible approach. It can give managers a fast but comprehensive view of the business including a measure of how well they are creating future value (Kaplan & Norton, 1992). The American Institute of Accountants' survey revealed that 64 per cent of US companies are experimenting with some sort of performance measurement system (Kurtzman, 1997). Two main approaches are reported. The first is a balanced scorecard with both financial and non-financial measures. This is based on the premise that financial results are historical therefore you need other measures in addition to know where you are going and your potential. Motorola and Analog are examples of this approach. The second approach uses a balanced scorecard but all measures used are, or ultimately contribute to, purely financial measures. Fortis and Shell are examples of this approach. The two measures that Shell advocates to reflect the intangible assets (including human capital), are the overall market value of the company if it was put up for sale and economic value added (EVA).

[35] EVA= net sales-operating expenses - taxes - capital charges

EVA is being used increasingly as a measure of the value to a company of its professional staff (Bontis, 1999; 1999; Chen & Dodd, 1997; Epstein & Young, 1999; Kurtzman, 1997; McCowan, Bowen, Huselid, & Becker, 1999; Schneier, 1997; van Buren, 1999). Fitz-enz's (2000) human capital return on investment is also a type of EVA. EVA has the appeal of a simply calculated formula available from existing data. However, EVA sheds no light on what it is that this group can do that lead to the results, i.e. the substance of human capital is not illuminated.

The measures chosen and how they are distributed, plus associated information technology capabilities, are central to the effectiveness of the balanced scorecard (Leadbeater, 1997; Roos, Roos, Dragonetti, & Edvinsson, 1997; Rosemann & Wiese, 1999; Silk, 1998). Hauser & Katz (1998) warn a firm becomes what it measures. Many measures seem right and are easy to measure but have subtle, counterproductive consequences. Other measures more difficult to calculate would focus the enterprise on those decisions and actions that are critical to success. Over measuring needs to be avoided and ideally the measures should not require a great deal of additional cost or effort.

Kaplan and Norton (1992) describe several major advantages of their balanced scorecard. First, it brings together aspects of the company that were not generally related in the past and demonstrates how these aspects must interrelate in order for the company to be successful. Second, it lessens the possibility that any given measure will lead to poor long term decisions in the company i.e. that improvement in one area will not come at the expense of another. Third, designing the balanced scorecard forces the integration of an overall vision into the daily planning in a company. It also forces the company to agree on what the vision should be and how it should be attained.

Bontis (1999) outlines a number of disadvantages of this popular business reporting strategic management model. He points out the inherent rigidity. Because the four quadrants drive the identification of key success factors there is a tendency to leave out any success factors that are cross perspective and do not fit tidily into one quadrant. In addition the quadrants themselves are limiting. Although Kaplan and Norton (1996a) advocate quadrants be expanded and modified, adherents of the balanced scorecard stick

to them rigidly. Moreover, consideration of the external environment is limited to customers – which tends to ignore the interaction and leverage of the suppliers, alliance partners, local community, and unions. No external comparison is possible with this model as it is primarily an internal document (Bontis et al., 1999).

I argue that there is a gap in the balanced scorecard's measures. A weakness, which I consider very significant to any consideration of human capital, is that employees are lumped together with the information technology systems into the learning and growth quadrant. Also innovation (the result of human learning and action) is part of the internal business process quadrant. As a result the balanced scorecard appears to submerge human capital and underestimates the specific challenges of managing people and their knowledge. Human capital, which is a driver of other results, is hidden. Organisational climate surveys, the number of training days, dollars spent on training, productivity and economic value added, are commonly used measures to infer employee performance. Although espoused as a value measure, the detailed knowledge of people's competences (the substance of human capital), particularly for non-management roles, appears to be at best included only by indirect inference. Hence in a knowledge economy where the importance of intellectual capital and knowledge management is critical, the competences remain undefined. The balanced score card model does not include human capital as a clear entity. I suggest that the lack of a practical, quantifiable measure for competences has hindered their inclusion in the balanced scorecard.

Rousseau and Rousseau (2000) remind us that the balanced scorecard is about performance reporting not performance management. I maintain that competences encourage the connection between performance reporting and performance management because they can make visible the human capital employees contribute. A balanced scorecard that includes competences has the potential to provide a performance management system aligned with business plans and results.

The balanced scorecard has a strong following because of the practical framework and process it offers for business planning and reporting, but on its own it provides incomplete information on the requirements and the current value of the organisation's

human capital. I suggest this weakness is aggravated by the current lack of a human capital measure that is based on competences.

Intellectual capital

Intellectual capital is the other key business reporting process that addresses human capital as an important intangible asset. It is a practitioner-created concept developed in Europe during the nineteen eighties independent of the balanced scorecard. There are a number of different paradigms for intellectual capital which all feature human capital as a discrete entity. The purpose of intellectual capital reporting is to make the knowledge of the company visible for decision-making and management. It overcomes a number of paradoxes that appear in the traditional reporting systems. For example, when investing in human capital there is a short-term deterioration in profits, which in turn reduces the book value of the organisation on the balance sheet. Intellectual capital reporting can make this investment visible (Bontis, 1999).

Bontis (1999) draws attention to the difference in performance of knowledge as a resource. An economic fundamental of supply, demand and scarcity does not account for intellectual capital. The more knowledge is supplied (or shared), the more highly it is valued; the demand for knowledge never declines. Bontis adapts the resource-based view of the firm, the predominant, theoretical framework and describes intellectual capital as a knowledge-based view of the firm.

The term intellectual capital to describe these intangible assets evolved along the way. By 1988 Sveiby (1997) introduced the terms 'structural capital' and 'individual capital' to differentiate intangible assets when outlining the company's position in the annual report. Edvinsson and Roos developed this framework further. It was not until 1991 that Stewart (1997) coined the term 'intellectual capital' for these intangible assets. Shortly afterwards, Edvinsson became director of intellectual capital at Skandia, the first such position in the world (Edvinsson, 1997). In 1996 the Securities and Exchange Commission in the USA indicated that they would like to see an intellectual capital supplement to companies' annual reports (Roos & Roos, 1997). By 1997 an American Society for Training and Development poll reported that nearly fifty per cent of respondent companies had someone, or a department, addressing intellectual capital

issues (Harvey & Lusch, 1999). A recent survey in the USA by Ernst & Young's Centre for Business Innovation found measuring the value and performance of knowledge assets ranked as the second most important challenge facing companies today (43 per cent) surpassed only by changing people's behaviour (56 per cent). However only four per cent claimed to be currently 'good' or 'excellent' at measuring the value of knowledge assets or the impact of knowledge management (Harvey & Lusch, 1999).

There are an increasing number of applications of intellectual capital reporting. In Sweden annual reports of public companies usually have personnel statements that contain key figures and graphs on the subject and such reporting is also increasing in other countries (Allee, 1997; Harvey & Lusch, 1999; Lynn, 1998; Sveiby, 1997). Applications include Skandia's 'navigator' (Edvinsson & Malone, 1997; Sveiby, 1997), Sveiby's (1997) 'intangible assets monitor' and Stewart's radar chart: 'intellectual capital navigator' (Stewart, 1997).

There are a number of different perspectives of what intellectual capital is comprised and where knowledge and human capital fit within the paradigm. Machlup (1984) identifies three components of knowledge capital. First, knowledge embodied in physical tools or machines built according to specifications developed in costly research and development. Second, knowledge embodied in individuals who are specially schooled and trained 'knowledge carriers' or qualified workers with acquired skills. Third, non-embodied knowledge created and disseminated at a cost, but not inseparably embodied in any particular carriers or any particular products (later referred to as structural capital or internal structure).

The key researchers in the area of intellectual capital all include these three components with the exception of Ulrich. Intellectual capital is variously categorised and termed as: employee competence, internal structure and external structure (Sveiby, 1997), human, structural and customer capital (Stewart, 1997), human capital and structural capital (Roos et al., 1997) and human capital, renewal capital, structural capital, and relationship capital (Miller, 1999). Ulrich (Gautschi, 1998; 1998) refers to intellectual capital as 'competence times commitment'. I observe that this appears to be a

reframing of Sutermeister's (1976) earlier ability times motivation as a description of the human contribution to productivity.

In contrast to the balanced scorecard, human capital has a very clear role in each intellectual capital paradigm, although the span of influence varies. Sveiby (1997) describes human capital as employee competence, which is the capacity to act in a wide variety of situations to create both tangible and intangible assets. Roos and Roos (1997) describe human capital as the collection of intangibles that are embedded in members of the organisation. These include competences (including skills and know how), attitude (motivation and the leadership qualities of top management), intellectual agility (the ability of organisational members to be 'quick on their intellectual feet') and innovation and entrepreneurship, (the ability to adapt and cross-fertilise etc.). This mental agility is equivalent to what other authors call meta-cognition. Roos and Roos' description of human capital is compatible with my definition of competences. Ulrich's (1998) narrower description of intellectual capital reflects the focus of his research into how to get committed employees.

Not all advocates of intellectual capital reporting consider human capital is the key component. Stewart (1997) considers structural capital more important than human capital: human capital is individual know how. He argues that because structural capital can be traded and owned it is ultimately more important than human capital that cannot be owned but only rented. Consequently, a key role of leadership, is transforming human capital into structural capital by making the tacit[36] knowledge explicit (Stewart, 1997). A company therefore must not over invest in knowledge development (Keisler & Sproull, 1991; Stewart, 1997). Both Edvinsson and Stewart have less focus on the nature of human capital and are less descriptive about employee competence than Sveiby and Roos and Roos. This is no doubt influenced by their focus on structural capital.

Roos and Roos and Stewart emphasise that, in addition to recording the stocks of intellectual capital, it is essential for a company to measure and thus manage the flows.

[36] Tacit knowledge is knowledge that cannot be documented, formalised easily, talked about with newcomers, turned into procedures or reproduced through statements, techniques or models (McAulay, Russell, & Sims, 1997)

The growth or decline of intellectual capital in a company can be interpreted as an early warning signal of subsequent financial performance (Roos et al., 1997).

Toystiga and Sveiby developed knowledge worker frameworks. Toystiga's (1999) diagnostic instrument profiles nine different knowledge worker roles to reveal the tacit knowledge of an organisation. Sveiby (1997) classifies the employees of a company that consists largely of skilled professionals into four categories based on professional and organisational knowledge: professionals, leaders, support staff and managers.

I do not use either of these frameworks, as they do not illuminate the substance of human capital. They categorise roles and enable generic observations between organisations. They do not clarify what it is in a particular organisation that comprises a particular role.

Human capital has an undisputable role as an important, if not the most important intangible asset of an organisation's intellectual capital. However, the measures to represent human capital although many and varied (Edvinsson & Malone, 1997; Stewart, 1997; Sveiby, 1997) do not appear to measure human capital directly. I have listed the myriad measures of human capital in groups in Table 2.2.

Table 2.2
Intellectual capital reporting - Human capital measures

Type of Measure	Human Capital Measures
Indexes	leadership index, motivation index, empowerment index (Edvinsson & Malone, 1997)
General personnel data numbers, percentages, averages	number of employees, employee turnover, average years of service with the company, average age of employees, number of fulltime permanent employees, average age of fulltime/permanent employees, average years with company of fulltime permanent employees, annual turnover of full-time permanent employees, average years with company of fulltime temporary employees, fulltime/permanent employees who spend less than 50 percent of work hours at a corporate facility, percentage of fulltime permanent employees, , number of full-time temporary employees, number of part-time employees/non-fulltime contractors, average duration of contracts (Edvinsson & Malone, 1997)
Key staff data numbers, ratios, percentages, averages, trends,	number of managers, number of women managers, percentage of company managers with advanced degrees in business, science and engineering and arts, percentage of employees under age of 40 (Edvinsson & Malone, 1997) rookie ratio (percentage of employees with less than two years of experience), value-added per expert and per employee, turnover among experts, the average number of years of experience employees have in their professions, growth in average professional experience, change in the added value per professional (EVA), change in the proportion of professionals, turnover rate of professionals, executive grading, average years of education, ratio of support staff to professional staff (Sveiby, 1997)
Staff competence duration, costs, qualitative, gap analysis, standards,	time in training (days/year), information technology, literacy of staff, per capita annual cost of training, communication and support programs for full-time permanent employees, per capita annual cost of training and support programs for full-time permanent employees (Edvinsson & Malone, 1997) records of the gaps between staff skills and customer expectation, competence turnover, training costs as a percentage of turnover (Sveiby, 1997)
Productivity Percentages, ratios, EVA	percentage of sales attributable to new products or services (innovation), share of sales from competence-enhancing customers, EVA (Sveiby, 1997)

Competence turnover appears to be the only measure in Table 2.2 that looks directly at the substance of human capital. The measures described here have a strong personnel management focus rather than a knowledge/competence management focus. This is at odds with the intellectual capital paradigms with which they are associated.

The American Society for Training and Development (ASTD) developed a framework to encourage standardisation of human capital measures in intellectual capital reports. Their goal is to develop sound methods for measuring the value and effects of intellectual capital, to generate the information needed to continuously improve its value to an organisation (van Buren, 1999) and provide the information considered essential

for investment in intellectual capital to become a strategic consideration. As Cohen and Backer (1999) point out the training industry's main purpose is to gather, disseminate and convert knowledge into value and thereby create intellectual capital.

The ASTD's intellectual capital management model advocates two sets of measures in order to capture the stocks and flows of human capital and to measure the strategic effect on a company's performance. There are measures of intellectual capital stocks and measures of financial performance to assess effectiveness and thus link training and development to the bottom line.

This ASTD initiative identified four categories of intellectual capital measures: human capital, innovation capital, process capital, and customer capital. Commonly used measures in each category are ranked in terms of their relevance, 'collect ability' and applicability to a wide variety of firms as 'core'[37] indicators and measures and 'elective'[38] measures. I have listed the human capital measure in Tables 2.3 and Table 2.4 respectively to highlight commonly used American measures of human capital.

Table 2.3

Core human capital[39] measures

Indicator	Measure
Retention of key personnel	Percentage of employees most essential to the organisation retained during the previous year
Ability to attract talented people	Percentage of openings requiring advanced degrees or substantial experience filled in the previous year
Information Technology literacy	Percentage of employees with a basic level of proficiency in standard office applications
Training expenditures as a percent of payroll	Total expenditures on training in the previous year as a percent of the organisation's annual payroll
Replacement costs of key personnel	Average cost to recruit, hire, and train someone to fill an essential job in the organisation
Employee satisfaction	Percentage of employees highly satisfied with the organisation and their jobs
Employee commitment	Percentage of employees highly dedicated and committed to the organisation

(van Buren, 1999, p.75)

[37] Core= top quartile
[38] Elective= second quartile
[39] Human capital is defined as the knowledge, skills and competences of people in an organisation

Table 2.4
Elective human capital measures

Organizational learning	Employee empowerment
Effectiveness of learning transfer in key areas	Management experience
Management credibility	Time in training
Employee wages and salaries	Percentage of training with X+ years of experience
Educational levels- percentage of college graduates	Empowerment teams

(van Buren, 1999, p.76)

By collecting the most commonly used human capital measures to create consistency in reporting the ASTD has not addressed the challenge of creating a more valid measure of human capital to lead organisations into the future. These measures, although they are the most commonly used currently, have a mismatch between indicators and measures. For example, organisational learning is represented by employee empowerment. The focus on training and development does not produce measures that identify the nature of stocks and flows of individuals' human capital. There is an unexplained chasm: the competences needed and those currently available are not visible. Nor is there a standardised measure that can directly connect an individual's identified competences through work performance to business results.

Bassi and Plott (Powell, 2002) base their 'knowledge asset management' formula on this model. Their formula accommodates a one-year lag factor for the benefits of training and education, includes investments in training and education and other financial variables and calculates an expected total stockholder return. It is a return on investment[40] formula. It does not illuminate the substance of human capital.

Intellectual capital reporting of human capital has both advantages and disadvantages. It is flexible and dynamic. Partially external comparisons are possible and it is also applicable to not-for-profit organisations (Bontis et al., 1999). I can see that a broad description of workforce qualifications, training and development initiatives, personnel statistics, staff and customer survey feedback and associated financial return provides vastly greater visibility of human capital as an intangible asset.

[40] Return on investment measures have been discussed earlier in this chapter

Disadvantages of the current intellectual capital reporting lie in the confusion of intellectual capital categories, their components and measures (Hauser & Katz, 1998). The ASTD initiative attempts to address this bewildering array of measures, albeit based on historical data. Bontis (1999) argues that current applications tend to concentrate more on the stocks of knowledge at the expense of the flows. Yet it is the flows of knowledge that are needed for an accurate view of an organisation for planning and predictions. I contend that the measures tend to be descriptive of associated factors of human capital but not the substance of human capital itself; since the stocks of human capital are not identified and measured, changes in stock cannot be. Flows of human capital are not visible with any clarity of detail of the substance. The lack of a measure that encompasses the substance of human capital linked to the bottom line or organisational success measures (for a not-for-profit organisation) limits the strategic consideration of human capital in business planning.

Brown's HCI

Brown (1999) approaches this gap between the acknowledgement of human capital as a key asset and the measures available, with both a simple and a more complex human capital index. The more complex index includes experience and competences, with individual weighted percentage scores for each. These two scores are then combined into a human capital index score. The competence score is derived from the proportional weighted percentages of an individual's technical and non-technical competences, weighted according to the company's perceived importance. The experience score is comprised of four weighted percentages (also determined by the company). First is job level in the company (by job grade or organisational chart level). Second are the performance ratings on the competences. Third is the number and variety of positions/assignments held, and fourth is the years of experience in the business/field. This formula results in a custom designed measure for a company to identify the level of performance and knowledge of its employees. Brown's human capital index can be used to observe trends from year to year therefore the flows of human capital become evident.

Indexes are common and appropriate measures for trends. They do not claim to prove anything but aspire to give a consistent, legitimate view of a complex phenomenon

(Fitz-enz, 2000). Maintenance of Brown's individual human capital indexes aims to identify the trends in stocks and flow of human capital in an organisation. However Fitz-enz (2000) cautions that calling something an index does not make it one. To be a true index it must be a valid and reliable focused set of data in a given context and be maintained over an extended period. This consistency in determination means it can also provide an effective basis for prediction of future performance. Internal validity is essential; in other words, the index must represent a true relationship among components. Examples of familiar indexes that are long standing and reliable, the 'cost-of-living index', and the 'consumer price index', have had long-term consistency in application. Brown's human capital index does not stress consistency.

Brown's (1999; 2000) index is a flexible structure that he proposes an organisation adopt and develop itself. The weightings are subjective and can vary from company to company. How objective measures such as years of experience and level in the company are presented for consistency is not explained. Therefore, one of the same criticisms of the balanced scorecard and Flamholtz's models (1974) applies to Brown's formula. Unless a work role has the same presentation of objective measures and competences and weightings, inter-organisational comparison is not possible. Furthermore, Brown's approach to competences is relatively unstructured. Brown acknowledges:

> *the competency side of the equation is a little more challenging*
>
> (Brown, 2000, p 144)

Technical and non-technical competences are included in Brown's human capital index. Technical competences are the broad disciplines or fields of knowledge selected by a cross-functional team. Non-technical competences are non-technical skills considered important by the organisation. They may be the core values or sourced from generic lists. He recommends inclusion of fifteen to twenty technical and non-technical competences most closely correlated with company current and future success. How this close correlation is determined is unclear. This list of competences that includes both technical and non-technical, is given weightings and a ten-point rating scale is used for individuals' competence measurement.

Brown's (1999; 2000) human capital index has a number of strengths. His index draws together quantitative and qualitative data that is already available, or required to manage performance effectively, into a single measure that is dynamic and can be used to monitor human capital stocks and flows. The majority of the components are objective, reliable data; for example, the job level, years of experience and number of positions (Brown, 2000). The criticism that the index cannot be compared across companies and is less reliable because subjective measures are introduced, has the converse advantage that it can be more relevant to a particular organisation for monitoring trends. For example, the process of assigning weightings could clarify priorities in any psychological contract. Furthermore, the inclusion of the specific competences required by an organisation makes it more valid. However, the use of generic lists for competences, the partial coverage of competences required and the untested relationship between the variables in the index and the index and the bottom line are all issues to address for it to be a valid and reliable human capital measure. Brown's human capital index cannot in its present form be used as a strategic measure of the human capital of the total workforce.

There were no available examples of companies who have adopted Brown's human capital index at the time of writing. I was told there are a few companies experimenting with this index[41] in the USA.

A valid, credible measure such as an index based on competences could identify stocks and flows of human capital. It could have a significant role in business planning and monitoring the benefits of human resource practices including training and development. To be more reliable and valid than the Brown index, more structure is needed to create consistency in what types of competences are included. Furthermore a company would need to undergo a process of pilot, review and amendment of their index, in relation to relevant productivity measures or the bottom line results.

Conclusion

This review of literature reveals the gap between the importance of human capital and the characteristics of the available measures and their uptake. All this is in the context

[41] Email communication with M G Brown in 2001

of theories and models with concepts relevant to my research. There does not appear to be a human capital measure, currently in use, that provides information on an individual's competence performance and presents this information as a simple measure directly connected to the bottom line. A number of theories, models, paradigms and measures in the areas of human resource management, competence, productivity and human capital exist and contribute to this study. My applied research explores some of the connections between several of these independent constructs in the process of developing an original human capital measure based on competences. Key ideas from the literature include the use of a typology to foster a consistent span of competences, competence performance equating to work performance, correlations between competences and productivity measures, components to include in a human capital index measure and consideration of the validity of a human capital measure.

Human capital theory and Flamholtz's (1972a) human resource accounting model provide a context for exploring competences in a human capital measure. Becker's (1962; 1964) human capital theory is a cornerstone for research into human capital and provides a standard measure of inferred human capital from tertiary qualifications. Flamholtz's 'revised model of the determinants of an individual's worth to a formal organisation' (Flamholtz, 1972a) includes components that represent the substance of human capital and gave me inspiration to find a simpler, more acceptable measure. The more recent constructs of the psychological contract between the worker and the organisation, and Davenport's (1999) proposal that the workforce be regarded as the owners and investors of their own human capital are compatible with this model.

Nordhaug's (1993) typology of competences, influenced by management science and economic theory, provides a framework for competences that is comprehensive enough to encompass an individual's knowledge, skills and aptitudes. Its flexibility makes it functional for most organisations and positions, and it has potential also for comparative research. This typology, with the computer software available today, increases the practicality of reporting competence as an intangible asset.

Strategic human resource management in a primarily knowledge economy, has made the time right to explore human capital measures compatible with the balanced score

card and intellectual capital reporting paradigms. Currently, the measures that tend to be used are simple, concise measures from which human capital can only be inferred. A gap remains between these measures and the information required for an organisation to manage its workforce for strategic advantage.

What this study will attempt to do is develop a human capital measure with direct links between a competence profile and organisational/productivity outcomes. If individuals' aggregate competences can be quantified as a measure for strategic monitoring by senior executives, this would be an added advantage. Interpretation of and experimentation with Brown's (1999) human capital index provides a starting point to link the performance scores of workforce competences to productivity measures.

Productivity is organisation specific, as is this type of human capital measure. Hence the link between competences and productivity has the advantage of conceptual simplicity. Evidence of a positive correlation between the two could illuminate the competences associated with superior organisational performance. A human capital measure that can encompass this relationship would bridge the current gap between the concept and available measures of human capital.

I have developed and applied a human capital index procedure in a pilot and seven samples for seven different job roles. Competences and productivity measures along with consideration of other workforce characteristics have been researched in the development of a valid human capital index as a measure of human capital. Chapter 3 outlines the methodology used in this case study research and its limitations.

Addendum

* Knowledge and skills are included in the OECD definition of human capital which is in chapter 1 p 18

Chapter 3

Methodology

My study set out to develop and test a new procedure involving competences to measure human capital. This chapter outlines the methodology for this study with its many variables. It is conducted within the workplace amidst the realities of accessibility to people and information and with the quality of data being beyond my control. However as my objective was to develop a practical measure for human capital it was very appropriate to carry out exploratory research in this diverse and complex environment.

The methodology is outlined as follows. First my overall approach is explained in terms of the relevant research design paradigms. This is followed by the two key research practices used, case study and 360-degree feedback. Key issues in the literature on these two issues are outlined. Design of the human capital index procedure is in two sections. First, a pilot case study is described which provided a basis for exploring dimensions of an existing human capital index. This is followed by a revised and simplified human capital index procedure that is used in the case studies. Then the case studies and the steps taken in conducting the exploratory field study with this original human capital index are outlined, followed by the method of data analysis and limitations of the research approach. The flow chart Figure 3.1, which follows, gives an overview of the sections in the methodology.

Figure 3.1
Methodology outline

Research objective	To develop a practical valid measure of human capital based on competences, that correlates strongly with productivity measures.
Research sub-questions	Should the HCI include any other workforce characteristics in addition to competences because of their strong correlations with productivity results?
	How practical is the Nordhaug *(1993)* framework in accommodating all types of competences in profiles that give comprehensive coverage of job roles?
	Are any of the Nordhaug *(1993)* competence domains associated with superior productivity results?
	What attributes of organisation productivity measures foster a reliable, valid association with workforce competences?
Research design paradigm	

Research methods	Case study 360-degree/multi-rater feedback	
Design of HCI procedure	Pilot case study Revised simplified HCI	
Case Studies	Selection process Steps taken	Competence profile development 360-degree feedback personnel data collection productivity measures correlations and HCI development reaction to HCI
Data Analysis		
Limitations		

Research design paradigm

A brief analysis of research design paradigms follows to position my use of case study methodology and multi-rater feedback research methods. This subsequently assists the interpretation of study results.

There are numerous well documented, competing paradigms in social science research (Guba & Lincoln, 1994; Miles & Huberman, 1994; Strauss, 1987) but my research is best explained in terms of positivistic research with reference to the contrasting phenomenological paradigm. Morgan and Smircich (1980) argue that to accommodate the variety of research designs used in reality, it is more functional to consider the positivistic paradigm to be at one end of a research paradigm continuum and the phenomenological paradigm to be at the other. A selected research methodology may lie between the two extremes and therefore have features and assumptions of both.

This research design is primarily positivistic with certain phenomenological features. Positivistic research seeks the facts; data tends to be quantitative, highly specific and precise. This study fits into this paradigm because it is a number based process for developing a human capital measure. Phenomenological research focuses on meaning rather than measurement of human activity (Hussey & Hussey, 1997). Although this study is about the development of a measure for human capital, what makes my approach different to other measures of human capital is that it is attempts to create a meaningful human capital measure that represents the substance of human capital. This involves me in the development of competence profiles unique to each case study and

un-piloted, although Nordhaug's standardised framework to categorise the competences tempers this. The productivity measures collected are also unique to each case study and in some instances had not been tested previously. This context specific data, small sample sizes, my involvement in the process and the question of reliability for multi-rater feedback and productivity measures, sit more often in a phenomenological paradigm.

The phenomenological features within this positivistic research design mean that the deductive process of cause and effect and hypothesis testing often associated with positivistic research is not directly applicable. Therefore, I use a research objective with sub-questions rather than a hypothesis. This is exploratory research. My emphasis is on developing a valid human capital measure rather than a highly reliable but less valid measure. Plenty of the latter are currently available. Reliability is increased with the use of a competence typology, a reliability check on the classification of each competence profile, the calculation of standard deviations for the multi-rater feedback, the use of existing objective productivity measures where possible and verification of results in case studies where additional productivity results are available.

Lieberson (1992) has previously highlighted the applicability of borrowing from other research paradigms for interpretation of results. Although generalisations from the sample to a population associated with positivistic research are not appropriate, my study aspires to make generalisations about the procedure for developing a human capital measure. In case study and phenomenological research designs, generalisations can be made from one setting to another, but not to a population (Creswell, 1994; Hussey & Hussey, 1997). Yin (1989) describes this when addressing the question of the scientific generalisability of the outcomes of case study research as analytic generalisations but not statistical generalisations.

A possible interpretation of the research results could include a theoretical proposition in accordance with a phenomenological paradigm. The study aspires to predicting analytical generalisation for other groups within a case study organisation if they use the same competence profile, processes of competence categorisation, rating system, weighting, human capital index components and productivity measures. More

importantly, because the procedure for the development of a human capital index is applied to a number of different competence profiles in different organisations, there is the potential for generalisability of the procedure.

Research methods

Case study

I developed a human capital index as a human capital measure with small groups of employees in six different organisations. The first organisation, an engineering company, was used to pilot, and subsequently review, the components of the formula and the process for a human capital index. The revised process was then applied in five organisations with a total of seven groups, each with a different competence profile. Further modifications were introduced to the process during these applications.

The competence profiles were for two groups of lawyers in the same department and firm, customer service representatives and customer service officers in the same bank, engineers in a not-for profit organisation, department managers in a supermarket and service technicians in a gaming company. I facilitated the development of all the competence profiles except for the lawyers. The lawyer profiles were taken from their existing performance management competences and a competence profile developed in another law firm. In every case study each domain of the Nordhaug typology was covered directly or by inference in each profile. Confidential 360-degree feedback (on a rating scale) on the participants' competence profiles was collected as well as individual productivity measures and personnel data.

Correlations between competences, personnel data and productivity measures were made. The correlation results, and competence performance scores provided the basis for a formula that resulted in a human capital index. Correlations between the human capital index and productivity measures were compared with the correlations of personnel data including tertiary education.

A case study approach was chosen because case studies allow for the exploration of a new area with the purpose of developing a theoretical proposition and a procedure for a new organisation specific human capital measure (Eisenhardt, 1989). This study

explores the use of competences as a basis for a human capital index to represent the value of an organisation's human capital. It is therefore appropriate to try out the process for developing a human capital index in a number of organisations and with a number of groups. A case study approach makes it possible to focus on the process without being distracted by large numbers in each of the samples.

Case studies focus on naturally occurring, ordinary events in a natural setting, hence there is an inherent flexibility for adapting to the realities of a busy workplace. Thus they facilitate richness and holism of collected data (Marshall, 1999; Yin, 1989). The reality of a number of different workplaces is relevant to my aim to develop a practical measure for the workplace. A human capital index procedure developed in workplace contexts ensures practicality is present in the frame of reference. The interactions and completeness of data and processes varied from organisation to organisation. The contact people in the organisations determined what was practical for them, what data they were prepared to divulge, what activities I could participate in and the people I could meet during the process. The flexibility of a case study approach is also conducive to a developmental process where a procedure is adapted during application because of the workplace realities.

The data collected in each case study was predominantly quantitative data. Data collected consisted of the performance ratings for competences, the number of years of work experience, the number of jobs, age, the number of years of tertiary education, the number of qualifications, productivity measures and gender together with case notes on each organisation. The key quantitative entities were the performance ratings for competences and productivity measures. Competences were classified according to Nordhaug's (1993) qualitative typology but represented by performance scores from 360-degree feedback. Quantifying competences enables comparisons between typology domains and the development of a human capital measure based on competences correlated with productivity measures. Competences are by nature descriptive and Nordhaug's typology provides a descriptive framework for categorising competences. Human capital is made visible through the performance ratings on comprehensive competence profiles. Conversely, the quantitative competence performance-rating data can be supplemented, explained, illuminated, or reinterpreted by the qualitative data of

the competences (Miles & Huberman, 1994; Yin, 1989). Each case study explores the correlations between productivity measures and competences and personnel data. This fits Yin's (1989) description of an embedded design because it has multiple levels of analysis within a single study.

I examine the similarities and differences between the human capital index process in each case study and identify any cross case patterns. My purpose is to augment the constructs for the tentative development of a process model for a human capital index based on competences. These constructs were used in turn to determine whether the evidence from each case study supported any emergent relationships between constructs. The case study approach is compatible with a process of hypothesis development for theory building research (Eisenhardt, 1989).

In case studies small sample size, measurement error and a myriad of uncontrolled variables are issues when it comes to interpretation of results. Lieberson (1992) suggests that it is appropriate to approach the methodology in a deterministic paradigm as described above, but to borrow from the probabilistic paradigm for the interpretation of results. Interpretation of results in terms of the probability of an outcome with certain variables accommodates the perpetual social science problem of measurement error. Thus a result that involves some measurement error may deviate from the hypothesis, but still not make the hypothesis wrong.

In this study I have small numbers in each case study and measurement errors are likely with performance ratings of competences and some of the productivity measures available in some of the organisations. In addition, there are a myriad of uncontrolled variables because it is a case study approach. I approach the development of a human capital index in a deterministic way, with a formalised set of procedures and a correlation process. Verification of results with an additional set of productivity measures was possible in two cases. Interpretation of results in each case study is, however, tentative and probabilistic due to these characteristics associated with my case study approach. I consider that this does not prevent a response to my research objective. Nor does it negate interpretation of the utility of the procedure for developing a human capital index as a valid practical measure of human capital.

360-degree/multi-rater feedback

In each case study I develop and conduct 360-degree feedback to obtain the performance rating scores (on a five-point scale) for each individual in the group on each of the competences in a competence profile. Performance scores for competences are used to make an individual's human capital visible. The scores received for a competence are averaged to provide the individual's score for the competence. The averaged score is used in correlation analyses between competences and productivity measures and in the formula for a human capital index. Each group and their competence profile receive feedback from the participant, a peer, a superior and in most cases a subordinate also. A competence performance score is therefore the average of three or in most cases four scores. Individuals' feedback remains anonymous as it is sent directly to me.

The use of multi-rater feedback in which subordinates, peers and supervisors provide anonymous feedback on a staff member (often in association with self ratings) is widely used (Antonioni, 1996; De Nisi, 2000; Fletcher & Baldry, 2000). It is considered an invaluable developmental tool (Atwater, Roush, & Fischthal, 1995; Reilly, Smither, & Vasukopoulos, 1996), although, there is an increasing amount of literature that qualifies the benefits (Borman, 1998; Brett & Atwater, 2001). The groups in each case study are very different in terms of their organisations, roles, education levels, age, gender composition and work experience. I, therefore, include at this point key findings from the literature on multi-rater feedback to provide a context for interpretation of the results.

Studies using multi-rater feedback have revealed biases in ratings. These include a gender bias such as a pro-male bias when only men serve as raters (Bowen, Swim, & Jacobs, 2000) and a bias resulting from female managers rating themselves lower than their male counterparts and lower than their own supervisors rate them (Wohlers & London, 1989). Similarly, female staff in a sales and marketing company are less likely to over-estimate their performance, when it is measured objectively, than males (Lindeman, Sundvik, & Rouhianen, 1995). There are also gender differences between self-rating and subordinate ratings far greater agreement is reported between female

mangers and their subordinates than between male managers and their subordinates (London & Wohlers, 1991).

Self-ratings tend to be higher than ratings by superiors (Pollack & Pollack, 1996) and colleagues (Nilsen & Campbell, 1993). It is suggested that this is a form of self-defence in a potentially threatening assessment situation. De Nisi (2000) suggests that a 360-degree feedback process should only be used with employees who have high self-esteem. He also recommends that all raters not evaluate employees in all areas. Raters should provide feedback only in the areas of which they have knowledge. Multi-rater feedback should also only be used for development purposes, not for decision-making. This he argues will ensure people trust the process and avoid manipulation of the results (De Nisi, 2000). However, other studies counteracted some of his concerns. Multi-rater feedback is anonymous and research has demonstrated that anonymous feedback is more honest and closer to what raters actually feel about the recipients than any other method of feedback (Ghorpade, 2000).

Typically, a multi-rater feedback process involves subordinate, peer, superior and self-ratings and four to ten feedback providers per recipient (Vinson, 1996). In general the literature suggests that the more people who appraise an individual's performance, the more it is likely biases will cancel each other out. Moreover, collecting performance data from a variety of sources allows for a more complete picture of the individual's performance (Pollack & Pollack, 1996). Often the subordinate, peer and superior ratings are averaged and compared with self-ratings. However for this research the self-rating is included in the median score and standard deviations are calculated between the different rater sources to monitor differences. The 360-degree feedback approach I use generally includes superior, subordinate, peer and self-rate. It is adopted to allow for a 360-degree feedback process that is practical and feasible to administer and allows for as reliable and valid assessment of performance as possible within the limits of the research contexts.

Murphy & Cleveland (1995) emphasise the importance of considering the rating context before attempting to analyse and evaluate the effectiveness and accuracy of

performance ratings. The case study approach with its qualitative contextual data provides this information.

Best practice is to prepare and train staff for the introduction of any 360-degree/multi-rater performance measurement system (UBS Warburg LLC, 2001; Woehr & Huffcutt, 1994). It is recommended that there be a robust education campaign including face-to-face meetings and briefings open to all, with senior managers present and involved. A training course in evaluating performance and providing feedback should also be provided to prepare employees for the process (UBS Warburg LLC, 2001). In this research it was possible to record the prior organisational experiences of the 360-degree process, but not to implement any preparatory processes for the method.

De Nisi (2000) raises the issue of the acceptability of rating people. Hedge and Teachout (2000) propose that in a 360-degree feedback rating system, user acceptance may be critical for successful implementation and continued use. These same issues I predict will apply to a human capital index measure based on a 360-degree feedback process. Hedge and Teachout argue that user acceptance should be considered in addition to the reliability and validity[42] of a performance appraisal instrument. They found rater motivation, rater trust and situational constraints[43] were predictive of acceptability for both supervisors and job incumbents. Bernardin and Beatty (1984) argue the organisational climate surrounding performance appraisal affects acceptability. Acceptability of the human capital index measure derived from 360-degree performance ratings requires consideration, along with the criteria for an effective measure discussed in the productivity literature review in Chapter 2.

Design of the HCI procedure

I first conducted a pilot study in order to test out the components of and a procedure for developing a human capital index that drew from a variety of sources in the literature (Brown, 2000; Flamholtz, 1972a; Nordhaug, 1993; Wright, McMahan, & McWilliams, 1994). As a result of a review of this pilot I developed an original instrument that was used in each of the subsequent case studies. Each case study has a different context and

[42] Reliability and the three elements of validity - criterion-related, content and construct (Cooper2001)
[43] Situational constraints include availability of clear instructions, manuals and equipment to be able to judge job proficiency fairly, accurately and confidently

data therefore they contributed in different ways to the development of the human capital index procedure.

The Pilot Study

During the early part of 2000 I conducted exploratory research into the potential process of using the Nordhaug domains of competences as a basis for developing a human capital index. A small engineering company, whose owner/operator was well known to me, agreed to be involved. This was conditional on there being no direct contact with his staff by me, nor disruption of their work schedule. We applied the Nordhaug typology (Appendix 1) in the development of a simple competence profile and a human capital index for his production staff.

The company consists of the owner/operator who has professional engineering qualifications, his wife who does the books, one production staff member who is also the supervisor, five staff who are machinists, fitters or welders and one apprentice. Minimal individual personnel records existed and there were no prior competence ratings or individual measures. The job cards recorded time but did not identify quality or rework. Nor were there any records of standard times for specific jobs.

The company's primary market is engineering jobbing[44] work, particularly that involving hydraulics. This means there is a need for diagnostic skills for repair and maintenance, design of equipment and parts and machining, welding and fitting. Customer contact, design of equipment, costing and scheduling, co-ordination and supervision of work are primarily done by the owner/operator. The supervisor occasionally manages projects. The owner/operator said he utilises the individual strengths of the production staff by knowledgeable allotment of tasks and just enough, very targeted, on-job-training for effectiveness and efficiency. For example, if a relatively large number of parts require manufacturing for a particular job, one of the slower learning fitters will be given the training in how to do it. However if the volume is small it is left to the more skilled workers.

Throughout this exploratory process I met informally with the owner/operator for six periods of approximately 20-30 minutes. Because of the nature of his work, making a

[44] One off repairs and maintenance

precise time for any future appointment was of no advantage, although the days to avoid or aim for were indicated.

First the owner/operator gave me the first names of the staff to be included in the study and their qualifications. With these qualifications as a basis I investigated the equivalent NZQA competence-based qualifications but found that any translation of the qualifications into competence standards still did not cover all the competence categories of the Nordhaug typology. The NZQA units in a trade qualification focus on the trainable competences related to technical work. Nordhaug's typology covers work related personal traits, attitudes, aptitudes and organisational and industry cultural mores and networks. Links with the NZQA qualification framework were therefore not pursued further in this study.

Subsequently, I talked the owner/operator through the Nordhaug's (1993) domains of competences (See Appendix 1 for the outline used) and noted what competences he described for his production staff. I typed these up and took them back to him. They were reviewed by him and modified until they reflected what he thought were the competences the production job required. From this list he selected those he considered the most important for a weighting in the human capital index procedure. After discussion about the relative importance of the competence domains to organisational success, he also gave me his proportional weightings for the clusters of non-technical and technical competences. This was non-technical 25 and technical competences 75. The competence profile is in Appendix 2, Engineering pilot case study.

This profile was then used to make a rating on a one to five-point scale for each competence for each of the seven production staff. I read out the competence to the owner/operator (who also had a copy in front of him) and asked him what rating he would give each of the staff members. I then wrote down the number he said. All of the competences for each individual were then represented by a quantitative measure for competence performance. A small number of technical competences were not applicable to certain staff, because of role variation between fitters and welders, fitters and turners, and toolmakers. There was also one supervisor and an apprentice in the group of seven. The owner/operator originally gave ratings on all competences for all

of those in this case study. It was therefore possible to carry out two human capital index calculations, one that included all competences and one that excluded those few the owner/operator subsequently said he did not require of particular staff. I used the total competence profile ratings for all competences to create a human capital measure to represent a multi-skilled workforce.

I chose a five-point scale to rate the competences because it is familiar and accepted, easy to turn into percentages and therefore keeps constructs and analysis simple, yet it provides sufficient score differentiation. The ratings for each competence for each individual were used to calculate a number of score totals. Each person's ratings for all the competences were added to produce a total competence performance score for each of the six Nordhaug domains and for the total non-technical competence domains and the total technical competences. In addition, competences rated as three or more out of five were classified as 'competent' and a competence score of the proportional weightings out of 100 for the number of non-technical and technical competences that were scored as 'competent' respectively was calculated.

The owner/operator gave me personnel data pertaining to the seven production staff. This consisted of the available information about their qualifications, age, gender, any known training and development, position in the firm, number of positions held in the firm, years of experience in this job and others. Age was collected because studies had shown that it was significantly positively correlated with measures of productivity (Waldman & Avolio, 1986). Training and development records were incomplete. Classification of training into types, amounts and levels was impossible. Hence inclusion of training and development in the human capital index was not pursued. Because there were very few written records, most of this data was given orally. The grouped and quantified personnel data, which was subsequently included in the human capital index formula, was each given a percentage weighting, so that combined with competence performance scores they totalled one hundred per cent. These percentage weightings were discussed with and decided by the owner/operator.

Productivity measures used were the replacement costs (Cascio, 1991; 1984; Fitz-enz, 2000) for each production staff member. This includes the cost of recruitment, the

initial productivity loss, the on-job training costs, the training fees and the owner/operator's hourly rate (it did not include any separation costs). The owner/operator's hourly rate was my guesstimate but was subsequently approved by him as 'about right'. Other time and financial statistics in the replacement cost were calculated with information given to me by the owner/operator.

My pilot human capital index and the respective replacement costs were calculated for each staff member. The components of my pilot index parallel those of Brown's (2000). Brown's formula focuses on the development of an individual human capital index. Components are job level in the company, number of jobs held in the company, years of experience, a performance score and a competence score. How the quantitative measures for these components are derived differs. Personnel components are each grouped and translated into five-point scales and competence scores are from a five-point scale rather than Brown's proposed ten-point scale.

The scope of competences included differed considerably from Brown's approach. I used the Nordhaug (1993) framework and included all domains and all of the competences whereas he does not.

Brown's (1999; 2000) human capital index formula for combining the components was followed. The formula has two composite measures: a competence score and an experience score that are combined according to the proportional weightings (negotiated with the owner/operator) for the respective importance of technical and non-technical competences. The competence score has been described previously (the 'competent' competences). The experience score consists of the combined weighted percentage scores for job level, performance ratings, variety of experience, and years of experience. The experience score is then multiplied by the non-technical proportional weighting, the competence score is multiplied by the technical proportional weighting and when added together result in the human capital index score. I developed a human capital index and a multi-skilled human capital index for each of the seven production staff (See Appendix 2 A for further details).

While Brown (1999; 2000) suggests that the human capital index score is a useful measure for inclusion in a company's balanced scorecard he does not link his to any

productivity measures. My pilot procedure makes this link with a correlation analysis procedure between the human capital indexes and the productivity measure - replacement value. The Pearson correlation analysis with the SPSS software package was used because at the time with the advice available and research inquiry it seemed appropriate. The results of the correlation analysis were then compared with correlations between the replacement value and equivalent years of tertiary education (See Appendix 2 Tables 1-9 for these results and Appendix 2 A for the HCI calculation).

There were very strong negative correlations evident (see Appendix 2, Table 6) between both the HCI (-.896) and the multi-skilled HCI (-.941) and replacement costs. Correlation between tertiary education and replacement costs was weaker (-.643). The negative correlation between the HCIs and replacement value means that the more competent the person (i.e. the higher their human capital index) the less expensive they are to train up to their present level. A more competent person, even if paid more, is still cheaper to train up to their present level of performance. The human capital index in this case study was strongly associated with the productivity measure. Equivalent years of tertiary education had a weaker association with the same productivity measure.

This analysis was carried out before the decision to use the Spearman test of analysis and before the decision was made to avoid the use of levels of significance because the latter is not appropriate with such small numbers. I originally presented the results of the correlations with replacement value, as HCIs are statistically significant to the .01 level where as tertiary education has no statistically significance correlation. Subsequent correlation results are more appropriately interpreted as 'strong' if they are greater than + or - .7 and a human capital index with a strong correlation is considered a valid measure of human capital.

The individual competence domain scores also resulted in some high negative correlations with replacement costs. Domains clustered into non-technical and technical performance rating subtotals had correlations with replacement costs of respectively -.919 and -.774. Meta-competences (-.923) and trade technical competences (-.782)

were primarily responsible for these results (Appendix 2 Table 8). The faster learners with higher ratings for technical competences were less expensive to develop into productive workers. In the HCI procedure the respective proportional weightings for technical and non-technical competences were 75 per cent and 25 per cent. Yet the influence of the non-technical competences is still evident in the HCI correlation results. These very strong correlations for the human capital indexes and the component competences supported the validity of an HCI based on competences covering the Nordhaug domains.

This engineering pilot case study acted as a reality check in planning my methodology and a product to assist me in further research. I used it to persuade other organisations of the merit of taking part in my research process to explore the development of a human capital index based on competences. (See Appendix 2 for the fuller version of the pilot case study.) The data available, level of researcher involvement and the procedures possible were all reliant on the owner/operator. The impact of this contact person as a gatekeeper was enormous. Data was primarily collected orally, no one else was consulted in the development of the competence profile, no 360-degree feedback was possible and no bottom line productivity measures were made available. Gatekeepers determine access and resources therefore the components and procedures in the development of a human capital index procedure vary according to the reality of the different organisations and the priorities of their contact people (Argyris, 1969; Hartley, 1994; Klein, 1976; Punch, 1998).

I subsequently re-examined the wording and intention of the pilot case study competences and their domain classification. This revealed some inconsistencies in my earlier classification of competences into the intra-organisational and meta-competence domains. Several of the meta-competences could have been classified as intra-organisational competences as the competence wording made them specific to the engineering company. The results might have revealed stronger correlations for intra-organisational competences with more accurate classification. My original classification was consistent with Nordhaug's generic application of his own typology (Doeving, 2000)

A year after the first competence ratings of the engineering company's seven production staff I approached the owner/operator for approval of another assessment. The six remaining production staff members were re-assessed by the owner/operator on the same competence profile. As previously, I read out the staff names and the competences and the owner/operator gave a rating on the one-to-five-point scale. A human capital index that used the original components was calculated and the results compared (See Table 9 in Appendix 2). There was consistency in the correlations with the human capital index and the productivity measure (2000 multi-skill HCI -.941, 2000 HCI -.896, tertiary education -.643 and 2001 HCI -.859).

This second calculation of a human capital index for the pilot case study was conducted after the other case studies' HCIs had been calculated. The contrast in complexity in the process of development for the two different HCI formulae was uncomfortably evident. For no easily apparent benefits the process of HCI calculation used in the pilot engineering case study was extremely ponderous and time consuming in contrast to the simpler instrument adopted for the subsequent case studies.

Revised and simplified HCI procedure used in the case studies

I simplified the components of the pilot HCI procedure and developed the administration process. A review of the pilot HCI calculations and results suggested that there was little benefit gained by the inclusion of so many components in the formula. I experimented with further correlation analyses between competences, personnel data and productivity measures.

The comprehensiveness of the competences, guided by Nordhaug's typology, appeared to identify performance differences effectively. There seemed no need to include the measures of years of experience, job level and variety of experience. I, no doubt influenced by the core competence paradigm (Hamel & Prahalad, 1994) in strategic management literature, developed the competence 'performance' score from the subgroup of competences that strongly correlated individually with the productivity measures. It is presented as a percentage (the total of the rating scores for strongly correlated competences as a percentage of a perfect score - 5 out of 5 for each of the competences included). I considered that this measure alone would not create a robust

measure of human capital because it did not include all of the competences. Potentially some competences might relate to long-term success and not have any evident association with currently available productivity measures. Therefore the second measure in the formula included all the competences. The number of 'competent'[45] competences is presented as a percentage of the total number of competences in the profile.

I retained the divisions into technical and non-technical competences, the percentages and weightings for technical and non-technical and the inclusion of both 'competent' competences and performance rating totals for competences. The result is a new HCI calculation that is less complex. It includes the 'competent' competences score and the strongly correlated competences 'performance' score. This was used in the subsequent case studies.

Nordhaug's competence typology is used as the basis for the development of a competence profile or as the criterion for the acceptance of an existing competence profile. Classification of competences into the domains increased reliability. I was more practised at classifying competences into the domains for these case studies. After the data collection there was also an independent reliability check for each competence profile. Consultation with relevant staff within the organisation was encouraged in the process of competence profile development, the subsequent weighting of individual competences and establishing the proportional weightings between non-technical and technical clusters of domains.

Competences performance ratings (1-5) were carried out by a minimum of three and usually four raters in a formal, written, confidential 360-degree/multi-rater process. The mean competence scores are used in the correlations and human capital index formula.

As in the pilot, productivity measures and personnel data are collected and used in correlation and comparative analyses. The productivity measures are specific to each organisation. In some instances I assisted with the identification or development of additional or amended measures to widen the scope of productivity to span the competence profile. The details for each case study are in the respective chapters.

[45] Competences with 3 or more on the 5-point scale

The formula for the human capital index is the sum of the percentage score for competences judged as competent and the percentage score for competences performance, divided by two. Both sets of scores - the non-technical and the technical 'competent' competences percentage and the non-technical and the technical competences 'performance' score - are multiplied by the proportional weighting assigned by the organisation. The 'competent' competences score encompasses all possible competences from the competence profile whereas the competences 'performance' score only includes competences that have a strong correlation with at least one of the organisation's productivity measures. Appendix 3 describes the calculations for the human capital index in more detail.

Personnel data collected is correlated with the productivity measures in order to identify any trends and patterns that could shed more light on their association with a person's human capital. Equivalent years of tertiary education have a special role in comparative validation of my human capital index. The number of years assigned to qualifications[46] was calculated according to the OECD Australian[47] qualification typical length of programmes (OECD, 1999a).

Correlations and comparative analysis for the development of human capital indexes went beyond those used in the pilot. The human capital index was considered valid if it had a correlation with any productivity measures of .7 or more and if the correlations were greater than those of the number of years of tertiary education, with the productivity measures. In addition, it was possible to verify the results in two of the cases by carrying out correlations with a further set of productivity measures that had not been used in the development of the HCI.

Case studies: selection and steps taken

The organisations and groups in which my revised simplified human capital index procedure was implemented are diverse. There are considerable differences between a large law firm, a supermarket, a large international bank, a not-for-profit/armed services organisation and a small to medium gaming company. If it had been possible I would

[46] There is one exception, the Gaming case study- see Chapter 6
[47] The NZ current qualification system means that the qualifications available in NZ in the past are no longer featured, but these past qualifications equate to those listed for Australia however

have liked to focus on a role common to all organisations, for example, the manager role, in order to foster comparative analysis. The roles in this study (lawyer, customer service officer, call centre representative, supermarket manager, engineer and gaming technician) appear dissimilar but all include a knowledge and/or customer service focus.

A case study approach involves vast volumes of information to collect, document, and to develop in the exploratory analysis process. Later collation, analysis and conclusion determine what is essential for a thesis. In order to cope with the volume and complexity of material I set up structured documentation systems at the beginning. I kept a separate diary on each case study organisation for a record of events and information gained orally. In addition to this diary there was a folder to store paper resources for each organisation, files for the returned 360-degree/multi-rater feedback forms and a separate folder for the large hard copies of the SPSS[48] analyses. There were also computer files for each of the competence feedback forms, information sheets, correspondence, record keeping systems for distribution and collection of forms and the reports for the organisation.

Selection

My first critical challenge was to find organisations that would participate in research into a competence-based human capital measure. In the latter half of 2000 advertisements were placed in the *National Business Review* and the Auckland branch of Human Resource Institute of New Zealand (HRINZ) newsletter, inviting interested companies to contact the researcher. A brief of the research was given as a notice at the end of an Auckland branch HRINZ meeting and a handout with contact details left for interested people to collect. I also co-conducted the November 2000 HRINZ special interest group workshop 'Human capital measures and management' as a platform to raise awareness of this research opportunity. This seminar covered human capital, balanced scorecard and intellectual capital measures and their limitations, and introduced the Nordhaug typology. At the end of the seminar participants were invited to collect the handout (referred to above) and to talk to me about taking part in this research. In addition I rang up firms, with whom I had had a prior contact, which could be classified as having knowledge workers according to the OECD categories (OECD,

[48] SPSS Statistical package for the social sciences

1999b). The final case study companies with the exception of one, the gaming company, all resulted from these telephone calls to a previously known personal contact within the organisation.

All organisations that agreed to take part in the study were included in this research. The pre-planned criteria for selecting case study organisations were modified in light of the various organisational contexts. However only organisations that had or were prepared to develop the critical components for my human capital index procedure were included. This judgemental sampling (Hussey & Hussey, 1997) resulted in a sample of organisations classified as having knowledge workers according to the OECD categories (OECD, 1999b), with productivity measures in place or in development, who were receptive to conducting 360-degree performance reviews based on a competence profile that covered Nordhaug's domains. Several organisations needed considerable development of their productivity measures and most provided less people for their selected competence profile sample than initially advised.

Steps taken

In each case study, after an initial expression of interest, I had a minimum of two introductory sessions of approximately two hours each with the contact person in the organisation. In the not-for-profit organisation and the bank there were two additional sessions at which managers of the potential role groups were present. In the introductory session, the results of the engineering case study, the Nordhaug typology and the details in the Information Sheet (see Appendix 4) were discussed. The latter was left with them. During these sessions I also ascertained the presence and availability of any existing competence system, job descriptions and associated organisational/productivity measures. Agreement was reached about the job role to be studied, the use of an existing competence profile, its adaptation, or the development of a new profile, the organisational productivity measures and personnel data. The contact person provided background information on the company and the specific group they wished to be involved. Contact details for the chief executive officer or equivalent were also obtained and their consent was sought and obtained to proceed with the research.

Competence profiles

Competence profiles were defined and accepted. The only two existing competence profiles (both for lawyers) were analysed for coverage of the Nordhaug domains and accepted. The five other competence profiles were developed with the criterion that the six domains of Nordhaug be covered. In these five instances I facilitated or coached until there was a competence profile acceptable to the organisation that met the criterion above. This involved me in preparation of several presentations of the competence profile based on their input. With the exception of the supermarket it was the organisation contact person who conducted any wider consultation within the organisation. I participated in a staff meeting of all the supermarket managers who had been invited to participate in the study. During the meeting I provided information on the process and gained feedback on the competence profile and their choice of raters.

The organisation contact person and whom they chose to consult determined the individual competence weightings and the non-technical and technical proportional weightings. Non-technical and technical competences had proportional weightings out of a hundred. Competences considered most critical to organisational success attracted a times two weighting for their rating score. It was suggested that high impact competences or competences with a larger span of influence be given this double weighting.

360-degree feedback data collection

An oral or written (or both) invitation to take part in the study was extended to the relevant group. In addition to the invitation, an information sheet[49] (See Appendix 4 for this generic information sheet) and a written consent form were provided. Completed consent forms were passed on to me. The organisation contact person managed this process.

Competences were presented in a competence feedback form with a not applicable option, a scale from one to five and a space for comments. The format of this form separated the competences into two consecutive groups of non-technical and technical competences. These competence feedback forms were distributed to the consenting

[49] The law firm had its own information sheets - see Appendix 16 & 17

participants, the superior, subordinate and peer raters with an information sheet and a stamped envelope addressed to me to ensure confidentiality for their responses.

The distributed competence feedback form was the first view all the raters, with the exception of one group of lawyers, had of the selected competences. They were given no training or explanation to complement the competence feedback form to foster a common understanding of each competence. Nor was there any training or practice with feedback on how to rate fairly and consistently. The research circumstances did not allow for these desirable adjuncts to the 360-degree process.

Peer and subordinate raters were nominated by the sample members or by the organisation contact person. I made follow up visits and phone calls to the contact person in the organisation to encourage a one hundred per cent return of the forms. All of the sample participants subsequently received in a sealed envelope addressed to them and labeled 'Confidential', a copy of their competence feedback form with the averaged score for each competence and a thank-you note for their participation.

Personnel data

Personnel data was collected about each study participant. This was either from a personnel data form (Appendix 4 A) included with the competence feedback form and completed by the study participant or, in the case of the law firm data by the human resource department. Data requested included age, level of position, gender, years in the present position, years in the organisation, years in the industry, tertiary qualifications and training and development.

Productivity measures

The contact people provided me with productivity measures for each individual. When it came to the actual production of these measures all but the law firm and the customer service representatives in the bank had difficulty producing existing, meaningful, reliable, valid measures of individual productivity that covered the competence profile. I had to facilitate further development of measures, hence they were not 'well established and verified' prior to the study data analysis.

Correlations and HCI development

A human capital index score was developed for each individual. Correlations were carried out between personnel data, competence data and the productivity measures. A formula involving the competence and productivity data produced a human capital index for each individual. These were aggregated for a group human capital index. HCI bands with a fixed 10-point range of scores were also created from the HCIs. I subsequently recalculated the HCI band for one group of the lawyers as a band of plus or minus five around the specific HCI number.

Reaction to HCI

The case studies were written up and the results orally presented to the contact people of all the case study organisations with the exception of the gaming company. Their initial reactions to and associated explanations for the results were noted and subsequently included in the case studies. Following this a written summary of the case study research was prepared for each of the contact people. A month later (the period included Christmas and New Year) all of the case study companies were followed up for further reaction to the research results, process and practicality for their own situation. Any further comments were noted.

Data analysis

Data analysis was exploratory because I tried out correlations between a range of productivity measures and personnel and competence performance data in the process of developing a new human capital measure. There is also some descriptive data. The measures are non parametric because they arise from case studies selected by judgemental sampling. There are two primary groups of variables: competences and productivity measures. However, there are also extraneous variables present at the case study companies that could affect both these groups of variables. Details of extraneous variables such as the education and skill level of participants, the experience of raters with 360-degree evaluations and any cultural and gender considerations were recorded. The influence of these variables on the human capital index correlation results was considered.

Both competences and productivity measures are presented as quantitative measures. A measurement scale is used to detextualise the nominal competences data. Individual

performance ratings of these competences are on a one to five-point interval scale. For the pilot engineering case study interval scales are also used to quantify years of experience in the role studied, level of the position in the company and the number of positions held to date in the company. Productivity data are presented as quantitative scales of one to five, in the form of the raw score numbers, or as the particular companies' existing indexes and weighted scores.

The equivalent years of tertiary education are correlated with productivity measures. The number of equivalent years of full-time education is a widely accepted human capital measure used by the OECD (1999a) for macro-level, inter-country comparisons. The OECD identifies the number of years of a typical programme length in its educational programme categories. At the time data was collected I did not have the OECD manual for classifying educational programmes. I subsequently matched my estimation of fulltime equivalent years to the Australian qualifications outlined in the OECD manual. With the exception of the gaming company, they matched the OECD typical programme length.

Correlations between productivity measures and the human capital index are compared with the correlations for tertiary education and productivity measures. Validity for the HCI as a human capital measure is defined in terms of a plus or minus .7 correlation or more with productivity measures and with a stronger correlation with productivity measures than years of tertiary education.

In the pilot case study with the engineering company sample, the intention was to identify a formula for a human capital index that correlated strongly with productivity measures. This involved testing out a formula for a human capital index including the variables proposed by Brown (2000) and considering the contribution of each of the components in creating a HCI with strong positive correlation with the organisational/productivity measures. A new, less complicated but potentially just as effective formula for a HCI was then developed and applied to the subsequent case studies during the main body of the applied research (See Appendix 3).

There was a development in the correlation analyses. The pilot case study did not correlate individual competences with the productivity measure before the development

of a formula. I used the Pearson two-tailed analysis of variance for correlations between the human capital index and the company's productivity measure replacement value. As a result of subsequent statistical consultation and consideration, the non-parametric Spearman rho two tailed correlation analysis is used in the subsequent case studies[50]. This latter is used to correlate the competences, the personnel data and the human capital index with productivity measures. A correlation of plus or minus .7 or more is described as a strong correlation in preference to results being described in terms of statistical significance to the .01 or .05 levels. The use of statistical significance is less appropriate with the small sample sizes in these case studies. Confirmatory data analysis of the research results for the customer service representatives in the bank and one group of lawyers[51] is executed by conducting correlations of their HCIs with an additional subsequent set of productivity results.

The classification of all the competence profiles into the six domains of Nordhaug's typology (Nordhaug, 1993) is significant to the analyses of the results. Data analysis includes the total competences performance rating scores for each of the domains and also the respective total scores for the three domains clustered into non-technical and technical respectively. Consistency in the classification of the competences into the respective domains was important. So a reliability check was conducted on all competence profiles. A Massey University doctoral student and lecturer completed the reliability check on the bank and law firm competence profiles, and my original Armed Services contact person carried out the reliability check on the remaining three competence profiles. In both cases they were given the Nordhaug classification brief (See Appendix 1) and a session was held with them to clarify the meaning of the domain definitions.

For each study participant on each competence, both weighted and unweighted, the means of all raters' scores and associated standard deviations are calculated. Averaging the scores is the commonly accepted approach for this feedback technique (Antonioni, 1996; De Nisi, 2000). If one of the respondents chose not to respond to an item, or

[50] The statistical analysis process was reviewed by Dr. Denny Meyer of the Albany Massey University campus
[51] The group of lawyers who are described in Chapter 4 as the New Competences Profile group

circled the 'not applicable' (N/A) response, then the average for the score was taken as the sum of the numbers circled divided by the number of respondents.

The purpose of the analysis is to see what competences and personnel data have a strong positive correlation with the given organisational/productivity measure(s). In addition, any patterns in the results are noted as part of the exploratory process to create a human capital measure with a strong positive correlation with organisational measures.

The differences and benefits, if any, of using a times two weighting for individual competences is also noted for those case studies in which this weighting is applied. The inclusion of an analysis of any benefits of individual competence weightings is limited to those organisations that appear to have comprehensive, reliable productivity measures. I made this a precondition for discussing the impact of weightings of individual competences because productivity measures are so important for meaningful correlation analysis.

Feedback was sought from the case study companies after they were presented with the results. Did they think my human capital index and/or human capital index band was an acceptable human capital measure for their business planning and reporting? This information is included in the write up of each case study. Differences in the reactions to the HCI by different organisations contribute to predicting in which organisations this human capital measure is most applicable. In addition to their reactions to the HCI, any explanations given for patterns or trends in the results are also noted. This context specific information contributes to an understanding of the research outcomes.

Names are changed to preserve the privacy of participants. I consider it important however to use names and not a code in order to present the individual human capital index results as they would be reported in an organisation. The use of names provided the opportunity to gauge the reaction of the contact people to a measure, in the form of a number, being assigned to each employee's value to an organisation.

Limitations

There were some limitations with this research focus and methodology. The case study method has limitations associated with non-representative, small samples. Competence

profiles are reliant on resources made available by case study organisations. Use of 360-degree feedback as the source of performance assessment of competences has inherent subjectivity. Moreover, the availability of relevant and reliable productivity measures is dependent on the situations in each case study organisation.

The first limitation was the availability of case study companies that fitted the desired profile[52], who were interested in the project, willing to accommodate some disruption to their current performance feedback systems and who would accept the involvement of an external researcher. I required access to some of the organisation's confidential records and the involvement of some of the organisation's staff. Furthermore, the organisation had no guarantee that the disruption would lead to a measure with a significant positive correlation with productivity, nor result in an easy to use, valid measure for human capital. A company whose owner/operator I knew well was used in the pilot, and all companies who committed to being involved are included in the main body of the research. One consequence of this is that less rigour was applied in accepting the characteristics of each case study's productivity measures before their inclusion in the study. On the other hand, the HCI procedure was applied in more companies and therefore in the context of greater variety, which is appropriate in exploratory research.

Case study as a method has limitations in the degree to which each case study's results can be transferred and generalised to other contexts. There is no independent variable in the experimental design. I had originally intended that one of the roles studied in each company would be management. This would have given a tentative glimpse of any potential for inter-company comparisons of similar roles. This was not possible with the organisations and groups available. Samples have different competence profiles, different domain weightings and different productivity measures. Moreover, there is no uniformity in the organisations' external environment or internal culture and systems. However, the Nordhaug (1993) typology does offer an opportunity for comparability between organisations at the domain level.

[52] Prepared to use Nordhaug typology for competence profile development & /or review, comprehensive individual productivity measures in place, knowledge economy workers, prepared to conduct a 360-degree performance feedback

The HCI procedure is the focus of this research. Although there are limits to the transferability of specific results, involvement of several different companies and groups provides evidence of some transferability and generalisability of the procedure used to develop the human capital index.

The breadth of the definition of competence in this research is both its strength and its limitation. Both input and output competences are accepted in the same framework and the size and level of complexity of the competences are not moderated. Some companies identified larger competences or/and more complex competences than other companies and within any competence profile there are similar variations. The classification of competences into Nordhaug's (1993) typology fosters the span of competences relevant to an individual's workforce performance and value. A system of proportional weighting for technical and non-technical competences is aimed at accommodating inequities in the size and complexity of competences. In addition a doubling of the performance score for more important competences was explored in some case studies.

Only one competence profile had accompanying descriptors for the competences. The preciseness of behavioural descriptors is sacrificed to the practicality of developing a minimally resourced competence profile within the workforce. The impact on results of this reliance on the Nordhaug framework domains is also examined.

There is greater subjectivity in a human capital measure including 360-degree feedback than traditional measures such as years of secondary and tertiary education. Reliability of the 360-degree approach was not tested in this research. The literature (Antonioni, 1996; De Nisi, 2000; Fletcher & Baldry, 2000) reflects the wholesale adoption of this practitioner process, although it has little in the way of a theoretical basis. There is little empirical evidence of its reliability. No assessment evidence of competent behaviour is required in the 360-degree performance feedback process. Judgements of competence on a five-point rating scale by the sample, their superiors, subordinates and peers are influenced by conditions such as training in the rating system that are uncontrolled in this study. It was also outside the scope of this research to increase the reliability of the outcome (UBS Warburg LLC, 2001; Woehr & Huffcutt, 1994) by training the staff

involved in the process. Issues of acceptability, previous experience of 360-degree feedback and organisational culture also impact on the reliability of the 360-degree process.

This is a case study design, not a random sample within an experimental design. I have not calculated any intraclass correlation coefficients to develop a reliability index to determine the acceptability of mean performance ratings (Shrout & Fleiss, 1979). Each case study is unique and there were no resources for additional groups to participate in the 360-degree competences feedback process to verify the consistency of raters' scores.

Senior managers in the past have favoured objective data over subjective valid data. This is illustrated by the wide acceptance of the human capital measures commonly used in the balanced scorecard and intellectual capital reporting (Allee, 1997; Harvey & Lusch, 1999; Kaplan & Norton, 1993; Lingle & Schiemann, 1996; Lynn, 1998; Sveiby, 1997; Vitale, Mavrinac, & Hauser, 1994b). They appear to find objective data more credible. Thus the subjectivity of a potentially more valid measure (my HCI) may still gain only the limited support of senior managers.

Subjectivity limitations are addressed in several ways. I use the average rating scores of the 360-degree feedback to eliminate many of the biases. In addition, the calculation and consideration of the standard deviations for ratings provides evidence of consistency and increases the validity of the process. I have tested the criterion-related validity and reliability of the human capital index process and outcome where possible, by comparing initial correlation results with an additional set of productivity data for the same group. The use of Nordhaug's typology and performance ratings for competences foster content and construct validity. Furthermore, the HCI results are subsequently presented to the organisation contact person for their feedback on the acceptability of the human capital index measures, the procedure and the results. Context specific explanations are identified and included.

The available productivity measures in an organisation did not always equate to a comprehensive and reliable coverage of the competence profile in the study. Some measures were incomplete and others were introduced, or massaged into composite measures for the purposes of this research. In some instances there were subjective

qualitative rating scales for the productivity measures. Consequently, there are correlations between the subjective ratings of the competence scores with subjectively rated productive measures. All of these limitations have potential to impact on the results. I acknowledge these limitations within the case studies in which they occur.

Finally, there was not the time in the scope of this research to record the human capital indexes for these groups over several years. A longitudinal study could measure the consistency of correlations between high human capital indexes and favourable productivity measures. Further research is required to accumulate evidence of long-term reliability and validity. Only after this additional testing would my adoption of .7 as a strong correlation instead of levels of statistical significance in the Spearman rho correlation analyses, gain sufficient evidence to judge rigorously its appropriateness or lack there of, for this HCI procedure.

One of the outcomes of this exploratory research is a recommendation for additional practical ways to deal with these limitation issues.

Because this study is exploratory the construction of an index is tentative. Each company involved in the study selected different competences and weightings. This made the index company specific. The results of each case study are compared however to identify any trends in the correlations between a greater human capital index and productivity measures.

Case studies

The next three chapters describe the context and results for the seven samples for which my original human capital index procedure was used. Chapter 4 outlines the study of two different roles in a bank: the customer service representatives and the customer service officers. Samples from these two have differences in their competence profiles and have different productivity measures. Additional productivity data was also made available for the customer service representatives. They comprise the second sample for which there is further correlation analysis to validate the results.

Chapter 5 outlines the study of two matched samples of lawyers with the same types of productivity measures whose performance was assessed on different competence

profiles: a new and an existing one. It was possible in this case study to go back after the development of the case study and collect the twelve-month productivity measures. This data is used to validate the new competence profile sample HCI results. In this case study I also explore the presentation and acceptability of the HCI as a HCI band.

Chapter 6 describes the study of a sample of department managers in a supermarket, a sample of ISS engineers in the armed forces, and a brief description of a less successful outcome with a group of eleven service technicians in the gaming industry. Chapter 7 summarises the results of these case studies in a comparative analysis.

Each case study is an exploration of the over-arching research objective and the sub-questions. The content of and subheadings in each chapter reflect this exploration. In each case a competence profile and productivity measures are described and their role in the process of developing a practical, valid measure of human capital is considered. I have also recorded any known experience of performance ratings, competences and measurement of performance in the organisation. This is considered in the context of the contact person's reaction to a human capital measure in the form of an HCI or an HCI band.

Personnel data including age, gender, years in the workforce and in the job, tertiary education and training and development involvement is gathered and analysed to see whether any of these workforce characteristics would make a significant contribution to a human capital measure that correlates strongly with productivity measures.

The group of 'strongly correlated competences' is also considered in each case study in order to examine any differences in the correlation outcomes of a human capital measure with productivity measures of this smaller sample of competences (associated with greater productivity) and the more comprehensive HCI that includes all competences.

Nordhaug's framework/typology of six domains to categorise workplace competences to capture human capital is little known and there have been relatively few applications. Therefore the practicality and advantages of using it to develop comprehensive competence profiles in different types of organisations is discussed in Chapter 7, in the

comparison of case study results. In addition each case study analyses the correlation results of the domains to see if any are associated with superior productivity results.

Addendum

* p. 108 Spearmans rho test of analysis The *Pearsons* correlation analysis was substituted with the Spearmans rho test of analysis at the advice of the statistician Dr. Meyer. The later being more appropriate for non-parametric measures. The samples in this research predominantly score in the 3-5 range on a 1-5 rating scale, therefore are not populations with a normal distribution of results.

* p. 108 + or - .7 is regarded as a strong correlation On the advice of the statistician Dr. Meyer the criterion of + or - .7 was selected as a 'strong' correlation. Because the HCI is a new procedure with a number of subjective components, a high level of correlation was considered to be appropriate for the criterion of a strong correlation.

Chapter 4

Bank Case Study

Two bank roles

These two case studies had very different results. They have different productivity measures and different competence profiles (CSR & CSO). The CSRs results are extended to include verification of results with the third quarter's results, which are an independent set of productivity measures. My reflections on the process are included because the CSR data was one of the first sets of data available for analysis. The reflections give a context for developments in the HCI procedure used in other case studies.

The Organisation

The organisation is a major, long-established bank with branches throughout New Zealand. The contact person is the manager, human resources information (MHRI). She agreed to be involved after attending my HRINZ session because of my previous work history with their organisation. The two roles she requested be included were the customer service representatives (CSRs) and the customer service officers (CSOs). Both roles offer service to the public, the former via the centralised call centre's computerised telephone system and the latter face-to-face with the public who come to counters in the branches.

Customer service representatives (CSRs)

This bank has an inbound call centre in the Auckland region that employs 184 fulltime equivalent staff made up of the customer service representatives (CSRs) and their managers. The CSRs work shifts, in teams supported by team leaders. They have an individual workstation within an open plan situation. There is no telephone or receiver visible as they use computer-integrated technology. This technology provides account details, customer service data, answers to product and service questions and a comprehensive structured and monitored activity and performance feedback system

called 'pulse'. The CSRs' role is to answer the questions phoned in by the bank's customers as knowledgeably, positively and quickly as possible.

Seventy five per cent of CSRs are women and some of them are part time workers, particularly those on the night shifts. There is a high turnover rate, in excess of 30 per cent, although one third go to other positions in the organisation. The bank provides a comprehensive training and coaching programme over the first two months in the role. This focuses on the technology and competences required by a CSR. Ongoing monitoring, feedback and support in their teams follow this and there are further training and development initiatives as required. Incentive schemes are in place to reward exceptional performance. Measurement is integral to the CSR role.

Sample

Eleven full-time CSRs from two teams were approached by the contact person and all consented to take part in the study. Those approached belonged to either of two groups: those who exceed the organisational targets with scores of 105 or more who are therefore in the 100+ club and those who do not reach their targets, having scores between 80 and 100.

The sample consists of five males, two who did not reach their targets and three who exceeded their targets; and six women, two who did not reach their targets and four who exceeded their targets. Their ages range from 21 to 55 years, and they have spent between two and two third years and thirty-four years in the workforce. The amount of time they have been in the CSR position in the narrow range of six months to four years reflects the recency of establishment of such positions. They have all undergone the bank's CSR training but have very different amounts of formal tertiary education. The range is equivalent to one quarter of a full-time academic year up to six years of full-time university. The qualifications vary from NZQA unit standards to a Master of Science degree with honours.

Competence profile

I had four meetings with the manager of human resource information, two of which were attended by the recruitment manager. I facilitated the development of competence

profiles for the CSR position with them both. Competence profiles were then distributed to two CSR managers for their comments. The two CSR managers invited me to visit the call centre. I was given a conducted tour of the centre and an explanation of the CSR role and the equipment. This led to further discussion and modification of the CSR competence profile and a decision to approach CSRs to take part in the study who were clearly either over or under the organisational targets. The CSR managers also decided on the weighting of specific competences to reflect their importance and the proportional weightings of non-technical competences to technical competences. I modified the competence profile and they approved it for use.

There are 33 competences classified into the six Nordhaug (1993) domains. Twenty-five are non-technical: nine are meta-competences, nine are intra-organisational and seven are industry. Eight competences are technical: two are standard technical, two are trade/professional and four are unique (See Appendix 5 for a categorised list of the competences).

Productivity measures

In the call centre there is already in place a very structured performance measurement system arising from the comprehensive performance records associated with the computer-integrated technology. The productivity measures used in this study are the 'quarterly' output measure and its component (partial) measures, which are calculated every three months for the incentive scheme target. The latter consist of a score for 'sales', a score for 'productivity' and a score for 'customer care'. The sample's first quarter measures, (the only ones available at the time the sample were selected) ranged from 90.42 to 113.

When the component scores are combined for a quarterly measure, the sales portion is targeted at 30 per cent, productivity at 30 per cent and customer care at 40 per cent. There is controlled flexibility to allow for individuals' different strengths in any of the three areas with a maximum 5 point over run possible in each sector for those who achieve beyond the targets. This limitation on credit for over-attainment of targets is to keep the balance between the dimensions and to encourage the short term and long term performance of the CSR in the cultural context of this call centre. 'Sales' consists of

points awarded for the sale of products. Some products attract more points than others, the target being 225 points. 'Productivity' targets 80 per cent as the time for CSRs to be involved in either talking to customers or waiting for a call, while the other 20 per cent of their time is for post-call processing and refreshment breaks. 'Customer care' scores are based on the assessment of individuals taking calls according to ten different criteria that have different weightings. Seventy-five per cent is the target.

The data collection for this research was initiated between two quarters. In the initial analysis the previous and the following quarter measures are used. They are referred to respectively as the first and second quarter 2001. Subsequently, I was given the components measures of these two quarters and the third quarter measures for those still in the CSR position.

Competences 360-degree feedback

The 360-degree feedback was conducted according to the methodology outlined in Chapter 3. There are three completed forms on each study participant. The study participant completed a form, his or her team leader completed another form and a team member selected by the study participant completed a third. Within three weeks I had all forms. (See Appendix 6 for a copy of the competence feedback form.)

Personnel data

Study participants completed the personnel data form with varying degrees of thoroughness and possibly accuracy. Comparisons between the numbers of years given in response to several of the questions suggest that there was some lack of clarity in the questions and confusion in what work experience to include. There were also obvious errors. For example, one study participant's responses indicate commencement of fulltime work at about nine years of age. The detail from the personnel data form was: age, gender, years in the current CSR job, number of years in the workforce, number of full-time equivalent years of tertiary education and number of formal qualifications. Included in the equivalent years of full-time tertiary education are university courses and degrees, polytechnic and professional association courses and qualifications and NZQA unit standards.

Analysis

The means of the different raters' scores and associated standard deviations for each competence both weighted and unweighted are displayed in Appendix 7. The results for the unweighted competences indicate general consistency between the raters with only 17 sets of scores out of a possible 363 with a standard deviation of greater than one. One of the study participants, Yaap, accounts for six of these deviations that are greater than one but less than 1.60. The individual rater scores for Yaap show a pattern of Yaap scoring himself higher or at least as high as the highest other ratings. Ernest is similar with four competences with standard deviations in this range and on investigation of his self-rating in comparison with his other raters' scores follows the same tendency of rating himself higher. Nina has three standard deviations that are over one at 1.15. The pattern of her self-rating is to rate herself lower than her peers and manager. There is only one competence with a standard deviation greater than one (1.15) for several of the sample. This competence is 'has a good understanding of the various X applications i.e. TELLER, HBTE, OSCAR[53]'. These results support the use of the mean score of the ratings for each competence for analysis.

During the correlation analysis phase I tried out several levels of productivity measures and experimented with how to present a strong correlation. Initially correlations were calculated between the competences and the first and second quarter composite measures. This identified seven competences with correlations of .600 or more. After raising the level of a strong correlation to .700 or more, the group of strongly correlated competences reduced to four. Then due to the effectiveness of a family of measures in the analysis of the law firm case studies I decided to expand the organisational output measures to reveal their partial measures as well. Some competences were strongly correlated to these partial measures but this went undetected when the components were combined into the one output measure. The weaker or negative correlations of a competence with other partial measures cancelled out the strong positive correlation. As the purpose of conducting correlations is to identify competences strongly correlated to positive productivity results it appeared to be more comprehensive to include the component parts (partial measures) of a total measure. The organisational measure data

[53] X bank's computer software applications

for the CSRs was therefore expanded to include the partial measures for each quarter's result i.e. the sales measure, the customer care measure and the productivity measure. The correlations results identify the same seven competences (with .700 correlation) as the original analysis in which a .600 correlation with the composite quarterly measures was required for inclusion.

A third quarter result was obtained for this group, although by this time there were only eight of the sample of eleven still working in this role. Two had been promoted to other positions in the bank and the third had gone overseas to travel. The third quarter's results are used for verification.

CSR analysis

There are seven competences that have strong correlations with one or more of the given productivity measures. Six of these are non-technical competences (two meta-competences and five intra-organisational) and one a technical competence (trade/professional). The six non-technical competences could be broadly classified into two clusters, which are both in alignment with a CSR role: personal goals and values, and positive initiative. The one competence with the most consistent strongly positive correlation with all measures is 'Able to organise self to meet personal goals'.

The one technical competence in this group 'Understands and practices sales and service techniques' I consider must be central to attaining job targets although on this occasion the CSR managers did not give it a weighting to reflect its importance. These competences are listed in Table 4.1 with their correlations with the productivity measures. Any correlations of .700 or more are in bold type.

Table 4.1

CSR competences with a strong positive correlation with the given productivity measures (N: 11)

Type	Competence	Sales	Customer Care	Productivity	First quarter 2001 1	Sales	Customer Care	Productivity	Second quarter 2001
NT & M	Able to organise self to meet personal goals	**.781**	**.797**	**.712**	**.865**	**.824**	**.760**	**.704**	**.795**
NT & Intr	Displays sustained interest and initiative with the CSR role	.664	.588	**.752**	.698	**.886**	.542	**.818**	**.848**
NT & Intr	Responds positively to the highly structured performance monitoring and feedback system	**.734**	**.799**	.498	**.825**	.669	**.762**	.581	.646
NT, Intr & W	Responds positively to the highly structured performance monitoring and feedback system	**.709**	**.741**	.393	**.772**	.591	**.724**	.498	.552
NT & Intr	Flexible use of problem solving strategies and products for service to a range of customers	**.766**	.588	.556	.660	**.803**	.469	.695	.691
NT & Intr	Personal goals fit the requirements of the CSR role	.584	**.723**	.329	**.726**	.441	**.726**	.345	.441
NT & M	Consistent methodical work performance	.538	.550	.677	**.722**	.643	.617	.632	**.706**
Tech & T/P	Understands and practices sales and service techniques	.699	.641	.367	.691	.557	**.722**	.521	.559

Key

Tech = Technical competence

NT = Non-technical competence

N = The number of study participants

M = Meta-competence

T/P =Trade/Professional

W = Weighted Competence

Intr = Intra-organisational Domain

The correlations for all other competences positively (not strongly) correlated with productivity measures are displayed in Appendix 8. They include most of the non-technical competences with the exception of three that have negative (but not strong correlations - see Appendix 8). The three non-technical competences with weak negative correlations are:

'Able to cope with a moderate pace of on-going development of systems and information'

'Able to retain information on new products and systems'

'Has a general overview of the competitors in the banking industry'

There are the following possible explanations although because of the sample size I offer them tentatively. The first two competences above are circumvented by the support strategies such as training, team leader support, and the FAQ[54] system that provides a ready reference to all products and services. These make it less important for a CSR to retain new information and more important to know where to go for assistance. As for the third competence above, the organisational measure does not include any dimension that requires knowledge of banking industry competitors. Although it is considered desirable to have staff understand the industry, this knowledge does not necessarily lead to increased sales and service performance. Furthermore the setting of a large call centre, which only takes inbound calls, is remote from the influence of banking competitors.

The correlations for the technical competences, in contrast to the non-technical competences, are negative for five out of the possible eight. As a user of bank services I experienced a sense of relief that the two CSR technical competences noted below are positively correlated with the organisation results, albeit not strongly.

'Can efficiently use the X bank telephone system'

'Has a thorough understanding of the relevant X bank products and services'.

The competences identified as strongly correlating with positive productivity measures are probably not the only important ones in the competence profile. First, the productivity measures may not be sufficiently comprehensive to measure all that is

[54] FAQ = product information reference computer software

important. Second, long-term effects may not be measured in a snapshot exercise such as a 360-degree evaluation. Take the following competences with correlations that are less than .300:

> 'Displays resilience by sustained enthusiasm when dealing with customer complaints and problems' (all measures <[55] .400 1st and 2nd quarter = .274 & .164)
>
> 'Understands the structure and culture of the X bank' (all measures < .400 1st and 2nd quarter = .180 & .022)
>
> 'Able to handle the intensity of work associated with a call centre' (all measures < .400 1st and 2nd quarter = .208 & .067)

The low correlation of these competences could underestimate their importance. Possibly they relate to retaining high performing staff. There are likely to be important competences that relate to long-term organisational success, not strongly correlated with short-term productivity measures, because the measures are just that, measures of short-term results.

Personnel data

There are no strongly positive correlations between the productivity measures and the personnel data. This endorsed my decision to leave personnel data out of the HCI formula. There are positive correlations between customer care and years in the job (.418 & .361), years in the workforce (.461 & .554), gender (.493 & .626) and age (.314 & .537). More females than males scored higher on customer care. However, the sample was not randomly selected, it is small in numbers and has a wide range in age and work experience and the correlations did not reach the threshold determined for strong correlations.

The correlation of the eight productivity measures, with tertiary education for the first and second quarter of 2001 are all weakly negative, with the exception of the weakly positive .051 correlation of the 'sales' component of the 'first quarter's result. With this sample for this job role the commonly held assumption that successful tertiary education will be an indicator of good performance in a job is completely unproven. In fact a

[55] Less than

greater number of years of tertiary education appears to have a negative (although not strong) correlation (See Table 4.2 following for the correlations with personnel data).

Table 4.2

CSR correlations of personnel data with the productivity measures (N = 11)

Personnel Data	Sales	Customer Care	Productivity	First quarter 2001 1	Sales	Customer Care	Productivity	Second quarter 2001
Age	.222	.314	-.072	.255	-.065	.537	.225	.207
Gender	.290	.493	.000	.462	-.029	.626	.058	.117
Years in this job	.296	.418	-.256	.280	-.242	.361	-.041	-.056
Years in the workforce	.393	.461	.105	.427	.115	.554	.312	.317
Tertiary education	.051	-.303	-.242	-.221	-.082	-.114	-.047	-.114

Key

N = The number of study participants

Domains

There are no strongly positive correlations between any of the domain subtotals and the productivity measures. However, as could be expected from individual competence correlations, the non-technical subtotal has a much stronger positive correlation than the technical subtotal. The meta-competence domain (.618 & .607 with quarters 1 & 2 respectively) and the intra-organisational domain (.674 & .581 with quarters 1 & 2 respectively) are the basis of the strength of this positive correlation. These results suggest a greater association of non-technical competence performance ratings with superior organisational measure results. (See Appendix 8 for the table of correlations.)

Subgroup of strong correlated competences

The seven competences with strong correlations with the productivity measures were totalled and correlated with the productivity measures; they meet the 'strong' criterion (unweighted, first quarter = .873, second quarter = .759). The third quarter's results, not included in the HCI development are also included in Table 4.3 that follows. Considerable consistency is evident in the correlation results of all three quarters. See

Table 4.3 below for the strongly correlated subgroup of competences correlations with all of the productivity measures.

Addendum

*The CSRs had a partial productivity measure called 'productivity'. This is not to be confused with my reference to 'the productivity measures'; the latter refers to all the productivity measures

Table 4.3

CSR strongly correlated competences, HCIs & tertiary education correlations with productivity measures N (11)

	Sales	Customer Care	Productivity	First quarter 2001 1	Sales	Customer Care	Productivity	Second quarter 2001	Sales	Customer Care	Productivity	Third quarter 2001
Strong comps	.804	.799	.648	.873	.786	.770	.679	.759	.623	.807	.575	.786
Strong comps weighted	.776	.758	.572	.836	.749	.723	.596	.676	.527	.711	.527	.714
HCI	.639	.703	.420	.727	.598	.700	.550	.593	.527	.711	.527	.714
HCI weighted	.639	.703	.420	.727	.598	.700	.550	.593	.527	.711	.527	.714
Tertiary education	.051	-.303	-.242	-.221	-.082	-.114	-.047	-.114	-.172	.037	-.098	-.049

Key

Strong comps = Strongly correlated competences

Strong comps weighted = Strongly correlated competences using weighted mean performance scores

HCI = Human capital index

HCI weighted = Human capital index using weighted mean performance scores

N = The number of study participants

There is very little difference between the correlations results of the unweighted scores and of the weighted scores. Competences were weighted with the intention of giving prominence to competences an organisation considered more critical to their success. The results suggest the benefit of including these weightings with an untested new competence profile is questionable. There is no point in increasing the complexity of the human capital index procedure by introducing weightings if they have little impact on results. A future review of the competence profile and the weightings, along with training in the use of the competence feedback system, might increase the difference between the weighted and unweighted scores. Initial feedback from the CSRs' manager supported abandonment of the weighting system for individual competences if the difference in the results is negligible.

Human capital index (HCI)

Table 4.3 above presents the group human capital index correlations with the productivity measures. The unweighted human capital index correlation is the same as the weighted human capital index and slightly lower than the correlations for weighted and unweighted strongly correlated competences. This result is influenced by the presence of only one weighted competence in the strongly correlated sample and by only two competences having members not rated as competent.

Although the correlations for the subgroup of strongly correlated competences meet the criterion for 'strong' correlations with more productivity measures than both the weighted and unweighted human capital indexes, the latter are more comprehensive measures for an organisation as they include all of the competences. The human capital index, which includes all competences, has more strong positive correlations with productivity measures than the non-technical domains on their own.

How valid are the CSRs human capital indexes as measures of workforce value? There is a strong correlation between the human capital indexes with the productivity measures in all three quarters. By contrast, the internationally accepted OECD measure of human capital (the equivalent years of fulltime tertiary education) has negative correlations with the same measures. There is one exception, which is the very weak positive correlation of .051 for 'sales' in the first quarter. The third quarter results were

not included in the development of the human capital index. These results therefore provide evidence of the consistency of this index and support my claim that the human capital index is a valid measure of human capital.

For the CSRs the HCI calculated for 30th June 2001 provides the following data: the human capital index for the group of CSRs is 86.9 (with a positive correlation with the first and second quarter measures respectively of .727 and .593). In addition, there is each CSR's HCI and the performance ratings on each competence from which it is derived. The HCIs are displayed in Table 4.4 following, in association with the productivity measures.

Table 4.4

CSR individual HCIs and productivity measures for the first three quarters of 2001

Name	HCI	HCI (w)	Sales	Customer Care	Productivity	First quarter 2001	Sales	Customer Care	Productivity	Second quarter 2001	Third quarter 2001
Ina	92.48	92.84	32.5	45.5	35	113	31.5	44.5	33	109	Left
Nina	94.01	94.07	30.5	44	35	109.5	31	44.5	35	110.5	111.5
Alex	87.3	87.42	30	45.5	35	110.5	30	45.5	35	110.5	106.3
Yaap	89.06	88.64	31	43	35	109	31	44.5	35	110.5	Left
Stan	87.01	86.95	31	42.5	33	106.5	30.5	41	33.5	105	110.5
Yvonne	92.96	93.14	30	43.5	31.5	105	30.5	44.5	34	109	100.3
Ada	90.44	91.46	24.5	41.5	28.88	95.26	30.5	44.5	34	86.12	94.17
Nelly	84.13	83.82	20.13	40	35	95.13	30.5	39.11	31.5	101.11	99.8
Ernest	83.09	82.98	22	39.47	31	92.47	22	39.47	32	93.47	Left
Kelly	80.47	80.4	20.53	42	29.48	92.01	20.93	41	29.79	91.73	92.59
Alison	75.34	74.93	23.33	40	29.61	92.94	20.1	41	29.29	90.42	90.74

Key

HCI = Human Capital Index **HCI (w)** = Human Capital Index for weighted scores

In this group of CSRs the results above (Table 4.4) suggest a manager may want to look at the apparent mismatch between productivity measures and competence ratings for three of the group: Yaap and Stan appear to be over performing and Ada appears to be under-performing for her HCI.

Reaction to the HCI

The initial reaction of the call centre manager when I gave him a brief overview of results was that it was such a fleeting introduction to the results that he was not quite sure at that stage what it was telling him. What he wanted to know was whether the human capital index would give him any guidelines for what he should be doing better or differently or the same. This was his priority as an effective manager, which he undoubtedly is.

The manager's question is at the operational level. I suggested that the individual competence results would provide the information about who is able to do what and which competences are strongly correlated to the productivity measures. This provided the basis from which he could investigate the guidelines he sought although it would not provide them directly. The human capital index could provide a standardised measure to monitor the overall trends in performance of the CSRs, as a group, from one period of time to another. The individual results could monitor trends in individual performance and subsequently be broken down into competences for which they rated highly or poorly. This latter is the basis for workforce planning and training and development plans.

I asked the call centre manager how he thought a HCI specific number, in contrast to a band of ten points range, would be received by CSRs. In his opinion the culture of the organisation and in particular that of the call centre was one of acceptance of regular, individual measures with numbers to two decimal points. The productivity measures for each quarter used in this case study are examples of the measurement culture referred to. Numbers are the basis for personal development provision already, so measurement associated with incentives and development has no punitive connotations. Consequently, the manager saw no advantage in converting the human capital index to a

band. He also saw no requirement to accommodate variations in accuracy with a number based on ratings by reporting results as a band.

At the time of this meeting (which was post 360-degree feedback) the organisation had introduced a new measurement system for all staff using ratings scales on key performance issues, the product being a number to two decimal places.

A summary report was given to the call centre manager and a month later I telephoned to ask if he had any further comments to make now that he had had a chance to read the report thoroughly. He was happy with the process, referred to above, that the whole organisation had recently adopted, and had given little further thought to the human capital procedure and outcomes. He invited me to conduct further research with his staff if it was of any further benefit for my studies.

Conclusions

In this case study there are comprehensive productivity measures for the performance of each CSR. The use of the components of the quarterly measures helped identify the individual competences with strong correlations. Uniformity in correlations across competences indicates consistency in what competences the organisation metrics measure. The 'productivity' measure, however, does not appear to link with the competence profile as well as the other two component measures. Overall the measures appear satisfactorily functional, particularly in the short to medium term.

This was a first application of a competence profile for the CSR role, developed in a minimal amount of time, with only a small number of people involved in the consultation process i.e. very economical with resources. It produced the following. First, performance ratings that distinguished seven competences with a strong positive correlation with the productivity measures. Second, a human capital index with a strong correlation to the productivity measures.

Further refinement and piloting of the competences and weightings could improve this process further by clarifying the competences and determining if there is any advantage to weighting certain competences. Training in the use of the competence feedback form

and how to make consistent, fair ratings would promote greater validity and reliability in the resulting human capital index.

The use of competences as a basis for a human capital value appears to have much greater validity than the OECD measure of human capital, the number of equivalent full-time years of tertiary education.

Customer service officers (CSOs)

A customer service officer is what the general public would recognise as a teller - the person behind the counter when one goes into a bank branch to make a transaction. This case study bank employs nationally approximately 850 CSOs with between 4 and 14 CSOs at each branch.

The role of the CSO has changed over the last decade as more people use the alternative financial transaction facilities and services such as automatic teller machines, EFTPOS in stores, direct debits, automatic payments, telephone banking and computer banking. When a customer of the bank chooses to approach a CSO it is viewed as an opportunity to help a customer explore strategies for better money management. The CSO is set monthly targets for getting referrals for the personal bankers from their customers. The CSO role has therefore expanded from the clerical, financial transaction role to include a front-line customer service and sales role. They are closely monitored and expected to meet target performance. The bank provides initial induction training, which is a two-week workshop followed by a twelve month programme of training and development and support on bank products and services.

Sample

CSOs, unlike CSRs, are spread throughout the country in small teams at each branch. The MHRI approached nine regional branch managers to participate in this study. Six regional managers agreed. Three branches were chosen in each of the six regions: a low, a median and a high performing branch in each case. Out of these eighteen branches, seven branch managers consented to the participation of their CSOs. All their CSOs were approached; seven consented to take part before the cut off date and a further two

volunteered to late to be included, because their forms arrived after the next phase of the project was initiated.

The sample consisted of seven full-time CSOs, two male and five female. They were aged between 21 and 56, although both males were in their mid twenties. The amount of time the females had been in their position ranged between 2 and 13 years. The males had been in their positions for 2 and 3 years respectively. The number of years worked in the banking industry ranged from 2 to 13 and for the workforce in general from 5 to 24 years. The CSO role is not the first employment position for any of the sample. The two males have both completed one or more full time equivalent years of tertiary education, one with three years and achievement of a BA degree and the other with a year of full time equivalent tertiary education towards a qualification. Other tertiary education included an Introductory Certificate in Investment.

Competence profile

I facilitated the development of a competence profile for the customer service officer (CSO) position with the recruitment manager and the manager human resource information. They distributed this competence profile to two CSO managers for their comments. The recruitment manager and MHRI suggested some minor modifications but the CSO managers suggested no change. The MHRI consulted with the CSO managers about which competences should be weighted for importance and the proportional weightings for non-technical and technical competences, the latter being 65 and 35 respectively. All Nordhaug domains are covered.

The CSR and the CSO competence profiles have many of the same competences. A number of them have minor wording changes to suit the two different roles. A small number are different, due to their differences in dealing with the public and their work environment. The CSO competence profile has twenty-two non-technical competences and six technical competences. Non-technical consist of nine meta-competences, nine intra-organisational competences and four industry competences. Technical consist of two standard technical competences, two technical trade/professional and two unique competences (See Appendix 9 for a list of the competences classified in the Nordhaug domains).

Productivity measures

CSO productivity measures received lacked consistency in presentation and provision and hence comprehensiveness and rigour. I discussed the scales and how to amalgamate measures and incomplete data with my contact person and one of her staff members. They preferred not to bother the branch managers by more consultation or requests for further data.

Measures span one month's results, May 2001. I developed the data I was given into a total measure comprised of three partial measures in the form of 5-point scales. My first analysis only used the total measure. Experimentation with correlation analyses with partial measures led to my decision to include them. Competences are strongly correlated to some of the partial measures but not to the total measure. The three partial measures are 'key product referrals', quality in the form of 'teller cash outs' (i.e. how much the cash in their till is over or under the balance) and a 'service' survey score. Details of theses productivity measures are in Appendix 11.

Competences 360-degree feedback

There were three completed forms on each study participant. (See Appendix 10 for a copy of the competence feedback form). The study participant completed one form, his or her branch manager another, and the third was completed by a peer selected by the branch manager. Blank forms were sent to the branch managers with a cover note of introduction and explanation to the raters. Branch managers distributed the forms along with the stamped and addressed envelopes and information sheets. A personnel data form was included in the material for the study participant. I did not speak directly to any of these branch managers.

The office of the MHRI was approached to follow up any forms that did not arrive. Because she was away during much of this period one of her staff (who I had not met) did most of the follow up. Within six weeks all forms were in.

Personnel data

The personnel data form was completed by the study participants and returned with their competence feedback forms. As with the CSRs these forms were completed with varying degrees of thoroughness and (probably) accuracy.

Analysis

I was aware of the limitations of the CSO productivity measures before analysis of the results. I had been assured there were objective measures in place and it was only upon seeing them during the data collection process that the consistency issues were revealed. The measures are untested translations of key performance indicators into five-point scales for a very small numbers of CSOs. In addition, unlike the CSR productivity measures, the CSO measures cover only one month's results. However, the competences are developed within the structure of the Nordhaug typology of six domains and the measure did cover the dimensions considered to be evidence of the performance valued by the organisation.

The means and standard deviations for each competence for each of the study participants were calculated. These are displayed in Appendix 12. Out of a possible 196 standard deviations for the unweighted competence scores there are thirty-four that are greater than 1 but less than 1.60. There is no competence that had more than two of the sample with a standard deviation greater than one. Two of the study participants are responsible for twenty-one of these thirty-four standard deviations greater than one. Neil had thirteen greater and Liana eight. The rating patterns of the individual raters showed that Neil consistently rated himself higher than his superior rated him and sometimes more than the peer rater. Liana tended to rate herself lower than the peer and her superior. I anticipated these results would impact on the human capital indexes.

There are seven competences with a strong correlation and all of these are with the '(Customer) service'[56] productivity measure. One of the seven competences is a technical competence and the other six are non-technical competences. If the total measure for May 2001 had not been separated out into the partial measures, these strong positive correlations would have been cancelled out by the other partial measures and

[56] They refer to the 'customer service' measure as 'service'. I have included (customer), to clarify the area being judged

no strongly positively correlated competences would have been evident. Table 4.6 displays these competences and their correlations with the four productivity measures.

Although the CSR and the CSO competence profiles share most of their competences, there is only one competence in common in the two lists of competences with strong positive correlations with productivity measures (CSR= Table 4.1 & CSO= Table 4.6 below). This common competence is an interest in their respective roles: 'Displays sustained interest and initiative with the CSO (CSR) role'. The six other competences give a very different perspective of what distinguishes exceptional performance in the respective roles. CSO non-technical and technical strongly correlated competences relate to dealing with the public in a face-to-face situation as part of a team. In this sample the higher performing CSOs appear to have a greater awareness than the CSRs of the X bank's culture and products and service and greater knowledge of the industry. This contrasts with the CSRs' strongly correlated competences that reflected their individual, more structured, technological interface with the public. This difference between the two groups suggests that this first attempt at a competence profile for each group has demonstrated some consistency between these competences and their respective measures.

The CSOs' single strongly correlated technical competence is weighted because of its importance: 'Has a thorough understanding of the relevant X bank products and services'. Presumably, unless a CSO knows what the products are, unlike a CSR who has a computer directory of product and service information to consult, it would not be possible to give service and gain referrals in the short interaction time involved in serving a customer.

Table 4.5

CSO competences with a strong positive correlation with productivity measures (N: 7)

Type	Competence	Referral	Cashout	Service	Total May 2001
Tech, T/P & W	Has a thorough understanding of the relevant X bank products and services	-.175	.615	**.801**	.615
NT & M	Verbal communication is suited to the everyday language of the broad base of customers, team and management	-.191	.528	**.786**	.528
NT, M & W	Enjoys engaging customers in conversation to try and help them	-.369	.423	**.801**	.423
NT & Intr	Values being associated with the corporate image of the bank as a leading, successful organisation (this is evident in their pride and loyalty)	-.591	.245	**.746**	.245
NT & Intr	Works co-operatively as part of a team	-.486	.226	**.707**	.226
NT & Intr	Understands the structure and culture of the X bank	-.486	.208	**.746**	.208
NT & Intr	Displays sustained interest and initiative with the CSO role	-.638	.151	**.707**	.151

Key

Tech = Technical competence

M = Meta-competence

NT = Non-technical competence

T/P = Trade / Professional

W = Weighted competence

N = The number of study participants

There is also a long list of the competences that had at least one positive, although not strong, correlation with an organisational measure. These are listed in Appendix 13.

Personnel data

There are no strong correlations between the productivity measures and any of the recorded personnel data: age, gender, years in the CSO job, years in the workforce and equivalent years of tertiary education. The measure 'number of referrals' recorded weak, positive correlations with gender, years in the workforce and the number of equivalent fulltime years of tertiary education. There appears to be no advantage in including any of the personnel data in a human capital index because the correlations are too weak. Tertiary education has very weak correlations with productivity measures. It does not appear to have any meaning as an indicator of workforce performance (See Table 4.11).

Table 4.6

CSO personnel data correlations with the productivity measures (N: 7)

Personnel Data	Referrals	Cashout	Customer Service	Total May 2001
Age	-.187	-.185	-.077	-.185
Gender	.246	.000	.000	.000
Years in this job	-.062	-.102	.170	-.102
Years in workforce	.142	.037	-.234	.037
Tertiary education	.303	-.092	-.096	-.092

Key

N = The number of study participants

Domains

Correlations of Nordhaug's domains with productivity measures are considerably greater than equivalent full-time years of tertiary education (-.096 with the 'service' measure and -.092 with the 'total May 2001' measure).

Non-technical performance totals have a strong correlation with the '(customer) service' measure (.772). These results are influenced by the strong correlations of the meta-competence and the intra-organisational domains (both .772) with the same measure. Technical performance totals also have positive, although not strong correlations with the '(customer) service' measure (.309 and weighted is .463).

The technical unique competences subtotals have a positive, although not strong, correlation (.506 & .662 for weighted) with the '(customer) service' measure. This domain however only consists of two competences:

'Has a thorough understanding of the relevant X bank products and services'

'Able to navigate their way through the X bank's software for frontline banking systems'

The first one was given a weighting to reflect its importance and is the only technical competence with a strong correlation with the productivity measures (.801 with the 'service' measure) and the second has a weak but positive correlation (.323 with the 'service' measure).

There is a pattern of an inverse relationship between the 'referrals' measure and the 'service' measure. Competences or personnel data (such as tertiary education - see Table 4.11) that are positively (although nothing is strongly positive) correlated with the 'referrals' measure (.303 for tertiary education) are negatively correlated with the 'service' measure (-.096 for tertiary education). All the domain totals and the non-technical and technical totals above in Table 4.12 are positively correlated with the 'service' measure and all are negatively correlated with the 'referrals' measure. There is one exception, which is the small group of competences in the standard technical domain that do not appear to have positive correlations with any measures.

Subgroup of strongly correlated competences

Seven competences have a strong correlation with productivity measures. There is no difference between the unweighted and the weighted strongly correlated total scores (See Table 4.7). This subgroup had a strong positive correlation with the '(customer)

service' measure (.772), the same component organisational measure with which the individual competences are strongly correlated.

Human capital index (HCI)

A human capital index score was developed following the procedure outlined in Chapter 3. (See Table 4.7 below for the HCIs with their correlations with the productivity measures in contrast to those of tertiary education.)

The subgroup of competences individually strongly correlated with the productivity measures is included to highlight any positive correlation differences between this smaller group and the more comprehensive human capital index measure.

Table 4.7

CSO strongly correlated competences, HCI & tertiary education correlations with productivity measures. (N: 7)

	Referrals	Cashout	Customer Service	Total May 2001
Strongly correlated competences	-.505	.296	**.772**	.296
Strongly correlated competences (W)	-.505	.296	**.772**	.296
HCI	-.505	.222	.694	.222
HCI weighted	-.505	.296	**.772**	.296
Tertiary education	.303	-.092	-.096	-.092

Key

HCI = Human capital index **N** = The number of study participants

HCI weighted = Human capital index using weighted performance score

Tertiary education = Equivalent years of full-time tertiary education

There is a strong positive correlation with the '(customer) service' measure of the weighted HCI at .772 and a .694 correlation with the unweighted human capital index. This is considerably higher than the tertiary education correlation of -.096 for this same measure. In addition, there is a weak positive correlation (.222 and .296 respectively) between 'total May 2001' and the human capital index and weighted human capital

index. This contrasts with a -.092 correlation with the same measure, of 'equivalent years of full-time tertiary education'.

The human capital index has validity relative to the tertiary education correlations because of its strong correlation with one of the organisation's measures, the '(customer) service' measure. However, the productivity measures were not as reliable and balanced as the CSR productivity measures. Moreover, the 'referrals' measure needs reviewing in terms of its relationship with the competences. The correlation analyses do not provide a cause and effect relationship but highlight an association or lack of association between competences and measures.

All strong correlations were with one of the partial measures. This made me aware of the potential for unidentified bias in the presentation of HCI results. Presenting the HCI measure with the correlation details, acknowledges this bias. The CSO result would be presented as: a group HCI of 88.8 unweighted and 88.91 weighted (with a Spearman positive correlation with the May 2001 '(customer) service' measure of .772 and 'total measure for May 2001' of .259). Individual CSOs' HCIs and their productivity measures (or key performance indicators) are displayed in Table 4.8 below.

Table 4.8
CSO HCIs and productivity measures for May 2001

Name	HCI	HCI (w)	HCI Band	Referrals	Cashout	Customer Service	Total May 2001
Euera	97.63	97.79	91-100	4	5	5	14
Ester	94.76	94.81	91-100	4	5	5	14
Tana	91.66	91.66	91-100	2	4	5	11
Alice	82.34	82.97	81-90	5	5	4	14
Ariel	82.36	82.20	81-90	5	4.5	3	12.5
Neil	88.10	88.16	81-90	5	2	3	10
Liana	84.76	84.81	81-90	3	1	3	7

Key

HCI = Human capital index **HCI (w)** = Human capital index for weighted scores

Variations between individual HCI and productivity measures can be investigated by considering performance scores for each competence. As predicted from the standard deviations for each study participant's competences, Neil and Liana gained a higher HCI than their results for May appear to justify. Tana's and Alice's results are affected by their different referral results. Weightings for different competences have a small effect, which disappears when HCI bands are used.

Reaction to HCI

When I first briefly presented the results to the MHRI, the analysis did not yet include the partial measures of which the total measure is comprised. Hence these initial results had no competences with strong positive correlations. Conceptually she was very positive about the acceptance of this human capital index. However, she could not see anything like this being used extensively in a large, complex organisation with a high rate of change because of the amount of work involved. With over 600 different roles she said they were struggling to keep up with accurate position descriptions. Developing competence profiles (which would also need maintenance) was not going to happen. On reflection she thought the use of my human capital index suited a role with large numbers of people in which they already used 360-degree performance review systems with numerical ratings. In this bank this applied to leadership and management roles. She admitted measures currently available for these types of roles are often not specific, which would seriously affect the procedure for developing this HCI.

Like the call centre manager, the MHRI regarded the use of a specific number for a HCI, in contrast to a band, acceptable. CSOs are accustomed to having numbers for performance feedback. She thought managers would find it useful to have a number for each staff member but she felt that they might not like a human capital index number or band being assigned to them.

Conclusions

The CSO case study has a HCI with a strong positive correlation with one of the partial productivity measures given for May 2001 a considerable greater correlation than with tertiary education. This supports my procedure for the development of a human capital index as a value for people in the workforce.

Reflections on the process of conducting these two case studies

Because these were my first case studies I found it helpful to reflect on the results, after their completion, in order to improve the process in subsequent case studies. The personal data form was completed poorly. There was definitely a need to simplify it and to make the meaning of each question clearer. That I did for future case studies. Another impact on the quality of the data was where it was completed. It was probably completed in most instances by the individuals participating in the study at work, without any curriculum vitae to jog their memory on details of their work history. It is likely to be more accurate if not completed by the individuals themselves but if their details are extracted from the organisation's personnel database and any formal curriculum vitae on file. This organisation chose to leave it to the individual study participants to complete the personnel data. This required fewer resources and they also said that the form contained items that were not held in the organisation's personnel files.

Because these case studies were the first with all necessary data collected, I continued the exploratory analysis of data. This led to the re-evaluation of the HCI formula used in the pilot engineering case study. I set out to use the Nordhaug (1993) typology to develop a comprehensive competence profile with minimal development resources, to combine it with the personnel data components proposed by Brown (1999; 2000) to calculate a human capital index. However, analysis of the data collected led to the development of this different procedure and different components in the index to represent human capital.

The characteristics of productivity measures, which were apparent from the differences in the productivity measures and the HCI results of these two bank roles, follow. The productivity measures need to cover the competence profile, be consistent and preferably span more than one month. A family of measures appears to be more relevant for correlation with a profile consisting of individual competences. When partial measures are amalgamated into a total organisation productivity measure, it is possible for strong positive correlations with competences to be cancelled out by weaker, or negative correlations by other partial measures. A longer span of measures

increases the chances of correlation reliability, as does a family of measures developed to cover the competence profile and measure the organisation's goals.

Chapter 5

Law Firm Case Study

Two lawyer samples

These two case studies had very different results. They have the same productivity measures but different competence profiles (NCP & ECP[57]). The NCP results are very positive and have accordingly been extended to include development of the HCI band and to illustrate verification of results with the full year productivity measures.

The Organisation

The organisation is one of the larger law firms in New Zealand with offices in both Auckland and Wellington. My contact person was the human resources (HR) director. She regarded involvement in this research as an opportunity to pilot a new performance appraisal system and compare the result with the existing appraisal system. The new performance appraisal competences were developed after an extensive process of consultation in the law firm in which the HR director previously worked. Competences included all those required in the different departments of a large law firm. They required more time and effort to use because they were more descriptive than the firm's existing list . The HR director felt that if there appeared to be no major difference in the results of the two different competence appraisal systems then she would need to reconsider her plan to introduce the new, more comprehensive one.

Samples

The HR director chose two samples. Both were from the corporate department, which is headed by a managing partner always keen to be involved in developmental projects. This department has two sections, financial services and communication, and technology and media. Two matched[58] groups of thirteen lawyers each were approached[59] to participate in this research. It was, she said a fairly random list with

[57] NCP & ECP are explained later in this chapter and also appear on the List of Abbreviations
[58] Each group had the same number of lawyers at each level: 3 senior associated (level 3), intermediates (level 2) & 6 juniors (level 1)
[59] Information distributed was the modified information sheet (Appendix 9) and a supporting memo (Appendix 10) written by the HR director

certain people excluded. Reasons given for o ission were awareness that they were too busy, absent from the firm, would not want to be involved in a non-fee paying activity, or had performance issues. Seventeen of the twenty-six lawyers consented to take part in the study.

These seventeen lawyers were divided into two groups matched for levels. To distinguish between the samples they were labelled in accordance with their competence profile. One sample of lawyers was differentiated as 'new competence profile' (NCP) and the other as 'existing competence profile' (ECP). NCP lawyers were rated on a competence profile new to this organisation while ECP lawyers were rated on competences developed from the existing, 'legal staff development discussion form'.

The ECP sample of nine lawyers consisted of four men and five women. Five of the sample, three women and two men, were junior (level 1) lawyers, with an age range of 24 to 26 years. These level one lawyers all had five years full-time tertiary education and one year in their present position. Three in the sample were intermediate (level 2) lawyers, with a minimum of two years of post-graduate work experience - one of them with only one of those years in this organisation. The two women in this group were 25 and 26 years old and the man was 33 years old and had 6 years of work experience in the workforce outside this company. The ninth subject was a senior associate (level 3) lawyer, male, 33 years old with one and one-half years in his present position but with 9.5 years in the workforce in total. All but the level 3 lawyers had worked part time for this firm as both a summer clerk and a law clerk while training.

Each of the existing competence profile group had an LLB degree and a conjoint degree. The two thirty-three year old men had conjoint Bachelor of Com ercial Accounting (BCA) and LLB degrees which had involved four years of tertiary education while the other seven each had conjoint degrees of five years duration. The latters' degrees were LLB conjoint with a Bachelor of Arts (BA), Bachelor of Commerce (BCom) or Bachelor of Property Management degree (BProp). During their tertiary education five of the nine had been awarded one or more prizes, honours or scholarships. The incidence of honours and scholarships was high because grade point average was traditionally taken into account in the recruitment of graduates.

The NCP sample consisted of eight lawyers, three men and five women. There were four junior (level 1) lawyers, three women and one man, whose ages ranged from 24 to 28; three intermediate (level 2) lawyers, two women and one man whose ages ranged from 25-26 and one senior associate (level 3) lawyer, a male aged 31. The level 1 lawyers had each had one year in their positions, the level 2 lawyers had each had two years and the level 3 had had six years of post graduate work experience in another law firm, but only six months in this position. Each lawyer had at least five (one had 6) years of tertiary education with an LLB and a conjoint or second degree. The conjoint or second degrees were BA, BCom or Bachelor of Management (BMgt). Four of the lawyers had been awarded one or more prizes, honours or scholarships during their tertiary education.

Competence profiles

The ECP was taken from the existing 'legal staff development discussion form'. This form has been the basis of performance discussion and development for the junior and intermediate legal staff in this firm since 1999. However the participants had not given one to five ratings before. Previous ratings consisted of a self-rate on a four-point scale used only as a basis for discussion with the rater's manager. Many of the competences are less descriptive than the NCP competences described below and did not have accompanying descriptors.

The ECP competence profile covered five of the six Nordhaug domains. The standard technical domain had no written competences. There was however an assumption that the lawyers would all have the standard technical skills: telephone skills, and basic keyboard skills as a foundation for other listed competences. Therefore I accepted the ECP as meeting my criteria for coverage of the Nordhaug domains. No further competences were added. (See Appendix 1 for descriptions of the six Nordhaug categories/domains and Appendix 21 for the ECP competences classified into the Nordhaug domains.)

The NCP is derived from an imported appraisal system. It is many pages long because the competences all have accompanying detailed behavioural descriptors. I consulted the descriptors to classify the competences into Nordhaug's domains. As a result some

competences that looked like meta-competences were classified as intra-organisational competences because of the organisational context outlined in the descriptors. The comprehensive descriptors resulted in no meta-competences and a very large number of intra-organisational competences. Like the ECP above, there are no identified standard technical competences. I accepted the competence profile as it was, as meeting my criteria for coverage of Nordhaug's domains because the two domains, meta-competences and standard technical competences were subsumed in the other four domains. Because of the wordiness of the descriptors, I decided to include only the competence on the 360-degree feedback form. A notice on the form directed raters to access the 'dictionary of guiding behaviours' i.e. descriptors, on the organisation's intranet. Raters were also asked whether they had consulted the intranet located dictionary.

The HR director discussed the weightings for individual competences and for the technical and non-technical groups of domains with the human resource advisor in the firm's other office who has a law degree, legal experience and had been with the firm for a number of years.

They commented:

> *It was a bit difficult assigning weightings to individual competences in the sense that there are a lot of variables like age, level, area of practice and as people become more senior the non-technical skills tend to become more important. We have pitched our weightings at the junior to intermediate level in a corporate department i.e. less than 5 years experience.*[60]

Fifteen of the thirty-four NCP competences were given a weighting and fifteen of the twenty-five ECP competences were given a weighting. The two HR personnel decided that the proportional importance of the technical and non-technical competences for both the existing and the new competences was 50:50.

[60] Email from HR director to researcher 22/6/01

Productivity measures

In this organisation a number of measures are calculated to monitor the work of each lawyer and their respective financial contribution to the firm. I initially included eight of these measures for the correlation analyses with productivity measures. This was subsequently reduced to six for the recalculation of the HCI in a verification of results process.

My selection criteria were productivity measures that provided comprehensive coverage of competence outcomes. The basic unit of measurement is a six-minute period of time. The year's budget identified the units and fees anticipated for each lawyer at each level for each month. The budgets for units and fees vary according to the level of the lawyer i.e. a level 2 lawyer is expected to include more billable units and to bring in more fees than a level 1 lawyer. Their time (as units) is also charged out at a higher rate. The total measure, the 'YTD total financial contribution', is the accepted significant financial indicator of the performance of each lawyer.

The measures included are 'unit percentage to budget, April 2001', 'unit percentage YTD[61]', 'fees percentage of budget for April 2001', 'fees percentage for the YTD', 'recovery rate', 'productive non-billed time', 'YTD total units' and 'YTD total financial contribution'. (See Appendix 18 for an explanation of these productivity measures.)

Competences 360-degree feedback

On the NCP feedback form there were thirty-four competences: nine technical and twenty-five non-technical. The technical competences were classified as six trade/professional and three unique. Non-technical competences were classified as twenty-one intra-organisational and five industry competences. (See Appendix 14 for a list of the competences and Appendix 15 for a copy of the NCP feedback form.)

On the ECP feedback form there were twenty-five competences: eight technical and seventeen non-technical. The technical competences were categorised as six technical trade/professional and two unique. The non-technical competences were classified as two meta-competences, fourteen intra-organisational competences and one industry

[61] YTD = year to date

competence. (See Appendix 21 for a list of the competences and Appendix 22 for a copy of the ECP feedback form.)

Four feedback forms were completed on each study participant[62]. The study participant completed one form, their manager another and the participant selected someone of the same level of experience as themselves and someone more junior. However, the rater's position was not identified as the HR director considered team membership the major criterion for feedback, not the rater's position. Some of the study participants included an administration staff member among their raters.

Personnel data

The human resources administrator completed the personnel data forms on all participants using the personnel files (See Appendix 4 A for a copy of this form). The groups were more homogeneous that those in other case studies. All had two degrees and the age range was narrower - 24 to 33 years old. There is a structured progression to get to be a lawyer at level 1, 2 or 3 i.e. summer clerk then law clerk as a foundation, usually with the same firm. Once fully qualified, having completed their professional examination, they become level 1 lawyers and progress over the years to level 2 and then level 3.

There are clear records on courses booked for training and development – but no real way of equating these. The number of years spent in the workforce is also ambiguous. Some list up to 8 part-time years – which in consideration of their age must include their part time work during university and possibly senior high school years. Others list no part time years and yet have recorded two prior positions with the firm as summer clerk and law clerk. The lawyers 'equivalent years of tertiary education' is very clear; it is all full time university education. Most of the two samples had five years, a couple four years and one had six years.

Lawyers: NCP analysis

None of the study participants had all of their raters use the dictionary of guiding behaviours posted on the intranet; a total of six raters out of a possible twenty-four used

[62] Procedure is outlined in the Methodology Chapter 3

the dictionary. There were certain competences that some of the study participants were not rated on. They and/or their peer raters considered them outside their current job requirements or experience. Therefore, they were not in a position to assign a performance rating. Included in this group of competences were:

'Court advocacy skills' - (no study participants were rated on this).

'Ability to mediate and generate alternative dispute resolution' - (two only of the sample were rated).

'Ability to present client information tools' - (five of the sample were rated).

'Ability to effectively negotiate on behalf of clients' - (seven of the sample were rated).

'Ability to develop existing client relationships' - (seven of the sample were rated).

'Effective supervision of junior staff' - (seven of the sample were rated).

The list of NCP competences was designed to cover all the competences across the various departments and the different levels in a large law firm. The samples were both from the corporate department and the first two competences in the list above are not a requirement for junior and intermediate lawyers in this department. The last three on the list above are competences that are required only when the opportunities develop during a progressive career path.

I calculated means for the raters' scores and the standard deviations for the thirty-four competences (both weighted and unweighted) for each of the eight study participants. These are displayed in Appendix 19. Nineteen of the 234 scores had a standard deviation greater than 1.0, although these were still less than 1.5. The two, level 2 woman lawyers, Alijcia and Elsie, had four and seven competences respectively with standard deviations greater than 1.0. When their self-rating is reviewed in the context of the other ratings on these competences, they have consistently rated themselves lower or at least as low as the lowest other rating. Alijcia's and Elsie's 'YTD total financial contribution' to the firm were consistent with this difference in self-perception. They both earned less than the other level 2 lawyer and Elsie earned less than Alijcia. The regular feedback of their lower productivity measures could have impacted on their lower self-ratings (Arnold & Davey, 1992).

One competence had three study participants with standard deviations greater than 1.0. This competence was, 'effective supervision of junior staff'. The two level two lawyers account for two of the three involved.

Below is a table of the ten competences that show a strong positive correlation. All study participants were rated on the first six competences. The last four competences are associated with a reduced sample size and all of them appear to be related to more specialist functions. Since the sample is small and the intention of the weightings of competences on the NCP form was to pitch it at the more junior and intermediate level lawyers, I only included the competences rated for all eight participants in the development of human capital indexes (HCIs).

Of the six strongly positive competences for the sample of eight, one is technical trade/professional, i.e. specific to the profession of law, 'ability to undertake efficient and accurate research'. Another is a non-technical industry one specific to law firms: 'commitment to the development of legal skills'. The other four are non-technical intra-organisational competences specific to the X law firm. Most of these competences also have some weak negative correlations to at least one of the other productivity measures, the exception being the competence, 'effective delegation of matters and/or tasks'.

Table 5.1

NCP Lawyers: Competences with strong positive correlations with at least one of the productivity measures

Type	Competence	No. of Participants (N)	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $
Tech, Prof & W	Ability to undertake efficient and accurate research	8	.313	.458	-.205	**.735**	.542	-.012	.530	**.747**
NT & Intr	Effective delegation of matters and/or tasks	8	.401	.325	.175	**.751**	.375	.275	.601	**.751**
Intr & W	Financial performance to budget	8	.443	**.778**	-.108	**.802**	.467	-.180	.539	**.731**
Intr	Effective supervision of junior staff	7	.430	.561	-.168	**.786**	.318	-.393	.356	.692
Ind & W	Commitment to the development of legal skills	8	.415	.610	.171	**.756**	.366	-.171	.268	.537
Intr	Contributes to the firm's precedent system	6	-.213	.152	.334	.395	**.820**	.638	.334	.334
Intr	Effective coaching skills	8	.571	**.812**	-.025	.178	.000	-.431	.571	.330
Intr	Facilitates firm and practice group planning	4	-.211	-.211	.211	.632	**.949**	**.738**	-.211	.316
Intr	Commitment to the development of collateral professional skills	8	.530	.193	**.771**	.229	-.289	-.386	-.289	-.205
Intr	Ability to present client information tools	5	-.200	-.300	**.800**	-.400	-.100	.100	**-.700**	**-.700**

Key

Tech = Technical competence **Prof** = Trade/Professional **W** = Weighted

NT = Non Technical competence **Ind** = Industry **Intr** = Intra-organisational

N = The number of study participants out of a possible eight that were rated on this competence

There is one competence that has a strong negative correlation with one or more of the productivity measures (See Appendix 20). The competence 'ability to present client information tools' (based on a sample of five), has a strong positive correlation with the 'fees percentage for April 2001' (.8) but a strong negative correlation with 'YTD total number of units' (-.7) and the 'YTD total financial contribution' (-.7). My interpretation is that fees brought in for April, for the five in this sample, were influenced by the ability of the lawyers concerned to give presentations to clients. In January, February and March however there are no fee generating outcomes associated with this competence, hence the YTD negative results for both units and fees. My inclusion of one month's productivity results led to this distortion in the competence correlation results (See Appendix 20 for the competence correlations that are less than plus or minus 7).

Personnel data correlations with the productivity measures

I correlated the recorded personnel data and productivity measures (See Table 5.2 following). The results did not indicate any benefit in including personnel data in the HCI formula at this stage of development.

Table 5.2

NCP Lawyers personnel data correlations with productivity measures (N: 8)

Personnel data	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non billed units	YTD total units	YTD Total contribution $
Age	.158	-.061	-.558	.497	.036	-.230	.133	.509
level	.183	.183	-.365	.039	-.209	-.730	-.183	.091
Gender	.282	-.394	.737	.056	-.507	.056	-.394	-.394
Years in this job	-.674	-.385	.289	-.302	.234	.289	-.654	-.385
Equivalent F/T years tertiary	-.274	-.577	-.247	.247	.082	.577	.082	.247
Prizes/honours	-.078	-.183	.104	.170.	.209	.730	.391	.170

Key

N = The number of study participants

Age has the largest correlation with the 'YTD total financial contribution' (.509) although it is not a strong positive correlation. It would be logical to assume that this result for age is associated with the impact of the greater charge-out rate and greater budgeted fees billings of the more senior lawyers. However, the level of each lawyer has a very weak positive correlation of .091 with his or her 'YTD total financial contribution' result. This is due to the considerable overlap in the results of level 1 and level 2 lawyers. The age variation in the sample, although small, also overlaps between levels. There are 26 year olds who are at level 1 and 26 year olds who are at level 2 as well as a level 1 lawyer who is 28 years old. Within a level in this very small sample there is a pattern of the older lawyers having a greater 'YTD total financial contribution'.

Gender has a strong correlation with the 'April fees percentage to budget'. There are five females and only three males in the sample of eight, and two of the females had much higher percentages for April than any of the others. This could explain the strength of this correlation that appears to be a short-term effect as the 'YTD results have a weak negative correlation.

The lawyer level has a strong negative correlation with 'productive non-billed units'. More experienced lawyers are awarded less 'productive non-billed units' than level one lawyers.

Different level lawyers have different charge-out rates and different budget requirements. Level three lawyers have the higher budget targets and the higher charge-out rates. These differences in budgets and charge-out rates could cancel out or rendered some differences undetectable in the correlation analysis. However the bottom line 'YTD total financial contribution' is a common objective output at all levels.

The personnel results above show a correlation of .577 between the equivalent years of tertiary education and 'productive non-billed units' and a strong positive correlation of .730 between those who gained prizes and/or honours and their 'productive non-billed units'. All but two of the study participants had five years of tertiary education (two had four years). This result suggests that those with five years of tertiary education and especially if they received awards or honours, spend more time on training and

development and the other activities awarded productive non-billed time. Level 1 lawyers all had five-year degrees and accounted for most of the honours and prizes. The number of years of equivalent full-time tertiary education has a very weak positive or negative correlation with all other productivity measures. The weak positive correlation with the 'YTD total financial contribution' is .247.

Four of the group of eight (all of them level one) were recipients of prizes or honours. These four were awarded nearly twice as many 'productive non-billed units' in the first four months of the year as anybody else. The validation correlation analyses with the twelve-month, end of year results, reveals the consistency of this strong correlation (.810). By the end of the year, lawyers with two prizes and/or honours had been awarded approximately twenty per cent more 'productive non-billed units' than the next highest recipient.

Domains

There are no clear-cut patterns of correlations with the subtotals of Nordhaug's domains. The intra-organisational correlations were unable to be calculated[63], a number of non-technical competences were not rated for some participants[64] and only four of the six domains are used to categorise the competences. However, the total mean performance scores for non-technical competences have a strong correlation with productivity measures (.837 with 'fees% YTD'). There are no strong negative or positive correlations with any technical subtotals (See Appendix 20 Table 3 for these results). Categorisation of the thirty-four competences is dominated by the twenty-five non-technical competences of which twenty are classified as intra-organisational. The later predominate in the sub-group of competences strongly correlated with productivity measures.

Sub-group of strongly correlated competences

Strongly (positively) correlated competences include one technical and five non-technical (nine competences, if the sample size for consideration is reduced to include those competences for which only five study participants were rated). Of the non-

[63] Due to a variable constant
[64] Only two of the sample are included in the correlation for industry competences

technical competences one is an industry competence and the other four are intra-organisational.

There are both strongly correlated competences and weighted, strongly correlated competences. Because three out of the six competences are weighted to indicate their importance, the subtotal of the weighted scores has a slightly stronger correlation with the productivity measures. The 'productive non-billed units' measure is the only one with a negative correlation with the sub-totals.

These six strongly correlated competences seem to encompass financial productivity, research accuracy and the organisation and development of oneself and others. Contrary to these results, I had anticipated that several of these competences would have a strong association with 'productive non-billed units'. As it is, the scores of these six competences account for approximately 70 per cent of the differences in the lawyers' surveyed 'YTD total financial contribution'.

The correlations with productivity measures of the strongly correlated competences subtotal (Table 5.3) are included to compare these results with the subsequent HCI results. I propose that a measure that includes all the competences has more significance for the long-term results of an organisation, as it is less susceptible to short-term outcomes over-shadowing the long-term requirements. However, as this research explores competences as a measure of human capital, the relationship of the smaller more targeted group of 'strongly correlated competences' to the productivity measures is displayed.

Human capital index (HCI)

Human capital indexes were calculated for the sample. The procedure and formula are outlined in Appendix 3. (See Table 5.3 following for the correlations of the human capital index with the productivity measures and with the equivalent years of tertiary education and prizes and honours.)

The HCI strong correlations with the productivity measures together with the weighted human capital index (HCIW) appear similar to the correlations of the subtotals of the 'strongly correlated competences' in Table 5.3. However the 'strongly correlated

competences do not meet the strong correlation criterion (.7) for 'YTD total financial contribution' and the HCI and HCIW do not meet this criterion for the 'Units % YTD'. This suggests that a focus only on competences that correlate highly with this later partial measure would fail to emphasise all the competences that the organisation thinks are important.

Table 5.3 shows a small negative correlation between 'productive non-billed units' and the strongly correlated subgroup of competences and the human capital index. It appears that the lawyers scoring more highly on these competences tended to generate less 'productive non-billed units'.

Table 5.3

NCP Lawyers strongly correlated competences, human capital index (HCI), tertiary education and honours/prizes correlations with productivity measures (N: 8)

	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non bill units	YTD Total units	YTD Total contribution $	Tertiary education	Prizes/ honours
Strong comps	.500	.714	.095	.762	.381	-.143	.500	.667	.500	.714
Strong comps weighted	.429	.762	-.024	.810	.500	-.119	.524	.714	.429	.762
HCI	.381	.452	-.095	.905	.476	-.048	.429	.786	.082	-.156
HCIW	.405	.548	-.119	.952	.500	-.024	.500	.810	.082	-.065
Tertiary education	-.274	-.577	-.247	.247	.082	.577	.082	.247	1	.632
Prizes & Honours	-.078	-.183	.104	.1708	.209	.730	.391	.170	.632	1

Key

Strong comps = Strongly correlated competences **W** = Weighted

HCI = Human capital index **N** = The number of study participants

Tertiary education = The equivalent number of full-time years of tertiary education

Prizes & honours = The number of prizes and/or honours gained during the tertiary university years

In contrast there is a .730 correlation between gaining prizes and honours during tertiary education with the 'productive non-billed units'. Those lawyers with prizes and honours record more 'productive non-billed units'. The correlations for the 'YTD total units' and the 'YTD total financial contribution' suggest this same group of lawyers do not record as many billable units as the lawyers who did not receive prizes and honours during their tertiary education. Fewer billable units have an impact on their total financial contribution results.

The human capital index has a strong positive correlation with the bottom line ('YTD total financial contribution') and the 'fees percentage for the YTD'. The years of tertiary education (which are similar for all study participants and therefore are not clearly distinctive) and the number of prizes and honours received have only a weak positive correlation with any of the other productivity measures.

The individual HCI scores for the eight participants are recorded below in Table 5.4 along with their individual productivity measures.

Table 5.4

NCP Lawyers individual HCIs and productivity measures

Name	HCI	HCIW	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non bill units	YTD Total units	YTD Total contribution $
Lisa (1)	90.53	91.31	139	114	203	152	106	2499	7455	$156,958
Aeda (1)	80.33	80.70	69	61	41	85	103	3185	5843	$104,906
Amy (1)	76.72	76.63	109	89	73	79	95	1358	5243	$72,241
Nick (1)	76.29	75.62	54	72	70	48	104	3060	6188	$77,802
Richard (2)	85.39	86.5	12	74	34	82	107	1656	4877	$89,734
Alijcia (2)	80.22	79.94	93	71	109	68	96	1488	4593	$77,711
Elsie (2)	77.35	76.44	99	65	77	51	76	469	3310	$64,581
Stan (3)	87.28	87.83	158	167	24	111	99	316	7583	$168,023

Key

(1), (2) or (3) = Level 1, 2, or 3 lawyer

HCI correlation with productivity measure 'total financial contribution' (.786) and 'fees %YTD' of .905

HCIW correlation with productivity measure 'total financial contribution' (.810) 'fees % YTD' (.952)

Two level 1 lawyers - Lisa and Aeda - had greater bottom line results and HCIs than some of the lawyers at higher levels. With the exception of Nick, the 'YTD total financial contribution' is in matching descending order with the HCI, within each subgroup of lawyer level. This clustering is illustrated in Table 5.4.

The HCI calculation for the whole group is 81.76 and the whole group HCI weighted score is 81.87. If the HCI is calculated for the group according to the level of the lawyers the results for the level 1 lawyers in the group is 80.96 and their group weighted human capital index is 81.06 with an average dollar value for total financial contribution of $102,976. For the level 2 lawyers the group HCI is 80.99 and the weighted HCI is 80.96 with an average dollar value for total financial contribution of $77,342. There are

overlaps in this bottom line productivity measure for the two groups but overall the level 1 lawyers outperformed the level 2 lawyers.

Although the same feedback form was used for all three levels, the various raters might have had different perceptions of the standard expected and applied the five-point scale accordingly. Similarly, the calculations for productivity, recovery rate, charge-out rate and budgets, change for the different levels. This could explain why level 2 lawyers as a group do not have a higher HCI than level 1 lawyers (80.99 and 80.96 respectively), in spite of additional experience and professional development. Their average performance feedback scores are not really any greater than level 1 lawyers' scores. On the other hand, the level 2 lawyers' average financial contribution (for this small group of three) was lower for the first four months of the year. These weaker financial results suggest the level 2 lawyers performance to budgets is considerably weaker than that of the level 1 lawyers. Higher charge-out rates have the potential to mask weaker performance while these HCI results can identify these performance differences.

HCI bands

When I initially presented the results to the firm for comment, I suggested that bands could be more appropriate than a number to two decimal places[65], and also appear less threatening to those being rated. The bands I proposed at the time were fixed with a ten-point range. However, fixed bands have an inherent problem: scores just either side of a number that separates two bands appear to have bigger differences than they have reality. Examples of these original fixed bands are 51 to 60, 61 to 70, 71 to 80, 81 to 90 and 91 to 100. See Table 5.5 below for the original HCI bands for the study participants. These are presented with their associated 'total financial contribution' productivity measures.

[65] A number to two decimal places suggests greater accuracy in the method than I claim for the HCI procedure

Table 5.5
NCP Lawyers individual HCI band and
YTD total contribution

Name	HCI Band	YTD Total contribution $
Lisa (1)	91-100	$156,958
Aeda (1)	81-90	$104,906
Amy (1)	71-80	$72,241
Nick (1)	71-80	$77,802
Richard (2)	81-90	$89,734
Alijcia (2)	81-90	$77,711
Elsie (2)	71-80	$64,581
Stan (3)	81-90	$168,023

Key

(1), (2) or (3) = Level 1, 2, or 3 lawyer

The group band for the NCP lawyers and for level 1 and level 2 subgroups of lawyers is 81-90.

Verification of results

At the end of the financial year the full year results for the productivity measures were collected and used to rework the correlations. The April monthly results had caused a distortion of results in the earlier correlations. The two competences that had strong correlations with these results did not correlate strongly with any of the twelve-month results. These one-month results are included in the YTD results for the first four months of the year used in the earlier correlations. Therefore, in order to equate the end of year results with the results to the end of April, I felt justified in eliminating the two April measures. The recalculated HCIs, referred to as the adjusted HCIs involve the remaining six productivity measures.

Competences with a strong positive correlation with any of the six productivity measures for the four-month period to the end of April and for the twelve-month period to the end of December follow in Table 5.6. The participants included in the sample for

the full year productivity measures number seven, as one had left since the original collection of data.

Table 5.6

NCP Lawyers: Competences with strong positive correlations with 6 productivity measures for year to date April and whole year.

Type	Competence	Units % YTD	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $	Units % YTD	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $
		Until End of April 2001						12 Months of 2001					
Tech, Prof & W	Ability to undertake efficient and accurate research	.458 (8[66])	**.735 (8)**	.542 (8)	-.012 (8)	.530 (8)	**.747 (8)**	.376 (7)	.291 (7)	.523 (7)	.291 (7)	**.709 (7)**	**.727 (7)**
NT & Intr	Effective delegation of matters and/or tasks	.325 (8)	**.751 (8)**	.375 (8)	.275 (8)	.601 (8)	**.751 (8)**	.510 (7)	.543 (7)	.519 (7)	.150 (7)	**.767 (7)**	.636 (7)
Intr & W	Financial performance to budget	**.778 (8)**	**.802 (8)**	.467 (8)	-.180 (8)	.539 (8)	**.731 (8)**	**.782 (7)**	**.883 (7)**	.655 (7)	-.342 (7)	.667 (7)	.559 (7)
Intr	Effective supervision of junior staff	.561 (7)	**.786 (7)**	.318 (7)	-.393 /(7)	.356 (7)	.692 (7)	.522 (6)	**.883 (6)**	.612 (6)	-.393 (6)	.356 (6)	.692 (6)
Ind & W	Commitment to the development of legal skills	.610 (8)	**.756 (8)**	.366 (8)	-.171 (8)	.268 (8)	.537 (8)	.564 (7)	**.793 (7)**	.591 (7)	-.270 (7)	.505 (7)	.360 (8)
Intr	Effective coaching skills	**.812 (8)**	.178 (8)	.000 (8)	-.43 (8)	.571 (8)	.330 (8)	**.875 (7)**	**.906 (7)**	**.716 (7)**	**-.709 (7)**	.355 (7)	.493 (7)
Tech, Prof & W	Legal drafting skills							.396 (7)	.607 (7)	**.847 (7)**	-.143 (7)	.393 (7)	.643 (7)
NT & Intr	Knowledge of client markets and businesses							.42 (7)	**.709 (7)**	.666 (7)	-.315 (7)	.158 (7)	.099 (7)
NT & Intr	Ability to produce client focused written communication							.200 (7)	.505 (7)	**.755 (7)**	-.162 (7)	.072 (7)	.288 (7)
NT & Intr	Co-operation							.415 (7)	**.748 (7)**	**.821 (7)**	-.281 (7)	.337 (7)	.487 (7)

Key Tech = Technical NT = Non-technical **Prof** = Trade/ Professional Ind = Industry **W** = Weighted Intra = Intra-organisational

[66] The number of participants out of a possible 8 that were rated on this competence

The correlations with the twelve-month productivity measures include all the same competences that were strongly correlated for the whole group (plus one competence[67], rated for seven of the sample) with the end of April results. This is evidence of the consistency in correlations between competences and productivity measures.

The full year productivity results identify four additional competences with strong correlations. Three are strongly correlated with the productivity measure 'recovery rate'. These are 'Co-operation', 'Ability to produce client focused written communication' and 'Legal drafting skills'. In addition, 'Co-operation' and 'Knowledge of client markets and businesses' are strongly correlated with the 'fees % YTD' measure.

I recalculated the HCIs based on the competences with strong correlations for both the four-month productivity data to the end of April and the twelve-month productivity data to the end of December. This adjusted HCI includes one less strongly correlated competence (i.e. five) because the monthly April productivity correlations were excluded. Moreover, 'Effective supervision of junior staff' is not included although there is consistency between the two sets of productivity measures. This is because one member of the sample was not rated for this competence. I did not calculate a weighted HCI.

The results of the correlations with part and full year productivity measures of the adjusted HCI are presented in Table 5.7 along with the previous HCI and weighted HCI. Included in the table are the correlations for tertiary education and prizes and honours in order to compare these correlation results with those of the HCIs.

[67] Effective supervision of junior staff was not rated for one of the sample

Table 5.7

NCP Lawyers: HCIs and adjusted HCI correlations with end of April (4 month) and end of year (12 month) productivity measures

	Units % YTD	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $	Units % YTD	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $
	Until End of April 2001 (N: 8)						12 Months of 2001 (N: 7)					
HCI	.452	**.905**	.467	-.048	.429	**.786**	.414	.643	.613	-.107	.571	.571
HCIW	.405	**.952**	.500	-.024	.500	**.810**	.505	.571	.450	.036	.571	**.750**
Adjusted HCI	548	**.857**	**.714**	.190	.667	**.929**	.631	.571	.595	.143	**.821**	**.893**
Tertiary education	-.274	.247	.082	.577	.082	.247	-.412	-.612	-.618	.612	.000	.204
Prizes & Honours	-.078	.170	.209	**.730**	.391	.170	-.039	-.463	-.409	**.810**	.000	.424

Key

N = The number of study participants

The adjusted HCIs have strong correlations with both sets of productivity measures. They have stronger correlation (.929) with the April 'YTD total financial contribution' results than the HCI and the weighted HCI and are similar to the April 'fees percentage YTD' (.857). The stronger correlation for the 'YTD total financial contribution' is also associated with an increase in strength of the correlation with the 'recovery rate' for the first four months of the year.

The adjusted HCI in this case study is a more valid measure of human capital than tertiary education or prizes and honours awarded during tertiary education. Adjusted HCI correlations with the twelve-month productivity measures show a strong correlation with the 'YTD total financial contribution' (.821) and the 'YTD total units' (.821). This verifies the adjusted HCI developed using the YTD April measures. Furthermore there is potential for even stronger correlations. The HCIs could include the additional four strongly correlated competences and future HCIs would have the whole previous year results upon which to base their calculations.

In comparison, correlations of tertiary education and prizes and honours with the productivity measures (particularly 'YTD total contribution') for the first four months and the whole twelve months are consistently weak. There is one exception: tertiary education has a positive strong correlation with 'productive non-billed units'.

The adjusted HCIs for the seven members of the sample with productivity measures for the 12-month period are set out in Table 5.8 in association with their productivity measures for the year. Included are the HCI bands, expressed as a plus or minus five per cent range. I had by this stage decided that this approach to bands would address the distortion of results for participants whose scores fall just either side of a dividing score for fixed bands.

Table 5.8

NCP Lawyers: Individual adjusted HCIs, associated HCI bands and productivity measures

Name	HCI	HCIW	HCI Adj	HCI Adj +/-5%	Units % YTD	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $	12months Units % YTD	12 month Fees % YTD	12 month Recovery Rate	12 month Productive non bill units	12 month YTD total units	12 month YTD Total contribution $
Lisa (1)	90.22	91.01	90.42	85-95	114	152	106	2499	7455	$156,958	121	130	112	7,902	26,130	$480,242
Aeda (1)	80.10	80.47	88.16	83-93	61	85	103	3185	5843	$104,906	78	74	95	9,494	21,194	$330,213
Nick (1)	76.29	75.62	80.32	75-85	72	48	104	3060	6188	$77,802	90	88	103	7,545	21,164	$333,774
Amy (1)	76.68	76.59	79.65	74-84	89	79	95	1358	5243	$72,241	90	91	98	5,303	18,931	$286,499
Alijcia (2)	80.29	79.94	79.87	75-85	71	68	96	1488	4593	$77,711	89	94	103	4,481	17,967	$325,749
Elsie (2)	77.11	76.21	75.24	70-80	65	51	76	469	3310	$64,581	71	78	100	5,591	16,162	$307,182
Stan (3)	87.05	87.60	88.16	83-93	167	111	99	316	7583	$168,023	130	131	107	2,712	22,283	$730,304
Group Totals	567.74	567.44	581.12	546-616												
Group Average	81.11	81.06	83.42	78-88												

Key

(1), (2) or (3) = Level 1, 2, or 3 lawyer respectively **Adj** = Adjusted **HCI** = Human capital Index **W** = Weighted

The HCI results expressed as bands of plus and minus five per cent, accommodate the similarities and differences in Aeda and Nick's results as there is an overlap between their HCI bands. Furthermore, Aeda recorded a much greater number of 'productive non-billed units' than Nick for the period May to December. Possibly the flexibility of a band can provide some balance between the types of units recorded, i.e. the billed and non-billed units. The group HCI is recorded at the bottom of Table 5.8.

Correlation results for four month and twelve-month productivity measures for the adjusted HCI and for the associated adjusted HCI band are consistent. This use of subsequently collected measures appears to verify the adjusted HCI and associated adjusted HCI bands as valid human capital measures.

ECP Lawyers analysis

All of the nine members of this sample received a rating on each of the competences. The means and standard deviations were calculated for each competence and any associated weighted scores (See Appendix 23). Considerable consistency is evident among the raters as only fifteen performance score means out of 234 unweighted scores have a standard deviation greater than 1.0 (but less than 1.5). There is no clear pattern of particular individual(s) or particular competence(s) associated with greater standard deviation(s). Yvonne with three has the most competences with a standard deviation greater than 1.0. Yvonne did not rate herself on one of the competence and rated herself higher than the other raters on two others. These are: 'training and development of others' and 'effectiveness of working relationships with support staff'. These larger standard deviations arise from a greater range in the performance scores given by different raters for these three competences. Three participants (one third) have standard deviations greater than 1.0 for the competence 'effectiveness of working relationships with support staff'. This exhibits the greatest variation amongst raters in this small sample.

Correlation analyses between competences and the original eight (and subsequent six) productivity measures identified only one non-technical competence with a strong positive correlation. The non-technical intra-organisational competence 'training and development of others' has a strong positive correlation with the productivity measures:

'units % YTD' (.738) and 'fees % YTD' (.784) (See Table 5.9). This association of 'training and development' with higher 'YTD fees' is consistent with NCP results. This is contrary to commonly regarded perceptions that training and development competences are hard to associate with the bottom line in an organisation (van Buren, Fitz-Enz, 1990; Lynch & Black, 1996; 1999). The negative, although not strong (-.414), correlation with the 'productive non-billed units' could explain why this competence does not follow through to a strong positive correlation with the total calculated 'YTD total financial contribution'. It appears that there is some disconnection between being rated highly on training and development and generating 'productive non-billed units'. This is in spite of training and development's association with profitability and the inclusion of training and development activities in the productive non-billed units schedule.

Table 5.9

ECP Lawyers: Competence with a strong positive correlation with measures (N: 9)

Type	Competence	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $
NT & Intr	Training & development of others	-.186	**.738**	-.388	**.784**	-.081	-.414	.25	.388

Key

NT = Non technical **Intr** = Intra-organisational

N = The number of study participants

There were seven competences with a strong negative correlation with productivity measures. The negative correlations are all with either the April units or April fees percentage to budget productivity measures. Six of these had a strong negative correlation with the fees and one with the units. Possibly April was an extraordinary month in regard to what units were charged out and subsequently what fees were brought in, as none of these competences have strong correlations with any of the YTD measures. Appendix 24 has a table of these correlations.

This list of competences negatively correlated with April results illustrates the impact on a small sample of considering only one month's data. A subsequent review of the productivity measures included in the correlation analyses deleted the April productivity measures. The outcome was no competences with strong negative correlations. Only one competence: 'training and development', had a strong correlation with any of the six productivity measures (See Appendix 24 for these results).

ECP Lawyers personal data

The personnel data has no strong positive correlations with productivity measures. There is, however, a strong negative correlation between tertiary education and 'recovery rate'.

There are a number of correlations that did not reach, but were close to the .7, 'strong' correlation threshold. These are the lawyer level and the 'YTD total financial contribution' (.671) and lawyer level and 'productive non-billed units' (-.671). Prizes and honours have positive correlations with both the 'YTD total financial contribution' (.576) and 'recovery rate' (.612). Gender has a positive correlation with the 'units percentage to budget' (.612) and the 'total units for the year (.693).

This sample differed from the NCP sample. The average 'YTD total financial contribution' for the level 2 and level 3 lawyers is greater than the level 1 lawyers' average (and included fewer productive non-billed units). In addition, more of the level 2 and level 3 lawyers have prizes and honours than the NCP sample. (See Table 5.10 following for these results.) The lawyers' levels and whether they have prizes and honours have the most positive association with the 'YTD total financial contribution'.

Table 5.10

ECP Lawyers: Personnel data correlations with productivity measures (N: 9)

Personnel data	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non billed units	YTD total units	YTD Total contribution $
Age	.447	.236	.696	.185	.507	-.412	.060	.464
Gender	.433	.617	.173	.391	-.655	-.260	.693	.260
Years in this job	.538	-.061	.528	-.230	.196	-.478	-.478	.279
Tertiary education	-.207	.000	-.311	-.104	**-.731**	.414	.414	-.311
Prizes & Honours	.390	.243	.594	.485	.612	-.195	.364	.576
Level of Lawyer	.373	.303	.559	.112	.207	-.671	-.447	.671

Key

N = The number of study participants

Domains

There are no patterns of strong positive correlations of any domain[68] with the given productivity measures. Correlations with productivity measures resulted in strong negative correlations with the month of April results. These one-month results were subsequently removed from the calculations because they were inconsistent with the full year results. In addition, no correlation was calculated for the total non-technical scores[69]. This outcome was no doubt influenced by the presence of only one strongly correlated competence in total (See Appendix 24 Table 3 for these results).

Subgroup of strongly correlated competences

There was no subgroup as there was only one competence with a correlation of .700 or more. This is 'training and development of others'. Its correlations with productivity measures (.738 and .784 with 'units % YTD' and 'fees % YTD', respectively) are shown in Table 5.9.

[68] The ECP competence profile had no written competence in the standard technical domain.
[69] It could not be calculated because at least one of the variables was constant

Human capital index

The HCI procedure was used although there is only one competence in the competence performance score. HCIs were correlated with productivity measures[70] for the first four months of the year (available at the time of HCI development) and the twelve-month results[71] collected subsequently. These were compared to the equivalent correlations for tertiary education and prizes and honours (See Table 5.11 below for the results).

Table 5.11

ECP Lawyers: Correlations of HCIs, tertiary education and prizes & honours with productivity measures for the YTD April and 12 months

	Units % YTD	Fees % YTD	Recovery Rate	Productive Non bill units	YTD Total units	YTD Total contribution $	Units % YTD	1Fees % YTD	Recovery Rate	Productive Non bill units	YTD Total units	YTD Total contribution $
	Four months till end of April 2001 (N: 9)						12 months of 2001 (N:8)					
HCI	**.727**	**.747**	-.102	-.387	.269	.361	.427	**.764**	.006	-.406	.578	.358
Equivalent F/T years of tertiary education	.000	-.104	**-.731**	.414	.414	-.311	-.574	-.063	-.317	.697	-.378	.317
Prizes & honours	.243	.485	.612	-.195	.364	.576	.693	.617	.597	-.617	.717	.276

Key

N = The number of study participants

The HCIs have a strong positive correlation with the 'fees % YTD' (.727), for the four months to the end of April which is consistent with that for the twelve-month period (.764). However, the strong correlation with 'units % YTD' (.727) for the first four months is not maintained in the twelve-month results. In spite of only one strongly correlated competence being included in the HCI, there is some consistency in the correlations of the HCI with the bottom line financial result.

[70] The April month measures have been omitted from the table to simplify presentation because they had no strong correlations with any variables

[71] One of the lawyers left the firm before the end of the year reducing the sample size to eight

Correlations of equivalent full-time years of tertiary education with the productivity measures are all negative or non-existent except 'productive non-billed units' (.414 for the four month period and .697 for the twelve-month period), 'YTD total units (.414 for the four month period) and 'YTD total financial contribution' (.317 for the twelve-month period). How 'productive non-billed units' are allocated appears to have influenced these results. The number allocated appears to be influenced by the participant's level (-.671 correlation). Level 1 lawyers are allocated more 'productive non-billed units' than higher-level lawyers. In this group the level 1 lawyers all have five years of tertiary education and two of the higher-level lawyers have only four-year degrees. Level 2 and level 3 lawyers also received most of the honours and prizes. This could have influenced the result. Tertiary education has a strong negative correlation with 'recovery rate' for the first four-month results (-.731) although not for the whole twelve-month period (-.317). Possibly this reflects the start-up performance of this sample of five-year degree level 1 lawyers. Moreover, the association of prizes or honours with the twelve-month 'YTD units' (.717) could reflect the superior performance of the level 2 and level 3 lawyers. Conversely, I suggest that the -.617 'productive non-billed units' correlation indicates the impact of the practice of allocating these units for the level 1 lawyers, on the 'total financial contribution' (.276) productivity measure.

The individual ECP lawyers HCIs and HCI fixed band results are presented in Table 5.12 following.

Table 5.11

ECP Lawyers: Individual HCIs, HCI bands and productivity measures

Name	HCI	HCI Fixed Bands	Units % YTD	Fees % YTD	Recovery Rate	Productive non bill units	YTD Total units	YTD Total contribution $
Len (1)	100	91-100	139	129	97	558	6603	$92,853
Angela (1)	92.5	91-100	117	72	99	1803	6917	$84,434
Xavier (1)	90	91-100	117	122	105	1760	6860	$105,789
Neil (1)	90	91-100	77	72	99	2571	5915	$85,040
Nathan (1)	85	81-90	79	69	101	2440	5890	$81,866
Yvette (2)	95	91-100	132	126	98	941	6670	$112,288
Nigel (2)	75.97	71-80	106	82	106	1547	6169	$92,284
Yvonne (2)	70.97	71-80	117	70	70	795	5907	$97,920
Maurice (3)	95	91-100	120	115	106	253	5488	$165,457

Key

(1), (2) or (3) = Level 1, 2, or 3 lawyer

The ECP group HCI is 88.27 and fixed HCI band is 81-90. If this group calculation is broken down into lawyer level groups, the HCI for level one lawyers is 91.5 (HCI fixed band 91-100) with a mean 'YTD total financial contribution' of $89,996. The group HCI for level two lawyers is 80.65 (HCI fixed band of 81-90) and a mean 'YTD total financial contribution' of $100,830.

Reaction to the HCI

I presented the procedure and four month HCI results for the ECP and NCP lawyers to the HR director. HCI bands were not introduced at this point because I wanted to compare case study reactions to participants' numbers versus bands.

The HR director saw considerable value in the correlations between competences and productivity measures, which is one step in the HCI procedure, but doubted the acceptability to lawyers of a HCI. Identification of the specific competences with strong correlations with productivity measures was very welcome news indeed. Senior staff members were often reluctant to be involved in training and development activities because they considered this would have a negative effect on their 'total financial contribution'. Yet in these results training and development-associated competences had strong correlations with 'total financial contribution'. The HR director also thought the correlations of personnel data and productivity measures added considerable insight into the way the unit and fee system performed. Thus the correlation process appeared beneficial to human resource management initiatives.

However, although the HCI had a strong correlation with the productivity measures for the NCP sample, the HR director felt she would be unlikely to use anything as specific as a number/ index. The culture of the organisation supported a development discussion and any number ratings for identified competences were used only for this purpose. She had not discussed the concept of a HCI that could be used as a strategic measure for trends and stocks and flows of human capital with any of the firm's partners at that point.

Subsequently, a full report of the results was left with the HR director to read at her leisure. At the next meeting she explained how she had already used the strong

correlations of the training and development related competences to gain support for certain human resource initiatives. After further consideration she felt the HCI fixed bands had potential, as they appeared less threatening than specific numbers.

This study highlighted the impact of alignment or lack of alignment between productivity measures and competences ratings. The HR director could see the need to review what is included in the schedule of 'productive non-billed units' and how they are allocated.

I received an invitation to extend my research study with all the lawyers in one department on a third competence profile to be ready in a further six to eight months time. Although appreciative of the confidence displayed in the HCI procedure I was unable to take up this offer as it was outside the time frame for completion of this applied research. Furthermore, it would have introduced new variables rather than given the opportunity to clarify and verify the existing results.

Conclusions

The NCP and to a more limited extent the ECP produced human capital indexes that were more valid measures of human capital than tertiary education and that maintained considerable consistency over a twelve month span of time.

Although the NCP had competences with associated behavioural descriptors, raters generally did not consult these descriptors[72].

There is a positive relationship evident in these case studies between contributing to the development of other staff and the bottom line. This could be indicative of the on going training and development initiatives and on going results because the results of this case study comprise a snapshot of what could be the benefit of a continuous process of staff development, to which some staff have been committed since well before this research study. Certainly for some of its lawyers this appears to be a learning organisation (Roos et al., 1997).

[72] Available in the dictionary of guiding behaviours on the intranet

When weighted scores are included in the correlation analysis they cause small differences in the strength of correlations. However, when bands are used for the HCI the impact of these small differences becomes negligible.

Chapter 6

Supermarket, ISS Engineers and Gaming Case Studies

This chapter contains the results of three case studies all of which had some issues with their productivity measures.

Supermarket

The Organisation

The supermarket is one of the larger owner-operated franchise supermarkets and has an extensive range of groceries, fruit and vegetables, flowers, gardening items, wine, seafood and delicatessen items. The butchery department breaks down and packages its own meat and the bakery makes bread and cakes on the premises. There are approximately 260 staff members of different ethnicities including: Indian, Samoan, Maori, Pakeha New Zealander, Sri Lankan, Welsh, Chinese and Tamil. The age range is from 14 to 62.

My contact person is the owner/operator (O/O). Prior to this research I had carried out a successful year of voluntary literacy tutoring of one of his staff. The O/O agreed to be involved in this research because he wanted a competence profile for feedback on and development of his department managers.

Sample

The ten supermarket managers were all approached to take part in this study. The O/O first spoke briefly about his support for my research at one of the monthly management meetings and distributed a copy of the information sheet (Appendix 4). A month later I attended a management meeting at which nine of the managers were present. I outlined the purpose of the study and how they could be involved. They were shown a competence feedback form, any questions were answered and the process for selecting a peer and subordinate rater (referred to as another manager and a staff member) was discussed. Study participants would nominate a peer and a subordinate and the nominations would be considered by the O/O for appropriateness before a final

decision. An information sheet and a consent form were given to everyone. Managers filled this in on the spot. Their choice of two employee raters was written on the form, along with any request for the mean results and this was handed in.

Eight of the possible ten managers consented to taking part. All of them wanted to see the results. The office manager was excluded later because of her different job competences and their associated productivity measures. Participants' selection of raters was all endorsed by the O/O. The liquor and the butchery managers had discussed their possible choices with him, the former to determine the availability of a knowledgeable peer and the latter to clarify who were his peer managers.

The sample of seven[73] consists of two women and five men with an age range of 31 to 57 years old. Three of the men have trade certificate level qualifications, all have taken part in some training and development organised by their organisation and have a minimum of one and one half years and a maximum of five and one half years in this management role. The number of years they have worked in the supermarket industry ranges from one and one half to thirty five and one half years. Departments represented are grocery, butchery, seafood, checkout (front-end), bakery, dairy/delicatessen and liquor.

Competence profile

I facilitated the development of a competence profile for the managers with the O/O. First, I explained the Nordhaug typology domains. This was followed by a brainstorming session about management competences that the O/O thought desirable in his department managers, under each of the six category headings. The resulting list and the job descriptions were the basis from which I developed a list of competences. This was taken back to the O/O to consider and a few minor changes were made before the competences were formatted into a competence feedback form (See Appendix 39 for a list of the competences).

The competence profile for each department manager had one or two different competences to cater for their different trade areas. However, at the point of analysis it

[73] The checkout manager was excluded in correlations with the two percentages of budgeted gross profit as these measures did not apply to her

became obvious that it would be more appropriate to amalgamate some of these into a generic competence of trade knowledge and experience. Synthesis of these competences avoided the already small sample being reduced to a series of one-person samples. The O/O was consulted and was comfortable with the simplification necessary to gain valid correlation results. There are 31 competences: 18 non-technical 13 technical. Four are meta-competences, eleven are intra-organisational competences, three are industry, three are standard technical, five are trade/professional and five are unique.

There was a similar process of development, consultation and simplification with the weightings for the competences. The O/O gave me a weighting for individual competences and technical and non-technical proportional weightings that were different for each department manager. Later I removed individual competences weightings altogether because of the inconsistencies in the productivity measures available (described below) and the differences for each manager made this level of analysis meaningless. After further discussion the proportional weightings for the non-technical and technical competences were standardised as 55:45.

Productivity measures

Finding productivity measures that covered the span of the competence profile required some exploration. There were two existing measures developed by the franchise corporate office and applied nationally. One is a Nielsen 'pursuit of excellence score' calculated ten times a year. This gives each department a national ranking against the equivalent departments in other franchise stores: departments are categorised so that similar size and scope departments are compared. The other measure, a 'focus report' prepared every six months, gives a percentage score for the performance of each of the individual department managers. It consists of a number of components that are rated out of four by a head office assessor. Each of these components is weighted and the total score is a maximum of 100. The components are tailored to meet the parameters of the different departments but all include 'presentation', 'merchandising', 'promotion', 'staff', 'leadership', 'compliance', 'financial' and 'customer focus'. Each of these components in turn has a list of items (listed in Appendix 27) that are given a weight, ranking and rate. These weightings are not uniformly applied for the same

components. For example, the checkout manager has a weighting of 30 for 'presentation', whereas the meat department has a weighting of 18 for the same component. A corporate assessor who specialises in assessing one type of department manager makes a visit to the store and judges the particular manager's performance.

Initial analysis for strongly correlated competences includes the mean Nielsen rank of each department from 10 visits for the year to 31st March 2001 and three focus report results: January and July 2000 and January 2001. Subsequently, the intermediate, partial measures (common components listed above) for the January 2001 focus report were added to the family of measures for analysis.

After further discussion with the O/O about the normative nature of the above measures, two other measures were investigated in the initial analysis process. These were the 'percentage of the budgeted contribution to gross profit' for this store's departments, and the 'percentage to gross profit' budgeted for departments of the nation-wide franchise stores in their category. Both of these measures were for the five weeks ending 31st March 2001 and were applicable to the six managers of departments with products. There were no measures for the front-end manager. These measures were also composite measures and were used only in an exploratory manner to see if they were more strongly correlated with the competences than the focus reports and their components above.

Competence 360-degree feedback

The competence feedback was conducted as described in the methodology in Chapter 3 (See Appendix 26 for a copy of the competence feedback form).

I handed the competence feedback forms, information sheets, personnel data sheets and the stamped and addressed envelopes for the self rate, peer rate and subordinate rate to the study subjects to complete and distribute appropriately. I also gave the O/O seven competence-feedback forms to enable him to rate each manager. It took several telephone calls to the supermarket office and visits to the store, to encourage all involved to return their forms. This follow up included producing an additional copy of the competence feedback form for one of the peer raters and waiting while he filled it in between his other appointments. I also returned two forms for completion to

participants who had left the third page blank. Seven weeks later all forms had been returned. There are four completed forms for each of the seven subjects.

Analysis

The means and standard deviations were calculated for all seven participants on each competence (See Appendix 28). The standard deviations for the variances between the different raters are predominantly less than 1.00. Mick's results however are an exception with considerably less inter-rater reliability. On sixteen of his competences the standard deviation is between 1.15 and 1.71. Mick gave himself a 5.00 (exceptional competence) on every competence, whereas other raters tend to rate him lower. Len and Gary also have a tendency to rate themselves higher than their other raters: eight and five competences respectively had a standard deviation of 1.00 to 1.41. The two women appear to rate themselves a little lower than their other raters on most competences but there were only two competences with more than one standard deviation greater than 1.00.

Mick's department was second nationally in the Nielsen ranking for the financial year to 31st March 2001. No other departments in this supermarket rank higher. Possibly this external comparative success influenced Mick's perception of his ability on all competences.

This was the first 360-degree feedback in which the raters had been involved. It was also the first use of these particular competences. There was no culture of subordinates and peers giving feedback in writing about their manager and colleagues. The subordinates are primarily of non-European ethnicity and the managers are all European. Cultural values such as respect for one's superior could have impacted on the ratings given, in spite of feedback being anonymous. The English literacy level of some staff could also have affected ratings.

There is a tendency for staff to rate their managers as four or five with notable exceptions for a small number of competences. 'Empathy with other cultures and differences in approach' received a rating of one from the staff member for Mick in contrast to the five he gave himself. Several other managers received a staff rating one point lower than their own self-rating on this competence. Edna in contrast received a

higher rating from her staff rater. This was accompanied by the comment below, which was one of the few comments on any feedback form.

'Gets along with any culture especially the coconut'

Competences related to knowledge of the industry, management of staff and co-operation with staff also received higher or lower staff ratings than self-ratings.

Because of the apparent variation between raters I carried out correlations of the competence results for the four levels of raters individually and in subgroups as well as with the mean score, with two of the measures (See Appendix 29). I compared the different competence correlation results with all of the measures and reviewed the standard deviations for competence scores. Because the great majority of standard deviations are less than 1.00 I decided it was more appropriate to maintain a consistent methodology by staying with the mean rating scores for each competence.

I used the focus reports for the correlation analysis. Three focus report total percentage measures and the measures for the components common to all of the seven managers from the latest report available at the time the data was collected i.e. January 2001 are used for correlation analyses. This resulted in eleven productivity measures. Inclusion of the components of the two earlier focus reports as well would have added another sixteen productivity measures, a total which I considered to be too unwieldy.

Table 6.1 below lists the competences with a strong correlation with one or more of the family of measures. There are nine non-technical competences and nine technical competences although only three of the technical competences are applicable to all of the seven study participants. Six of the twelve competences with strong correlations for all of the seven study participants are non-technical intra-organisational competences. The measures with which competences strongly positively correlate are 'customer', 'staff', 'merchandise', 'promotion', 'leadership', 'financial', 'compliance', and the 'July 2000 total focus' measures. One technical competence 'Buying' had strong negative correlations with the 'presentation' and the 'merchandising' measures for the five study participants concerned. The measure associated with the most strongly positive correlations was 'customer'.

The external assessor, like a customer, gets a snapshot assessment when visiting. Thus the competences in Table 1 could be those that an outsider can identify with some degree of accuracy during a visit. The external assessor uses observation and conversation to gather evidence for decision-making.

There is some evidence of validity in the strong correlations of some of the competences with the respective component measures. For example, 'Display and merchandising are effective', has a .813 correlation with the component measure, 'promotion'. 'Hygiene and cleaning systems for area of responsibility' and 'Quality checks and record keeping and systems for purchase, receiving and storage of inward goods', both have strong correlations with the component measure 'leadership' (.753 and .880 respectively). The latter competence also has a .759 correlation with 'compliance'.

Table 6.1

Supermarket managers: Competences with a strong correlation with productivity measures: focus report January 2001 components and focus report totals for Jan 00, Jul 00 & Jan 01

Type	Competence	No of Participants	Presentation *	Merchandise *	Promotion *	Staff *	Leadership *	Compliance *	Financial *	Customer *	Focus Jan 00	Focus Jul 00	Focus Jan 01
NT & M	Able to read and write fluently in a retail context	7	.000	-.416	.340	**.725**	-.340	-.246	.680	.076	.076	-.486	-.157
NT & M	Reasonably quick at picking up new concepts	7	.189	-.321	.340	**.820**	.038	.132	**.869**	.265	.170	-.391	.039
NT & Intr	Co-operative with other managers, own staff and Owner/operator	7	-.131	-.075	-.183	.481	.617	.543	.037	**.879**	-.150	-.057	-.505
NT & Intr	Knows who to go to for what, thereby effectively utilising company resources	7	.524	**.730**	-.356	-.123	.561	.561	-.075	.356	.206	**.802**	.427
NT & Intr	Knows the company's processes and systems	7	.279	.598	**-.921**	-.513	.438	.438	-.538	.438	.498	**.754**	.393
NT & Intr	Knows the company's strategic goals	7	-.299	-.617	.635	**.906**	.150	.150	.655	.318	-.487	-.670	-.583
NT & Ind	Is aware of the industry best practice relevant to own position	7	-.324	-.234	-.093	.491	.577	.541	.036	**.757**	-.378	-.109	-.561
Tech & Std	Has the basic administration skills required for the position	7	-.187	-.225	.038	.614	.674	.617	.225	**.805**	-.299	-.189	-.505
NT & Intr	Supervises staff effectively	7	-.148	-.259	.095	.524	.519	.408	.185	**.704**	-.148	-.374	-.538
Tech & Uni	Hygiene & cleaning systems for area of responsibility	7	.081	.092	-.292	.130	**.753**	.679	-.073	.698	.018	.130	-.133

Type	Competence	No of Participants	Presentation *	Merchandise *	Promotion *	Staff *	Leadership *	Compliance *	Financial *	Customer *	Focus Jan 00	Focus Jul 00	Focus Jan 01
Tech & Uni	Weekly sales analysis & gross profit report monitors stock on hand & profits	7	-.168	-.299	.250	**.821**	.505	.505	.468	.674	-.393	-.245	-.485
NT & Intr	Is aware of the organisation's political dynamics. Their management style takes this into consideration	7	.150	**.094**	-.673	.057	.112	.037	-.187	**.711**	.692	-.057	-.155
Tech& Uni	Pricing ticket display & price change communication to Front-End manager	6	.213	.030	**.813**	.216	.334	.152	.395	.030	-.395	-.339	-.290
Tech & T/P	Display & merchandising are effective	6	.213	.030	**.813**	.216	.334	.152	.395	.030	-.395	-.339	-.290
Tech & T/P	Knowledge & experience of trade	6	-.029	.088	-.682	-.045	-.029	-.118	-.383	**.765**	.588	-.088	-.219
Tech & Uni	Quality checks & record keeping, and systems for purchase, receiving and storage of inward goods	6	-.091	.273	-.219	.062	**.880**	**.759**	-.213	**.759**	-.395	.370	-.419
Tech & T/P	Buys appropriate amounts and quality of goods at effective prices	5	**-.900**	**-.900**	.051	**.821**	.500	.600	.300	.500	**-.700**	-.600	-.671
Tech & T/P	Stock rotation	5	.462	**.308**	-.081	.051	.359	-.051	-.205	**.718**	.359	-.103	-.553
Tech & Std	Can use the PA system for advertising products	4	**.775**	**.775**	**-.816**	-.258	-.258	-.258	-.258	-.258	**.775**	**.775**	**.775**

Key

Tech = Technical competence

NT = Non-technical competence

• = Component measures for January, 2001 focus report

Uni = Unique

T/P = Trade/Professional

Std = Standard technical

Intr = Intra-organisational

Competences that do not apply to all seven case study participants are excluded from the group of strongly correlated competences used in the calculation of a human capital index. This was done to keep the sample size as large as possible within the circumstances of this case study.

Three technical competences and one non-technical competence have strong negative correlations with at least one of the family of measures and no strong positive correlations (See Appendix 30). 'Technical training' provision is one of these (-.736 is the total focus report measure for January 2001).

Competences with no strongly positive or negative correlations with any of the productivity measures are listed in Appendix 30. These include competences not strongly positively correlated but with correlations over .6. These are 'Positive staff interactions with customers are encouraged' (.617 customer) and 'Effectively manages the people in own department' (.642 staff and .618 customer). A larger number or more instances of the measure could possibly have produced .700 or more positive correlations for these competences.

Personnel data

The personnel data was correlated with the productivity measures above and the Nielsen rank measure to determine whether tertiary education or any of the other aspects have strong correlations with any of the measures (See Table 6.2). There are only two women in the study, which means the gender correlation with 'leadership' (.791) derives from a very small sample. Age (.709, July 2000 focus report total), years in the job (.806, July 2000 focus report total) and years in the industry (.829, 'leadership' & .917- 'compliance') all have strong positive correlations with at least one focus report measure. It is logical that increased years in the job could be associated with increased age and time in the industry. There is no consistency, however, between the correlations with the 'focus report total' measures. Different head office assessors from one report to the other for at least some of the managers may have influenced the result.

Tertiary education has no strong positive correlation with any focus report measure but did with the Nielsen ranking (.882). In this sample, years of equivalent tertiary

education are confined to the three men with trade qualifications. The Nielsen ranking is in descending order. The best in the country is rated as one. A rank of twelve means eleven other equivalent departments are ranked higher than your department. Therefore, the strong positive correlation should be interpreted as the greater the number of tertiary years of education the greater the ranking number. In essence this means those with more tertiary education receive a poorer ranking (i.e. a greater number). There is therefore a negative relationship between superior ranking and more tertiary education.

Table 6.2

Supermarket managers: Personnel data correlations with productivity measures (N: 7)

Personnel data	Presentation *	Merchandise *	Promotion *	Staff *	Leadership *	Compliance *	Financial *	Customer *	Focus Jan 00	Focus Jul 00	Focus Jan 01	Nielsen
Age	.270	.505	.102	-.118	.631	.667	.036	-.018	-.360	**.709**	.411	-.651
Gender	.474	.632	-.163	-.160	**.791**	.632	-.158	.474	.158	.478	.164	-.483
Years in this job	.165	.514	-.330	-.370	.385	.459	-.275	-.018	-.128	**.806**	.438	-.458
Years in the industry	.036	.144	-.204	.273	**.829**	**.919**	.180	.541	-.252	.473	.168	**-.817**
Equivalent fulltime years Tertiary education	.144	-.144	.000	.364	-.433	-.433	.289	.144	.433	-.364	-.150	**.882**

Key

N =The number of study participants

* = Component measures for January, 2001 focus report

Domains

The domain totals and the totals for the technical and non-technical domains were correlated with the productivity measures (See Appendix 30). There are no domains with a strong positive correlation with any of the total measures- the focus report totals and the Nielsen. Instead there are strong negative correlations for standard technical, the technical trade and for the total for technical competences.

Strong positive correlations are evident between several of the partial measures and the domain totals. The measure 'customer' correlates strongly with all subtotals except meta-competences (.643) and unique (.685). Technical domains correlate strongly also with 'staff', 'leadership', 'compliance' and 'financial'. However, the sample size is small: only three and four respectively of the seven study participants are included because of competence variations. Where the sample size is six there is a strong correlation between the technical unique competences and 'leadership'. Overall, for the sample of seven, it is the 'customer' partial measure that correlates strongly with domains.

Human capital index (HCI)

A human capital index was calculated for each study participant. This measure, the subgroup of strongly correlated competences and tertiary education, were correlated with the family of measures. (See Table 6.3 below for the results.) The HCI has a strong correlation with the 'customer' measure (.784) and a .650 correlation with the focus report total for January 2000. There is no correlation trend evident between the HCI and other focus reports. Tertiary education has no strongly positive correlations with any measure[74].

Although total focus report measure correlations are inconsistent this sample has produced a HCI with potential for greater validity than a sample using equivalent full-time years of tertiary education as a measure of human capital.

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[74] Neilsen ranking correlations have an inverse relationship - described earlier in this chapter

Table 6.3

Supermarket managers: Strongly correlated competences and HCI correlations with productivity measures (N: 7)

	Presentation *	Merchandise *	Promotion *	Staff *	Leadership *	Compliance *	Financial *	Customer *	Focus Jan 00	Focus Jul 00	Focus Jan 01	Nielsen
Strongly correlated competences	-.115	-.359	-.025	.617	.654	.509	.432	**.910**	-.047	-.329	-.603	-.310
Human Capital Index (HCI)	.070	-.112	-.192	.245	.372	.196	.097	**.784**	.650	-.281	-.539	.012
Tertiary Education	.144	-.144	.000	.364	-.433	-.433	.289	.144	.433	-.364	-.150	**.882**

Key

N =The number of study participants * = Component measures for January, 2001 focus report

The group HCI for this sample of seven is 90.45 and the fixed ten-point band 91 to 100. It is derived from the individual HCI results shown below in Table 6.4. There are different weightings for the components of the focus reports, possibly differences in what the components cover and their assessment criteria. A perfect match between the productivity measures and the HCI is unlikely. However, there is a strong correlation between the HCI and the 'customer' component. The range between the highest and lowest HCI is small.

In Table 6.4 the 'contribution to percentage gross profit' measures are included to establish whether there is any pattern between them and HCIs. Len, the person with the largest score for the 'financial' component of the focus report for January 2001 also has the greatest 'percentage contribution to budgets' for the store and for the category. Edna, who has a high HCI but has the weakest performance to budget, had her results affected by theft from her department.

The O/O is very pleased with the performance of Ulee in Table 6.4 below as he exceeds all budgeted gross profits set for the store and even more so for the national category. However, his component measures awarded by the external assessor, apart from 'financial', are low. The O/O believes that this occurs for two reasons. Ulee is marked down in the focus report because of non-compliant shelving, that the O/O has decided not to replace at this stage, and, secondly, because Ulee has a modest manner.

The above illustrates some of the issues with the available productivity measures.

Table 6.4

Supermarket managers: Individual HCIs and productivity measures

Name	HCI	HCI band	Presentation*	Merchandise*	Promotion*	Staff*	Leadership*	Compliance*	Financial*	Customer*	Focus Jan 00	Focus Jul 00	Focus Jan 01	Nielsen	Store % Gross Profit	Category % Gross Profit
Gary	95.42	90-100	49.9	**39**	30	31.1	23.7	20.7	37.6	30	74	69	69	5	109	110
Edna	92.36	90-100	56	**48.6**	36	27	27	22.8	28	21	70	74	72	3	75	93
Lisa	91.46	90-100	96.8	**62.1**	18	25.1	30.2	30	30	24.2	**83**	82	79	2	N/A	N/A
Len	89.73	80-90	60	**58**	18	24	18	17.7	19.9	19.4	77	76	75	8	107	100
Ulee	89.44	80-90	74.6	**47.3**	45	30	15	15	**45**	15	75	73	75	12	**120**	**131**
Rick	88.75	80-90	4.6	**44.4**	30	15	12	12	9	12	71	73	74	3	113.4	110
Mick	85.96	80-90	52.9	**45**	36	30	24	24	39	18	N/A	75	75	2	104	97

Key

* = Component measures for January 2001 focus report

N/A = No available result

Reaction to HCI

I explained the results to the O/O, showing him the tables of correlations. He had never found the total percentage score of the focus report a useful measure for his staff. The list of strongly correlated competences results confirmed for him its limited use as a reflection of superior staff performance.

The focus report correlations with individual competences revealed a mixture of patterns. The partial measure 'promotion' has a strong correlation with two associated competences: 'Pricing ticket display and price change communication to front-end manager' and 'Display and merchandising are effective'. The partial measures 'presentation' and 'merchandising' have strong negative correlations with 'Equipment is maintained', possibly suggesting a technical trade interest more than a marketing approach. Other partial measures appear to have less validity in measuring the competences with which they are strongly correlated. For example, the partial measure 'staff' is strongly correlated to 'Weekly sales analysis and gross profit report monitors stock on hand and profits' and 'Buys appropriate amounts and quality of goods at effective prices'. The O/O and I speculated that an external auditor coming into the shop to assess the manager over a very short time, can gauge the performance for some of the partial measures such as 'promotion', 'merchandising', 'compliance', 'presentation' but is not in the position to make well informed judgements on others such as 'staff', 'leadership', 'financial' and 'customer'.

The personnel data produces a number of strong positive correlations. There is a very strong correlation between years in the industry and the component measures 'leadership' (.829) and 'compliance' (.919). The O/O considered this result very significant because he feels the present competence system of qualifications i.e. the National Qualification Framework under-values experience. While the strong correlation between gender and leadership reflects how women do not promote themselves as much as men, the O/O thinks his women managers exhibit a lower estimation of their abilities than do their fellow male managers. Furthermore, women raters tend to be the auditors for the focus reports on departments managed by women

and the O/O also maintained that women auditors tended to give lower ratings than their male counterparts.

The O/O thought the human capital index, particularly as a band, has potential as part of a performance management system. One of a manager's targets could be to maintain a HCI in the negotiated band. The O/O regarded the precision of a HCI number to two decimal places as inappropriate in measure with a development focus. The bands, however, could be a useful monitoring measure. He could see the need for further development including refinement of the measures and the competences, training staff on the system and selecting the raters for specific competences. Although the HCI is specific to each store (which is the focus of the franchise head office measurements), between stores comparisons would be possible if other stores chose to use the same competences and measures.

A further meeting was held after the O/O had had a summary report of the results for six weeks. He found the complex-looking tables in the summary report confusing yet he still supported the ideas expressed above.

Conclusions

In spite of a number of inadequacies in the consistency and validity of productivity measures this study still produced a human capital index with strong correlation with the component measure 'customer' (.784) and a .650 correlation with the January 2000 focus report. This contrasts with the correlations for the equivalent years of tertiary education (.144 and .433 respectively). It appears that even with this less than perfect situation my human capital index based on competence developed using a Nordhaug framework produces evidence of the association between competences and productivity measures and a human capital measure that is more useful than one based on years of tertiary education.

ISS Engineers

The Organisation

This case study is of a small sample of in-service support (ISS) engineers from the Fleet Engineering Centre in a not-for-profit organisation in the armed services. My initial contact person was the staff officer, strategic personnel planning (SOSPP). I used the pilot engineering company case study to illustrate the scope and approach of the research in a presentation to her and the deputy director of human resources. Following this presentation, the SOSPP invited the Fleet Engineering Centre to participate in my research because she said the Centre operated a balanced score card system and therefore recorded productivity measures. She was aware they were developing an 'expertise register' and would be receptive to any project that might assist them.

I next presented my research plans to the Commander, who was the manager of the Fleet Engineering Centre and his Lieutenant Commander (LC). The Commander agreed to become involved because he had a group of engineers for whom he wanted a new competence profile. Moreover, like most not-for-profit organisations, they felt under increasing pressure to be accountable in an era of reducing funding and retrenchment. At the same time they had a requirement for greater expertise. The Commander perceived that an HCI had potential for providing a strategic measure for the value of his highly qualified and talented engineering staff who were required to have an increased range of functions in a greater number of contexts.

I spent a couple of hours being briefed by the Commander on the background to the organisation and to this division. This was a step he considered essential in order to facilitate competence profile development and the case study research.

The Commander left the organisation before the data (including the productivity measures) was collected and the LC became the manager of the Fleet Engineering Centre and hence became my contact person.

Sample

The planned sample was six ISS engineers of the Fleet Engineering Centre. However, two of them left this section before the data collection process. All four remaining were

approached to participate by the Commander and consented (See Appendix 34 for the supporting note sent out with the consent forms). I expressed concern about the small sample size. The Commander suggested including the four staff involved in management roles in this section to increase the numbers. When the productivity measures were eventually finalised they did not apply to this group, so it was not appropriate to include them in the same human capital index procedure.

The sample of four ISS engineers are all men aged between 34 and 40 who have been employed by this organisation for their entire working life of between 18 and 22 years[75]. They have completed Trade Certificate qualifications through the organisation's training school in the areas of electrical fitter, electrician and fitting and turning. The youngest one has in addition a New Zealand Certificate of Engineering in microelectronics. The years of equivalent full-time tertiary education are calculated as four years for a trade certificate examination and four years for a New Zealand Certificate in Engineering[76]. All of them have served many years on ships with weaponry before joining this section of the organisation between one year and three years ago.

The organisation provides a comprehensive range of training and development opportunities. Besides trade training all of them have been involved in non-trade training over the years. Some furnished an extensive list. Identified courses include: instructional techniques, assessor training, quality management, alcohol and drug education, command examinations, anti-harassment induction and a swimming test. As with other case studies there was no clear way to classify training and development initiatives.

The function of this highly skilled group of engineers is to provide assistance to ships in the form of technical advice, installation of equipment, repair assistance, communication on the state of readiness of ships, development of maintenance policies and systems, capability enhancement and inspections and quality assurance.

[75] With the exception of one who had six months in employment before joining the organisation
[76] In accordance with the OECD Australian typical length of programme International standard classification of education 1997 (OECD, 1999a)

Competence profile

I assisted the Commander develop a competence profile. He consulted the LC, the two other fleet engineering officers and the ISS team. We reviewed the existing list of competences with reference to Nordhaug's typology. The Commander then developed the initial draft competence profile and emailed this to me for comment. I gave him a detailed response with suggestions for modifications. A meeting with him followed at which the LC was also present. The competence profile was reviewed and they agreed to develop an associated competence matrix to ensure all job requirements were covered by the profile. Weightings for competences were also discussed. Two weeks later the Commander sent me a copy of the revised competences profile and the cover note distributed to staff to encourage their input. After this input the competence profile was finalised.

There are nineteen competences in the profile: eleven non-technical and eight technical. Two competences are in the meta-competence domain, eight are in the intra-organisational, one each in industry and standard technical, five in technical trade/professional and two in the unique domain (See Appendix 31 for a copy of the competence profile categorised into the Nordhaug domains).

The Commander distributed the competence feedback forms (See Appendix 32). The raters in each case were the case study participants as self-raters, a peer, who was one of the other case study subjects, their respective supervising officer, and the LC who decided he should rate the ISS engineers in the role of an independent officer. The supervising officers concerned were the suggested additions to the sample subsequently excluded from the HCI calculation.

The weightings for individual competences and the proportional weightings for technical and non-technical competences that were suggested by staff consulted varied considerably. It was therefore decided to average these responses in order to move forward. Subsequently, the weightings for individual competences were not included in the analysis. The Commander and LC finally agreed to make the proportional weightings for technical and non-technical competences 60:40.

Productivity measures

The Commander left behind a short report on productivity measures, which was generic and referred to desirable future development of the current measures. No specific individual measures of performance were recorded for the individuals included in my study. Productivity data related to the armed service's fleet of ships. The ISS engineers are called on to reduce, monitor and assist with the operational defects possible and occurring in ships. These operational defects are referred to as OPDEFs and there was a system of ship measures[77] in place.

After further consultation with the LC and as a result of further analysis of their records, the raw score results for the four individual's OPDEFs for the previous six months[78] were made available. The four measures used for this case study, derived from these existing OPDEF measures are: 'engineering advice', 'repair advice' and 'logistical support' and these scores are averaged to give a 'ship's average' score. A further two associated measures were also developed: 'officer' - the ISS engineers' supervising officers' rating of how the ISS performed and 'ISS ship' - the ISS engineers' rating of the ship's supporting quality of information.

One engineer is assigned to each OPDEF therefore these measures relate to the individuals although the OPDEFs occur on different ships and are of varying complexity. The four study participants had different numbers of OPDEFs during this time, the range being 9 to 25. I tried to get some consistency between the available measures by recording them as percentages based on the number of OPDEFs. Thus there was a percentage score for each of the six dimensions for each of the four study participants.

Competence 360-degree feedback

The LC chose the peer and supervisor rater, based on who was in the best position to give feedback on the study participant. The competence feedback form, the information sheet, a cover note (See Appendix 33) and the stamp return-addressed envelope were

[77] Using a five point rating scale. The scale values consist of: 5 equals well above expected standard, 4 equals better than expected, 3 equals satisfactory, 2 equals worse than expected standard, 1 equals well below standard and 0 equals not applicable or no rating received.
[78] The first six months of 2001

put in an envelope for each rater and given to the LC to distribute. Twelve weeks later all forms were returned. Several raters were away on ships during part of this twelve-week data collection period and the LC spent five weeks overseas during this period as well.

Analysis

This case study has the smallest number of study participants - four. The same process of analysis was used as in the other case studies. However, the weighting of the individual competences was not included because of the differences of opinion about which ones should be weighted and the small final number of study participants.

The standard deviations (Appendix 35) for most participants on each competence are less than 1.0, a couple are 1.0 and Trevor is an exception with four competences with standard deviation greater than 1.0. The LC rated all engineers on all competences as a four or five. On these four competences for Trevor, the self-rating, peer rating and supervising officer rating are lower scores than that given by LC and greater standard deviations resulted. The LC in his capacity as an independent officer possibly knew less than any other rater about the participant's performance on specific jobs. As the standard deviations are small overall, the mean performance ratings are used for the correlations.

The productivity measures have a number of weaknesses. They do not provide a comprehensive coverage of the competences. For example, the engineers' competence profile also includes developing and reviewing maintenance policies, technical quality assurance through inspections and installation assistance. The OPDEF does not directly apply to these functions. Possibly there is a tenuous connection with the subsequent number and types of OPDEFs. Nor were the measures all collected within the timeframe of the performance. Some ratings are for work carried out six months prior. In addition, two of the OPDEF measures, the supervising officer's 'officer' rating of the engineer and the engineer's rating of the ship's support ('ISS ship') were developed for this study and therefore had not been previously tested.

There is also the potential for considerable variation in the ships' measures. There are a number of different types of ship and, therefore, very different types of OPDEF. The

ship raters are not moderated and they could have a more or less favourable approach to rating the engineer compared to other ship raters. As a result, productivity measures in this study have reliability weaknesses.

In spite of the weaknesses described above, eight competences out of the nineteen have a strong correlation with one or more productivity measures. Six of these strongly correlated competences are non-technical and two are technical. Five of them are intra-organisational and there is one in each of the following three domains - meta-competence, trade/professional and unique. These competences and their correlations are listed in Table 6.5 following.

Table 6.5

ISS engineers: Competences with strong correlations with the productivity measures (N: 4)

Domain	Competence	Ship Average	Engineering Advice	Repair Assistance	Logistical Support	Officer	ISS Ship
NT & M	Oral & written communication skills	.400	**.800**	-.400	.000	-.400	-.400
NT & Intr	Willingness to share knowledge	.211	**.949**	-.632	-.211	-.632	-.632
NT & Intr	Ability to recognize the needs of customers, and deliver accurate timely service	**-.775**	-.258	-.258	**.775**	-.258	-.258
NT & Intr	Ability to operate in a team environment	-.258	**.775**	**-.775**	.258	**-.775**	**-.775**
NT & Intr	Ability to research information from internal X sources (intranet, DIXS, BRs, handbooks, packs etc)	.105	-.316	.316	**.949**	.316	.316
NT & Intr	Knowledge of X administrative policies & procedures, and associated information sources.	**.949**	-.211	**.738**	-.316	**.738**	**.738**
T & T/P	Knowledge of X engineering standards	.258	**-.775**	**.775**	**.775**	**.775**	**.775**
T & Uni	Knowledge of X technical policies and procedures, and associated information sources	**1.00**	.000	.600	-.200	.600	.600

Key

NT = Non-technical **M** = Meta-competence **Intr** = Intra-organisational

T = Technical **T/P** = Trade / Professional **Uni** = Unique

N = The number of study participants

The productivity measurement scores are predominantly twos threes and fours on a one to five scale, therefore the differences are generally very small. There is little difference between the 'officer' ratings given for the engineers' performance, the rating given by the engineer concerned for the ship, ('ISS ship') and the ships' rating for the standard of the OPDEF ('repair assistance'). All correlations of these three measures are the same for each of the eight (strongly correlated) competences. Two competences only are strongly correlated to these three measures. They are: 'Knowledge of X administrative policies and procedures and associated information sources', and 'Knowledge of X engineering standards'. The similarity of these three measures suggests a greater focus on 'repair assistance' by both the officer when rating the engineer and the engineer when giving feedback on the ship's supportive communication. Doing things the right way to the correct standards appears to rate most highly. The ships' ratings for 'engineering advice' strongly correlate with competences related to good communication, sharing knowledge and working as a team, all of which have construct validity for the measure. 'Logistic support' has a strong correlation with the competences that cover recognition of customer needs, research skills, timely service and knowledge of engineering standards. This accordingly has construct validity also.

Competences with strong negative correlations with productivity measures are listed in Appendix 36. Several competences are correlated with the 'ship's average' measure but, surprisingly, 'logistic support' has strong negative correlations with competences such as 'Problem solving', 'Prioritising', and 'Knowledge of engineering and combat systems'. It may be that the behind-the-scenes aspects of logistic support are not evident to the ships. The three competences with no strong positive or negative correlations with any of the measures are also listed in Appendix 36. Two of these competences have no correlations recorded as all four engineers had identical mean ratings. Hence there is no distinctive difference as a basis for correlations.

Personnel data

Correlations between productivity measures and personnel data produced a strong correlation between 'years in the in-service support job' and 'logistic support' (.949). This suggests experience, knowledge and contacts developed over time mean that the

ships perceive themselves to get greater logistical support from the ISS engineers who have been in their position longer. If this is the case, retention of staff appears to be of considerable benefit. In contrast, tertiary education has a weak negative correlation with 'logistic support' (-.258). Years in the organisation correlate strongly with 'engineering assistance' (.738). In other words, the more experienced engineers are rated more highly by the ships on the quality of their engineering assistance. This 'years of experience in the organisation' (.738) correlation is considerably stronger than 'tertiary education' (-.258). 'Tertiary education' has a strong negative correlation with the 'ship's average' score and weak negative correlations with all other measures. See Table 6.6 for these results. Training and development, which is likely to be a component of current performance, was not included in the statistical analysis due to the complexity of quantifying the extensive lists of courses attended by the study participants.

Table 6.6
ISS engineers: Personnel data correlations with productivity measures (N: 4)

Personnel Data	Ship Average	Engineering Advice	Repair Assistance	Logistical Support	Officer	ISS Ship
Age	.200	.400	-.200	.600	-.200	-.200
Years in current job	-.316	-.632	.316	**.949**	.316	.316
Years in organisation	.632	**.738**	-.211	-.211	-.211	-.211
Equivalent years of tertiary education	**-.775**	-.258	-.258	-.258	-.258	-.258

Key
N = Number of participants

Individual results illuminate the interaction of experience and qualifications in this sample of four ISS engineers. Trevor who has worked for the ISS for three years (no one else had worked for the ISS for more than one and one half years) received the highest average ratings on 'logistic support'. Ratings for the rest of the sample are in

descending order, in accordance with the length of time they have been in the ISS position. 'Engineering advice' has a negative correlation with the number of years in the ISS role but a strong positive correlation with the number of years in the organisation. This can be explained by the impact of Trevor receiving the lowest rating for 'engineering advice'. Although he had been the longest serving in the ISS role, he is third in length of service in the organisation. It appears for this group, from the way the ship's rater interpreted 'logistical support', more experience in the ISS made participants better on this criterion or coincidentally those better at logistic support have been in the ISS role longer.

Yohann who is the youngest (36) had had the shortest time in the organisation (18.5 years) although not in the ISS (1.5 years). He has twice as many equivalent years of tertiary education as the other three. Not only does he have an engineering trade certificate but he has also completed a second trade certificate and an NZCE. However, he scores second to lowest on both of the productivity measures above. This emphasised the far greater positive impact of experience in the organisation on productivity results than equivalent years of tertiary education. These results are set out in Table 6.7 following.

Table 6.7

ISS engineers: Experience, tertiary education and productivity measures

Name	Age	Years in ISS	Years in organisation	Tertiary education	Logistic support	Engineering advice
Yohann	36	1.5	18.5	8	56.67	61
Nigel	38	1	22	4	54.5	63
Ian	40	1.5	22	4	60	66
Trevor	39	3	21	4	62	55

Domains

Two domains, the non-technical meta-competence domain and the technical unique domain have strong correlations with productivity measures. The meta-competence domain that consists of two competences has a strong positive correlation (.864) with 'engineering assistance'. The technical unique domain that also has only two competences correlates strongly (.775) with the three measures 'repair advice', 'officer'

and 'ISS ship'. The intra-organisational domain, usually one of the strongly correlating domains, does not have strong correlations in this analysis. Five of the total of eight intra-organisational competences individually have strong correlations with productivity measures (See Table 7.1). Nevertheless these five competences are strongly correlated with four different measures. Although most strongly correlated competences are intra-organisational, the diversity in the measures with which they correlate appears to have led to this domain result (See Appendix 36 Table 3 domain correlations).

Human capital index (HCI)

A human capital index and human capital index band were calculated for the four engineers. The HCI, equivalent years of full-time tertiary education and the group of strongly positively correlated competences are all correlated with the productivity measures to compare the strength of any positive correlations. See Table 6.8 following for these correlation results.

Table 6.8

ISS engineers: Correlations of strongly positive competences, HCI and tertiary education with productivity measures (N: 4)

	Ship Average	Engineering Advice	Repair Assistance	Logistical Support	Officer	ISS Ship
Strongly correlated competences	.316	.632	-.316	.316	-.316	-.316
HCI	.316	.632	-.316	.316	-.316	-.316
Tertiary Education	**-.775**	-.258	-.258	-.258	-.258	-.258

Key

N = The number of study participants

The strongly positive group of competences has the same correlation result as the HCI. This result is influenced by all study participants being competent in all competences with little variation in the individuals' mean performance scores. The inclusion of all the competences in a human capital index, in combination with the strongly correlated competences in a small sample like this, results in less variation. However, the HCI for individuals is still a far more comprehensive measure as it contains all of the competences from the profile.

Compared to the correlations of tertiary education the HCI is a more valid measure. Even at this initial stage of development, when competences have been developed with limited resources, measures are untested and raters untrained in the system. The HCI has no strongly positive correlations but has a positive correlation of .632 with 'engineering advice' and of .316 with both the 'ships average' and 'logistic support' scores. 'Tertiary education' has no positive correlation with any measure. In fact it has a strong negative correlation with the 'ship average' score.

The HCI correlates negatively with both the officers' ratings of the engineers ('officer') and the engineers' ratings of the ship support ('ISS ship'). This contrasts with the positive correlations of all of the ship measures except 'repair advice'. Although this is a very small sample, it does raise the question of the reliability of the competence ratings or the officer OPDEF ratings of the engineers and the position of 'repair advice' in relation to other measures.

The individual HCIs are very similar in this small sample because the four study participants were all rated very similarly on their competences. The group HCI band is 81 to 90 and the HCI is 87.34. In Table 6.9 below are the individual human capital indexes that are the basis for the group measure. They range from 85.63 to 88.13 and all of them are in the same fixed band of 81-90. Also listed are the individual percentage measures for the six-month productivity measures. The large variations between the 'repair assistance' but not other ship measures also illuminate the way this measure is at odds with the other productivity measures in the correlation results.

Table 6.9
ISS engineers: HCI and productivity measures

	HCI	HCI band	Ship Average	Engineering Advice	Repair Assistance	Logistical Support	Officer	ISS Ship
Ian	88.13	81-90	60.5	66.67	60	60	55.45	55.45
Trevor	87.81	81-90	65.82	55	95	62.5	60	62.2
Nigel	87.81	81-90	66.45	63.33	75	54.54	58.67	60
Yohann	85.63	81-90	60.3	61.33	67.14	56.67	56.8	56

Reactions to the HCI

The meeting to talk through the results with the LC and the SOSPP who was my original contact provided additional valuable information about the measures.

When the LC saw the synchronism of the ratings for 'repair assistance', 'officer rating' and 'ISS ship support', he explained how he had collected the data. The 'officer' rating and the 'ISS ship support' rating had been collected long after the OPDEFs had been completed. The request for a rating from both parties was sent round with a common spreadsheet. As a consequence all raters saw the ships' OPDEF ratings and the ISS engineers saw how their officers rated them before they made their own ratings of 'ship support'. This delayed data collection and the fact that subordinates made their ratings after seeing their superiors' ratings probably distorted the productivity measurements.

We discussed the competence profile and its coverage by the productivity measures with particular reference to the 'logistic support' correlations. The LC agreed that the matrix, which they had originally planned to develop as part of the competence profile development process, would have been beneficial. A matrix could have shown up gaps in the productivity measures coverage of the competence profile.

A human capital index versus a human capital index band of 10 points was discussed. The SOSPP considered that the organisation's culture meant that they would be comfortable with the precision of an HCI to two decimal points.

The LC was interested to see the strong correlations of the experience measure of 'years in the organisation', in contrast to the number of equivalent years of tertiary education. He seemed, however, a little unsure overall what the data was indicating although the SOSPP appeared to comprehend this clearly.

A short report was left for further perusal and a further meeting was held seven weeks later.

At this second meeting the LC was enthusiastic about repeating the process after tidying up the measures, with a larger sample, more consultation on the competence profile and with staff training on the meanings of the competences and ratings. However, this

exercise to date had spanned fourteen months so repeating the process would have taken me beyond the span of this doctoral study. On further thought the LC now considered that the 'logistic support' measure was definitely not a valid measure for the ISS engineers as external priorities and supply availability outside their control affect the timing. He thought a human capital index would be a complementary measure for his balanced scorecard measures.

Conclusions

The human capital procedure produced some relevant results. Because the final sample size in this case study is only four, the analysis of the correlation results is tentative. Regardless of sample size this application of my procedure for developing a human capital index contributes to understanding the issues of productivity measures and competence profile development and the HCI development process itself.

The human capital index does not meet the criterion for this research of a strongly positive correlation (.700). It is close, however, with a .632 correlation with 'engineering advice' and .316 correlations with 'logistic support' and 'ship's average'. This is a considerably greater positive correlation than the negative correlations of 'tertiary education'. Thus the human capital index procedure in this case study, in spite of the need for improvements in the productivity measures and data collection process, produced a more valid measure of human capital than the equivalent years of tertiary education.

Gaming

This case study involved the gaming technicians in an organisation with a franchise to sell gaming machines to and service them for clubs and pubs in the North Island from Kaitaia to New Plymouth. My contact for the organisation, the human resources and training manager, first contacted me by email after attending a seminar I conducted for the Human Resource Institute of New Zealand (HRINZ) when I called for expressions of interest in my research. My contact was aware of the increasing regulatory requirements in the gaming industry and hoped that by being involved, she would gain a comprehensive competence profile for her organisation's service technicians.

My contact went on sick leave for stress during the course of the data collection process and before the productivity measures were finalised. A few weeks later she was dismissed for inappropriate behaviour. At this point I had received the feedback data and personnel data for eleven of the sample of fifteen, but I had no productivity measures.

The replacement contact person made service analysis data available, but did not appear to want to become involved. I experimented with the presentation of this data as productivity measures in correlation analyses with the performance scores for competences. The service records appeared to be incomplete and inconsistent. There were no strong positive or negative correlations and no pattern evident between personnel data and these same productivity measures (See Appendix 37 for the details of this case study).

Chapter 7

Comparison of Case Study Results

In this chapter I examine the similarities and differences in the various case studies and the implications for the human capital index measure. Case studies were conducted in organisations with considerable differences in their business purpose, size, competences profiles, sample(s), characteristics and productivity measures. Samples in each case study were small; the range was from four to eleven participants. The same process was used with each of the seven samples to develop a human capital index based on competences. Results of the respective HCIs' correlations with productivity measures provided were varied. A comparison of these results and their contexts contributes to the development of the human capital index construct. The comparison provides a basis for refining the HCI procedure as an approach to developing a human capital measure based on competences and sheds light on the context in which it could be most effective. Appendix 41 Tables 1, 2, and 3 summarise the characteristics and the results for the seven groups.

All case study organisations, with the exception of gaming, were selected through my approach to someone in the organisation I already knew. Gaming was the only case study that arose from advertising or a seminar.

Five of the seven groups achieved HCIs that had strong positive correlations with at least one of their organisation's productivity measures. A sixth group, in the ISS organisation, had a .632 result with one of the component productivity measures. No HCI was calculated for the gaming company, the seventh group, as there were no competences with any strong correlations with the available productivity measures. A minimum of one competence with a strong correlation with productivity measures was required to calculate an HCI. Out of the five groups with a successful outcome there were two groups that had superior results. These two groups were the NCP lawyers and CSRs in the call centre of the bank. They both produced results with greater construct validity than the others because their HCIs had strong positive correlations with their respective long-established total (Brinkerhoff & Dressler, 1990) productivity measure.

Both groups' HCIs were subsequently tested for, and found to have, considerable reliability in a validation analysis.

The two most successful samples, NCP lawyers and the CSRs, are compared for their similarities and differences before comparison with other sample results. There were two matched groups of lawyers from the same department in the same law firm, yet I classify only one of the two samples as very successful. This difference in the results of the two lawyer samples provided an opportunity to look at the similarities and differences in the human capital procedure. A two-way analysis was possible for the NCP lawyers: comparison with another successful work role and the same work role with less successful results. Productivity measures, competences, and the workforce characteristics gained from the personnel data of gender, experience and equivalent years of tertiary education are compared for similarities and differences in the two groups of lawyers.

Characteristics of the most successful HCIs

The lawyer (NCP) and CSR case studies are outwardly very different, but the application and results of the HCI suggests that there are similarities that are significant to the HCI procedure. The respective occupations are very different, as are the two samples' education levels, age ranges and competences. However, both groups had existing performance appraisal systems in which they rated their own performance (and/or that of others) on given competences on a numerical scale. Thus they had some previous experience in rating the performance of competences on a numerical scale. As part of their appraisal systems they both had long-established individual, objective productivity measures (along with a smaller number of subjective measures), which were regularly fed back to the participants in association with budgeted targets. So both the lawyers and the CSRs were accustomed to regular numerical measures of their performance. Furthermore, their respective family of productivity measures came from one database/source, gave a comprehensive cover of their competences and incorporated a reasonable span of time. In the initial correlation analysis the productivity measures spanned four months for the lawyers and six months for the CSRs. Finally, their respective technical and non-technical proportional weightings were similar (lawyers 50:50 and CSRs 40:60).

The competence profiles were, appropriately, very different for NCP lawyers and CSRs. Both, however, covered all the Nordhaug domains (although for the NCP lawyers the two generic domains, meta-competences and standard technical, were covered as assumptions within other competences). Extensive development had gone into the NCP lawyers competence profile in another firm, but it was new to this group of lawyers and their raters. The CSRs competence profile was also new to the study participants. I facilitated its development using the Nordhaug typology as a guide, in consultation with the human resource manager, recruitment manager and the two call centre line managers. Compared with the NCP development, the number of people involved and the time given to the CSRs competence profile development process was minimal. However, the two call centre managers were very knowledgeable about their staff and the CSR job role and were very interested in the development of a competence profile at the time. Moreover, the Nordhaug typology was effective in providing a comprehensive coverage of the role competences. Consideration of each domain sequentially resulted in step-by-step development of a holistic profile. It was easy to focus on a description of the ideal profile for a CSR because there was no requirement to consider the wording, classification into traits, outputs, attitudes and the like.

The NCP competence profile was accompanied by detailed behaviour descriptors posted on the intranet in the 'dictionary of guiding behaviours'. The CSR profile had no accompanying behaviour descriptors. Only six out of a possible twenty-four NCP raters actually consulted these descriptors. For 75 per cent of the raters the descriptors played no part in rating decisions. Descriptors did not appear to contribute significantly to how either competence profile was rated.

The domains of the competences that produced the strong correlations for both the bank CSRs and the law firm samples were predominantly non-technical, intra-organisational. Each sample's strongly correlated competences included only one technical, trade/professional competence and six and five non-technical competences respectively. Both groups had been given the prerequisite preliminary vocational training in the technical skills required for their respective competence profiled jobs. All members of each sample were considered technically competent to keep their positions. Hence there was a baseline in both case studies of acceptable technical competence. It is not

possible to make any direct comparison between their non-technical competences because the profiles were so different. Most of the non-technical competences that produced strong correlations with their respective productivity measures suggested commitment to the organisation's job requirements and are predominantly in the intra-organisational domain.

Established, objective productivity measures with a comprehensive coverage of the competence profile were a feature of both the CSR and NCP case studies. Both families of measures include some quantitative objective measures, as well as some quantified subjective measures (respectively, 'productive non-billed units' and 'customer care' ratings). They also both have checks and balances to keep the component behaviours in proportion. The law firm does this by inclusion of the unit and fee budgets, the recovery rates and productive non-billed units. The CSRs quarterly composite measure includes a limit of a maximum five-point overrun in each of the three weighted sectors. The scope of the productivity measures reflects the work performance coverage represented in the competence profile.

Both the NCP and the CSRs had a number of partial productivity measures in their family of measures. The use of a number of partial productivity measures identifies the competences that have a strong correlation with at least one of them. A composite measure alone can hide the strong correlations between competences and partial measures if the different results cancel each other out.

The correlation analysis identified patterns in the relationship between the various productivity measures and workforce characteristics. This information provides a basis for reviewing criteria for personnel as well as productivity measurement. For example, in the NCP sample the measure, 'productive non-billed units' produces strong positive correlations with personnel data such as tertiary honours and prizes that do not appear to be reflected in the 'YTD total financial contribution'. Possibly the relationship of the schedule of non-billed activities and their assigned units requires review. Consequently, the study of the associations between competences, workforce characteristics and productivity measures has the potential to be effective in reviewing the measures

themselves and detecting any blinkered reliance on certain characteristics of personnel data.

A contributing factor to an effective HCI is an adequate time-span of the productivity measures. CSR productivity measures used for correlations involved in the development of the HCI spanned six months. In the NCP lawyers case study the differences in time-span of the productivity measures had an impact on the competences that were identified with superior performance (due to their strong correlations with the productivity measures). Original correlations included the month of April results for the performance to budget for the units recorded and the fees charged. Two competences, 'Ability to present client information' and 'Commitment to the development of collateral professional skills', were strongly correlated with the performance to budget for the April fees. However, these competences did not correlate strongly with the cumulative four- and twelve-month results. Inclusion of this one-month's results in the original family of measures, caused a distortion in the results. The use of four months cumulative productivity results produced strong correlations with the HCI but the full year productivity measures results were even stronger. A longer span for the family of productivity measures, therefore, resulted in stronger correlations for the NCP lawyers HCIs.

The range within productivity measures appears to influence correlation results. Both of the lawyer groups used the same productivity measures. The national director of human resources had matched the two samples for these case studies for their level in the firm, department, qualifications and age. However, she did not match them for their productivity results. Table 7.1 following shows the differences in the ranges for the productivity measure, 'total financial contribution', for the first four months of the year, between the NCP and ECP level 1, level 2 and level 3 lawyers. There is a difference of $60,794 (24 per cent) in the ranges of the two samples' level 1 lawyers for this productivity result. It is possible that the sample of NCP level 1 lawyers were outstanding individuals and the sample of NCP level 2 lawyers were not, and this influenced the correlation analysis results. A wider range in productivity measures creates more distinction in correlations. Levels 2 and 3 lawyers also had differences in the range of this productivity measure, although the differences were small. The lawyer

samples provided for the two different competence profile forms were not matched for all relevant criteria. As a result, differences between the results of the human capital indexes for the two samples are associated with this variation in the range of the productivity measure, 'total financial contribution', as well as dissimilarity of competence profiles.

Table 7.1
The ranges in 'total financial contribution' for lawyers at each level in NCP and ECP samples

Level of Lawyer	New (NCP)	Existing (ECP)	Difference in $ Range
Level 1	$72,241 - $ 156,958 = **$84,717** (4)*	$81,866 - $105,789 = **$23,923** (5)	**$60,794**
Level 2	$64,581 - $89, 734 = **$25,153** (3)	$ 92,284 - $112,288 = **$20,004** (3)	**$5,149**
Level 3	$168,023 (1)	$165,457 (1)	**$2,566**

*The number of lawyers included at this level

The CSRs' quarterly productivity measures had sufficient range to enable the HCI to identify considerable differences in individual performance. The sample of eleven had been selected by their managers to be invited to take part in this research because they were either clearly in the '100+ club' and had exceeded their organisational targets (with scores of 105 or more) or they clearly were not (had scores of 80 -100). There was, therefore, a significant difference in organisational terms in the range of their quarterly productivity measures results. The range between scores for the complete CSR sample was 23, with scores from 113 to 90.42. Although this does not appear to be a large range, it was sufficient to distinguish two subgroups' levels of performance to organisational targets. This difference in the participants' quarterly productivity measures was maintained with minor variations for the next two quarters.

CSO, supermarket, ISS engineers & gaming productivity measures

The CSOs, supermarket, ISS engineers and gaming case studies contact people all said prior to the data collection that they had established, numerical productivity measures

that covered the respective, to-be-researched, job roles. In practice their productivity measures had a number of weaknesses. Each of these case studies provided productivity measures, which to some degree had questionable validity or reliability, lacked comprehensiveness and/or balance, or had a limited time-span or range that influenced the correlation analysis process with their respective competences profiles. This in turn had a significant impact on HCI calculations. However, in spite of imperfections in the productivity measures a strong correlation was recorded between the HCIs and one of the productivity measures for two of these samples (supermarket managers and CSOs). Results suggest possibly more and stronger correlations would be likely with more robust productivity measures.

The bank CSOs' family of three productivity measures did not include a bottom line financial measure. The three partial productivity measures were the three key performance indicators (KPIs) used in the bank to monitor staff performance but their reliability was questionable. Data collected from the study participants' respective branches was compromised by lack of clarity in presentation, incomplete measures and inconsistencies in the type of data provided. In some instances, in order to be able to use the data, I had to consult with the organisational contact person to interpret the intention of the figures provided. Furthermore, a different rater for each study participant completed the 'service delivery' checklist. This was an in-branch assessment and the sample participants came from different branches. Also impacting on reliability and subsequently validity of the HCI was the one-month limited span of the productivity measures.

I reduced the CSO KPI data ranges into three five-point scales in an attempt to get some consistency between the different formulations of the measures. On reflection, by doing this, I reduced the visibility of the components within the measures and the visibility of differences in individual performance. For example, the 'service delivery' assessment KPI was originally scored out of one hundred, with individual percentages for twelve items. However, I was not given this raw data. Other case studies in his research have shown that amalgamated partial scores such as for these twelve items have the potential to cancel each other out and to camouflage strong correlations with individual competences. All of the CSOs achieved the target of a minimum of eighty per cent for

this service delivery KPI and this data was abridged to a score of three or more on a one to five-point scale.

Integration of the three KPIs into a total measure led to distortions in the balance of the partial measures in relation to the competence profile. For example, the productivity measure 'teller cash out' was not specifically covered by any competence in the CSO profile and in this composite productivity measure was represented as one third of the total productivity value.

The supermarket productivity measures were derived from the 'focus reports'. 'Focus report' productivity measures provided a comprehensive coverage of the competence profile with the partial measures. There was a wide range in individual's results and the available measures spanned one year. However, focus reports are primarily for inter-store comparative measurement of same department managers and not intra-store comparisons of managers in different departments. Having different raters led to inconsistencies between the managers' 'focus reports' both in the component measures and their weightings and this impacted on validity and reliability. External raters, based on one visit, made franchise-wide comparative ratings of the managers' performance. Different raters made the judgements for the different departments within the supermarket and there appeared to be no moderation process to foster internal consistency of these qualitative manager ratings within each supermarket. Furthermore, certain partial measures have greater face validity than others, for rating by an external person. 'Compliance' and 'promotion', for example, seem very appropriate for this rating process. However, others such as 'staff', 'leadership' and 'customer' would be difficult for an outsider to judge comprehensively in one visit.

There are variations between the supermarket departments in the components included in a 'focus report' and the associated percentage weighting. No doubt these variations reflect the different priorities for workplace performance of the different types of managers. In an attempt to have some intra-organisational consistency in this study the 'focus report' components I included were only those common to all seven managers. Variations in weighted scoring for some of these components remained however .

The ISS engineers had a family of productivity measures that spanned six months. They included untested new qualitative measures in an attempt to increase the scope of the measures to cover the competence profile and there was a narrow range in the scores for each measure. There were validity and reliability issues with the data and no consideration of the relative balance of the component scores in the newly developed composite, total measure. Existing balanced scorecard measures had not previously ever been broken down into individual scores; all the four measures were new. There is no moderation process to accommodate different sized OPDEFs, different ships and different raters. The measures were all from one to five-point rating scales and all based on subjective judgement of performance. Unbeknown to me at the time, the contact person collected some of the data retrospectively and on the one sheet. This enabled contributors to see the recorded measures of other raters, which seriously compromised independence in judgements. In addition, one of the assessors for the 'officer' ratings did not directly manage any of the engineers in the sample. He considered as an independent officer that it would be appropriate and a positive contribution to include his ratings of the sample. He gave each of the sample fours and fives on the five-point scales. Inclusion of this independent officer's ratings possibly skewed the results because he did not know about individual differences in performance of the engineers concerned.

There were not only problems with reliability but also with the validity of one of the ISS engineer productivity measures. The independent officer referred to above, after reading the report on the results of the research, had further thoughts on the validity of the 'logistic support' productivity measure. He felt there were supply and timing issues involved in 'logistic support' that would not be visible to the ship raters who made the assessment of performance. Moreover, many factors in 'logistical support' were also outside the control of the ISS engineer. Nevertheless, in this study there was a strong positive correlation with 'logistical support' and years in the current job, which suggested construct validity in how 'logistic support' was perceived by raters.

Finally, the productivity measures provided by the gaming case study, after a staff change during the study, could not be used for the development of a human capital index. The productivity measures promised sounded auspicious as they were to consist

of objective data on hours worked and the bottom-line client charge-out amounts. However, the data finally received to represent the value of gaming technicians' work included huge differences in hours worked and charge-out rates, which suggested incomplete records. My attempt to identify competences strongly correlated with the available productivity measures revealed no competences with strong correlations. The process for the development of an HCI depended on there being at least one competence in the profile producing a strong correlation with at least one of the available productivity measures.

Competences

The Nordhaug (1993) typology provided consistency in the span of competences included in the competence profile in each case study. Each competence profile covered (by assumption in the lawyer competence profiles) six domains, three technical and three non-technical. I found the use of this framework to facilitate the development of competence profiles gave the development process a clear process and saved time. The competences profiles resulting from a well-resourced development process (NCPs) and a minimally resourced development process (CSRs) both resulted in strong correlations for their HCIs. Because both these case studies had well-tested productivity measures, the results suggest the Nordhaug typology acts as a framework for competence profiles that validly represent job roles in an organisation.

Reliability checks of the competence profiles categorisation into meta-competence, intra-organisational, industry, standard technical, trade/professional and unique were made after they had been used in the correlation analysis. The two most successful case studies - the NCP lawyers and the CSRs - showed great reliability in domain classification of their respective competence profiles. There was 100 per cent agreement with both bank competence profiles and the ECP lawyer profile and 97 per cent agreement with the categorisation of the NCP lawyer profile. Agreement for gaming was 96 per cent, ISS engineer 89 per cent and for the supermarket 66 per cent. The descriptions of each domain promoted primarily accurate classification of competences.

Different interpretations of certain words used in the competence descriptions were the main cause of any classification variations. The two non-technical domains, meta-competence and intra-organisational, are distinguished primarily by the latter's competences being context specific. Similarly, the trade/professional and the unique domains are distinguished by the firm specific nature of unique competences. The re-classification of the supermarket competence profile highlighted how certain phrases such as the following can cause a change in classification:

'...own department'; '...in the department'; '...for the position'

These phrases change technical generic competences that could be classified as trade/professional to unique and non-technical generic competences that could be classified as meta-competences become intra-organisational.

Classification agreement was also affected by the nature of management. Non-technical intra-organisational competences such as 'Supervises staff' can be interpreted as trade/professional as they can be regarded as the technical skills for the profession of management. This is how the independent person classified a number of supermarket management competences; hence there was a greater inter-rater difference (66%). I had classified these competences as intra-organisational. Because Nordhaug's criteria for intra-organisational competences are task non-specific, firm specific non-technical tasks, I still think these management competences are best classified into the intra-organisational domain. I can see how my introduction of 'professional' to Nordhaug's 'technical trade' domain caused the confusion. A manager's responsibilities include managing staff. A common application of the term 'professional' could include 'Supervises staff' as a professional responsibility of a manager. Future competence profiles for managers would require clarity on the classification of competences.

Regardless of the origin, all competence profiles had more intra-organisational competences. I was involved in the development of five of the case study competence profiles, plus the pilot case study competence profile. The law firm case studies competence profiles were the only two already in existence. Of these two it was only the NCP that had had an extensive development process, although this was not in the case study firm or even in New Zealand. The number of competences identified ranged

from a total of 34 for the NCP lawyers to 19 for the ISS engineers. All case studies identified more non-technical competences than technical competences, with the exception of gaming, which had twelve technical and twelve non-technical competences, . The NCP lawyers and the bank CSR and CSO competence profiles had approximately three times as many non-technical competences identified as technical. Intra-organisational competences were the predominant domain in all competence profiles. Generic meta-competences were included in the intra-organisational domain if they were described in terms of the way things are done in the specific organisation.

A system of proportional technical and non-technical weightings was introduced as a simple method of addressing disparities in the number, size and complexity of competences. All the case studies regarded the non-technical competences as being equal to or greater than technical competences in their contribution to superior productivity results. Proportional weightings for non-technical competences ranged from 50 to 65. The proportional weighting range for technical competences was 35 to 50 per cent (See Appendix 41, Table 2). These competence profiles with their emphasis on non-technical competences are consistent with practice in knowledge and service industries.

The ISS engineers case study was the only one that weighted the technical skills equally with the non-technical. Whereas, the pilot case study engineering company emphasised the technical skills even more, with non-technical and technical proportions of 25:75. The pilot study correlations with productivity measures did not endorse technical competences as being associated with distinguishing differences in performance. Non-technical competences had the strongest correlations with productivity measures.

In all six samples in which HCIs were developed, non-technical competences - and intra-organisational especially - dominated the lists of those competences with strong correlations with the available productivity measures. Proportions of strongly correlated competences ranged from one to nine non-technical competences and zero to three technical competences. The greater number of non-technical and particularly intra-organisational competences might be viewed as increasing the chances that they dominate in correlation analysis. However, the correlation analyses are between the

performance scores from 360-degree feedback for the competences and productivity measures. The number of competences is immaterial; either there is an association or there is not between the two measures. Intra-organisational competences dominated the strongly correlated competences.

Participants in these case studies were technically competent in their respective roles, which could explain the minimal presence of technical competences in the strongly correlated group. The five-point rating scale effectively becomes a three-point range (3 to 5): a narrow range for performance distinction. Moreover, technical skills are required but may not have the most impact on outcomes in a service role. All of the case studies emphasise service.

Emphasising critical individual competences in the HCI procedure by doubling their score was explored in several case studies. Weighted competences that were strongly correlated with productivity measures were used in the calculation of a weighted human capital index. The application of a weighted HCI was calculated for the earlier case studies, which were the bank and law firm samples. The ECP lawyers had only one non-weighted strongly correlated competence and it was therefore not applicable. A weighted HCI was calculated for the CSOs and the CSRs in the bank and for the NCP lawyers. CSR results showed no differences between weighted and unweighted measures. The CSOs results produced a stronger correlation with the weighted HCI than the HCI and the productivity measure 'customer service' (HCI= .694 & HCIW = .772).

In the law firm the NCP results produced a number of differences in the weighted and unweighted HCI correlations with productivity measures. These included correlation differences with the total productivity measure 'YTD total financial contribution'. The HCI was .786 for four months and .571 for twelve months and the HCIW was .810 for four months and .750 for twelve months. In this research + or -.7 is the criterion for a strong correlation. Only the NCP weighted HCI met the .7 criterion for a strong correlation with the 12 month productivity measure.

Weighted HCIs were not calculated for the supermarket managers, the ISS engineers, and the gaming technicians. Those three case studies had productivity measures for

which reliability and validity were issues. It seemed therefore to be of little benefit to add to the complexity of the human capital index procedure by calculating the additional weighted human capital indexes.

The approach of the contact people in the ISS engineer and the supermarket manager case studies to determining individual competence weightings, highlighted issues to consider if weightings are included in future HCIs. The ISS engineers contact person consulted all of the sample and their respective officers about what competences to weight because of their importance. There were considerable differences of opinion about which competences to weight. A discussion about what competences are the most important in a role is no doubt valuable but a process for obtaining consensus, or deciding what to accept, is required in the HCI procedure. The supermarket O/O wanted to weight different competences for different managers. This would effectively have made each manager a separate group for analyses and was not acceptable for the current HCI procedure. However, it is realistic to consider that different managers in an organisation may need to emphasise different competences. The weighted competences may or may not have required superior performance. Possibly what is critical to superior performance is a basic level of some of these weighted competences.

Familiarity with, respect for and clarity of the wording describing the competences, may have an impact on how competence profiles are rated (Bernardin, Orban, & Caryle, 1981; Hedge & Teachout, 2000; Lawler, 1967). Because the law firm had two matched groups who used the same productivity measures, their competence profiles and how they were rated can be compared. There were major differences between the two groups in the development of their respective competence profiles and there were also differences in the study participants' familiarity with them. The NCP had been extensively researched and tested in another major law firm but not used in the subject firm before whereas the ECP was familiar to the participants. The ECP was up for review at the time of this research due to general dissatisfaction with its current appropriateness. Familiarity, wording of the competences and dissatisfaction with the competences included in the ECP could have impacted on the approach of some raters. Evidence of this could be the lack of comments associated with the completed ECP feedback forms and the fact that all raters rated every competence. This contrasted with

the completed NCP feedback forms, which carried some constructive comments and evidence of selective avoidance by raters of rating any competences, where they felt that they were not qualified to make judgements.

Although spaces were left for comments on all of the competence feedback forms, there were few comments from most of the samples. In all but the NCP lawyers feedback form there were no comments or only the occasional one. In the case studies other than of the lawyers, the educational level was generally lower, there was less experience of competence profiles and the profile was new to them. Whether any of these factors influenced the number of comments participants recorded on their forms is unclear.

Individual competences and the subsequent HCI were correlated with the same productivity measures. This could be perceived as an internal weakness of the HCI procedure because profiles with a greater number of strongly positively correlated competences might logically be expected to produce a HCI with stronger positive correlations. The supermarket managers (HCI correlation = .784) and the ISS engineers (HCI correlation = -.632) have the most competences with a strong correlation to at least one of a family of productivity measures. However, their HCI correlations are not as strong as those in the two most successful case studies. The bank CSRs and the law firm NCPs had fewer strongly correlated competences in their HCIs. The impact of including all competences in the formula, use of proportional weightings and a family of productivity measures, appears to address limitations associated with the use of productivity measure correlations both to develop and to validate the HCI.

In each sample the sum of the 'strongly correlated competences' was correlated with the productivity measures. Although usually there were more strong correlations with productivity measures for this group of competences than the respective HCIs, this measure was not pursued. This small group of competences is only a partial representation of the substance of human capital. I think focusing on this incomplete group of competences in association with current productivity measures has a danger of emphasising historical, short-term, human capital requirements.

Previous experience in 360-degree rating of competences may also have had an effect on results. Participants in both of the most successful case studies had had experience

of rating systems, although not of 360-degree ones. The ECPs had also had some experience, albeit negative, with rating on their particular competence profile, whereas the other samples had not had any exposure to rating themselves and others at all. They were given no training or explanation (with the exception of the NCP descriptors, not used by 75 per cent) to ensure a common understanding of each competence. In the absence of any training in how to rate fairly and consistently in the feedback process, one could speculate that positive experience of self-ratings and being rated by others would lead to greater consistency of inter-rater results. However, I did not collect data on reactions to previous feedback experiences, nor did the standard deviations of the rater scores for the two lawyer samples differ noticeably from samples with no experience of multi-rater feedback.

Certain competences are more appropriate for a particular role to comment on than others. In each sample all raters were asked to rate each competence. In the supermarket and lawyer case studies the ratings by subordinates and administrative staff respectively, for competences about how the participant got on with them caused the most standard deviations over 1.0. Performance-ratings of competences are likely to be more appropriate if given by those in the position to give knowledgeable feedback.

In summary, there are competence profile variables that are associated with an HCI with stronger correlations with productivity measures. The competence profile includes all the domains of the Nordhaug typology and has been developed in association with those who know the role well. Higher ratings on non-technical competences and in particular the intra-organisational competences dominate in correlations with superior productivity results. Productivity consists of a family of measures that span the short and long-term performance of all of these competences. I can only speculate that competences included are also considered worthy of attention by the raters who had previous experience of measurement and competence feedback.

Workforce characteristics (personnel data correlations with productivity measures)

Workforce characteristics data was collected (identified as personnel data in the case studies) and correlated with the productivity measures. These factors were included in the data analysis so that I could monitor whether my decision to exclude them in the

HCI formula after the pilot case study was warranted. If any of the workforce characteristics such as age, gender, work experience or tertiary education had strong correlations with productivity measure their inclusion in a HCI would need further consideration.

Work experience

The pilot for the development of an HCI included years of experience in the job as one of the components of the HCI formula. However, I did not consider the impact of years of experience on the HCI results great enough for this to be included in the HCI formula for subsequent case studies. Qualitative[79] aspects of experience are not directly considered n this study. Some qualitative aspects of experience, however, are likely to be captured in the performance ratings of competences.

The supermarket, ISS engineers and law firm case studies had strong positive correlations between years of experience in the job and at least one of their respective families of productivity measures. However, the quality of the available information on the years of work experience outside each study participant's present position varied between the case studies. There was a lack of consistency in presentation of data and in some case studies a lack of accuracy in years of work experience recorded. Therefore the impact of work experience is case study specific.

In the supermarket case study years in the job had a strong positive correlation (.806) with the July 2000 'focus report total', while years of work experience in the industry had strong positive correlations with two of the partial measures in the focus report: 'leadership' (.829) and 'compliance' (.919). Three of the four older staff who had more work experience in the industry and in this supermarket than other staff are rated more highly on both 'leadership' and 'compliance'. Two of them were women in their forties who had worked for the organisation for at least three years and in the industry for 24 and 11 years respectively. Moreover, gender[80] correlated strongly with 'leadership' (.791) and 'compliance' (.63), and age correlated strongly with the July 2000 'focus report total' (.709). Because the qualitative dimensions of work experience were not included in the data collection, their role in these strong correlations in a small sample is

[79] (Tesluk & Jacobs, 1998)
[80] Gender correlations are discussed later in this chapter

not evident. The reliability and validity issues of the productivity measures (previously discussed) add to the complexity in interpretation of results. It is unclear in a sample as small as this what part is played by experience, age, gender or even the ethnicity of the raters. Further research with larger samples and more valid, reliable productivity measures would be needed to separate out the impact of quantitative and qualitative work experience from these age, gender and other influences.

The ISS engineers similarly had some strong correlations between years of experience in the job and productivity measures. Years in the current job had a strong positive correlation with 'logistic support' (.949) and years in the organisation had a strong positive correlation with 'engineering advice' (.738). Those who had more years in the ISS did not necessarily have the longest years of service in the organisation. All ISS engineers had a minimum of eighteen years service in the organisation. Engineering skills were a requirement for internal selection into the ISS, whereas logistical support strategies are developed on the job. Thus the association of years of work experience with these productivity measures appears to have validity. My contact person questioned the validity of the ship rating the engineers on 'logistic support' in our final meeting.

The two case study samples in the law firm comprised lawyers who were broadly matched for work experience. They were with similar in the characteristics of level, qualifications and work experience as summer law clerks. Unlike the other case studies the matched levels identified a qualitative (Tesluk & Jacobs, 1998) aspect of work experience because progression in level was not automatic but based on ability. Within each group there were three different levels of lawyers, which were broadly, but not exclusively, associated with post-graduate years of experience in law firms. Level 2 and level 3 lawyers showed the most variation in age and years of experience in a law firm. Each level had different budgetary expectations; in effect there were three different groups of experience and expectation within each sample, although all had the same total productivity measure of 'total financial contribution'.

Work experience in the form of a higher level had a strong negative correlation with one of the productivity measures. 'Productive non-billed units' correlated negatively with

the NCP 'level' (-.730) and the ECP 'level' (-.671). The HR director was unaware of any rationale for lower level lawyers recording more 'productive non-billed units' than higher-level lawyers. There was also an interaction evident between level and number of prizes and honours. In the NCP sample lower level lawyers were the recipients of most of the honours and prizes that resulted in a strongly positive correlation with 'productive-non-billed units'. The schedule for awarding 'productive non-billed units' was not available to investigate this trend further.

Aside from the recording of 'productive non-billed units' there were no other strong correlations between level and productivity measures for either lawyer sample. Although for the ECPs, the level produced a .671 correlation with 'total financial contribution'. This difference between the two samples' correlations between 'level' and 'total financial contribution' could be influenced by the differences between each sample in the range of this productivity measure. The productivity measures based on performance to budget only provided comparison of performance between study participants at the same level although the 'recovery rate', 'productive non-billed units', 'YTD total units' and 'total financial contribution' applied to all levels similarly. Any benefits of experience are not great enough in either group to produce strong correlations for level or age with any of these other productivity measures.

Work experience was associated with different measures in some case studies. Two of the case studies provided evidence of a relationship between work experience and productivity measures that suggest construct validity. These were 'leadership' and 'compliance' for supermarket managers, and 'logistic support' and 'engineering advice' for ISS engineers. A lack of experience, in association with previous academic success, was associated with junior lawyers recording more units for work not charged out ('productive non-billed units') than those lawyers at higher levels.

Gender

There were very few strong correlation results associated with gender. The ISS and the gaming case study participants were all men and the bank CSOs had only weak correlations. The bank CSRs, lawyer and supermarket samples produced correlations

between gender and productivity measures of .6 or more. All of these were however, statistically small samples and would require further investigation

The bank CSRs had a positive, although not strong correlation between gender and 'customer care'. The first and second quarter 'customer care' productivity measures and gender correlations were respectively .493 and .626. Women in this case study tended to be rated higher on the qualitative 'customer care' scale.

Law firm correlation results for gender are inconsistent. In the NCP case study there was a strong correlation between gender and the month of April, 'percentage of fees to budget' (.737). This aberration appears to be due to a small sample and short time-span productivity measure as the 'YTD fees' results have very weak correlations with gender. ECP results show a gender-productivity correlation of .617 for the 'percentage of units to budget YTD and .693 with the 'YTD total units'. The women in this sample tended to record greater percentages and numbers of units. However, the NCP did not endorse these results; it had a weak negative correlation with these same productivity measures.

Supermarket results suggest gender differences but there is an interaction with other factors and only a small sample. The two women managers' results were responsible for the positive gender correlations with the productivity measures of 'leadership' (.791) and 'compliance' (.632) (as explained earlier in the experience section). Another gender difference was evident in the standard deviations for competence ratings on a five-point scale. There was a tendency for the men to self-rate higher than their other raters and for the women to self-rate lower than their other raters. The two women in this case study had no formal qualifications, while the men had trade qualifications. There is the possibility therefore that self-esteem associated with education level impacted on these results.

Training and development

The 'Training and development' competence had a strong positive association with output productivity measures for both the NCP and ECP lawyers, although it did not for supermarket managers. 'Technical training' in the supermarket managers' competence profile had a negative correlation with one of their partial productivity measures. I

found including the listed programmes, courses and qualifications for training and development, apart from tertiary education was too difficult. There was no straightforward, equitable way, to record the different training and development experiences. I therefore decided to include training and development in the HCI procedure only through any competences in the competence profiles and through its impact on performance ratings of competences and thus avoided this input issue. Consequently, this study does not comment on the impact of any specific types of training and development experiences (aside from reference to previous multi-rater feedback experience) upon the HCI results.

Tertiary education

This study used the correlations of the equivalent years of tertiary education with productivity measures as the standard against which to compare its own HCI human capital measures. There were no strong positive correlations between tertiary education and productivity measures in any of the case studies. The ISS engineers in fact had a strong negative correlation between 'tertiary education' and 'ship's average' productivity score (-.775).

The two samples in the law firm provided an opportunity to look at the influence of tertiary education with a little more detail. In well-known law firms the competition to be employed is considerable and the firms' graduate selection processes seek out exceptional students. Grade-point average is considered at recruitment but available records were not sufficiently complete to include in this study. Records of those who received either honours or prizes during their tertiary education were available. For the law firms higher grade-point average and receipt of prizes and honours distinguish superior graduate lawyers from the others. The two lawyer samples were not matched for prizes and honours. Nevertheless, with a baseline of similar tertiary qualifications, I decided it was an opportunity to consider the association of superior tertiary performance with productivity measures.

The recording of 'productive non-billed units' had an association with 'prizes and honours' as well as 'level'. In the NCP group 'prizes and honours' had a consistently strong correlation with 'productive non-billed units' (.730). All four of the group of

eight lawyers who had received prizes or honours were level one lawyers. The ECP produced a weak negative correlation between 'prizes and honours' and the number of 'productive non-billed units' recorded. This sample had only one level 1 lawyer awarded honours or/and a prize, but three level 2 lawyers and one level 3 lawyers were recipients. Any impact of gaining of prizes and honours in tertiary education on the numbers of 'productive non-billed units' recorded appeared to depend upon the level of the lawyer. Level 1 lawyers with prizes and honours in this study recorded more 'productive non-billed units' than others.

In these case studies correlations between tertiary education and the productivity measures contrasted with those of the human capital indexes and productivity measures. The HCIs in the case studies consistently correlated more strongly than tertiary education with productivity measures. In other words, the HCIs had a stronger association with the value they contribute to an organisation than the equivalent years of tertiary education. On the basis that tertiary education is an accepted human capital measure, I suggest that my human capital index has validity as a measure of human capital.

Reactions to the HCI

The human capital index needs to be acceptable to organisations and their employees if it is to be adopted. During the course of this study I experienced adverse responses to the term 'human capital' and to any numerical measurement of an individual's value to an organisation. The term 'human capital' sounds impersonal and employees can feel threatened by, or distrust the fairness of, assigned quantitative measures. Therefore, feedback was sought from the case studies' contact people on the acceptability of a human capital index to employees and to the stakeholders in their organisations. I also experimented with the presentation of individual and group HCIs as finite numbers out of one hundred and as bands with a ten per cent range.

Feedback varied according to the case studies' respective culture and familiarity with and acceptance of numerical performance measurement (See Appendix 41 Table 3 for the respective responses). The CSRs, for example, had a quarterly composite productivity measure with 100 as the benchmark. They were accustomed to regular

numerical feedback on their performance in relation to the budgeted targets that were components of this quarterly measure. Their manager believed that CSRs would accept of an HCI presented as a number out of one hundred. If the organisation were to introduce this measure, that would be his preference. The CSOs and the ISS engineers contacts considered that their groups would also be comfortable with a number or a range because they were accustomed to using precise measures. However, the CSO contact thought managers of the CSOs, who did not have such precise feedback measurement on their own performance, would not like this HCI measure for themselves. The other case studies reported that a specific number would definitely not be acceptable although a ten-point range might be more acceptable to both individuals measured and their managers.

I experimented with a standardised ten-point range HCI band and finally a plus and minus five, ten-point range around the specific HCI. The rank order HCI +/- 5 results of the NCP sample levels matched the productivity measures more closely than the fixed ten-point band. Because of the complexity of variables in on-job-performance and the in-built subjectivity in the 360-degree competence feedback process, I recommend that a range variation be included in the HCI. A ten-point variation is easy to administer but a plus or minus five-point range appears to be more effective. Presenting the human capital index as an HCI band with a plus and minus five-point range could increase the number of organisations in which it is acceptable as a valid human capital measure.

These case study results suggest that with refinements the HCI procedure has the potential to produce a valid measure of human capital in the form of an HCI band. I have applied the HCI procedure to seven competence profiles in five different organisations with a range of roles (but small sample sizes). This resulting measure of human capital is competence profile specific and dependent on the qualities of the available, associated productivity measures. Difference in types of organisations and in roles and the associated differences in their results provided evidence of conditions required for an effective application of the HCI procedure. Further research with larger samples is required to verify the competence profiles, productivity measures and organisations for which the HCI is most applicable and to test its reliability. What these

studies have done is assist development of a human capital measure that illuminates the elusive substance of human capital.

The case studies suggest that the HCI procedure, given appropriate data, has the potential to produce a valid[81] human capital measure although, further research is required to determine its reliability. I propose that competences, the major component of the HCI formula, when presented as performance scores of a competence profile that covers the six domains of Nordhaug's typology, equate to the construct of human capital. Human capital is therefore made visible, making it easier to measure and manage. Moreover, the strong positive correlations between the HCI band (derived from competences) and productivity measures suggests that it captures at least some of what is associated with superior performance i.e. what is valued in an organisation. This human capital index is a context-specific measure of human capital for individuals and groups who share the same competence profile.

I acknowledge that the contexts, acceptability and procedures for development of the human capital index all require further investigative research.

Implications for refining the human capital index band procedure

The case study results indicate that a number of refinements and some endorsements of the human capital index procedure were desirable before further application of it. An outline of application with appropriate procedural modifications follows and a discussion of the research findings in relation to the research objectives and sub-questions and the literature review are contained in Chapter 8.

The first step in the HCI procedure is the development of a competence profile that covers the six domains of Nordhaug's typology[82] and includes a good representation of intra-organisational competences. Two of the domains, meta-competences and standard technical, can be subsumed into other domains by being described as organisation or task specific. Domain coverage supersedes any inclusion restrictions associated with the various models of competences (Briegal, 1999; Fletcher, 1998; Green, 1999; Parry, 1998; Spencer Jr, 1993). The typology provides a framework that facilitates the

[81] Correlates strongly with productivity measure and a greater correlation with productivity measures than equivalent years of tertiary education. Competence profile also covers the 6 domains of Nordhaug's (1993) typology
[82] Nordhaug's typology is described in Chapter 2

development of a comprehensive competence profile that meets the requirements of the particular workplace. Ideally the competence profile will be well researched for the specific organisations and incorporate adequate consultation on the proportional weighting of the non-technical and technical competences. The use of the proportional weightings for technical and non-technical performance scores for competences also simplifies the process of competence profile development. Assigning a proportional weighting to the technical and non-technical clusters of competences addresses some of the difference in individual competence size and complexity and differences in their respective numbers and re-balances the profile according to the organisation's priorities.

In the initial stage of development of the HCI procedure I suggest that individual competences are not give weightings. In this research weightings of scores to emphasise critical competences were secondary to establishing a procedure for an HCI band. NCP results suggest there are potential benefits of greater HCI validity and reliability if weightings are included but further role and organisation specific research is required. Establishing, reviewing and improving the procedure without the times two weightings for key competences should come first. After this stage, in which the competences and productivity measures themselves are reviewed, consideration of the weighting for critical competences could be a significant aspect of the HCI band procedure.

The other essential component of the HCI procedure is productivity measures[83]. Productivity measures ideally should be well-established, accepted, individual measures that provide a comprehensive coverage of the competence profile. They should be presented as a family of measures that are balanced to reflect the value of the work performance to the organisation. Ideally, some objective data should be included. All measures should have a range that makes it possible to distinguish differences in individual performance. For example, a range greater than a one to five point rating scale is preferable for people all judged as competent. The span of the measures used in correlations should cover four or more months of the individual's job performance to avoid the over-emphasis of competences associated with rarely performed work tasks.

[83] Ramsay's definition of productivity is in Chapter 2

Results are likely to be improved if raters undergo training and development in the process of giving feedback on themselves and others according to the competences and the rating scale to be used in the HCI band development procedure. Additional preparation might be beneficial in some instances because of cultural mores and the specific cultural context of the organisation. Examples of this additional support are coaching through first attempts to rate others and monitoring and providing guidance to reduce any impact on ratings arising from gender differences, lack of education, lack of self-esteem, and lack of experience in the workforce.

Mean performance scores for competences should be derived from a 360-degree feedback process. Whatever the 360-degree feedback processes employed, confidentiality must be ensured and individuals must consent to and trust the purpose and subsequent use of the results. The administration procedures and those involved in the 360-degree feedback process for the development of competence scores will be specific to the company and the competence profile. Certain competences may not be appropriate for all raters to score. Furthermore, it may be more useful, valid and reliable for a company to include all subordinates for a managerial role, rather than only one for the subordinate score. Similarly, a greater inclusion of responses may be appropriate for the peer, superior, or other stakeholder roles.

Competences with strong positive correlations with any of the productivity measures using the Spearman rho two-tailed test of analysis[84] should be identified. Furthermore, if the population for the one competence profile is less than 200 people, the identification of a correlation as strong, as +/- .7 is more appropriate than referring to the correlations as significant to the .05, .01 or .001 level. Small samples have more validity if the correlations considered substantially different have a higher threshold than the standard levels for significant difference. Correlations are dependent on the quality of the productivity measures; therefore it is not possible to say definitively how many strongly correlated competences are ideal. It appears that a core of approximately six strongly correlated competences associated with robust productivity measures results in a more valid HCI band.

[84] This is appropriate for non-parametric data and where the participants in the procedure do not represent a random sample of the population

The formula used in the case studies (See Appendix 3) should be used to calculate the human capital index which should be presented as a band of plus and minus five. This formula is simple and only uses everyday mathematical procedures such as the calculation of percentages, addition and division. Maintaining simplicity is desirable. If the performance scores for the competence profile and the productivity measures span the same performance constructs, then the years of experience, level, number of positions in the organisation, motivation and so forth do not need to be introduced as additional HCI components. Group HCI bands should be calculated from aggregated individuals' HCI bands. This provides more global monitoring of human capital (See Appendix 3 for the HCI band calculation).

One should consider how the organisation and those in the roles within it would react to the introduction of an HCI band as a human capital measure. There are variations in what is acceptable. Each organisation needs to determine what is appropriate for their staff and reporting systems. Any reporting of the HCI should be in terms of a +/- five per cent range. In most organisations it will be appropriate only to make public the HCI band scores for groups. The individual scores would remain confidential to the particular individual, their own manager and the HCI band developer. Other organisations may only make the HCI band score optionally available to the individual concerned. In this instance their manager would receive only the individuals' mean performance scores for each competence and the list of competences that are strongly correlated with productivity measures.

Repeated implementation of the HCI band procedure on a particular competence profile will provide patterns for review of the competences themselves, the productivity measures, the relationship between the two and the procedure itself. As a result of this review, adjustments can be made to the competence profile and to the family of productivity measures, making both better reflect the human capital required to produce the work performance valued by the organisation. A more valid human capital measure will result.

Regular implementation of the HCI band procedure could subsequently be used to monitor the human capital of an organisation from one period to another. The group

HCI bands for the different job roles could be the strategic human capital measures used for business planning and decision-making. Changes in emphasis of competences, or changes in the competences themselves could be accommodated from one HCI calculation to another. The resulting HCI band results would have to identify any changes in the profile, productivity measures and process to maintain the validity of comparisons with previous scores.

In an organisation that uses a competence system to manage its people, HCI bands could be created from existing information. If 360-degree feedback is sought regularly and productivity measures exist that cover the competence profile, no additional data collection is required to develop an HCI. Managers receive the 'who can do what' information they require for the operational management of their people. This raw data is the basis for calculation of the HCI band for individuals and groups. Meanwhile with no disruption to workflow, but with the assistance of a computer software programme, the elusive, human capital measures would appear for strategic consideration.

My calculation process for the HCI band involved a computer software programme appropriate for research but not one that is currently integrated into any of the case study human resource information systems software. I used the SPSS software programme for the correlation analyses. The Spearman correlation analysis function needs to be combined with a programme for collection and analysis of 360-degree competence feedback scores. The raw data would then require combining in my formula that incorporates adjustment for differences in proportional weightings of the clusters of technical and non-technical competence scores. Ideally this computer software programme would provide the competence information for identifying individuals' and groups' competence strengths and weaknesses for staff management and would also calculate and track individuals and groups HCI band scores.

My exploratory case study approach to the development and application of a human capital measure has all the limitations outlined in Chapter 3. Further applications of the human capital index procedure are required, with larger samples, before any finalisation of the process. The refinements to the procedure described above derive from my observations of what was most effective in the present case studies. This comparison of

results and the contexts of seven human capital index procedure applications in five very different organisations is the basis of these refinements to the HCI procedure. I see the next step in the development process for a human capital measure based on competences as including these refinements. However, this is outside the timeline of this thesis.

Chapter 8

Discussion and Conclusion

This research explored the development of a human capital measure different from existing measures but consistent with some of the concepts of human capital outlined in economic theory (Becker, 1964; Schultz, 1961) and theories of strategic human resource management (SHRM).

The importance of human capital has been emphasised by many researchers (Becker & Huselid, 1999; Becker, 1962; 1964; Davenport, 1999; Mincer, 1958; 1962; Nordhaug, 1993; Schultz, 1961; 1963; Stewart, 1997; Sveiby, 1997; Ulrich, 1998; Wright, McMahan, & McWilliams, 1994; Wright & McMahan, 1992) and a number of measures of human capital have been developed (Brown, 2000; Cascio, 1991; 1998; Deloitte & Touche, 2002; Edvinsson & Malone, 1997; Fitz-Enz, 1990; 2000; 1974; Flamholtz, 1972a; Hekimian & Jones, 1967; Johnston, 1998; Kaplan & Norton, 1992; 1993; 1996a; Law & Myors, 1999; Phillips, 1994; 1997; 1998a; 1998b; Sheedy-Gohil, 1996; Watson Wyatt, 2002). There is also an increasing use of human capital measures in business reports (Edvinsson & Malone, 1997; Kurtzman, 1997; van Buren 1999) although existing measures all have limitations in their representation of human capital (Bontis, Dragonetti, Jacobsen, & Roos, 1999; Fitz-enz, 2000; Flamholtz, 1974; Terborg, 1988).

The HCI is positioned as a human capital measure that contributes to the integration of human resource management with other business functions. It is a measure with a number for individuals and groups and this visibility fosters consideration of human capital in strategic planning. It also identifies an individual's performance on competences, which is useful in operational management of human capital. What makes the HCI different to other human capital measures, such as, the number of years of fulltime education, EVA and ROI, is its competences base, which, it is argued, provides illumination of the substance of human capital. In other words, a comprehensive competence profile provides a description of the desirable human

capital, and the performance scores of the competences makes possible a measure that represents an individual's and groups actual human capital.

Research objective

The research objective was:

> *To develop a practical valid measure of human capital based on competences, that correlates strongly with productivity measures.*

On reflection this appears to have been a very ambitious goal considering the time frame and the extent of the associated literature. Perhaps there is no better opportunity than exploratory doctoral research, however, to pursue an ambitious project in an area that is one of the current challenges (Toulson & Dewe, 2001) for human resource management.

The human capital measure, an HCI based on competences, developed in this exploratory study was applied seven times in five different organisations. A case study approach involved small samples in a range of service and professional roles. Some case studies produced human capital indexes that correlated strongly with productivity measures; other case studies did not. Two of the case studies, CSRs and NCP lawyers produced HCIs that had strong correlations with an additional set of productivity measures. There was consistency in the categories of competences included in each HCI due to the application of the Nordhaug (1993) framework in each competence profile. Furthermore, there was consistency in the administration of the 360-degree feedback process from which mean scores for competences were calculated. No such consistency existed with the productivity measures. Established valid reliable productivity measures were not always available and this had a significant impact on results. In spite of the quality of the productivity measures, correlation results for the HCIs in each case study were greater than the OECD measure of human capital, years of tertiary education, with the same productivity measures.

A case study approach enabled practicalities and hindrances to emerge that require consideration in developing an HCI human capital measure in the midst of workplace realities. Case studies that had less favourable human capital index results provided a

basis for comparison with the case studies with better outcomes. Thus dependent on given particular conditions, this HCI procedure has the potential to produce a human capital measure based on competences that correlates strongly with productivity measures.

This HCI is based on individuals' performance scores on competences in a particular organisation. Performance is an activity by the worker, whether conscious or unconscious; it is not the worker him or herself. It is a measure of the human capital a worker invests in that organisation; therefore, it is a separate entity to the worker (Davenport, 1999; Edvinsson & Malone, 1997).

The HCI is subjective and context dependent. Hauser[85] (1998) argues that to be effective, measures are better to be vaguely right, rather than precisely wrong. This HCI procedure is competence profile specific, subjective and lacking in precision. These initial results, however, suggest that it is measuring at least an approximation of what comprises an individual's human capital. The HCI procedure includes all of the following subjective processes: ratings by individuals in the 360-degree feedback process, the selection of the non-technical and technical proportional weightings by the organisation, the subjectivity associated with what competences are included in a competence profile, and potentially the competences that are weighted because of their greater importance to the organisation. By contrast, while the OECD measurement of full-time equivalent years of tertiary education is precise[86], its association with what an individual contributes to an organisation (presented as productivity measures) was weaker in this research. The subjectivity in the HCI procedure, in accord with Hauser, does not appear to eliminate its potential effectiveness as a human capital measure.

Kearney (1978, as cited in Ramsay, 1995)[87] identifies seven criteria for an effective measure, namely validity, coverage of all inputs and outputs, ability to be reduced to a common denominator, completeness, useful for effective action, compatible with existing data and cost effective. The 'most successful'[88] HCIs in this research are consistent with five of these criteria and in a limited capacity with the third and seventh

[85] See Chapter 2
[86] An objective number of years of equivalent full time attendance
[87] Extensive search has not revealed the original source
[88] Case studies with the strongest correlations between their HCIs and their productivity measures These were the NCPs and CSRs

criteria. First, these HCIs exhibit validity because they are strongly correlated with productivity. Second, they cover all the people inputs and outputs, as the entire competence profile was included in the formula along with the associated comprehensive range of productivity measures. Third, comparability of measures is possible, although it is competence profile specific, as the HCI provides a common denominator that can be compared across time. Fourth, it has completeness because the Nordhaug domains encourage the inclusion of all competences significant in the organisation, and each of these is represented by performance ratings. Fifth, it is a useful measure as it can provide the information for the organisation's human capital acknowledgement, management, development and communication to stakeholders. Sixth, it is compatible with any existing sources of data on competences and productivity measures. Seventh, it is potentially cost-effective because the HCI measure can be developed from the data already existing in organisations that use a comprehensive competence profile system and individual measures of productivity.

Hauser (1998) emphasises the importance of understanding the job and involving managers and employees in developing a good measure. Although the same framework was used for development and acceptance of a competence profile, employee and manager involvement varied for each competence profile. One of the characteristics of the more successful HCI outcomes (NCPs and CSRs) was a competence profile which had had more manager and employee input. Little consultation, however, was carried out with employees and managers in the selection and/or development of the productivity measures and there was no involvement by employees in the components of the HCI formula and feedback on the resulting HCIs. The circumstances of data collection did not allow for this involvement, which could have contributed significantly to the measurement development procedure.

Ramsay (1995) states that a measurement by itself tends to be static and of little use, unless it is adopted for productivity improvement and can provide continuous feedback for management decision-making. This HCI is not appropriate for continuous feedback nor is it confined to productivity information. Updates in the HCI require a 360-degree competence feedback process. That takes time and relies on the support of staff

involved[89], so is not appropriate to do very frequently. It would be more practical to calculate an HCI as a measurement of human capital and competence performance information annually or biannually and use it for monitoring performance trends or when planning resources for a major change. The components of the HCI procedure have value as a source of employee performance information arising from the competences upon which it is based.

A measure has to be acceptable to all involved in order for it to be used. Phillips (1998b) describes three types of audiences (researchers, practitioners and stakeholders) for whom a measure of human capital must be acceptable. This HCI is consistent with Phillip's criteria for use by only one of the three audiences, that is, researchers. The HCI procedure results could provide a basis for further research into the development of a human capital measure based on competences. A number of processes have been explored and emergent relationships are suggested between the constructs for competences, productivity measures and the HCI.

The HCI does not meet Phillips' (1998b) practitioner's requirements for a measure at this stage of development. It is not in a format for inexpensive, simple, practical, quick development. It requires further research to finalise the procedure and to determine the types of organisations for which it is appropriate. It would further benefit from the development of a practical, simple to use, accessible computer software programme for the correlation analyses and formula calculation associated with a competence database system geared for 360-degree feedback.

The third audience Phillips (1998b) identifies is the stakeholders: managers, staff and sponsors, to which I would add directors and shareholders. These stakeholders all have different concerns and requirements of a measure. Phillips' criteria for acceptance are quantifiable results and a methodology similar to other ROI's. This HCI procedure does have quantifiable results but does not lead to an ROI measure and is therefore an unfamiliar methodology to stakeholders. Assuming further development along the lines described above is done, managers, directors and shareholders may be satisfied with the quantifiable results - which this HCI procedure (although it contains subjective

[89] Very frequent 360-degree feedback is repetitive and time consuming and responses may be less thoughtful and sincere

processes) provides - and with increasing exposure to and familiarity, they might accept it.

Acceptance of a number to represent an individual's value in the workforce by the individuals themselves is more complex. Such acceptance by the workforce is critical for the collection of meaningful performance scores for competences. The latter are central to the validity of this HCI procedure. Dunnette (1982) and De Nisi and Kluger (2000) stress the potential resistance to measures perceived as an evaluation of the worker. The acceptability of a number to measure people's worth was discussed with the contact person in each case study. It was outside the parameters of this research to approach the participants directly to gauge their acceptance of the HCI. The contact people's representation of how the HCI and HCI band would be accepted in their respective organisations was consistent with previous research (Bernardin & Beatty, 1984; De Nisi & Kluger 2000; Hedge & Teachout, 2000; Lingle & Schiemann, 1996). Acceptability was dependent on organisational culture, previous experience of performance evaluation, and trust in its validity and purpose.

In this research the culture of the organisation appeared to affect the likelihood of acceptability of the numerical HCI or an HCI band, more than the measure's validity. Each of the organisations appeared to accept the validity of the HCI measure developed. However, acceptability of the HCI as a measure of employee value was influenced by the existing approaches to staff appraisal and measurement. Consistent with Bernardin and Beatty's (1984) research the organisations that had regular employee measurement and feedback regarded positively by employees, considered that the HCI and/or the HCI band would be readily accepted. The CSRs and CSOs in the bank and the ISS engineers, who have a culture of precise measurement of individual performance, thought an HCI would be accepted. Organisations that either did not have measures, or did not use or trust available measures for regular employee feedback thought it would not be immediately accepted. Both lawyer groups have a family of precise individual financial and budget measures, but were dissatisfied with the existing performance appraisal system. Their contact person was absolutely sure they would not like an HCI, but later thought the HCI band might be acceptable. This distrust of an existing appraisal system (Hedge & Teachout, 2000) and its perceived disconnection from the

financial and budget measures in effect created an organisational culture, which was not accepting of personal measurement of competences. The supermarket had a culture of encouraging development of employees and a distrust of the external focus report measures. The contact person for the supermarket, the O/O, thought an HCI band would be useful in a circumspect way as a target for performance in association with planning and measuring management development initiatives.

An exploratory research approach to developing an HCI as a human capital measure minimised the issues surrounding validity of the resulting measure and any resistance to being measured. This was clearly positioned as a research project, not as an evaluation of people's performance and not as a change management process (Lingle & Schiemann, 1996). HCI results were confidential and differences in results had no impact at all on the individuals in the organisation. There were, however, differences among the case studies in the acceptability of participating in the research. In both the CSRs and the not-for-profit engineers case studies all those approached consented to take part, which suggests acceptance by individuals of a measurement process. Four samples, the managers in the supermarket, the CSOs in the bank and both groups of lawyers did not include all those approached to participate. This suggests that some members in these organisations considered measurement less acceptable (Hedge & Teachout, 2000). The study was limited to the consideration of resistance to employee measurement by the research context and with data filtered by the gate-keeping role of the contact people in each case study.

There are many other human capital measures.[90] 'Years of education' is the human capital measure most commonly used by the OECD, although its inadequacies as a measure are acknowledged (Hartog, 2000). Macroeconomics requires a measure that can be standardised across countries and industries; hence the continuing use of 'years of education' as the human capital measure to compare OECD countries. At a macro-economic level a greater number of years of schooling is associated with greater economic prosperity. This HCI is a micro-economic measure of human capital because it is organisation specific and, in practice, specific to a competence profile. Any claims for these research results need to be confined to the competence profile level. Under

[90] The introduction to this chapter cites references to key measures

certain conditions, at the organisational level, the HCI appears to be a more valid human capital measure than the OECD human capital measure 'years of (tertiary) education'.

The individual company specific focus of the HCI has advantages and disadvantages. Flamholtz (1971) developed a number of HRA measures that focus on the individual. He argues that the individual is the unit level for much operational decision-making in an organisation, and that individual values can be aggregated to larger groups for a specific firm. The HCI developed in this study can be analysed into individual competences as the units for decision-making. For example, training and development provision based on the need to have staff who 'can work as a team', or are able to 'delegate effectively'. Lower performance scores on these two competences, by a number of individuals, leads to the decision to provide appropriate training and development. An individual focus to a measure, however, affects the degree of implementation. Flamholtz's measures were not widely adopted, not only because of their complexity, but also because of this individual focus (Fitz-enz, 2000). Therefore the level of individual detail that enables this HCI to be integrated into a human resource management system could also be regarded by stakeholders as a reason to not adopt it as a human capital measure.

The internal organisational focus of the HCI in this study is consistent with many of the measures used in both the balanced scorecard and intellectual capital reporting (Roos & Roos, 1997). Two of the purposes of the balanced scorecard are to align strategic initiatives and to enhance strategic feedback and learning within an organisation (Kaplan & Norton, 1996a). The intellectual capital model of business reporting was developed as a way to make the knowledge of a company visible for decision-making and management (Bontis et al., 1999). A premise of both of these business-reporting approaches is that the management of an organisation is assisted by its own internal valid measures.

Yet the SHRM emphasis on competitive advantage means measures that can benchmark an organisation against others are considered desirable (Barney, 1991; Barney, 1995; Barney & Wright, 1998; Wright et al., 1994). Ratios involving years of education and qualifications (e.g. ratio of degree to non-degree staff) and EVA are examples of

balanced scorecard and intellectual capital reporting measures with an internal focus involving education that are able to be benchmarked by external comparisons. Furthermore, senior managers tend to find these objective measures more credible than more valid subjective measures (Allee, 1997; Harvey & Lusch, 1999; Kaplan & Norton, 1993; Lingle & Schiemann, 1996; Lynn, 1998; Sveiby, 1997; Vitale, Mavrinac, & Hauser, 1994b). This HCI is an internal, subjective measure designed to make the competences (equated with human capital) in the company visible. Like the Flamholtz (1972a) 'individual conditional value' and 'individual realizable value', it cannot be benchmarked with HCIs in other companies and involves considerable subjective judgements.

The SHRM resource-based view of the firm theory (Barney & Wright, 1998; Davenport, 1999; Wright & McMahan, 1992) emphasises competitive advantage to simplify the complexities of the workplace and focus on the small number of aspects that produce the greatest return on investment of resources. Although this HCI includes the group of strongly correlated competences, it is also includes all the competences in a very comprehensive profile. This is at odds with the SHRM competitive advantage simplification. The HCI involves a refocus on greater volumes of competences data and more productivity measures.

The HCI procedure is consistent with the competence management responsibility in SHRM cybernetic systems theory of human resource management (Wright & McMahan, 1992). It includes all competences and links them with outputs (productivity measures). As a measure it is, therefore, appropriate for competence management, because it makes the performance of competences visible and enables their management.

There was no direct testing in the HCI in this study; it relies on scores for judgements of performance. The least used measure of human capital acknowledged by the OECD involves direct testing of adults (Johnston, 1998). Direct testing of performance outcomes avoids the subjectivity of the 360-degree feedback process used in the HCI procedure. Applications of direct testing commonly survey literacy, numeracy and English language proficiency (Pearson, 1996), which the Nordhaug (1993) typology

would classify as meta-competences or intra-organisational competences. No examples of direct testing were found that encompassed all of the six domains of Nordhaug's typology.

Pearson's (1996) direct testing identified organisation cost savings associated with improvement in employees' literacy. Similarly, in this study, non-technical competences from the intra-organisational domain dominated the list of those competences strongly associated with greater productivity. Pearson's measures of cost saving were specific to each organisation, yet he generalises across organisations. A comparable approach to generalisation in this study could conclude that superior performance of some of the competences included in the non-technical intra-organisational domain is associated with superior productivity results.

This HCI differs from the Watson and Wyatt (2002), Deloitte and Touche (2002) and Brown (2000) HCIs. The Watson and Wyatt and the Deloitte and Touche HCIs link their HCIs to financial performance. This HCI procedure also encompasses relationships with financial measures. The former make the links between the human resource management practices and annual company results. Whereas this HCI proposes a link between the individual's performance of competences and the individual's productivity measures, which may or may not include financial results. The Watson and Wyatt and the Deloitte and Touche measures could be regarded as identifying the systems that are most likely to foster superior performance of an organisation's workforce. There is a complementary, rather than a contradictory, relationship in the purpose and positioning of individual and HR systems approaches to HCIs.

Brown (2000) developed both a simple and a more complex individual HCI, but it is only his more complex HCI that includes competences, which are the basis for the HCI in this study. His complex human capital index provided a framework for initial exploration of a human capital measure with the pilot case study. There were no examples of workplace applications of his HCI available to consider his process and contextual variables. Brown proposes that only a small number of non-technical and technical competences, which correlate with success, be included. What competences,

how they are measured and how success is determined is not prescribed. The 'strongly correlated competences' in the HCI in this study also represents a small group of competences that are correlated with success. However this HCI also included in the HCI formula all the competences from a comprehensive[91] profile.

Brown's other HCI components (years of experience, level of the job and variety of experience) are not included in the HCI in this study, although they were included in the pilot engineering company HCI procedure. The results of the pilot, within the confines of the analysis process used at the time, were encouraging. However, it was decided to leave out these components in the subsequent case studies because they increased the complexity of the process and therefore the difficulty in maintaining consistency in application of the procedure and in calculation of the HCI. There was no evidence, at this exploratory stage, to confirm that these non-competence components would result in a superior HCI.

A simplified revised HCI procedure was developed and used in the seven case study samples. The main component in common with Brown's HCI is competences, which are defined and treated in a different way. What this HCI does have in common with Brown's HCI is that it includes both technical and non-technical competences, includes proportional weighting of technical and non-technical competences, is calculated for each individual and is organisation specific.

Workforce characteristics

Although Brown's (2000) workforce characteristics were eliminated from the HCI procedure to make it simple, a number of workforce characteristics were monitored in the case studies. The first of the research sub-questions relates to any potential role in the HCI for these workforce characteristics that is evident from this monitoring:

> *Should the HCI include any other workforce characteristics, in addition to competences, because of their strong correlations with productivity measures?*

[91] Nordhaug's (1993) typology fosters a comprehensive competence profile

Data was collected on: years of experience in the job and the workforce, age, gender, training and development and years of tertiary education. These were considered only in relation to their respective correlations with productivity measures. Each one of these workforce characteristics could have resulted in an extensive study beyond the scope of the present study. The qualification of 'a strong correlation with productivity measures', contained in the sub-question, was effective. It provided a balance between naive avoidance of the impact of any workforce characteristics in the development of a human capital measure and uncontrolled expansion of the study parameters.

The literature[92] on 360-degree feedback identifies differences in performance ratings associated with age, gender and education. There were considerable differences in these variables between the case studies and the correlation analyses were used to monitor any relationships with productivity measures.

A key purpose of training and development is to increase an individual's value in the workforce. Training and development records were sought for consideration in the HCI development process. However, training and development records were varied in their presentation and were considered too complex to attempt to untangle 'specific' versus 'general' training (Blaug, 1976) or to present them in a form suitable for correlation analyses. The relationship between training and development and productivity was therefore not investigated further. And although training and development can improve productivity (1991; Bartel, 1989; Black & Lynch, 1996), the focus of this study was to develop a measure of human capital that encompassed more than training and development changes. It was more practical to observe any benefits of training and development interventions in the performance rating scores of a comprehensive competence profile.

The data collected on work experience in this research was limited to the individual's years of experience in the job and in the workforce. It was beyond the scope of this study to include significant qualitative dimensions of work experience such as job complexity and the density and timing of the work experience (Ericsson & Lehmann, 1996; McDaniel, Schmidt, & Hunter, 1988; Quinones, Ford, & Teachout, 1995; Tesluk

[92] See Chapter 3 360-degree/multirater feedback p 111

& Jacobs, 1998). This limitation of work experience to quantitative dimensions (number of years) is a common approach (Tesluk & Jacobs, 1998). In this study there was a lack of consistency and, in some case studies, a lack of accuracy in data made available. This, combined with the small sample sizes, added further limits to the interpretation of work experience results.

There are conflicting results in the literature on the association between experience and work performance. The results of these current case studies were similar. In accordance with Tubbs' (1992) results, no relationship was found between most productivity measures and work experience. However, the supermarket case study had two partial productivity measures 'leadership' and 'compliance' that had strong correlations with years of experience. The ISS engineers also had strong experience correlations with the following two productivity measures: 'logistic support' and 'engineering advice'. The job roles and the range of years of experience were quite different in these two case studies. The results for the ISS engineers who had 18 or more years of experience and possibly the supermarket result appear to be at odds with Tesluk & Jacobs' (1998) research. Tesluk et al suggest the greater the complexity of the job, the less the impact of years of experience on job performance (Ericsson & Lehmann, 1996; McDaniel et al., 1988). Doeving (2000) noted a plateau between six and ten years of work experience followed by diminishing returns. Numbers in these case studies were small, which can have a subsequent impact on reliability. Therefore, the findings are tentative and subject to further research with larger numbers.

The qualitative attributes (Tesluk & Jacobs, 1998) of work experience were not actively sought because the data in this study was limited to years of experience. Even so, the lawyer case studies did include a qualitative aspect of experience in both samples, because they identified three levels of legal experience. Different levels are associated with different performance expectations. In the law firm NCP sample, level 1 lawyers with honours and prizes, produced strong correlations for both of these variables with 'productive non-billed units'. The association between level and 'productive non-billed units', but not 'honours and prizes', was observed with the ECP sample level 1 lawyers. They, unlike the NCPs, did not have a level 1 group who held most of the honours and prizes in their sample. There appeared to be an interaction between honours and prizes

received and the level of the lawyer that led to a bias in the recording of these units. There was no connection between years of work experience and other productivity results.

The workforce characteristics[93], (in the first sub-question) age and gender had correlations with productivity measures that were predominantly weak or negative. Gender difference[94] did arise in the supermarket 360-degree feedback process, consistent with the literature, although the samples are small. However, the standard deviations for the different raters were still predominantly less than one, therefore mean results were used for the correlation of competences with productivity measures.

The female managers in the supermarket rated themselves lower than their male counterparts and manager rated them (Wohlers & London, 1989). There was also a tendency for male supermarket managers to over-estimate their performance (Linderman et al., 1995) and to rate themselves higher than their subordinates did (London & Wohlers, 1991).

It has been suggested that the 360-degree feedback process is more effective when there is high self-esteem (De Nisi & Kluger, 2000). Self-esteem is more often associated with higher educational levels. Therefore, differences in education could have contributed to the dissimilarity of the supermarket managers and lawyer case study gender correlation results. The female supermarket manager lower self-ratings are consistent with lower self-esteem and fewer years of education (Williams & Levy, 1992). Williams & Levy also found that employees, who perceive themselves as having low systems knowledge, had a lower compatibility with supervisor ratings of their own ability. Nisbett and Ross (1980) argue that self-raters may engage in self-defensive distortions to protect their self-esteem. The supermarket male managers, who consistently rated themselves more highly than their superior, also had fewer years of education but may have felt the need to protect themselves by recording high scores.

[93] Two case studies, the lawyers in the law firm, covered several position levels in the same competence profile. In a situation like this, level may well be a characteristic to consider in a future human capital index procedure

[94] Of the women in the NCP lawyer sample several had standard deviations for competence ratings that indicated their self- ratings were lower than others

The 360-degree process and use of mean scores tended to rebalance minor differences in performance scores arising from gender. Whether this pattern would be evident with larger numbers is unknown.

A conclusion to this sub-question, at this stage, is that there is no obvious benefit of including any of these workforce characteristics in the development of the HCI procedure. Restricting the components of the HCI to competences and their correlations with productivity measures maintains a less complex procedure.

Competences

The second and third research sub-questions, which will follow, relate to competences as the basis for the HCI. Nordhaug's (1993) typology provides the framework for the competence profiles in this study.

Nordhaug (1993) and others (Hendry & Pettigrew, 1990; Lawler111, 1994; McLagan, 1990) advocate that skills/competences become the organising concept of human resource management. Hamel & Prahalad (1994) also argue an organisation's portfolio of competences must disaggregate down to the individual level. Competence profiles can be adapted to meet changed circumstances and give flexibility (McLagan, 1990). In this HCI procedure competence profiles play a central role.

Although competences have been regarded as the key to successful management of an organisation, they have been too unwieldy in the past to include in business reporting. An attraction of HCIs (Deloitte & Touche, 2002; Watson Wyatt, 2002) as a human capital measure is they are presented as a simple measure (a number out of 100). Inclusion of all the performance scores of all competences in an HCI means the measure looks simple yet it can be analysed into individuals' performance of competences. This dual role of individual competence performance details and a measure for monitoring and managing employees performance is what the contact people for the CSRs and the supermarket managers were seeking.

Development of a measure from the competence descriptors is how Yin (1989) and Miles and Huberman (1994) describe qualitative data illuminating and explaining data generally, but in reverse. The outcome, however, is the same. The HCI, based on

competences, is a human capital measure and the descriptions of competences for which there are performance scores make visible the substance of human capital.

Nordhaug's (1993) typology for competences excludes motivation, attitudes and commitment. He refers to them as separate variables, which influence the actual performance of an individual's competences on the job. In this study motivation and attitudes, along with experience, are synthesized into the 360-degree ratings as judgements of the performance of competences. They are not investigated separately. In order to keep the HCI practical and not too complex, workplace performance is approached as a portfolio of competences in action. Nordhaug's third separate variable, commitment is not investigated in the current study. The commitment to an organisation by its employees determines the amount of human capital they contribute (Ulrich, 1998). Current commitment to performing well on the job is possibly reflected in the competence performance ratings and the HCI.

The second research sub-question focuses on the effectiveness of Nordhaug's (1993) framework.

> *How practical is the Nordhaug (1993) framework in accommodating all types of competences in profiles that give comprehensive coverage of job roles?*

Nordhaug (1993) framework was applied to eight competence profiles for seven different job roles[95]. The development process for competence profiles differed considerably. One (NCP) was developed with significant resources and consultation and featured detailed behavioural descriptors. Others I facilitated with the contact people, using minimal resources and consultation. These profiles had no accompanying behavioural descriptors. Nevertheless the Nordhaug framework facilitated consistent fast assessment of the suitability of existing competence profiles. It also gave an effective framework to develop a new competence profile that resulted in a comprehensive coverage of a particular job role. What types of competences could or could not be included was never a question. Competence profiles developed included a mixture of differential psychology, management science and training and development competences.

[95] This includes the pilot and the case studies

A reliability check on all categorisation of competences produced equivalent competence domain classification with the exception of two situations. The first of these (intra-organisational competences classified as meta-competences) would have been avoided with more careful consideration of the domain descriptions and how the competences were written. The second exception, to consistency of classification, which follows, requires further exploration. The supermarket mangers' management competences were coded variously as technical competences of a manager (trade/professional) and non-technical competences of working with people in the organisation (intra-organisational).

The title of Nordhaug's (1993) technical domain, 'trade', was modified to 'trade/professional' in this research, in an attempt to make his framework more acceptable to employees in knowledge and service positions. This title change may have influenced the perception of how management competences should be categorised. However, when task, firm and industry specificity criteria are strictly adhered to during classification, the management competences would be classified as intra-organisational competences. The title of the domain and the nature of management competences led to some confusion.

At the same time the Nordhaug (1993) framework did accommodate all types of competences and lead to comprehensive competence profiles. It requires further testing of the acceptability and clarity of the domain headings to improve its practicality for management roles. It is the comprehensiveness of the competence typology that Nordhaug (1993) maintains makes comparative studies of organisations possible. In this research the use of the typology in the HCI procedure did make it possible to compare the results of competence domains in quite different organisations and with different roles. Yet the competences in each case study's competence profile are specific to the role and the organisation.

The third sub-question also relates to the Nordhaug framework:

> *Are any of the Nordhaug (1993) competence domains associated with superior productivity results?*

In each case study the Nordhaug's (1993) non-technical domains and particularly the intra-organisational domain dominated the competence profiles and the latter was also the domain most often associated with superior productivity results. This result is contrary to Becker's (1964) emphasis on the economic returns to an organisation of specific technical training. It is consistent with Nordhaug's emphasis on the importance of non-technical competences when identifying and measuring human capital. Similarly, a number of other researchers accentuate the importance of non-technical competences described variously as the inter-personal, intra-personal and foundation and development competences (Aoki, 1984; Arnold & Davey, 1992; Carnevale, 1991; Chillemi & Gui, 1997; Fitz-Enz, 1990; Mailath & Postlewaite, 1990; McLagan, 1990; Sonntag & Schafer-Rauser, 1993; Stewart, 1997; Sveiby, 1997; Van Scotter 2000; Williams & Levy, 1992; Yukl, 1998).

Out of the three non-technical competence domains Nordhaug[96] (cited in Doeving, 2000) considers meta-competences have the greatest impact on productivity. The prominence of intra-organisational competences in this study appears to contradict Nordhaug. The result is, however, consistent with Doeving (2000) who similarly found intra-organisational (and intraunit) competences the greatest predictive information on work performance. Doeving's intra-organisational subcategory of intraunit competences was not introduced to the study because of the small sample sizes and relatively small workforce numbers. Nor did Doeving's study include all the competence domains. Meta-competences, for example, were not identified.

Nordhaug (1993) acknowledges, and it was also evident in this study, that the only difference between the meta-competences and intra-organisational competences is contextual. He describes an intra-organisational competence as a firm-specific meta-competence. Nordhaug's applied work (Lowendahl and Nordhaug, 1994 as cited in Doeving, 2000) tended to produce generic lists of competences. The competence profiles in these case studies, however, were specific to the job role and organisation, as were Doeving's identified competences. Generic versus organisation specific competence profiles would account for the differences in the relationship to superior productivity results of meta-competences and intra-organisational competences.

[96] A cited reference as the original is written in Norwegian

No other examples of Nordhaug's typology applied in studies linking competences to productivity were found. Motowidlo & Van Scotter (1994) found strong correlations between personality traits and contextual performance, but did not relate this to outcome productivity measures.

In this current research, in each case study where an HCI was calculated, one or more of the intra-organisational competences had strong positive correlations with productivity results. The other five domains had a minor role or did not feature at all. A correlation analysis process was successful in identifying an association between intra-organisational competences and productivity. All samples were considered to be basically technically competent in their jobs, and this may have influenced the correlation results. As a result any differences in performance arose from differences in the intra-organisational competences that are associated with how a job is done.

There was an awareness of the importance of intra-organisational competences in these knowledge or customer service focused case study organisations. Each competence profile included more intra-organisational competences than any other domains. The dominance of intra-organisational competences in the tables of competences strongly correlated with productivity measures provided evidence of the appropriateness of this emphasis. It is important to include intra-organisational competences in a measure of human capital, because they are associated with superior productivity results.

Productivity measures

The other key component of the HCI procedure was the productivity measures for each organisation. The case studies differed more in terms of their productivity measures than in terms of their competence profiles. There was less control over the qualities of the productivity measures than the qualities of the competence profiles. Whereas each competence profile adhered to the same framework for job coverage, there was no equivalent framework to guide the quality and coverage of the productivity measures. The attributes of the productivity measures depended upon the measures used by the organisation and the data they made available.

Ramsay's (1995) definition of productivity[97] made it possible to include a far wider range of measures than traditional productivity measures. This definition covered performance measures for non-technical competences and future performance based on current activities. This extends the applicability of productivity measurement to organisations beyond manufacturing and sales companies, in which productivity traditionally has been measured. Examples of non-traditional productivity measures are the lawyers' 'productive non-billed units', introduced in anticipation of future benefits to the firm, and the ISS engineers rating of the 'ship's support', in the ISS case study.

The scope and level attributes of productivity measures described by Brinkerhoff and Dressler (1990) were useful constructs in the analysis of the results of this research. Including the family of partial productivity measures in addition to the total productivity measure made it possible to identify a greater number of strongly correlated competences. A total measure could mask strong correlations of competences with partial measures in the aggregation process. Brinkerhoff and Dressler's (1990) argue that sub-optimisation of measures will lead to measurements with little direct impact on the bottom line. Yet, in this research, it was the partial measures that identified individual competences with strong correlations with productivity.

Linking bottom line[98] productivity measures with training and development is difficult (ASTD, 2000). Studies that do identify improvements in bottom line productivity measures associated with training and development interventions exhibit a lag effect (Bartel, 1991; Black & Lynch, 1996). In an apparent contradiction, the lawyer bottom line productivity measure 'total financial contribution' had a strong correlation with 'Training and development' and related competences. The competence referred to those lawyers who were involved in the training and development process, not necessarily the recipients of training and development interventions. Furthermore, no specific training and development event was being assessed. Possibly the on-going impact of training and development accommodates the lag effect. The NCP lawyer case study whole year productivity measures showed the consistency of this strong association between

[97] See Chapter 1 p 27
[98] Organisation financial results

training and development and 'total financial contribution'. There was no opportunity, however, to verify this result with a bigger sample.

The final sub-question focused upon what was learnt about the qualities of the different productivity measures and how these impacted on the correlation analysis with competences. The sub question was:

> *What attributes of organisation productivity measures foster a reliable, valid association with workforce competences?*

Surveys of New Zealand organisations demonstrate that few use effective productivity measures in human resource management (1999b; Johnson, 1999a; Toulson & Dewe, 2001). Even so one of the initial criteria for acceptance into this study was the existence of comprehensive productivity measures for the job role concerned. This requirement limited considerably the organisations available to take part. In all of the case study organisations the contact people said productivity measures existed (even if not in a final form, as in the Gaming case study). Available measures, however, varied considerably in their reliability and their job coverage. It was impossible to develop a HCI in the gaming case study because the productivity measures were so unclear and incomplete there was no strong correlations between them and the competences.

A number of factors are associated with a difference between perceptions and the reality of productivity measures. Many of the productivity measures did not provide a comprehensive coverage of the performance of the job role. Current SHRM theory and practice emphasises the consideration and measurement of either only the key competences of groups of people and the associated human resource systems (Barney & Wright, 1998; Pfeffer, 1998; Wright & McMahan, 1992), or only the elements of individual workers performance associated with the organisations' competitive advantage (Wright et al., 1994). It is considered counterproductive to maintain productivity measures that provide a complete coverage of individual job roles. The balanced score card (Kaplan & Norton, 1993; 1996a) is used by the ISS engineers in the armed forces and KPI's by the bank for the CSOs. Possibly these formal, commonly accepted practices provided the contact people with a sense of productivity measures coverage and quality not necessarily merited (Bontis et al., 1999).

In the absence of a comprehensive competence profile it is easier to assume productivity measures cover a job role (Hauser & Katz, 1998). Only the law firm, which had an effective range of productivity measures, had existing competence profiles. The CSRs had balanced, reliable valid productivity measures (Cooper & O'Connor Jr, 2001), in the absence of any competence profile. However, the measures were detailed in line with the purpose and expected processes of the CSR role, and integrated with the organisations goals through an incentive system (Brinkerhoff & Dressler, 1990; Dunnette & Fleishman, 1982). The gaming technicians, supermarket managers, ISS engineers and CSOs had no competence profile at the initiation of the study and were not relying on a balanced coverage of productivity measures to actively manage their staff.

Understanding the interrelationships and linkages between job performance and productivity measures adds to the value of the measures (Hauser & Katz, 1998). At the time the measures were decided and the data collected, the ISS engineers' contact person did not fully understand the interrelationships between competence performance scores and productivity measures. Consequently, a number of events impacted on the results. Some of the productivity measures were subject to bias as the ships' raters, officers and ISS engineers recorded their ratings all on the one page. This could explain the covariant halo effect evident in the same 'repair assistance', 'officer' and 'ISS ship' productivity scores for the ISS engineers, which is contrary to previous research (Fox & Dinur, 1988). In addition, the contact person, who did not manage the engineers concerned, included his own rating of their performance, and this decreased the range in performance differences. After the HCI results were discussed, he came to the conclusion that it was not entirely appropriate for the ships to score the 'logistical support' productivity measure.

Originally the contact person for the ISS engineers was going to develop a grid for the competence profile, which included the tasks required of the ISS engineers, sources of performance evidence, and the productivity measures existing and developed to provide coverage of the performance of the competences. This was not done. Discussion with the contact person at the time he was presented with the results suggested that this process would have identified the validity issues associated with certain measures, as

well as provided a view of the productivity measures' coverage of the competence profile.

The correlation analysis process between competences, work characteristics and productivity measures identified interrelationships (Hauser & Katz, 1998). In the lawyer case studies the productivity measure 'productive non-billed units' was not associated with superior performance on job competences but was associated with job level and previous educational honours. The firm was previously unaware of this pattern of 'productive non-billed unit' distribution. In a situation like this, with reliable productivity measures, correlations with productivity measures are an effective way to review both the productivity measures and the competence profiles.

Even when comprehensive productivity measures were available they were not integrated into human resource management (Toulson & Dewe, 2001). The law firm's productivity measures were comprehensive and related to budgeted performance calculated monthly, for each lawyer. It was left up to me, as the researcher, to select the measures that appeared to represent the overall performance of the individual lawyers. The contact person subsequently used the correlation analysis results between competences and these productivity measures in her planning because the connection was evident.

Some of the productivity measures for the CSOs, the supermarket managers and the ISS engineers lacked reliability and validity (Cooper & O'Connor Jr, 2001; Dunnette & Fleishman, 1982). This resulted from the lack of consistency in the assessment processes used. All had measures for the individual employees that were assessed and recorded by different assessors at different locations and/or for each employee. No moderation processes were evident. The O/O for the supermarket stated at the beginning of his involvement in this research that he regarded the franchise national measures as lacking credibility, in spite of their apparent comprehensiveness.

In addition, a total measure comprised of partial measures appeared to be influenced by consistency between each partial measure's proportion of the total measure and its importance to the total result. The three components of the CSO measures were treated as though they were of equal value when they were not. The KPI for 'overs and unders'

did not relate to any of the competences listed, but was one third of the value of the total measure. As a result the measure was not a valid total measure for the competence profile.

The duration of the productivity measures influenced their reliability. Inclusion of the one month results (April 2001) in the NCP lawyer case study lead to a distortion in the results. Two competences had a strong correlation with these one-month measures that was not borne out in any cumulative results for the initial four-month period and subsequently, the twelve-month measures.

The O/O of the pilot engineering firm retained knowledge in his head (from his observations of work performance) of productivity differences of his small workforce. Hence the use of replacement costs as the productivity measure. To identify them it was necessary to elicit the O/O's unrecorded knowledge of the on-the-job training time required for each staff member to reach his current level of performance. This situation of minimal productivity records and informal management could well be the norm in the small companies that dominate the New Zealand commercial arena (Decision Research Ltd, 1997; Department of Labour, 1999). It indicates that an HCI human capital measure is not likely to be adopted in small firms.

In summary, the variations in productivity measures and their consequently different HCI outcomes suggest that particular attributes will foster a more reliable, valid association with workforce competences. These attributes include a family of reliable productivity measures that span the competence profile and include an accurate, objective outcome/total measure and partial/component measures. In addition, there needs to be a balance between the partial measures, which reflects the importance of the competences with which they are associated. Finally, when the productivity results are used in an HCI procedure they should span a minimum of one third of a year.

Now that the sub-questions have been considered the overarching research question can be addressed. An HCI based on competences, given certain conditions, strongly correlated with productivity measures. It is therefore, a sufficiently feasible measure of

human capital to merit further research. The HCI has a number of limitations[99] as a human capital measure and is an internal organisational measure that is not appropriate for benchmarking. Because of the competence and productivity measure qualities and availability required, the HCI is only applicable in certain types of organisations. It is a measure that claims to illuminate the substance of human capital, because it is directly derived from competences. However the HCI procedure involves a number of subjective processes arising from the competences base. Senior managers traditionally prefer objective measures to more valid measures that are subjective. Furthermore, it is dependent on the reactions of all the stakeholders in regard to the acceptability of measuring the value of individual members of the workforce and presenting this measurement as a number out of one hundred (plus or minus five).

Reflections on the case study approach

The case study research approach as described by Miles and Huberman (1994) and Yin (1989) was used in this exploratory research. There were small sample sizes in a variety of organisations. Each sample had different roles, competences, productivity measures, contexts, and culture. This created a rich source of variables that impacted on the human capital measure development process. Data collected was limited to what was available through the gatekeepers (Argyris, 1969; Hartley, 1994; Klein, 1976; Punch, 1998) with minimal disruption to their respective workplaces. This arbitrary decision-making about what was included is consistent with exploratory case study research; as is the selection of the NCP lawyers and the CSRs cases as kind of anchor points against which differences in the other case settings could be more readily gauged (Marshall, 1999). Competence profiles were developed, by the researcher in association with the contact people, for six of the job roles. The case study approach accommodates this manipulation of data through participant observation (Yin, 1989).

A case study approach accommodated the repetition of a procedure in different circumstances. No generalisations from the specific HCI results to other groups or populations are possible (Marshall, 1999). However, generalisations from these case studies contribute to the development of the constructs for the two main components (competences and productivity measures) involved in the HCI procedure development.

[99] A full description of the limitations of the methodology are in Chapter 3 p 130

Comparison of the case studies is at the level of explanations with contextual support. Hence case study characteristics that are associated with an HCI with a strong correlation with productivity measures are compared. Marshall describes the robustness of these generalisations as similar to the critical reasoning processes that must be undertaken when trying to infer generalisations from a reading of the literature. Literature often addresses the same research questions but with different measures and samples. Thus, I maintain that it is appropriate to make such generalisations from comparisons of case studies.

Comparison of the case study results contributed to theory development. The CSR and the NCP lawyer case studies are used as the anchor point case studies for comparison (Marshall, 1999). They were selected because correlations with their post-HCI development productivity results verified that their respective HCIs had a consistent strong association with productivity measures. Characteristics of competences and productivity measures associated with an HCI with a strong correlation with productivity measures have been described. The association between competences and productivity measures is consistent with what Eisenhardt (1989) refers to as providing evidence of an emergent relationship. It is not presented as a causal relationship, but as causal complexity arising out of an intersection of appropriate preconditions (Ragin, 1987). Several combinations of conditions may produce the same phenomenon or change (Marshall, 1999). Evidence of an emergent relationship between productivity measures and competences and the associated conditions contributes towards theory development because it provides a basis for exploration of these relationships in further research with larger samples.

The exploratory case study approach to developing a human capital measure provided a wealth of details on the process and an opportunity to observe similarities and differences in the organisations characteristics and results. A number of factors that are associated with this use of a case study approach to develop a human capital measure are outlined below in the implications for human resource management.

Implications for human resource management

The research objective was only partially achieved. The HCI is not a practical, valid human capital measure that could be used without further research and development. Even when this occurs it will be limited to organisations with competences and productivity measures that meet certain criteria and it will constitute an internal organisational measure. However, this study has contributed to the field of human resource management in several ways. It has an eclectic literature review for, and comprehensive descriptions of, the exploratory case study process of developing a human capital measure based on competences. Furthermore, it has contributed to the development of the constructs of competences and productivity measures. Indications are that it is feasible to research further development of a human capital measure based on competences.

The overarching research objective required the literature search to draw together a number of theories and concepts and models from economics, human resource accounting, human resource management, management, occupational psychology and training and development. SHRM emphasises the need for human resource management systems and measures to be integrated with business functions. The literature review, through its emphasis on a human capital measure that represents the economic value of employees as well as providing descriptive competences, describes what is currently available with the advantages and limitations. It is apparent from this literature review that there is an increasing emphasis on the inclusion of measures to represent the value of employees to an organisation in business reporting. There are human capital measures currently in use, although many of these tend to be the simple to calculate, reliable measures that do not include a comprehensive coverage of human capital variables. More valid measures include a greater complexity of variables and greater subjectivity and lack generalisability and tend to be organisation specific internal measures. Perhaps what is important is that increasingly organisations are introducing some employee measures into their business planning and reporting.

The exploratory case study process has highlighted a number of aspects of the research approach that were not formally framed as sub-questions of the research objective, yet impacted on the process and outcome. Descriptions of these following aspects

contribute to the awareness of circumstances that could be encountered in future human capital, case study research in HRM. First, there were the practicalities of finding organisations willing to participate that met the criteria for selection as a case study. The number of organisations with competence systems and productivity measures for individual staff is limited. Organisations had to be convinced that the research objective and process would be of value and not too disruptive. In addition, the impact of the contact person's understanding of their organisation's productivity measures was considerable. All the contact people perceived that they had the data for comprehensive productivity measures for a specific job role. Yet only one of the contact people (a general manager for the CSRs) had a balanced well-tested productivity measure that was clearly understood and was actively used to manage staff performance. As an external student researcher gaining access to the details of the productivity measures before confirming research involvement was unrealistic. A researcher may have to accept the contact peoples' judgement on how they meet the selection criteria provided.

Second, the contact person, who is in effect the gatekeeper to the organisation, determines data access. As a researcher you have a carefully planned methodology. However, it is the contact person who determines the groups from which data can be collected, the data made available, the collection process and the degree of follow up and hence return rate. Consequently, the contact person in a case study research approach had a considerable impact on the attributes of all the data received.

Third is the process of experimentation with correlation analyses of competences, productivity measures and other workforce characteristics. Analysis and reworking of data collected resulted in insights and patterns. This new knowledge was either included in subsequent case study data collection or has been used to identify areas for further research.

A fourth impact on the results was the asynchronous involvement in the case studies. As a researcher knowledge and understanding developed during the cyclical stages of interaction with contact people throughout the competence profile development or acceptance, data collection and analysis phases. Insights from one case study could be applied to other case studies, for example, the discovery of the value of including the

partial measures in correlations between competences and productivity results. Previous case study data was reworked and further strong correlations between competences and productivity measures were identified.

Fifth, the case studies revealed that acceptance of the validity of a human capital measure and the acceptability of the use of a measure are not necessarily compatible. There was an unquestioning acceptance of the validity of the research results by each of the contact people, regardless of sample size and the overtly subjective processes of proportional weighting, 360-degree feedback and, in some cases, productivity measures involving ratings of performance. However, contact people's perception of the reaction of staff to the measurement of employees' human capital depended on the organisation's culture of measurement. Acceptability of an HCI was very much dependent on the previous experiences and acceptance of measurement in an organisation.

A final area of contribution is to theory development. The case study approach made it possible to make generalisations, in relation to human capital, about the attributes of the two key HCI procedure components, competences and productivity measures. The results suggest that with certain conditions there is an emergent relationship between the constructs of competences and productivity measures as they are defined and applied in this research.

The variations in productivity measures in this research and the impact they had on the HCI outcomes provided a description of productivity measures likely to be valid and reliable for use in correlation analyses for the development of a human capital measure based on competences. Productivity measures appear to be more appropriate if they cover the performance of the associated competence profile, represent the performance of a minimum of four months, are comprised of a family of partial measures with a total measure, represent a balanced assessment of the competence profile and are reliably assessed according to the same criteria and assessors.[100]

[100] Unless moderated to minimise judgement differences

Analysis of results suggests the Nordhaug (1993) framework encourages a comprehensive coverage of the competences in a job role unhindered by the types[101] of competences included. Hence, competence profiles have the capacity to represent the substance of human capital. The framework of domains, combined with a 360-degree feedback process for the performance of competences, classifies competences and makes them visible as a measurement. It is therefore possible to make generalisations about competences from very different competences profiles at the domain level. Furthermore, the intra-organisational domain appears to be associated with superior productivity results.

This study provides a platform for further research into the development of a human capital measure based on competences and associated with productivity measures. It presents a basis for further exploratory research and hypothesis testing with larger samples and more control of the variables.

Further research

The methodological outcomes and the findings of the research objective create questions for further research into the measurement of human capital, rather than give definitive answers. A number of potential avenues of research can be classified as broadly following two directions. One course of investigation could pursue the understanding of and reactions by the workforce and other stakeholders to employee human capital measurement. The other course of investigation could progress the development of a human capital measure based on competences.

Many variables impact on employee measurement in an organisation. These include a lack of comprehensive individual measures, limited use of measures available and reactions to measuring employees' value. The differences in the expectations of, understanding and acceptability of employee human capital measurement by the different stakeholders in different types of organisations would contribute to the knowledge of human capital measurement.

[101] Differential psychology, educational-behavioural, training and development and management science

The current HCI procedure could be explored further. Application of the HCI procedure to further job roles, that exhibit the proposed desirable attributes for competences and productivity measures, would add more clarity to the conditions, applicability and limitations of the process of developing a human capital measure based on competences. The application of the Nordhaug (1993) framework to further management profiles could investigate domain classification confusions that rose in the present study. Any advantages in reintroducing one of Brown's (2000) HCI components when a competence profile is applied to different levels could be explored.

A longitudinal study of additional, randomly selected groups of NCP lawyers and CSRs could test the reliability of the HCI measure. With larger samples the chances of some not competent staff being included increases. It would then be possible to compare whether there are differences in the Nordhaug (1993) domains that produce strong correlations with productivity measures for competent and not yet competent staff.

Another area requiring further research is a classification system for fostering more standardisation in the attributes of productivity measures. A framework or a more definitive list of criteria for productivity measures would benefit future developments in a human capital measure based on competences that involves correlations with productivity measures.

There are a considerable number of suggestions for further research because, although the importance of human capital is stressed, measurement of human capital lags behind. There is no one human capital measurement available, acceptable to all stakeholders, that encompasses the substance of human capital.

Conclusion

This study was initially motivated by a desire to find an approach that would produce evidence of the benefits to an organisation of an increase in employee competences. This evolved into a focus on human capital measures and an attempt to address the disconnection evident between current human capital measures and what it is that the workforce does that is of value in an organisation. Current measures appear to include all manner of components, but these do not address the 'human' element of human

capital. I set out to discover a measure that incorporated competences, which I refer to as the 'substance' of human capital, into a measure of human capital.

Existing measures have been researched and an HCI procedure based on competences developed and applied with seven groups. Although there was a mixture of results, an abundance of insights, issues and some clarity of the competence and productivity constructs emerged from the process. There were subjectivity limitations and contextual limitations for the organisations for which a HCI human capital measure of this type is applicable. It is feasible, however, to research further applications, refinements and development of an HCI procedure based on competences, and the acceptance of human capital measurement.

The writing of a doctoral thesis is commonly described as a journey in which the processes of the research are as important as any outcomes. This journey has taken me into a number of disciplines in the search for a path to follow that will lead to a simple yet comprehensive measure of human capital based on competences. Case study research provided a wealth of detail and opportunity to explore a measure and the conditions that appear to influence its reliability, validity and acceptability. All of this raised more questions and suggestions for directions to explore further.

This stage of the journey is over, but hopefully this study will lead to many more in the quest to develop human capital measures that capture the substance of human capital through competences. This identification of competences as the substance of human capital puts the 'human' back into human capital measurement.

Bibliography

Alexander, M. O. (1971). Investments in people. Canadian Chartered Accountant, 99(July), 38 - 45.

Allee, V. (1997). The knowledge revolution. Boston: Butterworth-Heinemann.

Antonioni, D. (1996). Designing an effective 360-degree appraisal feedback process. Organizational Dynamics, 25, 24-38.

Aoki, M. (1984). The co-operative game theory of the firm. Oxford: Clarendon.

Applebaum, S. H., & Hood, J. (1993). Accounting for the firm's human resources: Are an organisation's employees an asset or an expense? Managerial Auditing Journal, 8(2), 17-24.

Argyris, C. (1969). Diagnosing defences against the outsider. In G. J. McCall & J. L. Simmons (Eds.), Issues in participant observation (pp. 115-127). Reading,MA: Addison-Wesley.

Armstrong, M., & Long, P. (1994). The reality of strategic human resource management. London: Institute of Personnel and Development.

Armstrong, M. A. (1987). Human resource management: A case of the emperor's new clothes. Personnel Management(August).

Arnold, J., & Davey, K. M. (1992). Self-ratings and supervisor ratings of graduate employee's competences during early career. Journal of Occupational and Organizational Psychology, 65, 235-250.

Arvey, R. D., & Murphy, K. R. (1998). Performance evaluation in work settings. Annual Review of Psychology, 49, 141-168.

Asplund, R. (Ed.). (1994). Human capital creation in an economic perspective. Heidleberg: Physica-Verlag in association with The Research Institute of the Finnish Economy (ETLS), Helsinki.

ASTD. (2000). The 2000 ASTD learning outcomes report.

Second annual report on ASTD'S standards for valuing enterprises's investments. Training & Development, 54(5 (May)).

Atwater, L. E., Roush, P., & Fischthal, A. (1995). The influence of upward feedback on self and follower ratings of leadership. Personnel Psychology, 48, 35-40.

Baird, L., & Meshoulam, I. (1988a). Managing two fits of strategic human resource management. Academy of Management Review, 13(1), 116-128.

Baird, L., & Meshoulam, I. (1988b). The HRS matrix: Managing the human resource function strategically. In L. S. Baird, C. E. Schneier, & R. W. Beatty (Eds.), The strategic human resource management sourcebook (pp. 126 -142). Amherst, Massachusetts: Human Resource Development Press.

Baker, B. R. (1991). MCI management competences and APL: The way forward for management education, training and development. Journal of European Industrial Training, 15(9), 17 -27.

Baker, G. M. N. (1974). The feasibility and utility of human resource accounting. California Management Review, 16(Summer), 17 - 23.

Barnett, R. (1994). The limits of competence. Knowledge, higher education and society. Buckingham,UK: The Society for Research into Higher Education & Open University Press.

Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management, 17, 99-120.

Barney, J. B. (1995). Looking inside for competitive advantage. Academy of Management Executive, 9(4), 49 -61.

Barney, J. B., & Wright, P. M. (1998). On becoming a strategic partner: The role of the human resources in gaining competitive advantage. Human Resource Management, 37(1), 31 -46.

Barrett, G. V., & Depinet, R. L. (1991). A reconsideration of testing for competence rather than intelligence. American Psychologist, 46(10), 1012-1024.

Barsky, N. P., & Marchant, G. (2000). The most valuable resource- measuring and managing intellectual capital. Management Accounting, 81(8), 58 - 62.

Bartel, A. (1989). Formal employee training programs and their impact on labor productivity: Evidence from a human resource survey (Working Paper 3026). Cambridge,MA: National Bureau of Economic Research.

Bartel, A. (1992). Productivity gains from the implementation of employment training programs (Working Paper 3893). Cambridge,MA: National Bureau of Economic Research.

Bassi, L., & van Buren, M. E. v. (1999). Sharpening the leading edge? Training and Development, 54(1, January), 23-33.

Becker, B. E., & Huselid, M. A. (1998). High performance work systems and firm performance: A synthesis of research and managerial implications. Research in Personnel and Human Resources Management, 16, 53 - 101.

Becker, B. E., & Huselid, M. A. (1999). Overview: Strategic human resource management in five leading firms. Human Resource Management, 38(Winter/4), 287 - 301.

Becker, G. S. (1962). Investment in human capital: a theoretical analysis. Journal of Political Economy, 70(5 (October)), 9-49.

Becker, G. S. (1964). Human capital: a theoretical and empirical analysis, with special reference to education. New York: National Bureau of Economic Research.

Becker, G. S. (1993). Human capital a theoretical and empirical analysis with special reference to education. (3rd ed.). Chicago: The University of Chicago Press.

Becker, G. S. (1993a). Nobel lecture: The economic way of looking at behaviour. Journal of Political Economy, 101(3 (July)), 385-409.

Beer, M., Spector, B., Lawrence, P., Mills, D. Q., & Walton, R. (1984). Managing human assets. New York: The Free Press.

Bell, C. R. (1997). Intellectual capital. Executive Excellence, 14(1 (January)), 15.

Benjamin, A., & Benson, N. (1986). Why ignore the value of people? Accountancy(February), 81-84.

Bernardin, H. J., & Beatty, R. W. (1984). Performance appraisal: Assessing human behaviour at work. Boston: Kent Publishing.

Bernardin, H. J., Orban, J. A., & Caryle, J. J. (1981). Performance ratings as a function of trust in appraisal, puprpose for appraisal and rater individual difference. Paper presented at the Academy of Management.

Bish, C. (1999). Building competency maps. Training Journal(January/February), 10 - 12.

Bishop, J. (1994). The impact of previous training on productivity. In L.Lynch (Ed.), Training and the Private Sector: International comparisons. (pp. 161-199). Chicago: University of Chicago Press.

Black, S. E., & Lynch, L. M. (1996). Human capital investment and productivity. American Economic Review, 86(2), 263 -267.

Blaug, M. (1976). The empirical status of human capital theory: A slightly jaundiced survey. Journal of Economic Literature, 14, 827 - 855.

Bontis, N. (1999). Managing organizational knowledge by diagnosing intellectual capital: Framing and advancing the state of the field. International Journal of Technology Management, 18(5/6/7/8), 433-462.

Bontis, N., Dragonetti, N. C., Jacobsen, K., & Roos, G. (1999). The knowledge toolbox: A review of the tools available to measure and manage intangible resources. European Management Journal, 17(4. August), 391 - 402.

Borman, W. C. (1998). An analysis of the assumptions and a research agenda for evaluating their validity. Human Resource Management Review, 7, 299-315.

Borman, W. C., Hanson, M. A., & Hedge, J. W. (1997). Personnel selection. Annual Review of Psychology, 48, 299-337.

Boulding, K. (1956). The image. Ann Arbor, MI: University of Michigan Press.

Bowen, C. C., Swim, J. K., & Jacobs, R. R. (2000). Evaluating gender biases on actual job performance of real people: A meta-analysis. Journal of Applied Social Psychology, 30(10), 2194.

Boxall, P. (1996). The strategic HRM debate and the resource-based view of the firm. Human Resource Management Journal, 6(3), 59 - 75.

Brethower, D. (2000,). Keeping HPT simple. New & Notes.

The Newsletter of the International Society for Performance Improvement, 2 - 3.

Brethower, D. M. (1995). Specifying a human performance technology knowledge base. Performance Improvement Quarterly, 8(2), 17-39.

Brett, J. F., & Atwater, L. E. (2001). 360-degree feedback: Accuracy, reactions and perceptions of usefulness. Journal of applied Psychology, 86(5), 930-942.

Briegal, M. (1999). Training competency frameworks. Training Journal(January/February), 6-9.

Brinkerhoff, R. O., & Dressler, D. E. (1990). Productivity measurement . A guide for managers and evaluators. (Vol. 19). London: Sage Publications.

Briscoe, J. P., & Hall, D. T. (1999). Grooming and picking leaders using competency frameworks: Do they work?. An alternative approach and new guidelines for practice. Organizational Dynamics(Autumn), 37 - 52.

Brown, M. G. (1999). Human capital's measure for measure. Journal for Quality and Participation, 22(5 Sep/Oct), 28-31.

Brown, M. G. (2000). Winning score. How to design and implement organizational scorecards. Portland, Oregon: Productivity Press.

Business Europe. (2001). Measuring HR Performance. Business Europe, 41(20, 17/10/2001), 1-2.

Campbell, J. P., Gasser, M. B., & Oswald, F. L. (1996). The substantive nature of job performance variability. In K. R. Murphy (Ed.), Individual differences and behavior in organizations (pp. 258-299). San Francisco: Jossey-Bass Publishers.

Campion, M. A., Cheraskin, L., & Stevens, M. J. (1994). Career-related antecedents and outcomes of job rotation. Academy of Management Journal, 37(6), 1518-1542.

Carnevale, A. P. (1991). America and the new economy. How new competitive standards are radically changing American workplaces. San Francisco: Jossey-Bass Publishers.

Cascio, W. F. (1991). Costing human resources: The financial impact of behaviour in organizations. (Third ed.). Boston: PWS-KENT Publishing Company.

Castanias, R. P., & Helfat, C. E. (1991). Managerial resources and rents. Journal of Management, 17, 15 - 171.

Chapman, P. G. (1993). The economics of training. New York: Harvester Wheatsheaf.

Chen, S., & Dodd, J. L. (1997). Economic value added (EVA (TM)): An empirical examination of a new corporate performance measure. Journal of Managerial Issues., 9(3 Fall), 318 -333.

Chesley, J., & Wenger, M. (1999). Transforming an organization: Using models to foster strategic conversation. California Management Review, 41((3) Spring).

Chillemi, O., & Gui, B. (1997). Team human capital and worker mobility. Journal of Labour Economics, 15(4), 567-585.

Chow, C. W., Ganulin, D., Haddad, K., & Williamson, J. (1998). The balanced scorecard: A potent tool for energizing and focusing healthcare organization management. Journal of Healthcare Management, 43(May/June), 263-280.

Cohen, S. L., & Backer, N. K. (1999). Making and mining intellectual capital: Method or madness? Training and Development, 53(9 (September)), 46-50.

Conway, J. M. (1996). Additional construct validity evidence for the task/contextual performance distinction. Human Performance, 9(4), 309-329.

Cooper, S. E., & O'Connor Jr., R. M. (2001). Standards for organizational consultation assessment and evaluation instruments. Journal of Counselling & Development, 71(July/August), 651-660.

Cowey, M. (2000). Knowledge economy- Fact or fad? Management, 47(4), 54-55.

Creswell, J. W. (1994). Research Design: Qualitative and Quantitative Approaches. Thousand Oaks: Sage.

Daly, A., Hitchens, D., & Wagner, K. (1985). Productivity, machinery and skills in a sample of British and German manufacturing plants. Results of a pilot inquiry. National Institute Economic Review(February), 48-61.

Davenport, T. O. (1999). Human capital. What it is and why people invest it. San Francisco: Jossey-Bass Publishers.

Davidow, W. (1996). Why profits don't matter. Until we measure assets like goodwill and management savvy, bottom lines won't mean much. Forbes ASAP(April 8), 24.

Decision Research Ltd. (1997). Report of survey on training,1997 : New Zealand Employers' Federation.

Delery, J. E., & Doty, D. H. (1996). Modes of theorizing in strategic human resource management: Tests of universalistic, contingency and configurational performance predictions. Academy of Management Journal, 39, 802 - 835.

Deloitte, & Touche. (2002). Creating shareholder value through people: Human capital ROI study . Auckland: Deloitte & Touche.

De Nisi, A. S., & Kluger, A. N. (2000). Feedback effectiveness: Can 360-degree appraisals be improved. The Academy of Management Executive, 14(1, February), 129-139.

Department of Labour. (1999). Human capability. A framework for analysis . Wellington, New Zealand.

Dessler, G. (2000). Human resource management. (8th ed.). Upper Saddle River, New Jersey: Prentice-Hall Inc.

Doeving, E. (2000). Acquisition of competences in the workplace. Human resource development in Statoil. , University of Bergen, Bergen.

Down, S., & Smith, D. (1998). It pays to be nice to people: Investors in people: The search for measurable benefits. Personnel Review, 27(2), 143-155.

Drucker, P. D. (1968). The practice of management. London: Pan Books.

Drucker, P. F. (1955). The practice of management. London: Heinemann.

Dunnette, M. D., & Fleishman, E. A. (1982). Human capability assessment. (Vol. 1). New Jersey: Lawrence Erlbaum Associates.

Eccles, R. G. (1991). The performance measurement manifesto. Harvard Business Review(January- February), 131 - 137.

Edvinsson, L. (1997). Developing intellectual capital at Skandia. Long Range Planning, 30(June), 366-373.

Edvinsson, L., & Malone, M. S. (1997). Intellectual capital. Realizing your company's true value by finding its hidden brainpower. New York: Harper Collins.

Eisenhardt, K. M. (1989). Building theories from case study research. Academy of Management Review, 14(4), 532-550.

Enderwick, P., & Research, W. (1996, June 1996). What is workplace reform? The ideas and practice in New Zealand. Paper presented at the Workplace Reform Conference, Rotorua.

Epstein, M. J., & Manzoni, J. F. (1998). Implementing corporate strategy: from tableaux de bord to balanced scorecards. European Management Journal, 16(2), 190-203.

Epstein, M. J., & Young, S. D. (1999). 'Greeening' with EVA. Management Accounting, 80(7), 45-49.

Ericsson, K. A., & Lehmann, A. C. (1996). Expert and exceptional performance: evidence of maximal adaptation to task constraints. Annual Review of Psychology, 47, 273-305.

Fagerlind, I. (1975). Formal education and adult earnings. Stockholm: Almqvist & Wicksell International.

Febrero, R., & Schwartz, P. S. (Eds.). (1995). The essence of Becker. California: Hoover Institution Press, Stanford University.

Fiol, C. M. (1991). Managing culture as a competitive resource: An identity-based view of sustainable competitive advantage. Journal of Management, 17, 191 -211.

Fitz-enz, J. (1984). How to measure human resources management. New York: McGraw-Hill.

Fitz-Enz, J. (1990). Human value management. The value-adding human resource management strategy for the 1990's. San Francisco: Jossey-Bass Publishers.

Fitz-enz, J. (2000). The ROI of human capital. Measuring the economic value of employee performance. New York: AMACON.

Fitzpatrick, R. (2000). Building robust competencies: Linking human resource systems to organizational strategies. Personnel Psychology(53), 1.

Flamholtz, E. (1974). Human resource accounting. California: Dickenson Publishing Company.

Flamholtz, E. (1986). Which HR accounting system fits your organization? Personnel Journal, 65(7), 74 - 81.

Flamholtz, E. (1987). Valuation of human assets in a securities brokerage firm: An empirical study. Accounting, Organizations and Society, 12(4), 309 - 318.

Flamholtz, E. (1996). Effective organizational control: A framework, applications, and implications. European Management Journal, 14(6), 596 -611.

Flamholtz, E. G. (1971). A model for human resource valuation: A stochastic process with service rewards. Accounting Review, 46(April), 253-267.

Flamholtz, E. G. (1972a). Assessing the validity of a theory of human resource value: A field study. In I. o. P. A. Chicago (Ed.), Empirical research in accounting: Selected topics (pp. 241-266). Chicago: University of Chicago.

Flamholtz, E. G. (1972b). Towards a theory of human resource value in formal organizations. Accounting Review, 47(October).

Flamholtz, E. G. (1985). Human resource accounting. (2nd ed.). San Francisco: Jossey-Bass Inc.

Flamholtz, E. G., & Coff, R. (1989). Valuing human resources in buying service companies. Mergers & Acquisitions, 23(4 (January/February)).

Flamholtz, E. G., & Lacey, J. M. (1981). Personnel management human capital theory and human resource accounting. (Vol. 27). Los Angeles: Institute of Industrial Relations, University of California.

Flamholtz, E. G., & Lundy, T. S. (1975). Human resource accounting for CPA firms. Certified Public Accountant Journal, 45(October), 45 -51.

Flamholtz, E. G., & Randle, Y. (1998). Changing the game. Organizational transformations of the first, second and third kinds. New York: Oxford University Press.

Flanagan, J. C. (1954). The critical incident technique. Psychological Bulletin, 51(4), 327 - 358.

Fleisher, C. S., & Mahaffy, D. (1997). A balanced scorecard approach to public relations management. Public Relations Review, 23(2), 117 - 142.

Fletcher, C., & Baldry, C. (2000). A study of individual differences and self-awareness in the context of multi-source feedback. Journal of Occupational and Organizational Psychology(September), 303-327.

Fletcher, S. (1993). Quality and competence. Integrating competence and quality initiatives. London: Kogan Page.

Fletcher, S. (1997). Competence-based assessment techniques. (2nd ed.). London: Kogan Page.

Fletcher, S. (1998). Competence and organisational change. A handbook. London: Kogan Page.

Fox, S., & Dinur, Y. (1988). Validity of self-assessment: A field evaluation. Personnel Psychology, 41, 581-592.

Fuller, J., & Farrington, J. (1999). From training to performance improvement. Navigating the transition. San Fransisco: Jossey-Bass.

Garden, K. (1997). New directions in policy. Sci-Tech, 8(2, May), 1-2.

Gautschi, T. (1998). Develop your intellectual capital. Design News, 53(14 (July 20)), 170.

Ghorpade, J. (2000). Managing five paradoxes of 360-degree feedback. The Academy of Management Executive, 14(1), 140-150.

Gleeson, J. (1975). Accounting for human resources. Australian Accountant, 45(March), 82-84, 87-88.

Gooderham, P. (1995). Book reviews- Human capital in organizations: Competence, training and learning by Odd Nordhaug. Administrative Science Quarterly, 40(3 (Sep)), 528-530.

Green, P. C. (1999). Building robust competencies. Linking human resource systems to organizational strategies. San Francisco: Jossey-Bass Publishers.

Greenhalgh, C., & Stewart, M. (1987). The effects and determinants of training. Oxford Bulletin of Economic Statistics, 49(May 2), 171 -189.

Gronhaug, K., & Nordhaug, O. (1992). Strategy and competence in firms. European Management Journal, 10(4), 438 - 444.

Guba, E. G., & Lincoln, Y. S. (1994). Competing pradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), Handbook of qualitative research (pp. 105-117). Thousand Oaks,CA: Sage Publications.

Guthrie, J. P. (2001). High-involvement work practices, turnover, and productivity: Evidence from New Zealand. Academy of Management Journal, 44(1), 180-190.

Hall, D. T., & Moss, J. (1998). The new protean career contract: Helping organizations and employees adapt. Organizational Dynamics(Winter), 22-37.

Hamel, G., & Heene, A. (Eds.). (1994). Competence-based competition. Chichester: Wiley and Sons.

Hamel, G., & Prahalad, C. K. (1994). Competing for the future. Boston: Harvard Business School Press.

Hartley, J. F. (1994). Case studies in organizational research. In C. Cassell & G. Symon (Eds.), Qualitative methods in organizational research. A practical guide (pp. 208-229). London: Sage Publications.

Hartog, J. (1999). Behind the veil of human capital. Observer, 215(January), 37-39.

Hartog, J. (2000). Human capital as an instrument of analysis for economics. European Journal of Education, 35(1), 7-14.

Harvey, M. G., & Lusch, R. F. (1999). Balancing the intellectual capital books: Intangible liabilities. European Management Journal, 17(1), 85-92.

Hauser, J., & Katz, G. (1998). Metrics: You are what you measure. European Management Journal, 16(5), 517-528.

Hedge, J. W., & Teachout, M. S. (2000). Exploring the concept of acceptability as a criterion for evaluating performance measures. Group and Organizational Management, 25(1, March 2000), 22-44.

Hekimian, J. S., & Jones, C. H. (1967). Put people on your balance sheet. Harvard Business Review, 45(Jan/Feb), 105 - 113.

Hendry, C., & Pettigrew, A. (1990). Human resource management: An agenda for the 1990's. International Journal of Human Resource Management, 1(1), 17 - 44.

Hoffecker, J., & Goldenberg, C. (1994). Using the balanced scorecard to develop company-wide performance measures. Journal of Cost Management(Fall), 5 - 17.

Hunt, S. (1996). Generic work behaviour: An investigation into the dimensions of entry-level, hourly job performance. Personnel Psychology, 49(1), 51-83.

Hunter, J., & Hunter, R. (1984). Validity and utility of alternative predictors of job performance. Psychological Bulletin, 96, 72-98.

Hunter, J. E., & Schmidt, F. L. (1983). Quantifying the effects of psychological interventions on employee job performance and work-force productivity. American Psychologist(April), 473-478.

Huselid, M. A. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. Academy of Management Journal, 38, 645-672.

Huselid, M. A., & Becker, B. E. (1996). Methodological issues in cross-sectional and panel estimates of the human resource-firm performance link. Industrial Relations, 35(3, July), 400 - 422.

Hussey, J., & Hussey, R. (1997). Business research. A practical guide for undergraduate and postgraduate students. London: Macmillan Press.

Institute of Work Psychology, U. o. S. (1997). Impact of people management practices on business performance : Institute of Personnel Development.

Investors in People UK. (1997). The benefits of being an investor in people . UK.

James, W., & Hoque, Z. (1997). Balancing the scorecard: beyond the bottom line. Australian Accountant(November), 46 -47.

Jenson, A. R. (1980). Bias in mental testing. New York: The Free Press.

Jesson, B. (1999). Only their purpose is mad. Palmerston North, NZ: The Dunmore Press.

Johnson, E. (1999b). The Cranfield project on strategic human resource management . Auckland: University of Auckland and NZIM.

Johnson, G. (1999a). The Cranfield project on strategic human resource management. Human Resources, 4(April), 12 - 13.

Johnston, D. J. (1998). Human capital investment: An international comparison. France: Centre for Educational Research and Innovation, OECD.

Kamoche, K. (1991). .

Kaplan, R. S., & Norton, D. P. (1992). The balanced scorecard- measures that drive performance. Harvard Business Review(January - February), 71-79.

Kaplan, R. S., & Norton, D. P. (1993). Putting the balanced scorecard to work. Harvard Business Review(September -October), 134 -147.

Kaplan, R. S., & Norton, D. P. (1996a). Translating strategy into action. The balanced scorecard. Boston: Harvard Business School Press.

Kaplan, R. S., & Norton, D. P. (1996b). Using the balanced scorecard as a strategic management system. Harvard Business Review(January - February), 75 -85.

Katz, D., & Kahn, R. L. (1978). The social psychology of organizations. (2nd ed.). New York: John Wiley & Sons.

Katz, E., & Ziderman, A. (1990). Investment in general training: The role of information and labour mobility. The Economic Journal, 100(December), 1147 -1158.

Keisler, S., & Sproull, L. (1991). Connections: New ways of working in the networked organisation. Cambridge, USA: MIT Press.

Kelsey, J. (1995). The New Zealand experiment: A world model for structural adjustment? Auckland, New Zealand: Pluto Press.

Klein, L. (1976). A social scientist in industry. London: Gower.

Koch, M., & McGrath, R. G. (1996). Improving labour productivity: Human resource management policies do matter. Strategic Management Journal, 17, 335-354.

Koning, J. d. (1994). Evaluating training at the company level. In R. McNabb & K. Whitfield (Eds.), Then Market for Training. International perspectives on theory, methodology and policy (pp. 163-177). Avebury, England: Ashgate Publishing Co.

Kozlowski, S. W. J., & Farr, J. L. (1988). An integrative model of updating and performance. Human Performance, 1(1), 5-29.

Kurtzman, J. (1997). Is your company off course? Now you can find out why. Fortune, 135(3), 128 -130.

Lado, A. A., & Wilson, M. C. (1994). Human resource systems and sustained competitive advantage: a competency-based perspective. Academy of Management Review, 19(4), 699 - 727.

Law, K. S., & Myors, B. (1999). A modification of Raju, Burke and Normad's (1990) new model for utility analysis. Asia Pacific Journal of Human Resources, 37(1), 39- 51.

Lawler111, E. E. (1994). From job-based to competency-based organizations. Journal of Organizational Behaviour, 15, 3-15.

Lawler, E. E. (1967). The multitrait-multirater approach to measuring managerial job performance. Journal of Applied Psychology, 51, 369-381.

Leadbeater, C. (1997). Marking your scorecard crucial when the company sets targets. The National Business Review(April 24), 41.

Lees, H. J. (1996). Workplace Assessment (Unpublished). Auckland: Auckland College of Education.

Lieberson, S. (1992). Small N's and big conclusions: An examination of the reasoning in comparative studies based on a small number of cases. In C. E. Ragin & H. S. Becker (Eds.), What is a case? Exploring the foundations of social inquiry (pp. 105-137). New York: Cambridge University Press.

Likert, R., & Bowers, D. S. (1969). Organizational theory and human resource accounting. American Psychologist, 24(June), 585 - 592.

Lindeman, M., Sundvik, L., & Rouhianen, P. (1995). Underestimation or over estimation of self-person variables and self-assessment accuracy in work settings. Journal of Social Behaviour and Personality, 10.

Lingle, J. H., & Schiemann, W. A. (1996). From balanced scorecard to strategic gauges: Is measurement worth it? American Management Association(March), 56 -61.

Lippman, S. A., & Rumelt, R. P. (1982). Uncertain imitability: An analysis of inter-firm differences in efficiency under competition. Bell Journal of Economics, 13, 418 438.

London, M., & Wohlers, A. J. (1991). Agreement between subordinate and self-ratings in upward feedback. Personnel Psychology, 44, 375-390.

Lucia, A. D., & Lepsinger, R. (1999). The art and science of competency models. Pinpointing critical success factors in organizations. San Francisco: Jossey-Bass/Pfeiffer.

Lynch, L., & Black, S. (1996). Beyond the incidence of training: Evidence from a national employer survey . Pen: U of Pen.

Lynn, B. E. (1998). Performance evaluation in the new economy: Bringing the measurement and evaluation of intellectual capital into the management planning and control system. International Journal of Technology Management, 16(1/2/3), 162-176.

Machlup, F. (1984). Knowledge: Its creation, distribution and economic significance. (Vol. 3).

Mahony, C. (2000). Firms fail to see how IIP boosts profits. People management, 6(16), 8-9.

Mailath, G. J., & Postlewaite, A. (1990). Workers versus firms: Bargaining over a firm's value. Review of Economic Studies, 57, 369-380.

Maisel, L. S. (1992). Performance measurement: The balanced scorecard approach. Journal of Cost Management(Summer), 47 - 52.

Marshall, V. W. (1999). Reasoning with case studies: Issues of an aging workforce. Journal of Aging Studies, 13(4, Winter, Index Issue), 377-390.

Mason, G., van Ark, B., & Wagner, K. (1994). Productivity, product quality and workforce skills: Food processing in four European countries. National Institute of Economic Review(February), 62 - 83.

Mason, G., Prais, S., & van Ark, B. (1992). Vocational education and productivity in the Netherlands and Britain. National Institute Economic Review(May), 45-63.

McAulay, L., Russell, G., & Sims, J. (1997). Tacit knowledge for competitive advantage. Management Accounting-London, 75(11), 36-37.

McCowan, R. A., Bowen, U., Huselid, M. E., & Becker, B. E. (1999). Strategic human resource management at Herman Miller. Human Resource Management, 38(4 (Winter)), 303 - 308.

McDaniel, M. A., Schmidt, F. L., & Hunter, J. E. (1988). Job experience correlates of job performance. Journal of Applied Psychology, 73(2), 327 - 330.

McEnrue, M. P. (1988). Length of experience and the performance of managers in the establishment phase of their careers. Academy of Management Journal, 31(1), 175-185.

McGregor, D. (1960). The human side of enterprise. New York: McGraw-Hill.

McKelvey, B., & Aldrich, H. (1983). Population, natural selection and applied organizational science. Administrative Science Quarterly, 28, 101 -128.

McLagan, P. (1997). Competency approaches throughout history: A case example. Training and Development, 5(5 (May)), 40.

McLagan, P. A. (1990). Flexible job models: A productivity strategy for the information age. In J. P. Campbell & R. J. Campbell (Eds.), Productivity in organizations. New perspectives from industrial and organizational psychology (pp. 369-387). San Francisco: Jossey-Bass Publishers.

Miles, M. B., & Huberman, A. M. (1994). Qualitative data analysis. An expanded sourcebook. (2nd ed.). Thousand Oaks: Sage Publications.

Miller, R. (1996a). Measuring what people know. Human capital accounting for the knowledge economy. France: OECD.

Miller, W. (1999). Building the ultimate resource. Management Review, 88(1), 42-45.

Mincer, J. (1958). Investing in human capital and personal income distribution. Journal of Political Economy, 66(4), 281-302.

Mincer, J. (1962). On-the -job training: Costs, returns and some implications. Journal of Political Economy, 70(5), 50-79.

Mincer, J. (1974). Schooling, experience and earnings. (Vol. 2). New York: National Bureau of Economic Research: distributed by Columbia University Press.

Morgan, G., & Smircich, L. (1980). The case of qualitative research. Academy of Management Review, 5(491-500).

Morrison, & Hock. (1986). .

Morrison, R. R., & Brantner, T. M. (1992). What enhances or inhibits learning a new job? A basic career issue. Journal of Applied Psychology, 77(6), 926-940.

Morrow, C. C., Jarrett, M. Q., & Rupinski, M. T. (1997). An investigation of the effect and economic utility of corporate-wide training. Personnel Psychology, 50(1), 91-119.

Morrow, M., & Wurtz, W. (2000). Measuring the impact resulting from implementing an organizational capability plan. Organization Development Journal, 18(1 (Spring)), 65-73.

Motowidlo, S. J., Borman, W. C., & Schmit, M. J. (1997). A theory of individual differences in task and contextual performance. Human Performance, 10(2), 71-83.

Motowidlo, S. J., & Scotter, J. R. V. (1994). Evidence that task performance should be distinguished from contextual performance. Journal of Applied Psychology, 79(4), 475-480.

Murphy, K. R., & Cleveland, J. N. (1995). Understanding performance appraisal: social, organizational and goal-based perspectives. Thousand Oaks, CA: Sage.

Murphy, K. R., & Shiarella, A. H. (1997). Implications of the multidimensional nature of job performance for the validity of selection tests: multivariate frameworks for studying test validity. Personnel Psychology, 50, 823-853.

Myers, M. S., & Flowers, V. S. (1974). A framework for measuring human assets. California Management Review, 16(Summer), 5 - 16.

National Center on the Educational Quality of the Workforce. (1995). First findings from the EQW national employer survey (RE01). Philidelphia: National Center on the Educational Quality of the Workforce,.

Newing, R. (1994). Benefits of a balanced scorecard. Accountancy, 114((1215)), 52-53.

Newing, R. (1995). Wake up to the balanced scorecard. Management Accounting(March).

Nilsen, D., & Campbell, D. P. (1993). Self-observer rating discrepancies-once an overrater, always an overrater? Human Resource Management, 32, 265-281.

Nisbett, R. E., & Wilson, T. D. (1980). Human inference: Strategies and shortcomings of social judgement. Englewood Cliffs, NJ: Prentice Hall.

Nordhaug, O. (1993). Human capital in organizations. Competence training and learning. Norway: Scandinavian University Press.

O'Connell, P. J. (1999). Adults in training: An international comparison of continuing education and training (unclassified CERI/WD(99)1, 76378): OECD, Centre for Educational Research and Innovation.

OECD. (1997). Manual for better training statistics, conceptual measurement and survey issues. France: OECD.

OECD. (1999a). Classifying educational programmes. Manual for ISCED-97 implementation in OECD countries. Paris: OECD.

OECD. (1999b). OECD science, technology and industry scoreboard 1999. Benchmarking knowledge-based economies. Paris.

Parker, P., & Inkson, K. (1999). New forms of career: The challenge to human resource management. Asia Pacific Journal of Human Resources, 37(1), 76 - 85.

Parry, S. B. (1996). The quest for competencies. Training(July), 48 - 54.

Parry, S. B. (1998). Just what is a competency? (And why should you care?). Training(June), 58 - 62.

Pavitt, K. (1991). Key characteristics of the large innovating firm. British Journal of Management, 2, 208 - 230.

Pearson, G. (1996). More than money can say. the impact of ESL and literacy training in the Australian workplace (National Adult Literacy Project 0 642 25060 X). Canberra: Department of Employment Education Training and Youth Affairs,.

Peters, T. J., & Waterman, R. H. (1982). In search of excellence. New York: Warner Books.

Pfeffer, J. (1998). The human equation. Building profits by putting people first. Boston, Massachusetts: Harvard Business School Press.

Phillips, J. J. (1994). Measuring the return on investment. (Vol. 1). Alexandria, VA: American society for Training and Development.

Phillips, J. J. (1997). Measuring the return on investment. (Vol. 2). Alexandria, VA: American Society for Training and Development.

Phillips, J. J. (1998a). Measuring the return on investment in organization development: Key issues and trends. Organization Development Journal, 16(4, Winter), 29-41.

Phillips, J. J. (1998b, July 1998). Global best practices in measuring HR's contribution to the bottom line. Paper presented at the Info HRM conference, Brisbane.

Phillips, J. J. (1999). HRD trends worldwide. Shared solutions to compete in a global economy. Texas: Gulf Publishing Company.

Pollack, D. M., & Pollack, L. J. (1996). Using 360 degree feedback in performance appraisal. Public Personnel Management, 25(4, Winter), 507-529.

Porter, M. (1980`). Competitive strategy: Techniques for analyzing industries and competitors. New York: The Free Press.

Porter, M. (1985). Competitive advantage. New York: The Free Press.

Powell, W. (2002). Above the bottom line. Training and Development, 56(4 April), 34-42.

Prahalad, C. K., & Hamel, G. (1990). The core competence of the corporation. Harvard Business Review(May - June).

Prais, S. J. (1995). Productivity, education and training. An international perspective (48). London: The National Institute of Economic and Social Research.

Prescott, E. C., & Visscher, M. (1980). Organizational capital. Journal of Political Economy, 88, 446 - 461.

Punch, M. (1998). Politics and ethics in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), The landscape of qualitative research: theories and issues (pp. 156-184). London: Sage Publications.

Quinones, M. A., Ford, J. K., & Teachout, M. S. (1995). The relationship between work experience and job performance: A conceptual and meta-analytic review. Personnel Psychology, 48, 887-910.

Ragin, C. C. (1987). The comparative method: Moving beyond qualitative and quantitative strategies. Berkeley: University of California Press.

Ramsay, M. R. (1995). Enterprise productivity measurement and international labour productivity handbook. Sydney: Advanced Productivity and Quality Centre of Australia.

Reed, R., & De Fillippi, R. (1990). Causal ambiguity, barriers to imitation and sustainable competitive advantage. Academy of Management Review, 15, 88 - 102.

Reilly, R. R., Smither, J. W., & Vasukopoulos, N. L. (1996). A longitudinal study of upward feedback. Personnel Psychology, 49, 599-612.

Robinson, B. A. (1974). An approach to human resource accounting. Cost and Management (Canada), 48(May/June), 26-32.

Robinson, D. (1975). Two approaches to human asset accounting. Accountancy (England), 86(February), 46 - 48.

Roos, G., & Roos, J. (1997). Measuring your company's intellectual performance. Long Range Planning, 30(3), 413-426.

Roos, J., Roos, G., Dragonetti, N., & Edvinsson, L. (1997). Intellectual capital. Navigating the new business landscape: MacMillan Business Press Ltd.

Rosemann, M., & Wiese, J. (1999). Measuring the performance of ERP software- a balanced scorecard approach. Paper presented at the 10th Australasian Conference on Information Systems, Australia.

Rousseau, Y., & Rousseau, P. (2000). Turning strategy into action in financial services. CMA Management, 73(10), 25-29.

Scarpello, & Ledvinka. (1988). Personnel/Human resource management. Kent: PWS.

Schmidt, F. L., Hunter, J. E., & Outerbridge, A. N. (1986). Impact of job experience and ability on job knowledge, work sample performance, and supervisory ratings of job performance. Journal of Applied Psychology, 71(3), 432-439.

Schneier, R. (1997). People value added: The new performance measure. Strategy and Leadership(March/April).

Schuler, R. S., & MacMillan, I. (1984). Gaining competitive advantage through human resource management practices. Human Resource Management, 23, 241 - 256.

Schultz, T. W. (1961). Investment in human capital. American Economic Review, 51, 1-17.

Schultz, T. W. (1963). The economic value of education. New York: Columbia University Press.

Selvarajah, C., Lau, T. S.-W., & Taormina, R. J. (2000). Management training and development: A New Zealand study. Journal of the Australian and New Zealand Academy of Management, 5(2), 28-41.

Selznick, P. (1957). Leadership in administration. New York: Harper & Row.

Sheedy-Gohil, K. (1996). Putting the asset value of skills on the balance sheet. Managerial Auditing Journal, 11(7), 16-20.

Shetty, Y. K., & Perry Jr., N. S. (1976). Are top executives transferable across companies? Business Horizons, 19, 23 - 28.

Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. Psychological Bulletin, 86(2), 420-428.

Silk, S. (1998). Automating the balance scorecard. Management Accounting(May), 38-43.

Smith, A. (1776). The wealth of nations. Harmondsworth: Penguin.

Smith, A., & Hayton, G. (1999). What drives enterprise training? Evidence from Australia. The International Journal of Human Resource Management, 10(2 April), 251-272.

Snell, S. A., Youndt, M. A., & Wright, P. M. (1996). Establishing a framework for research in strategic human resource management: Merging resource theory and organizational learning. Research in Personnel and Human Resources Management, 14, 61-90.

Sonntag, K., & Schafer-Rauser, U. (1993). Self-assessment of abilities in the evaluation of vocational training. Zeitschrift fur Arbeits-und Organisationspsychologies, 37(4), 163-171.

Spencer Jr., L. M., & Spencer, S. M. (1993). Competence at work. Models for superior performance. New York: John Wiley & Sons,Inc.

Stalk, G., Evans, P., & Shulman, L. E. (1992). Competing on capabilities. The new rules of corporate strategy. Harvard Business Review, 70(2), 57 - 69.

Steedman, H., & Wagner, K. (1987). A second look at productivity, machinery and skills in Britain and Germany. National Institute Economic Review(November), 84-95.

Steedman, H., & Wagner, K. (1989). Productivity, machinery and skills: clothing manufacturing in Britain and Germany. National Economic Institute Review(May).

Sternberg, R., Wagner, R., Williams, W., & Horvath, J. (1995). Testing common sense. American Psychologist, 50(11), 912- 927.

Stewart, T. A. (1997). Intellectual capital. The new wealth of organizations. Auckland: Doubleday/Currency.

Stolovitch, H. D., & Keeps, E. J. (Eds.). (1992). Handbook of performance technology. A comprehensive guide for analyzing and solving performance problems in organizations. San Francisco: Jossey Bass.

Strauss, A. L. (1987). Qualitative analysis for social scientists. New York: Cambridge University Press.

Strober, M. H. (1990). Human capital theory: Implications for HR managers. Industrial Relations, 29(2 (Spring)), 214-239.

Sutermeister, R. A. (1976). People and productivity. (3rd ed.). New York: McGraw Hill Book company.

Sveiby, K. E. (1997). The new organizational wealth. Managing and measuring knowledge-based assets. San Francisco: Berrett-Koehler Publishers Inc.

Taylor, F. W. (1967, 1947). the principles of scientific management. New York: Norton.

Taylor, F. W. (1972, 1947). Scientific management: comprising shop management, the principles of scientific management [and] testimony before the special house committee. Westport, Conn: Greenwood Press.

Taylor, F. W. (1998). The principles of scientific management. Norcross, GA: Engineering and Management Press.

Teece, D. (1998). Capturing value from knowledge assets: The new economy, markets for know-how, and intangible assets. California Management Review, 40(3), 55-79.

Teece, D. J. (1985). Applying concepts of economic analysis to strategic management. In J. M. Pennings (Ed.), Organisational strategy and change (pp. 35 - 63). San Francisco: Jossey-Bass.

Terborg, J. R. (1988). The organisation as a context for health promotion. In S. Oskamp & S. Spacapan (Eds.), The social psychology of health (pp. 129 - 174). Newbury Park, CA: Sage.

Tesluk, P. E., & Jacobs, R. R. (1998). Towards an integrated model of work experience. Personnel Psychology, 51, 321-355.

Thorne, H., Gurd, B., & Southwick, A. (1995). Performance measures in manufacturing: Lessons from the balanced scorecard and dynamic modelling approaches. Accounting Forum, 18(March), 27 -44.

Torrington, D., Mackay, I., & Hall, L. (1985). The changing nature of personnel management. Employee Relations, 7(5), 10 - 16.

Toulson, P., & Dewe, P. (2001, September, 2001). HR: Value or expense? Measuring future business relationships. Paper presented at the HRINZ, Wellington.

Tovstiga, G. (1999). Profiling the knowledge worker in the knowledge -intensive organization: emerging roles. International Journal of Technology Management, 18(5/6/7/8), 731 - 744.

Tubbs, R. M. (1992). The effect of experience on the Auditor's organization and amount of knowledge. The Accounting Review, 67(4), 783-801.

Tucker, M., & Clark, R. (1999). World Productivity Congress, Edinburgh. Journal of the Institute of Management Services(December), 8 - 12.

Tuttle, T. C. (1983). Organizational productivity. A challenge for psychologists. American Psychologist(April), 479 -486.

UBS Warburg LLC. (2001). Competency-based benchmarking at UBS Warburg. Best practice measurement strategies, 1(4), 10-16.

Ulrich, D. (1991). Using human resources for competitive advantage. In R. Kilmann & I. Kilmann (Eds.), Making organisations competitive . San Francisco: Jossey-Bass.

Ulrich, D. (1997). Human resource champions. The next agenda for adding value and delivering results. Boston, Massachusetts: Harvard Business School Press.

Ulrich, D. (1998). Intellectual capital = competence X commitment. Sloan Management Review, 39(2 (winter)), 15 - 26.

Ulrich, D., & Lake, D. (1990). Organisational capability. New York: Wiley.

van Buren, M. E. (1999). A yardstick for knowledge management. Training and Development(May), 71 - 78.

Van Scotter, J. R., Cross, T. C., & Motowidlo, S. J. (2000). Effects of task performance and contextual performance on systemic rewards. Journal of Applied Psychology, 85(4), 526 - 535.

Vinson, M. N. (1996). The pros and cons of 360-degree feedback: Making it work. Training and Development, 50(4, April), 11 - 12.

Vitale, M., Mavrinac, S. C., & Hauser, M. (1994b). New process/financial scorecard: A strategic performance measurement system. Planning Review, July/August, 12-17.

Vitale, M. R., & Mavrinac, S. C. (1995). How effective is your performance measurement system. Management Accounting, 77(2 (August)), 43-52.

Watson Wyatt. (2002). Human capital index: Human capital as a lead indicator of shareholder value, [web site]. Watson Wyatt [2002, 23/07/02].

Westley, F., & Mintzberg, H. (1989). Visionary leadership and strategic management. Strategic Management Journal, 11, 17 - 32.

Wigham, R. (2002a). Government acts to prop up faltering IIP. Personnel Today(9/4/2002), 1.

Wigham, R. (2002b). IIP fail to impact on the bottom line. Personnel Today(19/3/2002), 10.

Williams, J. R., & Levy, P. E. (1992). The effects of perceived system knowledge on the agreement between self-ratings and supervisor ratings. Journal of Personnel Psychology, 45, 835-847.

Woehr, D. J., & Huffcutt, A. J. (1994). Rater training for performance appraisal: a quantitative review. Journal of Occupational Organisational Psychology, 67, 189-205.

Wohlers, A. J., & London, M. (1989). Ratings of managerial characteristics - evaluation difficulty, co-worker agreement and self-awareness. Personnel Psychology, 42, 235-261.

Woodruff Jr., R. L. (1970). Human resource accounting. Canadian Chartered Accountant, 97(September), 156 -161.

Work in America Institute (Ed.). (1978). Human resources accounting. Highlights of the literature. (Vol. Series 1, No. 6). Scarsdale, New York: Work in America Institute Inc.

Wright, P., McMahan, G., & McWilliams, A. (1994). Human resources and sustained competitive advantage: a resource-based perspective. International Journal of Human Resource Management, 5(2 (May)), 301-325.

Wright, P. M., & McMahan, G. C. (1992). Theoretical perspectives for strategic human resource management. Journal of Management, 18(2), 295-320.

Yin, R. K. (1989). Case Study Research. Design and Methods. (2nd ed.). (Vol. 5). Newbury Park: Sage Publications.

Yukl, G. A. (1998). Leadership in organizations. (4th ed.). Upper Saddle River,NJ.: Prentice-Hall Inc.

Zemke, R., & Zemke, S. (1999). Putting competences to work. Training(January), 70 - 76.

Appendix 1. Nordhaug's competence typology

(Source: (Nordhaug, 1993, p 58)

Nordhaug has developed six categories for competences in the workplace: three categories for non-technical competences and three categories for technical. The non-technical competence categories are meta-competences, intra-organisational, and industry: the technical categories are standard technical, technical trade/professional[102], and unique. There are three dimensions used to classify competences into the six categories: firm specificity, industry specificity and task specificity. Table 1 below identifies these three dimensions for each of the six categories.

Table 1

Types of Competence	Task Specificity		Industry Specificity		Firm Specificity	
	Low	High	Low	High	Low	High
NON –TECHNICAL						
Meta-competences	X		X		X	
Industry	X			X	X	
Intra -organisational	X					X
TECHNICAL						
Standards Technical		X	X		X	
Technical Trade/Professional		X		X	X	
Unique		X		X		X

A brief definition and examples of each competence domain follow.

Non-technical domains

Meta-competences

Definition: Firm non-specific, industry non-specific and task non-specific

Examples

- Literacy
- Learning capacity
- Analytical capabilities

[102] I have added the 'professional' to 'trade' to extend the occupations for which this typology is applicable

- Creativity
- Knowledge of foreign languages & cultures
- Ability to perceive and process environmental signals and events
- Capacity to tolerate and master uncertainty
- Ability to communicate
- Ability to co-operate with others
- Negotiation skills
- Ability to adjust to change

Industry competences

Definition: Low task specificity, low firm specificity and high industry specificity

Examples

- Familiarity with the history of the business
- Knowledge about the industry structure
- Knowledge about current developments in industry
- Ability to analyse the operations and strategies of competitors
- Knowledge about key persons, networks and alliances in the industry
- Capability of forming cooperative ventures and alliances with other companies in the industry

Intra-organisational competences

Definition: Low task specificity and high firm specificity (like an internal meta-competence)

Examples

- Knowledge about colleagues
- Knowledge about the elements in the organisational culture such as symbols, subcultures, history, norms and ethical standards
- Overviews of communication channels, informal networks and alliances within the firm
- Mastery of the organisational dialect or code
- Familiarity with the political dynamics of the organisation

- Knowledge about the firm's strategy and goals

Technical domains

Standard technical competences

Definition: High task specificity, low firm specificity and low industry specificity. Knowledge about methods and processes and procedures and techniques for conducting specialised activities, and the ability to use tools and to operate equipment related to those activities.

Examples

- Typing and stenography skills
- Knowledge of generic budgeting and accounting principles & methods
- Skills in computer programming
- Knowledge of standard computer software
- Craft skills and technical professional skills that can be applied across industries

Trade/Professional competences

Definition: Task specific, industry specific and firm non-specific.

Examples

- Skills in building automotive vehicles
- Skills in building aircraft
- Skills in assembling computer hardware
- Skills in hair cutting
- Bartending skills

Unique competences

Definition: Highly firm specific and task specific. They apply to one task or a few tasks within one firm only and include knowledge and skills related to operation of unique technologies and routines.

Examples

- Skills related to the use of specialised tools crafted in the firm

- Knowledge about rationalisation devices that have been developed exclusively within the company
- Skills in repairing tailored technology
- Skills in operating specialised, local, filing or data systems
- Skills related to the administration and maintenance of organisationally idiosyncratic routines or procedures

Appendix 2. Engineering Pilot Case Study

A human capital score was calculated for the seven members of the production staff of a small engineering firm

The company consists of an owner/operator (O/O) with professional engineering qualifications, his wife who keeps the books, one production staff member who is also the supervisor, five staff who are machinists, fitters or welders and one apprentice.

The company's primary market is engineering jobbing work, particularly if it involves hydraulics. This means there is a need for diagnostic skills for repair and maintenance, design of equipment and parts and machining, welding and fitting. Customer contact, design of equipment, costing and scheduling and co-ordination and supervision of work are mainly the responsibility of the O/O. The supervisor has managed projects occasionally. The O/O utilises the individual strengths of the production staff by knowledgeable allotment of tasks and on-job training.

This was their first performance appraisal against competences. With the O/O assisting the researcher it was conducted within a short time frame. Any subsequent performance appraisals will involve review the competence clusters to ensure that they cover all the skills, attributes, knowledge and attitudes required and that they are sufficiently clear to encourage reliable performance ratings. For example, I suggest that for a supervisor there should be additional competences, especially in the industry domain and the intra-organisational competences domain. I also suggest the production staff should be included in the clarification of the competence descriptions and subsequent self-rating.

Ideally a computer programme would be able to present the data in a layered manner so that senior managers and other stakeholders can access the information to the level of detail they require. The information available would include:

- total HCI for the staff
- total competence score for the staff
- total experience score for the staff
- HCI for individual staff

- individual performance ratings for staff
- Individual's personnel data on years of experience, variety of job, level of job, qualifications

The individual performance ratings on each competence (See Tables 1 & 2) and the competence scores based on having a multi-skilled workforce provide the basis for recruitment, performance management, training and development, career planning, project planning, and implementation of strategic development of an organisation.

The HCI can be a quantitative figure for the 'learning and development' sector for organisations using the balanced scorecard to record their results. It can also be used as a measure for organisations that include a supplementary section to their annual reports on the intellectual capital.

The human capital score can be used for trend analysis from one year to another to compare different branches or franchises of an organisation and to examine the gap between the current competence and the ideal for planned future directions of the company. Ideally, over a period of time, or over a number of similar branches or companies, correlations could be researched between the HCI and the productivity and/or income or profitability of the organisation.

The HCI components are based on those of Brown[103] (with adaptations and expansion of the application of competences). The competences are classified into the six categories developed by Nordhaug[104]. Three of these categories are clustered as non-technical*and three as technical**. Figure 1 below lists the term used with the O/O for the domains and the Nordhaug terminology in brackets in italics.

Figure 1

Non-technical	Learning capabilities	*(meta-cognitive)**
	Communication	*(intra-organisational)*
	Industry knowledge	*(industry)*
Technical	Generic technical	(standard technical)**
	Technical trade	(technical /trade)
	Company technical	(unique)

[103] Mark Graham Brown 'Human capital's measure for measure' in the Journal for Quality & Participation, 22(5): 28-31.1999 Sep/Oct.
[104] (Nordhaug, 1993)

The few competence clusters that are identified as the most important for the success of the organisation are given a double rating on the performance management system

The competence score is comprised of technical and non-technical competences for which the individual was scored as competent (i.e. 3 or more) which are weighted according to their respective importance for that particular industry or organisation.

The experience score is comprised of: job level, performance rating against competences, variety of experience in the company (i.e. the number of different job roles) and years of experience, all of which are given differential weightings.

The HCI is the combination of the two above with a weighting of 60 per cent for the competence score and 40 per cent for the experience score.

After he had seen the results in Table 3, the O/O suggested that the competence score basis should relate more specifically to the work role profile for each staff member rather than the multi-skill basis of the calculation I had used. Because he assigned the various responsibilities involved in a project, the O/O ensured that his people worked according to their competences. The wider skill base was not therefore crucial to their productivity. He considered that Noel, Errol and Steve were similar in their contributions, while Nat contributed considerably more and Stan, Colin and Yaap contributed less.

The competence scores were adjusted as suggested and these are presented in Table 4. Competence scores went up and consequently the HCIs also rose. The O/O predictions were mainly but not totally borne out as he had included some competences in the profile of individuals for which he had subsequently rated them as not competent.

There were no available productivity measures to compare the human resource scores as well. The O/O thought the benefit to him would be in comparing the scores from year to year as a monitoring mechanism. Subsequently, a replacement cost was calculated for each of the staff in the study. This included the costs of recruitment, the initial productivity loss, the on-job training costs and the training fees. (It did not include any separation costs.) The results highlighted the hidden costs of staff with less competence

being more expensive to bring up to their expected performance levels (See Table 5 for the replacement value calculations and the results).

Nat, with his superior qualifications and competence performance ratings, was the least expensive to get up to speed - a $3,000 to $6,000 saving. Stan has been the most expensive to get up to speed and has a lower HCI score even after this investment. This suggests that better qualified and better learners are more productive and effective workers.

A Pearson test of correlation showed a significant correlation between the replacement costs and the HCIs (-.896 (.01) & -.941 (.01)), non-technical competence performance (.01) and technical competence performance (.05) but no significant correlation between years of tertiary education and replacement costs (See Table 6 for the group HCI correlation results and Table 7 for the individuals' HCIs, their replacement costs and equivalent years of tertiary education). Table 8 has the non-technical and technical competence correlations.

Although the HCI components proposed by Brown did result in a very credible result it may be possible to simplify the index composition and procedure with further exploratory research. In Table 8 the correlations of the domains of meta-competence and technical trade appear to be responsible for most of the correlation strength of the HCI with replacement costs (-.923 and -.782 respectively). Simplification of the process and the components for a HCI will be the subject of further research.

Table 1

Summary of production staff non-technical competence profiles

Competences	Noel	Errol	Nat	Steve	Colin	Stan	Yaap
Non-technical	Level[105] 3	Level 3	Level 4	Level 3	Level 2	Level 3	Level 2
Meta-Competences							
Literacy- for timecards/plans	*3*	*3*	*4.5*	*3*	*3*	*2*	*3*
Learning capacity * [106] -memory i.e. shown once then do without supervision	*3.5x2*	*3x2*	*4.5x2*	*4x2*	*3x2*	*2x2*	*3x2*
Analytical capabilities * -diagnostic skills	*3x2*	*3x2*	*4.5x2*	*4x2*	*3x2*	*3x2*	*2x2*
Creativity * -design & make parts for a job	*3x2*	*3x2*	*4.5x2*	*4x2*	*3x2*	*3x2*	*2x2*
Communication skills -with co-workers & manager -a little on-job with customer -following & giving information orally	*3*	*3*	*4*	*4*	*3*	*2*	*2*
Ability to co-operate with others* -Essential to co-operate with co-workers re use of machines, rubbish removal	*2x2*	*3x2*	*4x2*	*4x2*	*4x2*	*4x2*	*4x2*
Ability to adjust to change -need to cope with a range of processes -no set routine	*3*	*4*	*4*	*3*	*3*	*3*	*3*
Numeracy -measure and use calculations -use formulae & equations to solve problems	*3*	*3*	*4*	*3*	*3*	*3*	*3*
subtotal	***35***	***37***	***51.5***	***45***	***37***	***34***	***33***
Industry competences							
subtotal	***0***	***0***	***0***	***0***	***0***	***0***	***0***
Intra-organisational competences							

[105] There are five levels in the company. Level 5 = MD; level 4= Supervisor; level 3 = production & office staff; level 2 = apprentice; level 1 = labourer

[106] * = weighted as twice as important

Competences	Noel	Errol	Nat	Steve	Colin	Stan	Yaap
Knowledge about colleagues Know how to co-operate with co-workers, honesty, trust, sobriety	3	3	3	3	3	3	3
Knowledge about firm -goal = first class job -values=innovative, no waste, on time, no slackness - use strengths in work allotment	3	3	4	3	3	3	3
Subtotal	6	6	7	6	6	6	6
Total A: Non-technical Performance	41	43	58.5	51	43	40	39
Number of Non-technical competences[107]	9	10	10	10	10	7	7
1. Weighted N/T competent competence score 25%	9/10x25% 22.5	25	25	25	25	17.5	17.5
Perfect performance profile score	70	70	70	70	70	70	70
Non-technical performance score	41/70% 58.57	61.43	83.57	72.86	61.43	57.14	55.71
2. Weighted 25% Non-technical performance	14.64	15.36	20.89	18.21	15.36	14.28	13.93

Key

N/A	=not applicable	**1**	=no evidence of skill
2	=not adequate skills	**3**	=acceptable skills
4	=above average skills	**5**	= exceptional skills

** The HCI included competence ratings subsequently excluded by the O/O as not essential for certain staff as he allocated tasks according to their ability

[107] The number of competences that the individual staff member has. This includes all competences that they score 3 (acceptable/competent) or above included in their profile plus any other competences.

Table 2

Summary of production staff technical competence profiles-

(Profile variations are for machinist, precision fitter and welder)

Technical competences	Noel	Errol	Nat	Steve	Colin	Stan	Yaap
Standard technical							
Reading plans *	4x2	3x2	4x2	4x2	3x2	3x2	2x2
Using timecards *	3x2	3x2	4x2	4x2	4x2	2x2	4x2
Phone skills	N/a	N/a	3	N/a	N/a	N/a	N/a
Cash sales	N/a	N/a	4	N/a	N/a	N/a	N/a
Heavy Traffic licence		3	3	3			
sub total	14	15	26	19	14	10	12
Technical trade							
Engineering materials	3	3	4	3	3	3	3
Engineering measurement F/T&F/W*	4	4	4	3	4	3	3
Engineering core-skills E.g. safety; use, care, maintenance of handheld tools	3	3	4	3	3	3	3
Engineering drawing & design	N/a	N/a	4	N/a	N/a	N/a	N/a
Engineering machining & tool-making F/T	4	4	4	3	3	3	3
Maintenance & diagnostics in ME &F/T	3	3	4	4	3	3	3
Engineering Fabrication F/W	2	4	4	3	3	3	3
Fluid power F/T	2	2	3.5	4	2	2	2
Mechanical installation F/T & F/W	3	3	4	4	3	3	3
Welding 4711F/T & F/W	N/A	4	4	3	3	3	3
Subtotal	24	30	39.5	30	27	26	26
Unique competences							
Hydraulics • -analysing hydraulic systems -procedures & processes -construction hydraulic rams -construction hydraulic valves Machining Welding –pressure joints •	 4x2 N/a	 4x2 N/a	 4x2 4x2	 N/a 4x2	 3x2 N/a	 2x2 2x2	 3x2 2x2
Subtotal	8	8	16	8	6	8	10
Technical performance	46	53	81.5	57	47	44	48
Number of technical competences	9	12	17	13	11	10	11
Technical competent	9/17 %	70.59	100	76.47	64.71	58.82	64.71

Technical competences	Noel	Errol	Nat	Steve	Colin	Stan	Yaap
competences score	52.9						
3. Weighted technical competent competence score 75%	39.7	52.94	75	57.35	48.53	44.12	48.53
Perfect profile score	65	70	95	75	65	75	75
Technical performance score	46/65% 70.77	75.71	85.79	76	72.3	58.67	64
4. Weighting technical performance score75%	53.08	56.78	64.34	57	54.22	44	48

Key

N/A	=not applicable	**1**	=no evidence of skill
2	=not adequate skills	**3**	=acceptable skills
4	=above average skills	**5**	= exceptional skills

** The HCI included competence ratings subsequently excluded by the O/O as not essential for certain staff as he allocated tasks according to their ability

Table 3

HCI calculations

(Assumes some multi-skilled staff for flexibility)

Competence score	Noel	Errol	Nat	Steve	Colin	Stan	Yaap	Total
Total competence individual scores =1 + 3	62.21	77.94	100	82.35	73.53	61.62	66.03	523.68
5. Weighting competence score 60% weighting	**37.33**	**46.76**	**60**	**49.41**	**44.12**	**36.97**	**39.62**	
Experience score								
Total Performance rating=2 + 4	67.72	68.3	85.23	75.21	69.58	58.28	61.93	
Performance rating - 40% weighting	27.09	27.32	34.09	30.08	27.83	23.32	24.77	
Job level 25%weight (1-5) X 5[4]	15	15	20	15	15	15	10	
Variety experience 15%weight 1-5x 3[6]	3	3	6	3	3	3	3	
Years 20%weight (1-5) X 4 [7]	16	16	12	16	8	4	8	
Total experience-individual scores	**61.09**	**61.32**	**72.09**	**64.08**	**53.83**	**45.32**	**45.77**	**357.73**
6. Weighted experience score 40%	**24.44**	**24.53**	**28.84**	**25.63**	**21.53**	**18.13**	**18.31**	
Human capital Index=5 + 6	**61.77**	**71.29**	**88.84**	**75.04**	**65.65**	**55.1**	**57.93**	**475.62**

HCI average = 68

Definitions

Competence score: Is the number of competences on which an individual is rated as competent or above.

Experience score: Is the weighted values of the individual's total performance ratings, job level, years of experience, variety of positions in the organisation.

[4] 5=MD; 4=Supervisor/production; 3 =Production/Office; 2=Apprentice; 1= casual labourer

[6] number of positions held in the company – 5 = maximum 1= minimum

[7] 5= 8+ years at Company; 4=6-8years; 3= 4-6years; 2= 2-4 years; 1= 0-2 years

Table 4

HCIs for production staff

(Recalculated on current requirements)

	Noel	Errol	Nat	Steve	Colin	Stan	Yaap	Totals
Competence score								
Non technical possible 10	*90*	*100*	*100*	*100*	*100*	*70*	*70*	
X 25%	22.5	25	25	25	25	17.5	17.5	
Technical possible 17	*8/11* *72.73*	*12/13* *92.31*	*17/17* *100*	*13/13* *100*	*11/12* *91.67*	*9/13* *69.23*	*10/13* *76.92*	
X 75%	54.55	69.23	75	75	68.75	51.92	57.69	
7. Total	**77.05**	**94.23**	**100**	**100**	**93.75**	**86.73**	**75.19**	**626.95**
Experience								
Performance rating	*67.72*	*68.3*	*85.23*	*75.21*	*69.58*	*58.28*	*61.93*	
X 40%	27.09	27.32	34.09	30.08	27.83	23.32	24.77	
Job level	*3*	*3*	*4*	*3*	*3*	*3*	*2*	
X 25%	15	15	20	15	15	15	10	
Variety of experience	*1*	*1*	*2*	*1*	*1*	*1*	*1*	
X 15%	3	3	6	3	3	3	3	
Years of experience	*4*	*4*	*3*	*4*	*2*	*1*	*2*	
X 20%	16	16	12	16	8	4	8	
8. Total	**61.09**	**61.32**	**72.09**	**64.08**	**53.83**	**45.32**	**45.77**	**403.5**
HCI calculation								
Total 7 x 60%	46.23	56.54	60	60	56.25	52.04	45.11	
Total 8 x 40%	24.44	24.53	28.84	25.63	21.53	18.13	18.31	
9. Individual HCIs	**70.67**	**81.07**	**88.84**	**85.63**	**77.78**	**70.17**	**63.42**	**537.58**

HCI Average = 76.8

Table 5

Staff replacement costs

(after one year for staff of similar calibre)

	Noel	Errol	Nat	Steve	Colin	Stan	Yaap
Hourly Rate	$17	$17	22.50	$17	$17	$17	$11
Annual Wages	38,000	38,000	49,000	38,000	38,000	38,000	24,000
Productivity 10% for 6months	1,900	1,900	2,450	1,900	1,900	1,900	1,225
On-job training @$40/hr *	4hrsx25wks 4,000	5hr/25wk 5,000	20hrs 800	3hr/25 3,000	5hr/25wk 5,000	5hr/38wk 7,600	5hr/35wk & 2hr/ 9wk =193 hours 7,720
Training fees							450
Recruitment costs	400	400	400	400	400	400	400
Total replacement cost	$7,020	$7,300	3,650	5,300	$7,300	9,900	9,795

Key

* = On-job-training

The number of hours of on-job training during the first year were assigned as follows:

- Level 4 position 1 to 20 hours
- Level 3 positions 6 to 9 months at an average of 5 hours per week

Performance rating on learning capacity was used to give individual's hours:

- Rating of 2 = 5 hours per week for 9 months - 38weeks i.e.190 hours
- Rating of 3= 5 hours per week for 6months - 25 weeks i.e. 125 hours
- Rating of 3.5 = 4 hours per week for 6 months – 25 weeks i.e.100 hours
- Rating of 4 = 3 hours per week for 6 months - 25 weeks i.e. 75 hours
- Apprentice at block courses and this is taken into account

Recruitment Costs	$160
Administration and advertising	
Interview & Work Test	$240
& Reference Checking	
6 hours @$40/hr	
Total	**$400**

Table 6

Engineering pilot: Pearson correlations of HCI, organisational measure and tertiary education: (N=7)

	Organisational measure (Replacement Cost)	**Tertiary education** (Equivalent years of)
HCI	-.896	.618
HCI (multi-skilled)**	-.941	.717**
Tertiary Education	-.643	

Key

N = No of study participants

** = The supervisor had the most competence and was the most highly educated.

The first degree was a Bachelor of Divinity not a technical one.

Table 7

Engineering pilot: Individuals' HCI and replacement value 2000

Name	Nat	Steve	Errol	Colin	Noel	Yaap	Stan	Total	Average
Level	4	3	3	3	3	2	3		
Tertiary education	8	4	4	4	4	3	5		
HCI	88.84	85.63	81.07	77.78	70.67	63.42	70.17	**537.58**	**76.8**
HCI Multi	88.84	75.04	71.29	65.65	61.77	57.93	55.1	**475.62**	**67.9**
Replacement value	$3,650	$5,300	$7,300	$7,300	$7,020	$9,795	$9,900		

Table 8

Engineering pilot: Pearson correlations of competence domains and the Productivity measure

Competence domains	Organisational measure (Replacement cost)
Non-technical performance score	-.919
Technical performance score	-.774
Meta-competences	-.923
Trade/Professional	-.782
HCI	-.896

Engineering company pilot: Follow-up one year later (May 2001)

The O/O without referring back to the previous years' competence ratings re-rated the six staff still in his employment. I read out the competences and staff names and the O/O assigned a one to five rating, which I noted.

Because this is a jobbing shop where the work involves diagnosis and original development of parts on primarily one off jobs, I had predicted that staff with the highest multi-skilled HCIs the previous year would again receive higher ratings on competences. Since the previous year the changes in the nature of work had made the use of a heavy traffic license desirable for all staff and the apprentice had successfully

completed one more year of his apprenticeship. The O/O did not give a rating in 2001 on a couple of competences for some level 3 and level 2 staff that he had rated them on in 2000. He also included a rating for the competence of 'heavy traffic license' for all production staff in 2001 and an additional rating for Errol.

Table 9
Engineering pilot: Individuals' HCIs 2000 & 2001 and replacement value

Name	Nat	Steve	Errol	Colin	Noel	Yaap	Stan	Total	Average
Level	4	3	3	3	3	2	3		
Tertiary	8	4	4	4	4	3	5		
HCI Multi 2000	88.84	75.04	71.29	65.65	61.77	57.93	55.1	475.62	67.9
HCI 2001	89.25	77.26	77.77	left	63.48	66.53	54.8	429.89	71
Replacement Value	$3,650	$5,300	$7,300	$7,300	$7,020	$9,795	$9,900		

(Noel has since left.)

The 2001 HCIs have a -.859 correlation with the replacement value. There is consistency in the measure, yet adaptability to allow for a different emphasis in competences and the different development of individual's competences. The increase in the HCI of the apprentice Yaap is evidence of the increasing return on investment for the company if the apprentice stays and progresses through his training. Stan's consistently lower HCI in both years assessment although he has qualifications equivalent to the other level 3 production staff, suggests the importance of investigating the competences of the non-technical domains at the time of recruitment.

Appendix 2A Engineering pilot case study HCI

1. A times two weighting as a measure of their critical importance was assigned by the O/O to specific competences for performance score calculations.

2. A proportional weighting of 100 was given for non-technical and technical competences. This was determined by the O/O to reflect their respective importance.

3. The O/O rated the staff on all of the technical and non-technical competences on a 1-5 scale.

4. The HCI formula comprised two components that were themselves comprised of a number of components.

   The two components of the HCI are the 'competence score' and the 'experience score'. These are added and the maximum score is 100. In this example the O/O gave the 'competences score' a weighting of 60 and the 'experience score' a weighting of 40.

5. The 'competence score' consists of two components a weighted score in this case of 75 per cent for technical competences and a weighted score of 25 per cent for non-technical competences.

   Competences that are rated as 3 or more are judged as 'competent'. A percentage of the number of 'competent' competences divided by the potential number was calculated individually for the technical and non-technical competences. These two numbers were then multiplied with their respective weightings (75 and 25) and added to produce a 'competence score' out of one hundred.

   This score was then multiplied by 60 per cent and added to the 'experience score'

6. The 'experience score' was made up of four components each assigned a weighting for their considered importance by the O/O. These components are:

   a. Job level - 25 per cent

   b. Performance rating - 40 per cent

   c. Variety of experience (i.e. number of job roles in the company) - 15 per cent

   d. Years of experience in the company - 20 per cent

7. Job levels were assigned a number on a 1 to 5 scale. The range in this exercise was 4 to 2, supervisor, tradesman and apprentice. This was converted into a score out of 25.

8. Performance ratings consisted of a performance score for technical and one for non-technical that were weighted as above 75 per cent technical and 25 per cent non-technical and added together.

   The performance score was developed from the raw score for performance ratings as a percentage of the maximum score possible if staff had received five ratings on each competence.

9. Variety of experience - the number of job roles in the company was converted into a scale of one - five and converted by multiplying by 3 into a score out of 15. It was hypothetically possible to have five roles in this company - reflected in the levels where 1 = the workshop cleaner through to 5 which was the O/O. Only one person had had more than one role in this company and that was the supervisor who had had two.

10. The number of years of experience in the company were converted into a five-point scale: 5 = eight or more years, 4 = six to eight years, 3 = four to six years, 2 = two to four years, and 1 = up to two years. The range in this sample was from less than one year up to six years of experience, i.e. ratings of 1 to 4. This score was then multiplied by four and calculated as a number out of 20.

11. The four components above were added together and multiplied by 40 % to become the experience score.

12. The competence score and the experience score for each individual were added together to become the individual's HCI.

13. The individual HCIs can be added together and divided by the number of individuals to get the group HCI.

Appendix 3. HCI calculation

(Case Studies other than the pilot engineering case study)

The HCI is:

$$\frac{(\%\ T\ \&\ NT\ competent\ competences) + (\%\ T\ \&\ NT\ competences\ performance)}{2}$$

Key: T= technical, NT = non-technical. Both T & NT have proportional weightings out of 100.

The HCI calculation

1. Competences are rated with a number from 1 –5, by each of the raters of the employee in the 360-degree competence feedback process. These are then averaged.

The 'competences performance score' is calculated as follows:

2. Means of the competences are correlated with the given organisational productivity measure(s), using a non-parametric two –tailed Spearman rho analysis of variance.

3. The group of competences with a strong positive correlation (.7 or more) is identified. Mean ratings for each employee's non-technical and technical strong positively correlated competences are added to create respective competence performance subtotals.

4. For each employee these two subtotals are converted to a percentage of a perfect score. This is done by dividing the subtotal above, by the maximum potential performance score (i.e. the number of competences x 5) and then converting this to a percentage.

E.g. Non-technical: 30/40 x 100% = 75%

Technical: 20/25 x 100% = 80%

5. Non-technical and technical competences are given proportional weightings out of 100, which are determined by the organisation based on their perceived respective values. For example, if the non-technical competences are regarded as more important than the technical competences the weightings might be non-technical 60 and technical 40.

E.g. Non-technical: 75% x 60 = 45%

Technical: 80% x 40 = 32%

6. The competences performance score is these two percentages added together.

E.g. Competence performance score= 45% + 32% = 77%

The 'competent competences score' is calculated as follows:

7. The number of non-technical and technical 'competent' competences (i.e. a feedback score of 3 or more) is divided by their respective total number of competences and converted to a percentage.

E.g. Non-technical: 7/8 = 87.5%

Technical: 4/5= 80%

8. The same technical and non-technical proportional weightings are used as previously, to convert this into a weighted percentage.

E.g. Non-technical: 87.5% x 60 = 52.5%

Technical: 80% x 40 =32%

9. The competent competences score is these two scores above added together.

E.g. Competent competences score = 52.5% + 32% = 84.5%

10. The two percentage scores 'competences performance' score and 'competent competences' score are added together and divided by two to give a number out of one hundred. The result is the HCI for the individual that is converted into a ten-point band.

E.g. HCI= 77% + 84.5%/2 =80.75

HCI= 80.75

HCI Band = 75.75-85.75

A weighted HCI (HCIW)

A weighted HCI (HCIW) is calculated in the same way. The difference is that the performance percentage is calculated including the scores given a double weighting (i.e. maximum score is 10 instead of 5) because of their critical importance to the organisation.

Acknowledge context

It is recommended that the individual's HCI be considered in relation to the strength of the correlation with the organisational productivity measure. Further validation of this procedure with larger samples is still to be done.

E.g. Individual HCI= 85.75%

(This competence profile has a correlation of .800 with the organisational measure(s) on a sample of X).

HCI Bands

Banding the HCIs of individuals is recommended for decision-making as an apparent precise number such as HCI=85.75% suggests a level of precision not possible with this calculation currently. The case studies were all initially presented with a fixed 10-point range band. For example: 61-70%[108] , 71-80%, 81-90%, 91-100%.

In this instance the HCI would be presented as:

HCI Band (fixed) = 81 – 90%

Subsequently, after further consideration, the following flexible 10-point band was applied to the law firm HCIs and recommended for future application.

A ten-point band presented as plus or minus 5 is recommended.

E.g. HCI Band = 75.75% - 85.75

Group HCIs

A group HCI measure is calculated by adding the individuals' HCIs and then dividing the total by the number of group members.

[108] In practice this would be measures from 70.1%-80% and 80.1% - 90 etc.

E.g. 80 + 82 + 76 + 68 + 90.5 + 90 + 77 + 78 + 85.5 + 88=815

815/10=81.5

E.g. Group HCI = 81.5

Group HCI Band

Group banding is also recommended for group HCI measures. The same plus or minus five ten-point band should be used as for the individual measures.

E.g. Group HCI Band = 76.5 - 86.5.

Appendix 4. Information sheet

Massey University
COLLEGE OF BUSINESS

Department of Human Resource Management
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099

Information Sheet
'Human capital links to productivity', research project

Scope of the study

I am Heather Lees, a full time student in the Massey University Department of Human Resource Management carrying out exploratory research on whether competences[1] can be the basis of a valid measure for the value of people in the workplace. This involves giving a group of employees a rating on identified competences. These scores are then clustered, weighted and analysed for any relationship with existing organisational measures.

My contact person in your organisation identified your work role, because it has some existing productivity/organisational measures potentially relevant to this study. Therefore, I sincerely invite you to take part in this research.

Participation

If you agree to participate as one of the group, this will involve you in completing a competence feedback form on yourself. This will take you about 10 minutes. You will be given a stamped and addressed envelope, to return the form directly to me.

People in other positions will be asked to fill in the same competence feedback form on you. These people are: your manager, an employee with a similar position, and an employee that reports to you. They will also have given consent to the contact person to contribute to the performance feedback process, and will be identified for me, only by their position. They will return their forms in the provided stamped and addressed envelopes directly to me. Only results averaged from all the forms will appear in any summary report back to you and the organisation.

You also need to agree to my receiving employment data such as your age, gender, years of work experience, your number of positions in the company, and involvement in and qualifications in training and tertiary education, from your personnel files. Once the competence feedback forms and the personnel data are grouped together, the name of each member in the sample will be changed to protect your privacy. After the research

1 competences = a cluster of related skills, knowledge, aptitudes and attitudes that are needed to effectively perform a role in an organisation

assistant, (who has signed a confidentiality agreement) and myself have entered data into a database, the original forms will be destroyed.

Results

The result of this research will be used for my thesis and any subsequent publications and seminars but there will be no identification of the organisation, nor the employees involved. In addition to these documents that are available to you, you and your organisation will be given a summary report of the research findings.

This is exploratory research that is looking for patterns and links between competences and organisational results with only small numbers of people, in different roles, in a number of very different organisations. Therefore these competences and this process cannot be the basis for any human resource decision-making, whatever the results of the study, without further development and further trials. However, your involvement could be a first step in looking at more meaningful ways to value the skills and knowledge of people in the workforce.

Consent form

As a member of the sample you will be asked to sign a consent form because it is your right to decline if you do not wish to take part. I have been assured by your organisation that there will be no consequences for you whether you choose to, or choose not to, take part. Obviously for me, I would really appreciate your involvement so that I can get sufficient numbers to look at patterns of responses. Your rights are set out below.

- You can decide to decline the invitation to participate in this study
- If there are any items on the competence feedback form that you don't wish to complete, you may decline to complete them.
- You can withdraw from the study at any time up until one week after you have sent in your competence survey form
- You may ask any questions about the study, at any time during the study
- You are providing information on the understanding that your name will not be used
- You will be given access to a summary of the findings of the study when it is concluded

Supervision of Researcher

This project has been reviewed and approved by the Massey University Human Ethics Committee, PN Protocol 01/27. This is to ensure that you and your organisation are not disadvantaged in anyway, by being involved.

I am being supervised for this doctoral research project by two Massey University staff, Dr. Paul Toulson and Dr. Su Olsson, who are both based at Palmerston North. Contact details for the three of us are below. If you have any questions or concerns about the project let us know.

I hope that you will participate, and thank you very much for your consideration.

Heather Lees
Ph 021 125 2159
Email: sagelees@ihug.co.nz

Supervisors at Massey University, Palmerston North
Dr. Paul Toulson
Dept. of Human Resource Management
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Ph 06 350 4290

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Te Kunenga ki Pūrehuroa

Inception to Infinity: Massey University's commitment to learning as a life-long journey

Appendix 4A Personnel data form

1. **First Name**

2. **Position**

3. **Level**

4. **Age**

5. **Gender**

6. **Work Experience**

    6.1 With your present organization

        6.1.1 Number of years in current position

        6.1.2 List any other positions in this company – and the years in each one

    6.2 Outside this organization

        6.2.1 List any jobs that were the same as your present one, or in the same type of industry or profession – and the years in each one

        6.2.2 What are your total number of years of experience in the workforce?

7. **Tertiary Education & Training**

    7.1 Equivalent years of tertiary education

    7.2 Tertiary qualification

    7.3 Training and Development courses attended, year and any qualifications

8. **Organisational Measures**

Appendix 5. Bank: CSR competences using Nordhaug typology

Non-technical	
Meta-competences	
Reading and writing skills are sufficient for job requirements	
Very skilled verbal communication suited to the everyday language of the broad base of customers, team and management. Enthusiastic, friendly, fluent, clear speaking.	X2
Very good listening skills	X2
Time management	
Consistent methodical work performance	
Able to organise self to meet personal goals	
Able to do basic arithmetic calculations	
Accurate attention to details	X2
Able to cope with a moderate pace of on-going development of systems and information	
Intra-organisational	
Responds positively to the highly structured performance monitoring and feedback system	X2
Displays sustained interest and initiative with the CSR role	
Works co-operatively and comfortably as part of a very large team	
Flexible use of the approach, problem solving strategies and products for good service to the range of customers	
Knows when to seek help and from who, and in addition who to assist	
Understands the structure and culture of the X Bank	
Values being associated with the corporate image of the Bank as a leading, successful organisation (this is evident in their pride and loyalty)	
Begins problem solving strategies quickly and fluently based only on verbal information	X2
Personal goals fit the requirements of the CSR role	
Industry	
Able to cope with the physical work environment	
Responds well to highly structured, time bound workday- including rosters	X2
Able to handle the intensity of work associated with a call centre	X2
Appearance, suited to a call centre in the banking industry	
Has a general overview of the competitors in the industry	
Able to retain information on new products and systems	X2
Displays resilience by sustained enthusiasm when dealing with customer complaints and problems	
Technical	
Standard technical	
Good keyboard skills	
Can work in a windows environment: specifically outlook, word and email	
Trade/Professional	
Understands international currency rates and changes	
Understanding and practices sales and service techniques	
Unique	
Has a thorough understanding of the relevant X Bank's products and services	
Able to navigate through the X Bank's software for call centre banking systems	X2
Can efficiently use the X Bank's telephone system	
Has a good understanding of the various X applications: i.e. TELLER, HBTE, OSCAR	X2

Appendix 6. Bank: CSR competences feedback form

Feedback on: _____ **Your first name:**_____

Your position_____

Directions

For each of the items below please **circle the number** that best represents your opinion of his/her competence. If there is a comment that you wish to add, please feel free to do so. A "not applicable " category, **(N/A)** has been included. If you have not been in a situation to observe or experience a competence, circle this. **If you do not wish to give a rating for a particular competence, do no circle.**

Key

N/A	= not applicable	**1**	= no evidence of competence	**2**	= not adequate competence
3	= acceptable competence	**4**	= above average competence	**5**	= exceptional competence

Non Technical

Communication Reading and writing skills are sufficient for job requirements	N/A 1 2 3 4 5
Very skilled verbal communication suited to the everyday language of the broad base of customers, team and management. Enthusiastic, friendly, fluent, clear speaking.	N/A 1 2 3 4 5
Very good listening skills	N/A 1 2 3 4 5
Numeracy Able to do basic arithmetic calculations	N/A 1 2 3 4 5
Time management	N/A 1 2 3 4 5
Self –management Consistent methodical work performance	N/A 1 2 3 4 5
Able to organise self to meet personal goals	N/A 1 2 3 4 5
Accurate attention to details	N/A 1 2 3 4 5
Able to handle the intensity of work associated with a call centre	N/A 1 2 3 4 5
Responds positively to the highly structured performance monitoring and feedback system	N/A 1 2 3 4 5
Knows when to seek help and from who, and in addition who to assist	N/A 1 2 3 4 5
Able to cope with the physical work environment	N/A 1 2 3 4 5
Displays resilience by sustained enthusiasm when dealing with customer complaints and problems	N/A 1 2 3 4 5
Responds well to a highly structured, time bound work day- including rosters	N/A 1 2 3 4 5
Customer service Begins problem solving strategies quickly and fluently based only on verbal information	N/A 1 2 3 4 5
Displays sustained interest and initiative with the CSR role	N/A 1 2 3 4 5
Flexible use of the approach, problem solving strategies and products for good service to the range of customers	N/A 1 2 3 4 5
Team work	N/A 1 2 3 4 5

Works co-operatively and comfortably as part of a very large team	
Learning capability Able to cope with a moderate pace of on-going development of systems and information	N/A 1 2 3 4 5
Able to retain information on new products and systems	N/A 1 2 3 4 5
Cultural fit Personal goals fit the requirements of the CSR role	N/A 1 2 3 4 5
Values being associated with the corporate image of the Bank as a leading, successful organisation (this is evident in their pride and loyalty)	N/A 1 2 3 4 5
Understands the structure and culture of the X Bank	N/A 1 2 3 4 5
Appearance suited to a call centre in the banking industry	N/A 1 2 3 4 5
Has a general overview of the competitors in the banking industry	N/A 1 2 3 4 5

Comments on any of the above

Technical

Good keyboard skills	N/A 1 2 3 4 5
Can work in a windows environment: specifically outlook, word and email	N/A 1 2 3 4 5
Understands international currency rates and changes	N/A 1 2 3 4 5
Understands and practices sales and service techniques	N/A 1 2 3 4 5
Can efficiently use the X Bank telephone system	N/A 1 2 3 4 5
Has a thorough understanding of the relevant ASB Bank Products and services	N/A 1 2 3 4 5
Able to navigate through the X Bank's software for call centre banking systems	N/A 1 2 3 4 5
Has a good understanding of the various X applications. i.e. TELLER, HBTE,OSCAR	N/A 1 2 3 4 5

Comments on any of the above

Please put this form into the stamp addressed envelope provided and post it.

Appendix 7. Bank:CSR competences means and standard deviations

Competences	Stan	Alison	Yvonne	Alex	Nelly	Ada	Ina	Kelly	Nina	Ernest	Yaap
Good keyboard skills	3.67	3.33	5.00	3.67	4.00	4.00	4.00	4.00	4.00	4.00	2.50
	.58	.58	.00	.58	.00	.00	.00	.00	1.00	1.00	.71
Can work in a windows environment: specifically outlook, word and email	4.00	3.33	4.67	3.67	4.00	4.33	4.00	4.00	4.00	4.33	2.50
	.00	.58	.58	.58	.00	.58	.00	.00	1.00	.58	.71
Understands international currency rates and changes	4.00	3.67	4.33	3.67	4.00	5.00	4.00	4.33	4.33	4.33	3.67
	1.00	.58	.58	.58	.00	.00	.00	.58	.58	.58	1.53
Understands & practices sales & service techniques	4.00	3.00	5.00	4.33	3.67	4.67	5.00	3.33	4.33	4.00	5.00
	.00	.00	.00	.58	.58	.58	.00	.58	.58	.00	.00
Weighted	8.00	6.00	10.00	8.66	7.34	9.34	10.00	6.66	8.66	8.00	10.00
	.00	.00	.00	1.15	1.15	1.15	.00	1.15	1.15	.00	.00
Can efficiently use the X Bank telephone system	4.33	3.33	4.33	4.33	3.67	4.67	4.67	4.33	4.00	4.33	3.67
	.58	.58	.58	.58	.58	.58	.58	.58	1.00	.58	1.15
Has a thorough understanding of the relevant X Bank's products and services	4.00	3.67	4.33	3.67	3.67	5.00	4.67	4.33	4.67	4.33	4.33
	.00	1.15	.58	.58	.58	.00	.58	.58	.58	.58	.58
Able to navigate through the X Bank's software for call centre banking systems	4.33	3.33	4.67	3.67	3.67	4.67	4.00	4.33	4.00	4.33	4.00
	.58	.58	.58	.58	.58	.58	.00	.58	1.00	.58	1.00
Weighted	8.67	6.67	9.33	7.34	7.33	9.33	8.00	8.67	8.00	8.67	8.00
	1.15	1.15	1.15	1.15	1.15	1.15	.00	1.15	2.00	1.15	2.00
Has a good understanding of the various X applications: i.e. TELLER, HBTE, OSCAR	4.33	4.00	4.67	3.33	4.67	4.67	4.00	4.33	4.33	4.33	3.67
	.58	.00	.58	1.15	.58	.58	.00	.58	1.15	.58	1.53
Weighted	8.67	8.00	9.33	6.67	9.33	9.33	8.00	8.66	8.33	8.67	7.34
	1.15	.00	1.15	2.31	1.15	1.15	.00	1.15	2.31	1.15	3.06
Reading & writing skills are sufficient for job requirements	3.67	4.33	4.67	4.00	4.00	4.33	4.33	3.67	4.33	4.00	4.33
	.58	.58	.58	.00	1.00	.58	.58	.58	.58	1.00	.58
Very skilled verbal communication suited to the everyday language of the broad base of customers, team & management. Enthusiastic, friendly, fluent, clear speaking	4.00	3.67	4.67	4.67	4.00	5.00	4.00	4.00	4.67	4.00	5.00
	.00	.58	.58	.58	.00	.00	.00	.00	.58	1.00	.00
Weighted	8.00	7.34	9.34	9.33	8.00	10.00	8.00	8.00	9.34	8.00	10.00
	.00	1.15	1.15	1.15	.00	.00	.00	.00	1.15	2.00	.00
Able to do basic arithmetic calculations	4.00	3.50	4.67	3.67	4.00	4.33	4.50	4.33	4.67	4.00	4.67

Competences	Stan	Alison	Yvonne	Alex	Nelly	Ada	Ina	Kelly	Nina	Ernest	Yaap
	.00	.71	.58	.58	.00	.58	.71	.58	.58	1.00	.58
Consistent methodical work performance	4.00	3.67	4.33	4.33	4.33	4.33	4.33	3.00	4.67	3.67	5.00
	.00	.58	.58	.58	.58	.58	.58	.00	.58	1.53	.00
Able to organise self to meet personal goals	4.00	3.00	4.67	4.33	4.00	4.00	5.00	3.00	4.67	3.00	5.00
	.00	.00	.58	.58	.00	.00	.00	.00	.58	1.00	.00
Accurate attention to details	4.00	3.33	4.67	4.00	4.00	5.00	4.33	4.00	4.67	4.00	4.33
	.00	.58	.58	.00	.00	.00	.58	.00	.58	1.00	1.15
Weighted	8.00	6.66	9.34	8.00	8.00	10.00	8.66	8.00	9.34	8.00	8.66
	.00	1.15	1.15	.00	.00	.00	1.15	.00	1.15	2.00	2.31
Responds positively to the highly structured performance monitoring and feedback system	4.00	3.00	4.67	4.33	3.67	4.33	5.00	3.33	4.67	3.67	4.33
	.00	.00	.58	.58	.58	.58	.00	.58	.58	.58	.58
Weighted	8.00	6.00	9.34	8.66	7.33	9.33	10.00	6.66	9.34	7.34	8.66
	.00	.00	1.15	1.15	1.15	1.15	.00	1.15	1.15	1.15	1.15
Knows when to seek help and from who, and in addition who to assist	3.67	3.33	4.67	4.33	4.00	4.67	4.67	4.33	3.33	4.00	4.33
	.58	.58	.58	.58	.00	.58	.58	.58	1.15	1.00	.58
Very good listening skills	4.00	4.00	4.67	4.00	4.00	5.00	5.00	4.00	4.67	4.00	4.67
	1.00	.00	.58	.00	1.00	.00	.00	.00	.58	1.00	.58
Weighted	8.00	8.00	9.34	8.00	8.00	10.00	10.00	8.00	9.34	8.00	9.34
	2.00	.00	1.15	.00	2.00	.00	.00	.00	1.15	2.00	1.15
Time management	4.33	3.50	4.33	3.67	4.00	4.33	4.00	3.00	4.67	3.33	4.67
	.58	.71	.58	.58	1.00	.58	.00	.00	.58	1.15	.58
Able to retain information on new products and systems	4.33	4.33	4.50	3.67	3.67	4.00	4.00	4.33	4.00	4.16	4.00
	.58	.58	.71	.58	.58	.00	.00	.58	1.00	.76	1.00
Weighted	7.33	7.34	9.34	8.00	8.00	9.34	9.34	8.00	8.00	8.66	8.67
	1.15	2.31	1.15	2.00	.00	1.15	1.15	.00	2.00	2.31	2.31
Able to cope with the physical work environment	3.33	3.33	4.67	4.00	4.33	4.00	4.67	4.00	4.33	4.00	4.00
	.58	.58	.58	.00	.58	1.00	.58	.00	.58	1.00	.00
Displays resilience by sustained enthusiasm when dealing with customer complaints & problems	3.67	3.33	4.33	3.67	3.67	5.00	4.67	4.00	4.33	4.33	5.00
	.58	.58	.58	.58	1.15	.00	.58	.00	.58	1.15	.00
Responds well to a highly structured time-bound work day including rosters	3.67	3.50	4.33	3.33	3.67	4.00	4.50	3.33	4.00	3.67	4.67
	.58	.71	.58	1.15	.58	.00	.71	.58	1.00	.58	.58
Weighted	7.34	7.00	8.66	6.67	7.34	8.00	9.00	6.66	8.00	7.34	9.34
	1.15	1.41	1.15	2.31	1.15	.00	1.41	1.15	2.00	1.15	1.15

Competences	Stan	Alison	Yvonne	Alex	Nelly	Ada	Ina	Kelly	Nina	Ernest	Yaap
Begins problem solving strategies quickly & fluently based only on verbal information	4.00	4.00	4.33	4.00	4.00	4.67	4.33	4.00	4.33	4.67	4.67
	.00	1.00	.58	.00	.00	.58	.58	.00	.58	.58	.58
Weighted	8.00	8.00	8.66	8.00	8.00	9.34	8.66	8.00	8.66	9.34	9.34
	.00	2.00	1.15	.00	.00	1.15	1.15	.00	1.15	1.15	1.15
Displays sustained interest and initiative with the CSR role	4.00	3.33	4.33	4.00	4.00	3.67	4.33	3.33	4.67	4.00	4.67
	.00	.58	.58	.00	.00	.58	.58	.58	.58	1.00	.58
Flexible use of the approach, problem solving strategies and products for good service to the range of customers	4.33	3.67	4.33	4.00	3.67	3.67	4.67	3.67	4.67	4.33	4.33
	.58	.58	.58	.00	.58	.58	.58	.58	.58	.58	1.15
Works co-operatively and comfortably as part of a very large team	4.33	4.00	5.00	4.33	4.33	5.00	4.67	4.00	4.67	4.33	4.50
	.58	.00	.00	.58	1.15	.00	.58	.00	.58	.58	.71
Able to cope with a moderate pace of on-going development of systems and information	4.33	4.00	4.33	3.67	4.00	4.00	4.00	4.00	4.00	4.67	3.00
	.58	1.00	.58	.58	.00	.00	.00	.00	1.00	.58	1.41
Weighted	8.66	8.66	9.00	7.34	7.34	8.00	8.00	8.66	8.00	8.32	8.00
	1.15	1.15	1.41	1.15	1.15	.00	.00	1.15	2.00	1.53	2.00
Personal goals fit the requirements of the CSR role	4.00	3.67	4.33	4.33	4.00	4.67	4.67	4.00	4.67	3.67	4.33
	1.00	.58	.58	.58	.00	.58	.58	1.00	.58	1.53	.58
Values being associated with the corporate image of the Bank as a leading, successful organisation (this is evident in their pride & loyalty)	4.00	3.67	4.33	4.00	4.00	4.67	5.00	4.33	4.67	3.67	5.00
	.00	.58	.58	.00	.00	.58	.00	.58	.58	.58	.00
Understands the structure & culture of the X Bank	4.00	3.33	4.33	4.33	4.00	4.67	4.67	4.67	4.67	4.33	4.00
	.00	.58	.58	.58	1.00	.58	.58	.58	.58	1.15	1.41
Appearance suited to a call centre in the banking industry	4.33	3.33	4.33	4.67	4.33	5.00	4.67	4.67	4.33	4.67	4.67
	.58	.58	.58	.58	1.15	.00	.58	.58	1.15	.58	.58
Has a general overview of the competitors in the banking industry	3.00	3.00	4.00	3.67	4.00	3.67	4.00	4.67	4.00	4.33	3.50
	.00	.00	1.00	.58	1.00	.58	.00	.58	1.00	.58	.71

Key

1st line = mean

2nd line = standard deviation

Appendix 8. Bank: CSR tables

Table 1

Bank: CSR competences with a positive correlation – (but less than .700) with productivity measures (N: 11)

Type	Competence	Sales	Customer Care	Productivity	First quarter 2001 1	Sales	Customer Care	Productivity	Second quarter 2001
NT & M	Time management	.627	.407	.416	.581	.555	.445	.521	.520
NT, Ind & W	Responds well to a highly structured, time bound work day- including rosters	.637	.337	.357	.515	.644	.387	.348	.400
NT & Ind	Responds well to a highly structured, time bound work day- including rosters	.618	.313	.324	.475	.636	.355	.316	.368
NT & Intr	Values being associated with the corporate image of the bank as a leading, successful organisation (this is evident in their pride and loyalty)	.591	.595	.291	.551	.548	.574	.294	.398
NT & M	Very skilled verbal communication suited to the everyday language of the broad base of customers, team and management. Enthusiastic, friendly, fluent, clear speaking	.332	.407	.162	.420	.159	.621	.443	.425
NT, M & W	Very skilled verbal communication suited to the everyday language of the broad base of customers, team and management. Enthusiastic, friendly, fluent, clear speaking	.337	.385	.141	.393	.189	.592	.430	.410
NT, M & W	Very good listening skills	.555	.449	.090	.508	.366	.532	.101	.186
NT & Intr	Works co-operatively and comfortably as part of a very large team	.487	.433	.162	.515	.377	.516	.274	.303
NT & M	Able to do basic arithmetic calculations	.452	.448	.219	.334	.582	.441	.412	441
NT, M & W	Accurate attention to details	.409	.416	.060	.412	.305	.505	.232	.257
NT & M	Reading and writing skills are sufficient for job requirements	.337	.276	.071	.328	.234	.494	.146	.195
NT & Ind	Able to cope with the physical work environment	.140	.446	.428	.365	.576	.325	.276	.398
NT & Ind	Displays resilience by sustained enthusiasm when dealing with customer complaints and problems	.399	.228	.010	.274	.289	.362	.136	.164

Type	Competence	Sales	Customer Care	Productivity	First quarter 2001 1	Sales	Customer Care	Productivity	Second quarter 2001
Tech & Uni	Can efficiently use the X bank telephone system	.258	.308	-.251	.220	-.065	.243	-.140	-.133
NT & Ind	Able to handle the intensity of work associated with a call centre	.210	.231	-.034	.216	.183	.371	.014	.076
NT & Intr	Knows when to seek help and from who, and in addition who to assist	.182	.351	-.112	.214	.040	.411	-.052	.014
NT & Ind	Able to handle the intensity of work associated with a call centre	.206	.221	-.045	.208	.181	.341	.041	.067
Tech & Uni	Has a thorough understanding of the relevant X bank products and services	.350	.234	-.178	.202	.176	.282	-.038	-.014
NT & Intr	Understands the structure and culture of the X bank	.105	.388	-.134	.180	.050	.333	-.029	.022
NT, Intr & W	Begins problem solving strategies quickly and fluently based only on verbal information	.259	-.039	-.082	.107	.133	.196	.098	.068
NT & Ind	Appearance suited to a call centre in the banking industry	.064	.115	-.169	.088	-.161	.233	-.094	-.072

Key

Tech = Technical competence

NT = Non technical competence

Uni = Unique

N = The number of study participants

M = Meta-competence

T/P =Trade / Professional

W = Weighted

Intr = Intra-organisational

Table 2

Bank: CSR competences with a negative correlation with one or both quarterly measures (N: 11)

Type	Competence	Sales	Customer Care	Productivity	First quarter 2001 1	Sales	Customer Care	Productivity	Second quarter 2001
Tech, Uni & W	Has a good understanding of the various X applications. I.e. TELLER, HBTE, OSCAR	-.438	-.495	-.435	-.484	-.266	-.550	-.465	-.510
Tech & Uni	Has a good understanding of the various X applications. I.e. TELLER, HBTE, OSCAR	-.442	-.421	-.400	-.447	-.226	-.477	-.432	-.460
NT, Ind & W	Able to retain information on new products and systems	-.019	-.215	-.603	-.447	-.243	-.202	-.214	-.341
NT & M	Able to cope with a moderate pace of on-going development of systems and information	-.180	-.397	-.407	-.408	-.153	-.501	-.256	-.372
Tech & T/P	Understands international currency rates and changes	-.264	-.205	-.527	-.342	-.262	-.196	-.335	-.386
NT & Ind	Has a general overview of the competitors in the banking industry	-.420	-.066	-.083	-.313	.045	-.186	-.094	-.061
Tech & Std	Can work in a windows environment: specifically outlook, word and email	-.216	-.182	-.416	-.263	-.174	-.207	-.260	-.319
Tech & Uni	Able to navigate through the X bank's software for call centre banking systems	.056	-.061	-.527	-.209	-.169	-.022	-.136	-.242
Tech, Uni & W	Able to navigate through the X bank's software for call centre banking systems	.082	-.023	-.526	-.181	-.178	.026	-.108	-.218
Tech & Std	Good keyboard skills	-.260	.017	-.193	-.164	.028	-.087	-.171	-.148

Key

Tech = Technical competence

NT = Non technical competence

Uni = Unique

N = The number of study participants

M = Meta-competence

T/P =Trade / Professional

Std = Standard technical

W = Weighted competence

Intr = Intra-organisational

Ind = Industry

Table 3

Bank: CSR correlations of the Nordhaug domains and technical/ non technical totals with productivity measures (N: 11)

Nordhaug's Domains Totals	Sales	Customer Care	Productivity	First quarter 2001 1	Sales	Customer Care	Productivity	Second quarter 2001
Non Technical Total	.603	.603	.381	.655	.570	.662	.440	.510
Meta-competence	.521	.598	.410	.618	.547	.672	.578	.607
Intra-organisational	.584	.664	.440	.674	.631	.687	.506	.581
Industry	.327	.236	.048	.223	.339	.320	.092	.154
Technical Total	.172	.137	-.253	.082	.076	.087	-.097	-.120
Standard Technical	-.286	-.164	-.382	-.270	-.158	-.173	-.278	-.304
Trade/Professional	.513	.382	.062	.460	.309	.504	.234	.244
Unique	.101	.088	-.395	-.018	-.060	.019	-.259	-.274

Key

N = The number of study participants

Appendix 9. Bank: CSO competences using the Nordhaug typology

Non-technical
Meta-competences
Reading and writing skills are sufficient for job requirements
Very skilled verbal communication suited to the everyday language of the broad base of customers, team and management.
Able to handle the work pressures associated with dealing with the public
Consistent methodical work performance
Able to organise self to meet personal goals
Able to do basic arithmetic calculations
Accurate attention to details-e.g. slips, forms, data entry X2
Able to cope with a moderate pace of on-going development of systems and information
Enjoys engaging customers in conversation to try and help them X2
Intra-organisational
Responds positively to the structured performance measurement feedback system
Displays sustained interest and initiative with the CSO role
Works co-operatively as part of a team
Flexible use of the approach, problem solving strategies and products for good service to the range of customers
Knows when to seek help and from who, and in addition who to assist
Understands the structure and culture of the X Bank
Values being associated with the corporate image of the Bank as a leading, successful organisation (this is evident in their pride and loyalty)
Personal goals fit the requirements of the CSO role
Is comfortable with the repetitive aspects of the CSO role X2
Industry
Professional appearance, suited to the banking industry
Has a general overview of the competitors in the industry
Able to retain information on new products and systems
Displays resilience by sustained enthusiasm for a job with a high ratio of approaches to successful referrals X2
Technical
Standard Technical
Reasonable keyboard skills
Can work in a windows environment: specifically outlook, word and email
Trade/Professional
Understands international currency rates and changes
Understanding and practices sales and service techniques-e.g. tag-on's & hot leads X2
Unique
Has a thorough understanding of the relevant X Bank's products and services X2
Able to navigate through the X Bank's software for frontline-banking systems-e.g. Teller, HBTE, Onyx

Appendix 10. Bank: CSO competence feedback form

X Bank Research Project

Competence Feedback for CSO's

Feedback on: _____ **Your first name:**_____

Your position_____

Directions

For each of the items below please circle the number that best represents your opinion of his/her competence. If there is a comment that you wish to add, please feel free to do so. A "not applicable " category, (N/A) has been included. If you have not been in a situation to observe or experience a competence, circle this. If you do not wish to give a rating for a particular competence, do no circle.

Key

N/A	= not applicable	**1**	= no evidence of competence	**2**	= not adequate competence
3	= acceptable competence	**4**	= above average competence	**5**	= exceptional competence

Non Technical

Communication Reading and writing skills are sufficient for job requirements	N/A 1 2 3 4 5
Verbal communication is suited to the everyday language of the broad base of customers, team and management	N/A 1 2 3 4 5
Numeracy Able to do basic arithmetic calculations	N/A 1 2 3 4 5
Self –management Consistent methodical work performance	N/A 1 2 3 4 5
Able to organise self to meet personal goals	N/A 1 2 3 4 5
Accurate attention to details-e.g. slips, forms, data entry	N/A 1 2 3 4 5
Able to handle the work pressures associated with dealing with the public	N/A 1 2 3 4 5
Responds positively to the structured performance and measurement feedback system	N/A 1 2 3 4 5
Knows when to seek help and from who, and in addition who to assist	N/A 1 2 3 4 5
Is comfortable with the repetitive aspects of the CSO role	N/A 1 2 3 4 5
Displays resilience by sustained enthusiasm for a job with a high ratio of approaches to successful referrals	N/A 1 2 3 4 5
Customer service Enjoys engaging customers in conversation to try and help them	N/A 1 2 3 4 5
Displays sustained interest and initiative within the CSO role	N/A 1 2 3 4 5
Flexible use of the approach, problem solving strategies and products for good service to the range of customers	N/A 1 2 3 4 5

Team work Works co-operatively as part of a team	N/A 1 2 3 4 5
Learning capability Able to cope with a moderate pace of on-going development of systems and information	N/A 1 2 3 4 5
Able to retain information on new products and systems	N/A 1 2 3 4 5
Cultural fit Personal goals fit the requirements of the CSO role	N/A 1 2 3 4 5
Values being associated with the corporate image of the Bank as a leading, successful organisation (this is evident in their pride and loyalty)	N/A 1 2 3 4 5
Understands the structure and culture of the X Bank	N/A 1 2 3 4 5
Professional appearance suited to the banking industry	N/A 1 2 3 4 5
Has a general overview of the competitors in the banking industry	N/A 1 2 3 4 5

Comments on any of the above

Technical

Reasonable keyboard skills	N/A 1 2 3 4 5
Can work in a windows environment- e.g. Outlook, Word, email	N/A 1 2 3 4 5
Understands international currency rates and changes	N/A 1 2 3 4 5
Understands and practises sales and service techniques e.g. tag-on's & hot leads	N/A 1 2 3 4 5
Has a thorough understanding of the relevant X Bank products and services	N/A 1 2 3 4 5
Able to navigate the way through the X Bank's software for frontline banking systems. e.g.. Teller, HBTE, Onyx	N/A 1 2 3 4 5

Comments on any of the above

Please put this form into the stamp addressed envelope provided and post it.

Appendix 11. Bank: CSO productivity measures

'Key product referrals' involve open and closed referrals. The CSOs have a given key performance indicator (KPI) of the number of open referrals per month and a target for closed referrals per month. When a CSO does not achieve the open referrals target but achieves an average of 100 per cent or over on the target for closed referrals, the KPI is taken as achieved. I received these results as a mixture of percentages and numbers. Some included details of both the open and closed referrals; others only gave the results of one unidentified type. After further consultation with the contact person we decided to interpret the provision of only one percentage result as referring to the KPI for open referrals. One number per month was taken as referring to the open referrals target, which I then converted to a percentage to be consistent with the other study participants' measures. Therefore one or two[109] percentages are the basis for translating referrals into a 5-point scale. The one to five-point scale description follows.

'Referrals' measure scale

1 = 0-75% **2** =76-99% **3** =100-120% **4** = 121-180% **5** =181%+

The quality measure 'teller cash out' has two aspects to it. First is the maximum number of times cash can be out over a year and still meet the bank's quality standards. Second is the maximum amount of dollars that they can be out of balance in the year (overs and unders) and still meet the quality standards. This is $X amount over and $X amount under. The entire sample met the target. Two scales were developed: one for the number of times the cash was out and the other for the amount the cash was over or under. These two scales described below are added and divided by two to arrive at the 'cash out' score.

Quality measure scale (Number of times cash out)

1 & 2 =Less than standards required and are undefined specifically at this point

3 = Target or less

4 = Less than half the target

5 = 4 times or less

[109] There were two percentages: their sum was divided by 2 to give one percentage measure.

Quality- teller cash out ($overs and $unders) scale

1 & 2 =Less than standards required and not defined specifically at this point

3 = Target or less

4 = Less than half the target

5 = Less than $25 over or under

The branch manager or a delegated second in charge measures 'service' every month using a service delivery observer checklist. This observer decides 'yes' or 'no' about each service description and gives points for the item prompted by the possible points listed beside it. There are twelve items on this list, which are given percentage weightings that add up to one hundred per cent. Percentage scores for each month are averaged for the year. The bank's achievement criterion for service is an average over the year of 80 per cent. Every one in this group achieved 80 per cent or more. The 'service' measure was translated into a 5-point scale as follows:

'Service' measure scale

1 & 2 =Less than standards required and are undefined specifically at this point

3 = 80-85%

4 = 86-94%

5 = 95-100%

Appendix 12. Bank: CSO means and standard deviations for each competence

Competences	Euera	Liana	Ester	Alice	Tana	Neil	Ariel
Reasonable keyboard skills	4.00	4.33	4.33	3.67	3.67	4.67	3.33
	1.00	.58	.58	.58	.58	.58	.58
Can work in a windows environment	4.00	4.33	4.33	3.00	3.67	4.67	3.00
	1.00	.58	.58	.00	.58	.58	1.00
Understands international currency rates and changes	4.33	4.33	3.67	4.00	3.67	4.33	3.67
	.58	.58	1.53	.00	.58	.58	.58
Understands and practices sales and service techniques	5.00	3.67	4.33	3.33	4.00	3.67	4.00
	.00	1.15	.58	.58	1.00	1.53	.00
Weighted	10.00	7.34	8.66	6.66	8.00	7.34	8.00
	.00	2.31	1.15	1.15	2.00	3.06	.00
Has a thorough understanding of the relevant X Bank products and services e.g. Tag-ons & hot leads	4.67	3.67	4.33	4.00	4.00	4.00	3.00
	.58	1.15	.58	.00	1.00	1.00	1.00
Weighted	9.34	7.34	8.66	8.00	8.00	8.00	6.00
	1.15	2.30	1.15	.00	.200	2.00.	2.00
Able to navigate their way through the X Bank's software for frontline banking systems e.g. Teller, HBTE, Onyx	4.67	3.67	4.33	3.67	3.67	4.67	3.33
	.58	1.15	.58	.58	.58	.58	.58
Reading & writing skills are sufficient for job requirements	4.00	4.00	3.67	4.00	4.00	3.67	3.33
	1.00	.00	1.15	1.00	1.00	.58	.58
Very skilled verbal communication suited to the everyday language of the broad base of customers, team and management	4.67	3.33	4.33	3.67	4.00	4.00	3.33
	.58	.58	.58	1.15	1.00	1.00	1.15
Weighted	9.33	6.67	8.67	7.33	8.00	8.00	6.67
	1.15	1.15	1.15	2.31	2.00	2.00	2.31
Able to do basic arithmetic calculations	4.67	4.00	4.00	4.33	4.00	4.33	3.67

Competences	Euera	Liana	Ester	Alice	Tana	Neil	Ariel
	.58	1.00	1.00	.58	1.00	.58	.58
Consistent methodical work performance	4.00	4.33	4.33	4.00	4.00	3.67	3.00
	1.00	.58	.58	1.00	1.00	.58	.00
Able to organise self to meet personal goals	4.33	4.00	4.00	3.33	4.00	3.33	3.67
	1.15	1.00	1.00	.58	1.00	1.15	.58
Accurate attention to details e.g. slips, forms, data entry	3.67	4.00	4.33	4.00	4.00	3.33	3.33
	1.15	1.00	.58	1.00	1.00	.58	.58
Weighted	7.33	8.00	8.67	8.00	8.00	6.67	6.67
	2.31	2.00	1.15	2.00	2.00	1.15	1.15
Able to handle the work pressures associated with dealing with the public	4.00	3.33	4.33	3.33	4.00	4.00	3.00
	1.00	.58	.58	.58	1.00	1.00	1.00
Weighted	8.00	6.67	8.67	6.67	8.00	8.00	6.00
	2.00	1.15	1.15	1.15	2.00	2.00	2.00
Responds positively to the structured performance measurement feedback system	4.67	3.67	4.33	3.67	3.67	4.33	3.00
	.58	.58	.58	.58	.58	1.15	1.00
Weighted	9.33	7.33	8.67	7.33	7.33	8.67	6.00
	1.15	1.15	1.15	1.15	1.15	2.31	2.00
Knows when to seek help and from who, and in addition who to assist.	5.00	4.33	4.33	3.33	4.33	4.33	3.33
	.00	.58	1.15	.58	1.15	1.15	.58
Is comfortable with the repetitive aspects of the CSO role	4.67	3.67	4.00	3.67	4.00	4.33	3.00
	.58	1.15	1.00	.58	1.00	1.15	.00
Weighted	9.34	7.34	8.00	7.34	8.00	8.66	6.00
	1.15	2.30	2.00	1.15	2.00	2.30	.00
Displays resilience by sustained enthusiasm for a job with a high ratio of approaches to successful referrals	4.67	3.33	4.67	2.67	3.33	3.33	4.00
	.58	.58	.58	.58	.58	1.15	.00
Weighted	9.34	6.66	9.34	5.34	6.66	6.66	8.00
	1.15	1.15	1.15	1.15	1.15	2.3	.00

Competences	Euera	Liana	Ester	Alice	Tana	Neil	Ariel
Enjoys engaging customers in conversation to try and help them	5.00	3.33	4.67	3.33	4.33	3.67	3.33
	.00	.58	.58	.58	.58	1.53	1.15
Weighted	10.00	6.66	9.34	6.66	8.66	7.34	6.66
	.00	1.15	1.15	1.15	1.15	3.06	2.30
Displays sustained interest and initiative in the CSO role	4.67	3.33	4.00	2.67	4.00	3.33	3.00
	.58	.58	1.00	1.15	1.00	1.15	.00
Flexible use of the approach, problem solving strategies and products for good service to the range of customers	4.00	4.00	4.33	3.00	4.00	3.67	3.00
	1.00	1.00	.58	.00	1.00	1.53	1.00
Works co-operatively as part of a team	4.33	3.33	5.00	3.00	4.33	3.67	3.33
	1.15	.58	.00	1.00	.58	1.53	.58
Able to cope with a moderate pace of on-going development of systems and information	4.33	4.00	4.67	3.67	3.33	4.33	3.33
	1.15	1.00	.58	.58	.58	.58	.58
Able to retain information on new products and systems	4.33	4.00	4.33	3.67	3.67	4.33	3.33
	.58	1.00	.58	.58	.58	.58	.58
Weighted	8.67	8.00	8.67	7.33	7.33	8.67	6.67
	1.15	2.00	1.15	1.15	1.15	1.15	1.15
Personal goals fit the requirements of a CSO	4.67	4.00	4.67	3.33	3.67	3.67	3.33
	.58	1.00	.58	.58	.58	1.53	.58
Values being associated with the corporate image of the Bank as a leading, successful organisation (evident in their pride and loyalty)	5.00	3.67	4.67	3.33	4.00	3.67	3.33
	.00	1.15	.58	.58	1.00	.58	.58
Understands the structure and culture of the X Bank	5.00	3.67	4.33	3.67	4.50	4.33	3.33
	.00	1.15	.58	.58	.71	1.15	.58
Professional appearance, suited to the banking industry	4.67	3.67	4.00	3.67	4.33	4.33	3.67
	.58	1.15	1.00	.58	.58	1.15	.58
Has a general overview of the competitors in the banking industry	4.33	3.33	3.67	3.33	4.33	4.00	3.00
	1.15	1.53	1.53	.58	.58	1.00	1.00

Appendix 13. Bank: CSO tables

Most of the competences had in fact some level of positive correlation: fifteen non-technical competences and two technical competences. Three with correlations over .600 I identify with an underline, because of their proximity to the cut off mark of .700 in this context of only one month of results. They are the following competences:

'Has an overview of the competitors in the banking system' ('service' correlation = .668)

'Understands and practices sales and service techniques' ('service' correlation = .629)

'Able to organise self to meet personal goals' ('service' correlation = .606)

Many of these positive correlations are for competences that appear in the profiles of both CSOs and CSRs. There is strong representation of personal goals and values and positive initiative and customer service focus.

Table 1

Bank: CSO competences with a positive correlation – (but less than .700) with at least one productivity measures (N: 7)

Type	Competence	Referral	Cashout	Service	Total May 2001
Tech, T/P & W	Understands and practices sales and service techniques	-.343	.415	.629	.415
NT, Ind & W	Displays resilience by sustained enthusiasm for a job with a high ratio of approaches to successful referrals	-.137	.388	.404	.388
NT & Intr	Responds positively to the structured performance management feedback system	-.088	.311	.485	.311
NT & M	Able to do basic arithmetic calculations	.157	.311	.283	.311
NT, M & W	Accurate attention to details. E.g. slips, forms, data entry	-.529	.272	.566	.272
NT & M	Able to handle the work pressures associated with dealing with the public	-.353	.252	.687	.252
NT & M	Able to cope with a moderate pace of on-going development of systems and information	.048	.245	.236	.245
NT & M	Able to organise self to meet personal goals	-.745	.155	.606	.155
Tech & Uni	Able to navigate their way through the X bank's software for front-line banking systems. E.g. Teller, HBTE, Onyx	.010	.155	.323	.155
NT, Intr & W	Is comfortable with the repetitive aspects of the CSO role	-.200	.151	.511	.151
NT & Ind	Professional appearance suited to the banking industry	-.275	.136	.566	.136
NT & Intr	Personal goals fit the requirements of the CS0 role	-.539	.133	.515	.133
NT & Ind	Able to retain information on new products and systems	-.098	.097	.283	.097

Type	Competence	Referral	Cashout	Service	Total May 2001
NT & Ind	Has a general overview of the competitors in the banking industry	-.486	.075	.668	.075
NT & M	Consistent methodical work performance	-.637	.058	.404	.058.
NT & Intr	Flexible use of the approach, problem solving strategies and products for service to the range of customers	**-.745**	.039	.606	.039
NT & M	Reading and writing skills are sufficient for job requirements	-.564	.000	.387	.000

Key

Tech = Technical competence
M = Meta-competence
Intr = Intra-organisational
N = The number of study participants
NT = Non technical competence
T/P = Trade / Professional
Std = Standard technical
W = Weighted competence
Ind = Industry
Uni = Unique

Table 2

Bank: CSO competences with a negative correlation with productivity measures (N: 7)

Type	Competence	Referral	Cashout	Service	Total May 2001
Tech & Std	Can work in a windows environment: specifically outlook, word and email	-.181	-.434	-.118	-.434
Tech & Std	Reasonable keyboard skills	-.086	-.360	-.118	-.340
Tech & T/P	Understands international currency rates and changes	.081	-.320	-.333	-.320
NT & Intr	Know when to seek help and from who, and in addition who to assist	-.088	.311	.485	-.041

Key

Tech = Technical competence

Std = Standard technical

N = The number of study participants

NT = Non technical competence

T/P = Trade / Professional

Intr = Intra-organisational

Table 3

Bank: CSO correlations of Nordhaug domains and technical /non-technical totals with productivity measures (N: 7)

Domains	Referrals	Cashout	Service	Total May 2001
TECHNICAL				
Standard	-.179	-.393	-.073	-.393
Trade/Professional	-.255	-.058	.162	-.058
Trade/Professional W	-.330	.286	.511	.286
Unique	.019	.355	.505	.355
Unique W	-.076	.505	.662	.505
Technical Total	-.187	.037	.309	.037
Technical Total W	-.281	.185	.463	.185
NON-TECHNICAL				
Metacompetence	-.505	.296	**.772**	.296
Metacompetence W	-.655	.259	**.772**	.259
Intraorganisational/ W	-.505	.296	**.772**	.296
Industry	-.318	.185	.540	.185
Industry W	-.168	.296	.540	.296
Non-Technical Total/ W	-.505	.296	**.772**	.296

Key

W =Weighted competence

N = The number of study participants

Appendix 14. Lawyer: New competence profile (NCP)

Technical Competences

Standard Technical

Trade/Professional

- Knowledge of general legal principles
- Knowledge of relevant legal procedures and processes
- Knowledge of specialist legal areas
- Legal drafting skills
- Ability to undertake efficient and accurate research
- Court advocacy skills

Unique

- Ability to manage WIP
- Effective file management
- Use of firm technology and resources

Non-technical competences

Meta-competences

Intra-organisational (note the descriptors lead to a number of the items below that appear to be meta-competences being classified as intra-organisational competences)

- Knowledge of client markets and businesses
- Responsiveness
- Ability to produce client –focussed written communication
- Ability to undertake client-focussed oral communication
- Ability to develop existing client relationships
- Ability to prepare and present client education tools
- Ability to generate new client relationships
- Financial performance to budget
- Effective time-management

- Commitment to the development of collateral professional skills
- Assertiveness and clarity
- Team participation
- Co-operation
- Contributes to firm precedent system
- Contributes to firm training and development
- Effective supervision of junior staff
- Effective delegation of matters and/or tasks
- Effective coaching skills
- Facilitates internal group training
- Facilitates firm and practice group planning

Industry

- Ability to identify key client outcomes and provide useful advice and solutions
- Ability to effectively negotiate on behalf of clients
- Ability to mediate and generate alternative dispute resolution
- Ability to manage associated legal relationships
- Commitment to the development of legal skills

Appendix 15. Lawyer: NCP competence feedback form

Research Project

Legal Staff Competences Survey

Feedback on: _____ **Your first name:**_____

Your position_____

Directions

For each of the items below please **circle the number** that best represents your opinion of his/her competence. If there is a comment that you wish to add, please feel free to do so. A **"not applicable"** category, **(N/A)** has been included. Circle this if you have not been in a situation to observe or experience a competence. **If you do not wish to give a rating for a particular competence do not circle.**

Key

N/A	= not applicable	1	= no evidence of competence	2	= not adequate competence
3	= acceptable competence	4	= above average competence	5	= exceptional competence

These competences have an associated Dictionary of Guiding Behaviours that is available on the intranet (under Internal Training, Legal). You can choose to use this to assist you decide what number to circle, but you do not have to. The number beside each competence listed below correlates with the description in the Dictionary.

Please consider the staff member's work performance demonstrated over the last six months in relation to their level of experience, peer group and your department standards.

Technical Competences: Legal Skills

Knowledge of general legal principles (1.1)	N/A 1 2 3 4 5
Knowledge of relevant legal procedures and processes (1.2)	N/A 1 2 3 4 5
Knowledge of specialist legal areas (1.3)	N/A 1 2 3 4 5
Legal drafting skills (1.6)	N/A 1 2 3 4 5
Court advocacy skills (1.7)	N/A 1 2 3 4 5

Comment on any of the above

Technical Competences: Self-Management Skills

Ability to manage WIP (3.2)	N/A 1 2 3 4 5
Effective file management (3.4)	N/A 1 2 3 4 5
Use of firm technology and resources (3.5)	N/A 1 2 3 4 5

Comments on any of the above

Non-Technical Competences: Legal Skills

Ability to identify key client outcomes and provide useful advice and solutions (1.4)	N/A 1 2 3 4 5
Ability to undertake efficient and accurate research (1.5)	N/A 1 2 3 4 5
Ability to effectively negotiate on behalf of clients (1.8)	N/A 1 2 3 4 5
Ability to mediate and generate alternative dispute resolution (1.9)	N/A 1 2 3 4 5
Ability to manage associated legal relationships (1.10)	N/A 1 2 3 4 5

Comments on any of the above

Non-technical Competences: Client service – relationship management

Knowledge of client markets and businesses (2.1)	N/A 1 2 3 4 5
Responsiveness (2.2)	N/A 1 2 3 4 5
Ability to produce client –focused written communication (2.3)	N/A 1 2 3 4 5
Ability to undertake client-focused oral communication (2.4)	N/A 1 2 3 4 5
Ability to develop existing client relationships (2.5)	N/A 1 2 3 4 5
Ability to prepare and present client education tools (2.6)	N/A 1 2 3 4 5
Ability to generate new client relationships (2.7)	N/A 1 2 3 4 5

Comments on any of the above

Non-Technical Competences: Self-Management

Financial performance to budget (3.1)	N/A 1 2 3 4 5
Effective time-management (3.3)	N/A 1 2 3 4 5
Commitment to the development of legal skills (3.6)	N/A 1 2 3 4 5
Commitment to the development of collateral professional skills (3.7)	N/A 1 2 3 4 5
Assertiveness and clarity (3.8)	N/A 1 2 3 4 5

Comments on any of the above

Non-Technical Competences: Team Support

Team participation (4.1)	N/A 1 2 3 4 5
Co-operation (4.2)	N/A 1 2 3 4 5
Contributes to firm precedent system (4.3)	N/A 1 2 3 4 5
Contributes to firm training and development (4.4)	N/A 1 2 3 4 5

Comments on any of the above

Non-Technical Competences: Team Management

Effective supervision of junior staff (5.1)	N/A 1 2 3 4 5
Effective delegation of matters and/or tasks (5.2)	N/A 1 2 3 4 5
Effective coaching skills (5.3)	N/A 1 2 3 4 5
Facilitates internal group training (5.4)	N/A 1 2 3 4 5
Facilitates firm and practice group planning (5.5)	N/A 1 2 3 4 5

Comments on any of the above

Please put this form into the stamp addressed envelope provided and post it. Thank you very much.

Appendix 16. Lawyer: Information Sheet

Massey University
COLLEGE OF BUSINESS

Department of Human Resource Management
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099

Information Sheet
'Human capital links to productivity', Research project

Scope of the study

I am Heather Lees, a full time student in the Massey University Department of Human Resource Management carrying out exploratory research on whether competences[1] can be the basis of a valid measure for the value of people in the workplace. This involves giving a group of employees a rating on identified competences. These scores are then clustered, weighted and analysed for any relationship with existing organisational measures.

My contact person in your organisation, Heather Brown, Human Resources Director, identified your work role, because it has some existing productivity/organisational measures potentially relevant to this study. Therefore, I sincerely invite you to take part in this research.

Participation

If you agree to participate as one of the group, this will involve you in completing a competence feedback form on yourself. This will take you about 10 minutes. You will be given a stamped and addressed envelope, to return the form directly to me.

People in other positions will be asked to fill in the same competence feedback form on you. These people are: your partner/supervisor, an employee with a similar position, and an employee that reports to you. They will also have given consent to the contact person to contribute to the performance feedback process, and will be identified for me, only by their position. They will return their forms in the provided stamped and addressed envelopes directly to me. Only results averaged from all the forms will appear in any summary report back to you and the organisation.

You also need to agree to my receiving employment data such as your age, gender, years of work experience, your number of positions in the company, and involvement in and qualifications in training and tertiary education, from your personnel files. Heather Brown would compile this data. Once the competence feedback forms and the personnel data are grouped together, the name of each member in the sample will be changed to protect your privacy. After the research assistant, (who has signed a confidentiality agreement) and myself have entered data into a database, the original forms will be destroyed.

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2 Competences = a cluster of related skills, knowledge, aptitudes and attitudes that are needed to effectively perform a role in an organisation

Results

The result of this research will be used for my thesis and any subsequent publications and seminars but there will be no identification of the organisation, nor the employees involved. In addition to these documents that are available to you, you and your organisation will be given a summary report of the research findings.

This is exploratory research that is looking for patterns and links between competences and organisational results with only small numbers of people, in different roles, in a number of very different organisations. Therefore these competences and this process cannot be the basis for any human resource decision-making, whatever the results of the study, without further development and further trials. However, your involvement could be a first step in looking at more meaningful ways to value the skills and knowledge of people in the workforce.

Consent form

As a member of the sample you will be asked to sign a consent form because it is your right to decline if you do not wish to take part. I have been assured by your organisation that there will be no consequences for you whether you choose to, or choose not to, take part. Obviously for me, I would really appreciate your involvement so that I can get sufficient numbers to look at patterns of responses. Your rights are set out below.

- You can decide to decline the invitation to participate in this study
- If there are any items on the competence feedback form that you don't wish to complete, you may decline to complete them.
- You can withdraw from the study at any time up until one week after you have sent in your competence survey form
- You may ask any questions about the study, at any time during the study
- You are providing information on the understanding that your name will not be used
- You will be given access to a summary of the findings of the study when it is concluded

Supervision of researcher

This project has been reviewed and approved by the Massey University Human Ethics Committee, PN Protocol 01/27. This is to ensure that you and your organisation are not disadvantaged in anyway, by being involved.

I am being supervised for this doctoral research project by two Massey University staff, Dr. Paul Toulson and Dr. Su Olsson, who are both based at Palmerston North. Contact details for the three of us are below. If you have any questions or concerns about the project let us know.

I hope that you will participate, and thank you very much for your consideration.

Heather Lees *(+ same addresses as standard information sheet)*

Appendix 17. Lawyer: Supporting memo

Research Project

We were approached by Heather Lees, a PhD student, to be involved in her study, which explores the use of competences as a basis of a valid measure for value of people in the workforce. We decided that this would create an opportunity for us to look at the work skills included in the existing: 'Legal Staff Development Discussion Form' and compare this with another option that is available to us. You are invited to participate in the study.

Heather Lees' Information Sheet and Consent Form are attached with details of her study. If you choose to take part, some participants will receive a Competences Survey Form based on the existing, 'Legal Staff Development Discussion Form and others will receive a competence survey form that is based on the alternative.

If you consent to take part in the study, you will need to consider who knows enough about what you do, to give some meaningful feedback on your work performance. Suggest the name of a colleague, who is on a similar position level in the organisation, and a staff member whose position is more junior. Write the first name and position on the Consent Form. I will endorse the selections, or in the event of further consideration being required, I will follow this up with you, to ensure mutual acceptability, before the study proceeds. The Consent Form should be returned to me and I will pass it on to Heather Lees.

Note that the Competence Survey Forms completed by those who do take part in the study, must all be returned directly to Heather Lees, in the stamped self-addressed envelope that will be provided.

The subsequent summary report from the study available to the organisation and yourself only includes summarised results with names changed. If you would like to see your personal, averaged results for each competence please indicate this on the Consent Form, so that Heather Lees can follow this up.

Your involvement would be of benefit to the organisation and yourself as it provides an initial exploration into the relevance and merits of the two staff development processes. It is great synergy if we can support a doctoral student's research within the parameters of our own human resource management plans.

XXXX and I encourage you to participate.

XXXXXX XXXXXX
Human Resources Director
X
Email:

Appendix 18. Lawyer: Productivity measures

- Unit percentage to budget April

This is the percentage of actual units billed divided by budgeted units for the month of April 2001.

- Unit percentage for year-to-date

This is the percentage of actual units billed for the year–to-date divided by the budgeted units for the year-to-date (i.e. for the four months: January – April 2001).

- Fees percentage of budget for April 2001

This is the percentage of the actual fees billed divided by the budgeted fees for the month of April 2001.

- Fees percentage for the year-to-date

This is the percentage of the actual fees billed divided by the budgeted fees for the year-to-date (i.e. for the four months: January –April 2001).

- Recovery rate

The organisation averages around 97-98% recovery rate with some legal services being under recovered and others being over recovered. Sometimes the client is not billed for all the time the service took and at other times the client is billed more than the standard value of the time as the work justifies a higher bill. A monitoring senior partner decides on the variations.

- Productive non-billed time

This refers to the units of time that are not billable but contribute to the future profitability of the firm. They include units of time recorded for training and development, public relation activities, and recruitment and performance management. A schedule of credits for non-billable activities has been developed and endorsed by senior partners in the organisation. These non-billable credits are awarded according to how much time the lawyer was involved in the activities on the schedule[110].

- YTD total units

This is the sum of the billable units and the Productive non-billed units for the YTD.

- YTD total financial contribution

This is, 'YTD' units above adjusted for the recovery rate and multiplied by the charge-out rate for the lawyer's level.

[110] This schedule was not sighted. The HR director told me it included the activities above

Appendix 19. Lawyers: NCP competences means and standard deviations

Competences	Nick	Lisa	Amy	Aeda	Richard	Alijcia	Elsie	Stan8
Knowledge of general legal principles	3.75	4.67	3.50	3.50	4.00	3.50	4.25	3.67
	.50	.58	.58	1.00	.00	.58	.50	.58
Weighted	7.50	9.33	7.00	7.00	8.00	7.00	8.50	7.33
	1.00	1.15	1.15	2.00	.00	1.15	1.00	.58
Knowledge of relevant legal procedures and processes	4.00	4.00	3.25	3.50	4.25	3.50	4.25	3.67
	.00	1.00	.50	1.00	.50	.58	.50	.58
Weighted	8.00	8.00	6.50	7.00	8.50	7.00	8.50	7.33
	.00	2.00	1.00	2.00	1.00	1.15	1.00	1.15
Knowledge of specialist legal areas	3.50	4.00	3.00	3.00	4.00	3.50	4.50	4.00
	.58	1.00	N/A	.82	.82	.58	.58	.00
Legal drafting skills	3.88	4.67	3.00	3.75	3.75	4.00	4.25	4.33
	.25	.58	.00	.50	.96	.00	.50	.58
Weighted	7.75	9.33	6.00	7.50	7.50	8.00	8.50	8.67
	.50	1.15	.00	1.00	1.91	.00	1.00	1.15
Court advocacy skills	.00	.00	.00	.00	.00	.00	.00	.00
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ability to manage WIP	3.67	4.00	4.00	4.00	4.50	4.00	3.67	4.00
	.58	.00	N/A	1.00	.58	1.41	1.15	.82
Weighted	7.33	8.00	8.00	8.00	9.00	8.00	7.33	8.00
	1.15	.00	N/A	2.00	1.15	2.83	2.31	1.63
Effective file management	3.67	4.00	3.75	4.50	4.33	4.00	5.00	4.25
	.58	.00	.50	.50	.58	.82	.00	.50
Weighted	7.33	8.00	7.50	9.00	8.67	8.00	10.00	8.50
	1.15	.00	1.00	1.00	1.15	1.63	.00	1.00
Use of firm technology & resources	3.63	4.00	4.25	4.33	4.25	4.00	4.33	4.33
	.48	.00	.50	1.15	.50	1.00	.58	.58
Weighted	7.25	8.00	8.50	8.67	8.50	8.00	8.67	8.67
	.96	.00	1.00	2.31	1.00	2.00	1.15	1.15
Ability to identify key client outcomes and provide useful advice & solutions	3.63	4.33	3.00	3.25	4.25	4.00	4.50	4.00
	.48	.58	N/A	.96	.50	.00	.58	.00
Ability to undertake efficient &	3.63	4.67	3.50	4.00	4.25	3.50	4.00	4.50

Competences	Nick	Lisa	Amy	Aeda	Richard	Alijcia	Elsie	Stan8
accurate research	.48	.58	.71	.82	.96	.71	.82	.71
Weighted	7.25	9.33	7.00	8.00	8.50	7.00	8.00	9.00
	.96	1.15	1.41	1.63	1.91	1.41	1.63	1.41
Ability to effectively negotiate on behalf of clients	3.50	4.00	.00	3.67	4.00	3.00	4.13	3.00
	.50	N/A.	N/A.	.58	1.41	N/A.	1.18	.00
Ability to mediate and generate alternative dispute resolution	.00	.00	.00	.00	.00	.00	4.33	3.00
	N/A.	N/A	N/A	N/A	N/A	N/A	1.15	.00
Ability to manage associated legal relationships	3.75	4.33	4.00	3.50	4.25	3.33	4.25	3.50
	.50	1.15	N/A	1.00	.96	.58	.96	.58
Commitment to the development of legal skills	3.25	4.67	4.00	3.83	4.25	4.25	3.63	4.25
	.50	.58	.00	.29	.50	.50	1.25	.50
Knowledge of client markets & businesses	3.33	4.00	3.50	3.00	3.75	3.50	3.50	3.50
	.58	.00	.71	.82	.50	.71	1.32	.58
Responsiveness	4.00	4.67	4.00	3.75	3.75	3.50	3.75	3.75
	.00	.58	.00	.50	.50	.71	.96	.50
Weighted	8.00	9.33	8.00	7.50	7.50	7.00	7.50	7.50
	.00	1.15	.00	1.00	1.00	1.41	1.91	1.00
Ability to produce client –focussed written communication	3.63	4.33	3.50	3.25	4.00	4.00	4.25	4.00
	.48	.58	.71	.96	.00	.00	.50	.00
Weighted	7.25	8.67	7.00	6.50	8.00	8.00	8.50	8.00
	.96	1.15	1.41	1.91	.00	.00	1.00	.00
Ability to undertake client-focussed oral communication	3.63	4.67	3.00	3.63	4.00	4.00	4.50	4.00
	.48	.58	.00	.48	.00	.00	.58	.00
Weighted	7.25	9.33	6.00	7.25	8.00	8.00	9.00	8.00
	.96	1.15	.00	.96	.00	.00	1.15	.00
Ability to develop existing client relationships	3.67	4.67	.00	3.00	3.75	3.67	4.75	3.50
	.58	.58	N/A	.82	.50	.58	.50	.58
Ability to prepare and present client education tools	.00	4.33	.00	3.00	4.00	.00	5.00	2.50
	N/A	.58	N/A	1.41	.00	N/A	N/A	.71
Ability to generate new client relationships	4.00	4.00	.00	3.00	3.67	2.00	5.00	2.75
	N/A	.00	N/A	1.00	.58	N/A	.00	.50
Financial performance to budget	2.50	4.67	3.67	3.33	4.25	4.00	1.50	4.67
	.71	.58	.58	.58	.50	1.00	.71	.58
Weighted	5.00	9.33	7.33	6.67	8.50	8.00	3.00	9.33

Competences	Nick	Lisa	Amy	Aeda	Richard	Alijcia	Elsie	Stan8
	1.41	1.15	1.15	1.15	1.00	2.00	1.41	1.15
Effective time management	3.67	4.25	4.00	4.67	4.00	3.50	4.50	4.00
	.58	.50	.00	.58	.82	1.29	.58	.82
Weighted	7.33	8.50	8.00	9.33	8.00	7.00	9.00	8.00
	1.15	1.00	.00	1.15	1.63	2.58	1.15	1.63
Commitment to the development of collateral professional skills	3.25	4.33	4.00	3.50	3.75	4.25	4.25	3.75
	.50	.58	.00	.50	.50	.50	.96	.50
Assertiveness & clarity	3.88	4.50	3.67	3.50	4.00	4.25	4.50	3.75
	.63	.58	.58	1.00	.82	.50	.58	.96
Weighted	7.75	9.00	7.33	7.00	8.00	8.50	9.00	7.50
	1.26	1.15	1.15	2.00	1.63	1.00	1.15	1.91
Team participation	4.00	4.50	4.00	3.75	4.75	4.50	4.75	4.50
	.82	.58	.00	.50	.50	.58	.50	.58
Weighted	8.00	9.00	8.00	7.50	9.50	9.00	9.50	9.00
	1.63	1.15	.00	1.00	1.00	1.15	1.00	1.15
Co-operation	4.00	5.00	4.00	4.00	4.75	4.50	4.25	4.50
	.82	.00	.00	.82	.50	.58	.96	.58
Weighted	8.00	10.00	8.00	8.00	9.50	9.00	8.50	9.00
	1.63	.00	.00	1.63	1.00	1.15	1.91	1.15
Contributes to the firm's precedent system	4.00	4.67	.00	4.00	4.00	.00	2.00	2.50
	.00	.58	N/A	N/A	.00	N/A.	.00	.71
Contributes to firm training & development	3.50	3.75	3.50	3.50	4.00	.00	4.00	4.00
	.58	.50	.71	.71	.82	N/A	1.41	.00
Effective supervision of junior staff	3.50	4.00	3.67	.00	4.00	4.00	3.67	4.50
	.71	.00	1.15	N/A	.82	1.15	1.15	.58
Effective delegation of matters &/or tasks	3.33	4.25	3.33	4.00	3.33	4.00	3.00	4.00
	.58	.50	.58	.00	.58	1.15	.00	.82
Effective coaching skills	4.00	4.00	4.00	3.00	3.67	4.00	3.50	4.67
	. N/A	.00	1.41	N/A	1.15	1.00	.71	.58
Facilitates internal group training	3.00	4.00	1.00	3.50	4.00	.00	5.00	4.67
	N/A	.00	N/A	.71	N/A	N/A	N/A	.58
Facilitates firm & practice group planning	.00	4.00	1.00	.00	4.00	.00	.00	3.50
	N/A	.00	N/A	N/A	N/A	N/A	N/A	.71

Appendix 20. Lawyer: NCP tables

Table 1

NCP Lawyers: Competences with strong negative correlations with productivity measures (N: 5)

Type	Competence	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $
NT & Intr	Ability to present client education tools	-.200	-.300	**.800**	-.400	-.100	.100	**-.700**	**-.700**

Key

NT = Non-technical competence **Intr** = Intra-organisational

N = The number of study participants out of a possible eight that were rated on this competence

Table 2

NCP Lawyers: Competences with no strong negative or positive correlations with productivity measures

Type	Competence	No. of Participants (N)	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution
Tech, Uni & W	Ability to manage WIP	8	-.096	.330	-.302	.619	.481	.041	.069	.426
NT, Intr & W	Co-operation	8	.221	.479	.196	.540	.454	-.184	.098	.430
Tech, Prof & W	Legal drafting skills	8	.575	.335	.323	.323	.036	-.275	.335	.395
NT & Intr	Facilitates internal group training	7	.270	.108	-.054	.153	-.224	-.320	-.007 **.988**	.384
NT, Intr & W	Ability to undertake client-focused oral communication	8	.307	.160	.405	.307	.135	-.233	-.061	.196
NT & Intr	Contributes to firm training and development	7	.154	.309	-.231	.231	.000	-.694	-.154	.154
NT, Intr & W	Responsiveness	8	.243	.460	.243	.192	.306	.281	.524	.153
NT & Intr	Knowledge of client markets and businesses	8	.292	.596	.317	.431	.304	-.304	-.013	.152
NT, Intr & W	Effective time management.	8	-.171	-.268	-.024	.415	-.049	.146	.024	.146
Tech, Prof & W	Knowledge of general legal principles	8	.073	.244	.244	.122	.366	-.024	.073	.122
Tech & Prof	Knowledge of specialist legal areas	8	.210	.222	.062	.074	.049	-.469	-.111	.062
Tech, Uni & W	Use of firm technology and resources	8	.272	.161	-.469	.296	-.395	-.420	-.099	.086
NT, Intr & W	Ability to produce client-focused written communication	8	.366	.317	.464	.195	.073	-.366	-.073	.073
Tech, Uni & W	Effective file management	8	-.060	-.431	-.228	.204	-.144	-.168	-.371	.024

Type	Competence	No. of Participants (N)	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution
NT & Ind	Ability to identify key client outcomes and provide useful advice and solutions	8	.120	.060	.311	.096	.108	-.275	-.240	.012
Tech, Prof & W	Knowledge of relevant legal procedures and processes	8	-.291	-.024	-.048	-.133	.364	-.024	-.170	.000
NT & Ind	Ability to manage associated legal relationships	8	.060	.265	.289	.169	.289	.024	-.036	-.072
NT, Intr & W	Team participation	8	.025	.161	.086	-.025	.012	-.531	-.420	-.148
NT, Intr & W	Assertiveness and clarity	8	.096	.036	.647	-.120	.024	-.192	-.335	-.216\
NT & Ind	Ability to effectively negotiate on behalf of clients	7	-.145	-.236	.255	-.036	.182	.127	-.400	-.273
NT, Intr & W	Ability to generate new client relationships	7	-.072	-.108	.306	-.288	.126	.162	-.162	-.306
NT & Intr	Ability to develop existing client relationships	7	.072	.090	.541	-.180	.018	-.270	-.414	-450

Key

Tech = Technical Competence
Prof = Trade/Professional
W = Weighted
NT = Non-technical Competence
Ind = Industry
Intr = Intra-organisational
Uni = Unique
N = The number of study participants out of a possible eight that were rated on this competence

Table 3

Lawyer: NCP correlations of the Nordhaug domains and technical/non-technical totals with productivity measures

Domain	Number of participants	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $
Non-technical total	5	.516	.412	.553	**.837**	.034	-.274	.242	.619
Intra-organisational	A	A	A	A	A	A	A	A	A
Industry	2	-1	-1	1	-1	-1	1	-1	-1
Technical Total	8	.090	.173	.189	.289	-.254	-.360	-.088	.315
Trade/Professional	8	.144	.206	.385	.296	-.173	-.230	.047	.335
Unique	8	-.085	-.004	-.368	.105	-.288	-.443	-.335	.085

Key

A = cannot be calculated because at least one of the variables is constant

Appendix 21. Lawyer: ECP existing competence profile

Technical competences

Trade/professional

Legal writing/drafting

Research skills

Knowledge of law-general

Knowledge of law- specialisation

Knowledge of legal practices and procedures

Commercial judgement

Unique

File management

Use of the keystone for time recording/billing/fees/debt control

Non-technical competences

Meta-competences

Time management

Organisation

Intra-organisational

Develops internal clients

Develops external clients

Increases business with new/existing clients

Prioritisation

Meeting deadlines

Delegation to others

Keeps appropriate staff informed about their work in progress?

Does he/she ask for help at appropriate times?

Contribution at team/department meetings

Training and development of others

Involvement in department administration/management

Effectiveness of working relationships with legal staff

Effectiveness of working relationships with support staff

Is he/she proactive/demonstrates initiative?

Industry

Standard of professional presentation (personal manner, business attire)

Appendix 22. Lawyer: ECP competence feedback form

Research Project

Legal Staff Competences Survey

Feedback on: _____ **Your first name:**_____

Your position_____

Directions

For each of the items below please **circle the number** that best represents your opinion of his/her competence. If there is a comment that you wish to add, please feel free to do so. A **"not applicable"** category, **(N/A)** has been included. Circle this if you have not been in a situation to observe or experience a competence. **If you do not wish to give a rating for a particular competence do no circle.**

Key

N/A	= not applicable	**1**	= no evidence of competence	**2**	= not adequate competence
3	= acceptable competence	**4**	= above average competence	**5**	= exceptional competence

Please consider the staff member's work performance demonstrated over the last six months in relation to their level of experience, peer group and your department standards.

Technical Competences

Technical Skills

Legal writing/drafting	N/A 1 2 3 4 5
Research skills	N/A 1 2 3 4 5
Knowledge of law-general	N/A 1 2 3 4 5
Knowledge of law- specialisation	N/A 1 2 3 4 5
Knowledge of legal practices and procedures	N/A 1 2 3 4 5
Commercial judgement	N/A 1 2 3 4 5

Comments on any of the above

Practice Management Skills

File management	N/A 1 2 3 4 5
Use of the keystone for time recording/billing/fees/debt control	N/A 1 2 3 4 5

Comments on any of the above

Non-Technical Competences

Marketing Skills

Develops internal clients	N/A 1 2 3 4 5
Develops external clients	N/A 1 2 3 4 5
Increases business with new/existing clients	N/A 1 2 3 4 5

Comments on any of the above

Practice Management Skills

Time management	N/A 1 2 3 4 5
Organisation	N/A 1 2 3 4 5
Prioritisation	N/A 1 2 3 4 5
Meeting deadlines	N/A 1 2 3 4 5
Delegation to others	N/A 1 2 3 4 5
Keeps appropriate staff informed about their work in progress?	N/A 1 2 3 4 5
Does he/she ask for help at appropriate times?	N/A 1 2 3 4 5
Is he/she proactive/demonstrates initiative?	N/A 1 2 3 4 5

Comments on any of the above

Team/Department Contribution

Contribution at team/department meetings	N/A 1 2 3 4 5
Training and development of others	N/A 1 2 3 4 5
Involvement in department administration/management	N/A 1 2 3 4 5
Standard of professional presentation (personal manner, business attire)	N/A 1 2 3 4 5
Effectiveness of working relationships with legal staff	N/A 1 2 3 4 5
Effectiveness of working relationships with support staff	N/A 1 2 3 4 5

Comments on any of the above

Thank you very much for taking the time to complete this survey as accurately and sincerely as you can.

Please put this form into the stamp addressed envelope provided and post it.

Appendix 23. Lawyers: ECP competences means and standard deviations

Competences	Nathan	Len	Zavier	Neil	Angela	Yvette	Nigel	Yvonne	Maurice
Legal writing/drafting	4.75	4.75	3.33	3.50	3.50	4.25	3.50	3.00	4.00
	.50	.50	.58	.58	.58	.50	.58	.82	.82
Weighted	9.50	9.50	6.67	7.00	7.00	8.50	7.00	6.00	8.00
	1.00	1.00	1.15	1.15	1.15	1.00	1.15	1.63	1.63
Research Skills	4.25	4.75	3.33	4.50	3.67	3.33	3.50	3.33	4.00
	.50	.50	.58	.58	.58	.58	.58	.58	.82
Weighted	8.50	9.50	6.67	9.00	7.33	6.67	7.00	6.67	8.00
	1.00	1.00	1.15	1.15	1.15	1.15	1.15	1.15	1.63
Knowledge of law-general	4.00	4.25	3.33	3.75	3.75	3.75	3.00	3.00	4.00
	.82	.50	.58	.96	.50	.96	.00	.82	.82
Weighted	8.00	8.50	6.67	7.50	7.50	7.50	6.00	6.00	6.00
	1.62	1.00	1.15	1.91	1.00	1.91	.00	1.63	1.63
Knowledge of law- specialisation	3.75	4.33	3.33	4.75	3.50	4.25	4.25	3.75	4.00
	.50	.58	.58	.50	.58	.50	.50	.50	.82
Knowledge of legal practices and procedures	3.75	4.25	3.33	4.00	4.25	4.33	3.25	2.75	4.00
	.50	.96	.58	.82	.50	1.15	.50	.50	.82
Weighted	7.50	8.50	6.67	8.00	8.50	8.67	6.50	5.50	8.00
	1.00	1.91	1.15	1.63	1.00	2.31	1.00	1.00	1.63
Commercial judgement	3.75	4.50	3.50	4.00	4.33	4.25	3.67	2.67	3.75
	.50	1.00	.71	.82	.58	.50	.58	.58	.58
File management	3.50	4.75	3.67	3.88	3.75	4.00	2.33	3.50	4.50
	1.00	.50	.58	.85	.50	.82	.58	.58	.58
Weighted	7.00	9.50	7.33	7.75	7.50	8.00	4.67	7.00	9.00
	2.00	1.00	1.15	1.71	1.00	1.63	1.15	1.15	1.15
Use of the keystone for time recording/billing/fees/debt control	4.50	5.00	3.67	4.33	4.00	4.00	2.00	3.67	4.00
	.71	.00	.58	.58	.00	1.00	.00	.58	1.00
Time management	4.25	4.50	3.00	3.75	4.33	4.25	2.75	3.25	3.75
	.50	.58	1.00	.50	.58	.50	.50	.96	.96
Weighted	8.50	9.00	6.00	7.50	8.67	8.50	5.50	6.50	7.50
	1.00	1.15	2.00	1.00	1.15	1.00	1.00	1.91	1.91

Competences	Nathan	Len	Zavier	Neil	Angela	Yvette	Nigel	Yvonne	Maurice
Organisation	4.5	4.5	3.33	4	4	4	2.5	3.25	4.25
	.58	1.00	.58	.00	.00	.82	.58	.96	.96
Weighted	9.00	9.00	6.67	8.00	8.00	8.00	5.00	6.50	8.50
	1.15	2.00	1.15	.00	.00	1.63	1.15	1.91	1.91
Standard of professional presentation (personal manner, business attire)	4.25	4.75	3.50	4.00	4.50	4.00	3.88	3.50	4.25
	.96	.50	1.32	.82	.58	1.15	.63	1.00	.96
Weighted	8.50	9.50	7.00	8.00	9.00	8.00	7.75	7.00	8.50
	1.91	1.00	2.65	1.63	1.15	2.31	1.26	2.00	1.91
Develops internal clients	3.50	4.25	4.00	4.00	4.00	3.50	3.25	3.00	3.50
	1.00	.96	.00	.82	1.41	.71	.50	.00	1.00
Weighted	7.00	8.50	8.00	8.00	8.00	7.00	6.50	6.00	7.00
	2.00	1.91	.00	1.63	2.83	1.41	1.00	.00	2.00
Develops external clients	3.00	5.00	N/A	3.00	4.33	3.00	3.67	3.50	3.67
	.00	.00	N/A	.00	.58	.00	.58	.71	1.15
Increases business with new/existing clients	3.00	5.00	N/A	3.00	3.50	3.75	4.00	2.00	3.25
	.00	.00	N/A	.00	.71	.50	.00	.00	1.26
Prioritisation	4.50	4.50	3.33	4.00	3.67	4.00	3.67	3.33	4.25
	.58	1.00	.58	.00	.58	.82	.58	.58	.96
Weighted	9.00	9.00	6.67	8.00	7.33	8.00	7.33	6.67	8.50
	1.15	2.00	1.15	.00	1.15	1.63	1.15	1.15	1.91
Meeting deadlines	4.75	4.75	3.17	4.00	4.00	4.00	3.50	3.50	4.00
	.50	.50	.76	.82	1.00	.82	.58	.58	.82
Weighted	9.50	9.50	6.67	8.00	8.00	8.00	7.00	7.00	8.00
	1.00	1.00	1.15	1.63	2.00	1.63	1.15	1.15	1.63
Delegation to others	3.67	4.25	3.33	4.00	4.00	4.00	3.33	3.67	4.50
	.58	.96	.58	.82	.82	.82	1.15	1.53	1.00
Keeps appropriate staff informed about their work in progress	4.33	4.50	3.67	3.67	4.00	4.00	3.67	3.75	4.00
	1.15	1.0	.58	1.15	.00	.00	.58	.96	.82
Does he/she ask for help at appropriate times?	4.25	4.75	3.67	4.00	4.50	3.00	3.50	3.75	4.00
	.50	.50	.58	.00	.58	1.00	.58	.50	1.00
Weighted	8.50	9.50	7.33	8.00	9.00	6.00	7.00	7.50	8.00
	1.00	1.00	1.15	.00	1.15	2.00	1.15	1.00	2.00
Is he/she proactive/demonstrates initiative?	4.25	4.75	3.33	4.50	4.25	4.00	4.25	3.50	3.75
	.50	.50	.58	.58	.96	.82	.96	.58	.96

Competences	Nathan	Len	Zavier	Neil	Angela	Yvette	Nigel	Yvonne	Maurice
Weighted	8.50	9.50	6.67	9.00	8.50	8.00	8.50	7.00	7.50
	1.00	1.00	1.15	1.15	1.91	1.63	1.91	1.15	1.91
Does he/she ask for help at appropriate times?	3.50	4.00	3.33	4.50	3.50	3.50	3.50	2.50	3.50
	1.00	1.15	.58	.58	.58	.58	.58	1.00	.58
Training and development of others	3.50	5.00	4.00	4.00	4.25	4.50	3.50	3.00	4.50
	.58	.00	.00	.00	.50	.58	.50	1.41	1.00
Involvement in department administration/management	3.50	4.33	3.00	3.50	3.67	3.33	3.67	3.50	3.00
	.71	.58	.00	.41	1.15	1.53	.58	.71	.00
Effectiveness of working relationships with legal staff	4.00	4.75	3.67	4.63	4.25	3.75	4.50	3.75	4.25
	.82	.50	1.15	.48	.96	.96	.58	.96	.96
Weighted	8.00	9.50	7.33	9.25	8.50	7.50	9.00	7.50	8.50
	1.63	1.00	2.31	.96	1.91	1.91	1.15	2.31	1.91
Effectiveness of working relationships with support staff	4.00	4.75	3.67	4.25	4.00	4.00	4.00	4.00	3.75
	.82	.50	1.15	.96	.82	1.00	1.15	1.15	.96
Weighted	8.00	9.50	7.33	8.50	8.00	8.00	8.00	8.00	7.50
	1.63	1.00	2.31	1.91	1.63	2.00	2.31	2.31	1.91

Key

1st line = mean

2nd line = standard deviation

Appendix 24. Lawyer: ECP Tables

Table 1

Lawyer: ECP competences with a strong negative correlation with productivity measures (N: 9)

Type	Competence	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $
Tech & Uni	Use of the keystone for time recording/billing/fees/debt control	-.655	.122	**-.877**	.060	-.326	.128	-.162	-.332
NT & M	Organisation	-.477	.268	**-.800**	.120	-.103	-.068	-.255	-.153
Tech & Prof	Knowledge of law- general	-.453	.357	**-.795**	.258	-.052	-.162	-.214	-.068
Tech, Prof & W	Research skills	-.593	-.121	**-.881**	-.026	.009	.136	-.305	-.458
NT & Intr	Meeting deadlines	-.659	.161	**-.712**	.000	-.239	.026	-.237	-.369
NT, Intr & W	Does he or she ask for help at appropriate times	-.167	.051	**-.837**	-.164	-.211	.067	-.075	-.502
NT, M & W	Proactive- demonstrates initiative	**-.746**	-.138	-.576	.034	-.179	.274	.034	-.610

Key

Tech = Technical competence

NT = Non-technical competence

N = The number of study participants

Intr = Intra-organisational

Uni = Unique

W = Weighted

M = Meta-competence

Table 2

Lawyers: ECP competences with no strong positive or negative correlations with productivity measures (N: 9)

Type	Competence	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $
NT, Uni & W	File management	-.192	.672	-.552	.655	-.245	-.427	.075	.427
NT & Intr	Delegation	-.205	.530	-.573	.335	-.220	-.427	-.188	.256
NT & Intr	Develops external clients	.540	.519	-.123	.445	-.025	-.516	.319	.098
Tech, Prof & W	Knowledge of legal practices and procedures	-.471	.513	-.336	.506	-.250	-.059	.387	.076
Tech & Prof	Knowledge of law- specialisation	-.647	.034	-.294	.295	-.182	-.101	-.244	.008
NT & Intr	Increases business with new/existing clients	-.500	.156	-.310	.659	-.024	.095	.500	-.048
NT & Intr	Keeps appropriate staff informed about their work in progress	-.224	.526	-.483	.139	-.331	-.328	-.212	-.104
Tech, Prof & W	Legal writing/Drafting	-.647	.303	-.477	.274	.000	-.119	-.187	-.136
NT, Intr & W	Prioritisation	-.661	.172	-.670	.145	.021	-.102	-.407	-.170
NT, Intr & W	Develops internal clients	-.293	.211	-.690	.450	-.122	.207	.500	-.173
Tech & Prof	Commercial judgement	-.561	.383	-.510	.395	-.291	.025	.360	-.218
NT & M	Time management	-.412	.427	-.597	.173	-.483	-.034	.202	-.261
NT, Intr & W	Standard of professional presentation (personal manner, business attire)	-.405	.326	-.658	.165	-.094	-.093	.025	-.304
NT, Intr & W	Effectiveness of working relationships with legal staff	-.470	-.060	-.538	.122	.017	-.008	-.134	-.361

Type	Competence	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $
NT, Intr & W	Effectiveness of working relationships with support staff	-.621	-.037	-.475	.009	-.589	.146	.018	-.475
NT & Intr	Involvement in department administration/management	-.256	-.035	-.205	-.073	-.341	.094	.231	-.633

Key

Tech = Technical competence
NT = Non-technical competence
N = The number of study participants
Intr = Intra-organisational
Uni = Unique
W = Weighted
M = Meta-competence

Table 3

Lawyer: ECP correlations of the Nordhaug domains and technical/non-technical totals with productivity measures (N: 9)

Type	Units % to budget April 2001	Units % YTD	Fees % April 2001	Fees % YTD	Recovery Rate	Productive non bill units	YTD total units	YTD Total contribution $
Non-technical total	A	A	A	A	A	A	A	A
Meta-competence	-.404	.077	-.723	.182	.083	-.049	.056	.012
Intra-organisational	-.434	.221	**-.737**	.438	.337	-.051	.345	-.172
Industry	-.422	.175	-.633	.144	.326	-.130	.107	.040
Technical Total	-.580	.110	**-.793**	.375	.278	-.095	.035	.069
Trade/Professional	**-.731**	.030	-.696	.318	.439	-.008	.029	-.001
Unique	-.185	.225	**-.781**	.388	-.068	-.226	.039	.176

N= the number of study participants

Appendix 25. Supermarket managers: Competence profiles

Competences	Butchery	Produce	Dairy/Deli	Grocery	Bakery	Liquor	Seafood	Check out
NON-TECHNICAL								
Meta-competences	√	√	√	√	√	√	√	√
Literacy. Able to read and write fluently in a retail context	√	√	√	√	√	√	√	√
Learning capacity-reasonably quick at picking up new concepts	√	√	√	√	√	√	√	√
Empathy with other cultures and differences in approach	√	√	√	√	√	√	√	√
Able to adjust to changes	√	√	√	√	√	√	√	√
Intra-organisational								
Co-operative with other managers, own staff and Owner/Operator	√	√	√	√	√	√	√	√
Negotiation skills- able to negotiate with staff and suppliers	√	√	√	√	√	√	√	√
Knows who to go to for what thereby effectively utilising company resources	√	√	√	√	√	√	√	√
Is aware of the company's desired culture and ethics. Therefore knows what is the acceptable way of doing one's job	√	√	√	√	√	√	√	√
Knows the company's processes and systems	√	√	√	√	√	√	√	√
Is aware of the organisation's political dynamics. Their management style takes this into consideration.	√	√	√	√	√	√	√	√
Knows the company's strategic goals	√	√	√	√	√	√	√	√
Effectively manages the people in own department	√	√	√	√	√	√	√	√
Staff induction given in X's specific staff training and personnel systems	√	√	√	√	√	√	√	√
Positive staff interactions with customers are encouraged	√	√	√	√	√	√	√	
Supervises staff effectively	√	√	√	√	√	√	√	√
Industry								
Has an experience-based overview of the industry	√	√	√	√	√	√	√	√

Competences	Butchery	Produce	Dairy/Deli	Grocery	Bakery	Liquor	Seafood	Check out
Is aware of the industry best practices relevant to their position	√	√	√	√	√	√	√	√
Technical training of staff provided for staff in the department	√	√	√	√	√	√	√	√
TECHNICAL								
Standard Technical								
Telephone skills are effective for arranging appointments, ordering, following up issues	√	√	√	√	√	√	√	√
Has basic administration skills required for the position	√	√	√	√	√	√	√	√
Can use the PA system for advertising products	√	√			√		√	
Trade/Professional								
Buys appropriate amounts and quality of goods at an effective price	√	√	√	√	√	√	√	
Equipment is maintained	√	√	√	√	√		√	
Display and merchandising are effective	√	√	√	√	√	√	√	
Stock rotation as appropriate is carried out	√	√	√	√	√		√	
Knowledge and experience of their trade	√	√	√	√	√	√	√	√
Unique								
Quality checks and record keeping and systems for purchase, receiving and storage of inward goods	√	√	√	√	√	√	√	
Pricing ticket display and price change communication to Front-End manager	√	√	√	√	√	√	√	
Hygiene and cleaning systems for area of responsibility	√	√	√	√	√	√	√	√
Weekly sales analysis and gross profit report that monitors stock on hand and profits	√	√	√	√	√	√	√	√
Occupational safety and health practices of X are followed.	√	√	√	√	√	√	√	√

Appendix 26. Supermarket managers: Competences feedback form

Research Project

Position: Bakery Manager **Your first name:**_____

Your position_____

Directions

For each of the items below please circle the number that best represents your opinion of his/her competence. If there is a comment that you wish to add, please feel free to do so. A "not applicable" category, (N/A) has been included. Circle this if you have not been in a situation to observe or experience a competence. If you do not wish to give a rating for a particular competence do no circle.

Key

N/A	= not applicable	**1**	= no evidence of competence	**2**	= not adequate competence
3	= acceptable competence	**4**	= above average competence	**5**	= exceptional competence

Non Technical

1. Meta-competences

Literacy- Able to read and write fluently in a retail context	N/A	1	2	3	4	5
Learning capacity-Reasonably quick at picking up new concepts	N/A	1	2	3	4	5
Empathy with other cultures and differences in approach	N/A	1	2	3	4	5
Co-operative with other managers, own staff and Owner/Operator	N/A	1	2	3	4	5
Negotiation skills- Able to negotiate with staff and suppliers	N/A	1	2	3	4	5
Change-Able to adjust to changes	N/A	1	2	3	4	5

Comments on any of the above

2. Intra-organisational competences

Resources- Knows who to go to for what, thereby effectively utilising company resources	N/A	1	2	3	4	5
Culture- Is aware of the company's desired culture and ethics. Therefore knows what is the acceptable way of doing one's job	N/A	1	2	3	4	5
Company systems- Knows the company's processes and systems	N/A	1	2	3	4	5
Organisational politics- Is aware of the organisation's political dynamics. Their management style takes this into consideration	N/A	1	2	3	4	5
Strategic goals-Knows the company's strategic goals	N/A	1	2	3	4	5
Management -Effectively manages the people in own department	N/A	1	2	3	4	5

Comments on any of the above

3.Industry competences

Industry knowledge- Has an experience-based overview of the industry	N/A	1	2	3	4	5
Best practice- Is aware of the industry best practices relevant to own position	N/A	1	2	3	4	5

Comments on any of the above

Technical

4. Standard technical competences

Telephone skills are effective for arranging appointments, ordering, following up issues	N/A	1	2	3	4	5
Administration -Has the basic administration skills required for the position	N/A	1	2	3	4	5
PA system Can use the PA system for advertising products	N/A	1	2	3	4	5

Comments on any of the above

5.Technical trade competences

Buying- Buys appropriate amounts and quality of goods at an effective price	N/A	1	2	3	4	5
Positive staff interactions with customers are encouraged	N/A	1	2	3	4	5
Equipment is maintained	N/A	1	2	3	4	5
Display and merchandising are effective	N/A	1	2	3	4	5
Stock rotation, as appropriate, is carried out	N/A	1	2	3	4	5
Technical training provided for staff in the department	N/A	1	2	3	4	5
Supervision- Supervises staff effectively	N/A	1	2	3	4	5
Knowledge and experience of baking of breads and cakes	N/A	1	2	3	4	5

Comments on any of the above

6. Unique to X supermarket competences

Quality checks and record keeping, and systems for purchase, receiving and storage of inward goods	N/A	1	2	3	4	5
Pricing ticket display and price change communication to Front-End manager	N/A	1	2	3	4	5
Hygiene and cleaning systems for area of responsibility	N/A	1	2	3	4	5
Weekly sales analysis and gross profit report monitors stock on hand and profits	N/A	1	2	3	4	5
Staff induction given in Eastridge specific staff training and personnel systems	N/A	1	2	3	4	5
Occupational safety and health practices of X are followed	N/A	1	2	3	4	5

Comments on any of the above

Please put this form into the stamp addressed envelope provided and post it.

Thank you very much.

Appendix 27. Supermarket managers: Focus report partial measures' sub-components

Presentation	Compliance	Financial
Housekeeping	OSH	Performance to budget
Stockroom	MAF food safety	Gross profits
	Building WOF	Shrinkage/wastage
Merchandising	Armed hold up	Security
Range review	Fair trading	
Displays	Sale of goods	
Stock rotation		
Quality	Staff	Customer Focus
Ticketing	Training support	POE/PSA
Other Areas	Security training	Support of scheme
	Staff appearance	Current ranking
Promotion		Results discussed
Advertised lines	Leadership	Action taken
In-store specials	Manager meetings	
Xmas Club Fly Buys	Daily reviews	Test Shopper
	Open mind	Support of scheme
	Overall attitude	Results discussed
		Action taken

Appendix 28. Supermarket managers: Competences means and standard deviations

Competences	Rick	Gary	Edna	Lida	Len	Mick	Ulee
Able to read and write fluently in a retail context	4.00	4.50	4.00	4.00	4.25	4.25	4.50
	.82	.58	1.15	.82	.96	.50	.58
Learning capacity-reasonably quick at picking up new concepts	4.00	4.50	4.00	4.25	4.00	4.25	4.50
	.82	.58	.82	.50	.82	.96	.58
Empathy with other cultures and differences in approach	4.00	4.00	4.00	4.00	3.50	2.75	3.75
	.82	.82	.82	.82	.58	1.71	.50
Co-operative with other managers, own staff and MD	3.75	4.75	4.25	4.00	4.00	4.00	3.75
	.96	.50	.50	.82	.82	1.15	.50
Negotiation skills- able to negotiate with staff and suppliers	4.50	4.75	4.25	4.50	3.50	4.00	4.50
	.58	.50	.93	.58	.58	1.15	.58
Able to adjust to changes	4.00	4.50	3.75	4.25	4.00	3.75	3.50
	.82	.58	.96	.50	.82	1.50	.58
Knows who to go to for what thereby effectively utilising company resources	3.75	4.00	4.25	4.25	4.50	4.25	4.00
	.50	.82	.96	.50	.58	.96	.82
Aware of the company's desired culture and ethics and therefore what is acceptable way of doing one's job	4.00	4.50	4.50	4.00	4.00	4.00	3.25
	.82	1.00	.58	.82	1.15	1.15	.96
Knows the company's processes and systems	4.00	4.00	4.00	4.25	4.25	4.00	3.75
	.82	.82	.82	.93	.96	1.15	.96
Aware of the political dynamics and this knowledge considered in manner of work	3.75	4.50	3.75	4.00	4.00	3.67	3.75
	.50	1.00	.50	.00	1.15	1.15	.50
Knows the company's strategic goals	4.00	4.75	4.25	4.00	3.75	4.25	4.25
	.82	.50	.50	.82	.96	.96	.96
Effective management of the people in own department	4.00	4.63	4.50	4.25	3.50	4.00	4.25
	.82	.48	.58	.50	.58	1.41	.96
Effective management of the people in own department	4.00	4.63	4.50	4.25	3.50	4.00	4.25
	.82	.48	.58	.50	.58	1.41	.96
Has an experience-based overview of the industry	3.75	4.75	4.00	4.00	4.50	4.00	3.33
	.96	.50	.00	.82	.58	.82	.58
Is aware of the industry best practices relevant to their position	3.50	4.75	4.50	3.75	3.75	4.25	3.33
	1.00	.50	.58	.96	.96	.96	.58
Phone skills for arranging appointments, ordering, following up issues	4.50	4.50	4.50	4.50	4.00	4.28	4.00
	.58	1.00	.58	.58	.82	.96	.82

Competences	Rick	Gary	Edna	Lida	Len	Mick	Ulee
Basic administration skills required for the position	4.00	4.75	4.50	4.25	4.00	4.25	4.00
	.82	.50	.58	.50	1.15	.96	.82
Can use the PA system for advertising products	3.00	3.00	3.00		3.50		
	.00	1.41	.82		1.29		
Buying appropriate amounts and quality of goods at an effective price		4.75	4.33		3.50	4.50	4.00
		.50	.58		.58	.58	.00
Positive staff interactions with custome s are encouraged	4.50	4.75	4.50	4.50	4.00	4.00	3.75
	.58	.50	.58	.58	.82	1.15	1.50
Equipment is maintained	4.30	4.50	4.17		4.25	4.25	
	.58	.58	.76		.96	.96	
Display and merchandising are effective	4.00	4.00	4.50		3.75	4.00	4.13
	1.00	.82	.58		.96	1.15	.63
Stock rotation	4.00	4.25	4.33		4.25	3.75	
	1.00	.50	.58		.50	1.50	
Technical t aining of staff provided for staff in the department	4.50	4.75	4.50	4.25	4.00	3.75	3.75
	.58	.50	.58	.96	1.15	1.50	.96
Supervises of staff effectively	4.00	4.75	4.50	4.25	3.67	4.00	4.00
	.82	.50	.58	.50	.58	1.15	.82
Knowledge and expe ience of their trade		4.75	4.00	4.50	4.50	3.50	4.00
		.50	.82	.00	.58	.58	.82
Quality checks and record keeping and systems for purchase, receiving and storage of inward goods	3.67	4.00	4.33		4.00	4.00	3.00
	2.06	1.15	2.22		1.15	1.15	.00
Pricing ticket display and p ice change communication to Front-End manager	4.00	4.00	4.75		3.75	4.00	4.25
	2.16	.82	.50		.50	1.15	.96
Hygiene and cleaning systems for area of responsibility	4.25	4.50	4.50	4.75	3.50	4.25	3.50
	.96	1.00	.58	.50	.58	.96	1.00
Weekly sales analysis and gross p ofit repo t that monitors stock on hand and profits	3.50	4.75	4.33	4.00	4.00	4.33	4.00
	2.06	.50	2.22	2.83	1.15	.58	.96
Staff induction and X specific staff training and personnel systems	4.50	4.25	4.25	4.75	3.75	4.33	4.00
	.58	.50	.50	.50	.50	1.15	1.00
Eastridge occupational safety and health practices are followed	4.50	4.50	4.00	4.00	4.00	4.00	4.25
	.58	.58	2.00	.82	1.15	1.15	.96

Key

1st line = mean

2nd line = standard deviation

Appendix 29. Supermarket managers: Separate rater group correlation results

I carried out correlations of the competence results for the four levels of raters individually and in subgroups, as well as with the mean score with two of the measures.

There are no strong positive correlations between self-ratings, the subordinate ratings, and the peer and self-ratings combined with the two measures: 'percentage of the budgeted contribution to gross profit' and 'percentage to gross profit'. Peer ratings identify two competences (also identified by the mean ratings) as strongly correlated. The superior ratings identify a total of four and the mean ratings identified a total of three strongly correlated competences. The three competences applicable to all seven managers identified from the superior's (O/O's) ratings are:

'Reasonably quick at picking up new concepts'

'Is aware of the organisation's political dynamics. Their management style takes this into consideration'

'Able to adjust to change'

These last two competences are not strongly correlated to the focus report measures, although the first one is.

The mean ratings identified the following competences as strongly correlated with the two measures above:

'Able to read and write fluently in a retail context'

'Equipment is maintained'

'Occupational safety and health practices of X are followed'

This last one is not strongly correlated to the focus report measure. Possibly this is because the focus report does not emphasise this enough or the external raters may have been unfamiliar with each supermarket's specific practices.

I decided after this exploration of a non-mean performance score to maintain consistency in methodology.

Appendix 30. Supermarket managers: Tables

Table 1

Supermarket managers: Competences with strongly negative correlations with productivity measures

Competence	No of Participants	Presentation *	Merchandise *	Promotion *	Staff *	Leadership *	Compliance *	Financial *	Customer *	Focus Jan 00	Focus Jul 00	Focus Jan 01
Able to adjust to changes	7	-.200	-.109	**-.804**	-.083	.200	.200	-.364	.636	.400	.009	-.170
Equipment is maintained	5	**-.718**	**-.821**	-.461	.205	-.616	-.462	-.051	.051	.410	-.667	-.368
Occupational safety and health practices of Eastridge are followed	7	-.598	**-.797**	.143	.151	-.677	-.677	-.020	-.199	-.060	**-.874**	-.558
Technical training provided for staff in the department	7	-.509	-.394	-.327	-.037	.073	-.073	-.491	.491	-.055	-.440	**-.736**

Key

Tech = Technical **M** = Meta-competence **NT** = Non technical

T/P = Trade/Professional **Uni** = Unique Ind = Industry

Table 2

Supermarket managers: Competences with no strong correlations with any productivity measures

Type	Competence	No of Participants	Presentation *	Merchandise *	Promotion *	Staff *	Leadership *	Compliance *	Financial *	Customer *	Focus Jan 00	Focus Jul 00	Focus Jan 01
NT& M	Empathy with other cultures and differences in approach	7	-.158	-.099	-.233	-.139	.158	-.020	-.374	.374	.158	-.308	-.429
NT & Intr	Able to negotiate with staff and suppliers	7	-.185	-.482	.057	.355	-.111	-.148	.222	.259	.185	-.636	-.346
NT & Intr	Effectively manages the people in own department	7	-.018	-.255	.290	.642	.382	.255	.364	.618	-.073	-.495	-.528
Tech & Std	Telephone skills are effective for arranging appointments, ordering, following up issues	7	-.378	-.219	-.235	-.070	.378	.279	-.359	.418	-.179	-.181	-.434
NT & Intr	Positive staff interactions with customers are encouraged	7	-.449	-.318	-.404	.047	.299	.206	-.374	.617	-.056	-.283	-.538
NT & Intr	Staff induction given in X's specific training & personnel systems	7	-.144	-.036	-.222	-.218	.360	.414	-.144	.036	-.108	.200	.206

Key

NT = Non-technical competence

M = Meta-competence

Intr = Intra-organisational

Std = Standard technical

Tech = Technical competence

***** = Component measures for January, 2001 focus report

Table 3

Supermarket managers: Nordhaug domain subtotals correlations with productivity measures

Domain Subtotals	No of Participants	Presentation *	Merchandise *	Promotion *	Staff *	Leadership *	Compliance *	Financial *	Customer *	Focus Jan 00	Focus Jul 00	Focus Jan 01	Nielsen
Meta-competences	7	.160	-.191	-.154	.172	.101	.016	.163	.643	.647	-.309	-.392	.172
Intra-organisation	7	-.064	-.324	-.106	.275	.598	.448	.156	**.810**	.181	-.2479	-.528	-.481
Industry	7	-.390	-.300	-.309	.212	.481	.311	-.065	**.795**	.059	-.353	-.682	-.449
Total non-technical	7	-.124	-.322	-.186	.263	.524	.366	.107	**.852**	.254	-.315	-.599	-.390
Standard technical	4	-.047	-.645	.574	**.843**	**.816**	**.767**	**.928**	**.872**	-.211	***-.755***	**-.966**	-.259
Trade/Professional	4	-.576	-.631	.189	.458	.425	-.030	.273	**.929**	.585	**-.913**	**-.993**	.001
Unique	6	-.529	-.528	.052	.296	**.812**	.673	.115	.685	-.122	-.466	**-.810**	-.669
Total technical	3	**-.896**	**-.940**	**.870**	**.909**	**.851**	**.823**	**.925**	**.749**	**-.705**	**-.834**	**-.942**	**-.830**

Key

• = Component measures for January, 2001 focus report

Appendix 31. ISS engineers: Competence profile

Non -technical competences

Meta-competences

Oral and written communication skills.

Generic problem solving skills.

Intra-organisational

Willingness to share knowledge.

Ability to recognise the needs of customers, and deliver accurate, timely service.

Ability to identify issues and initiate or direct rectification/improvement action.

Ability to operate in a team environment.

Ability to manage workload and prioritise tasks.

Knowledge of other people within X with technical expertise and knowledge.

Knowledge of 'x' administrative policies and procedures, and associated information sources.

Ability to research information from internal X sources (Intranet, DIXS, BRs, handbooks, packs, etc).

Industry

Knowledge of other organisations with technical expertise.

Technical competences

Standard technical

Ability to confidently use micro-soft office applications

Trade/Professional

Generic engineering knowledge

Knowledge of seagoing technical support processes and constraints.

Technical fault-finding skills.

Knowledge of combat system principles and technology.

Knowledge of naval engineering standards.

Unique

In-depth knowledge about specific combat systems.

Knowledge of X technical policies and procedures, and associated information sources.

Appendix 32. ISS engineers: Competences feedback form

Research Project

Feedback on: _____ **Your first name:**_____

Your position_____

Directions

For each of the items below please **circle the number** that best represents your opinion of his/her competence. If there is a comment that you wish to add, please feel free to do so. A **"not applicable"** category, **(N/A)** has been included. Circle this if you have not been in a situation to observe or experience a competence. **If you do not wish to give a rating for a particular competence do no circle.**

Key

N/A	= not applicable	**1**	= no evidence of competence	**2**	= not adequate competence
3	= acceptable competence	**4**	= above average competence	**5**	= exceptional competence

Non-technical competences

1. Meta-competences

Oral and written communication skills.	N/A 1 2 3 4 5
Generic problem solving skills.	N/A 1 2 3 4 5
Willingness to share knowledge.	N/A 1 2 3 4 5
Ability to recognise the needs of customers, and deliver accurate, timely service.	N/A 1 2 3 4 5
Ability to identify issues and initiate or direct rectification/improvement action.	N/A 1 2 3 4 5
Ability to operate in a team environment.	N/A 1 2 3 4 5
Ability to manage workload and prioritise tasks.	N/A 1 2 3 4 5

Comments on any of the above

2. Industry-competences

Knowledge of other organisations with technical expertise.	N/A 1 2 3 4 5

Comments on any of the above

3. Intra-organisational competences

Knowledge of other people within RNZN with technical expertise and knowledge.	N/A 1 2 3 4 5
Knowledge of RNZN administrative policies and procedures, and associated information sources.	N/A 1 2 3 4 5
Ability to research information from internal RNZN sources (Intranet, DIXS, BRs, handbooks, packs, etc).	N/A 1 2 3 4 5

Comments on any of the above

Technical Competences

4. Standard technical competences

Ability to confidently use Microsoft Office applications	N/A	1	2	3	4	5

Comments on any of the above

5. Trade/Professional competences

Generic Engineering knowledge	N/A	1	2	3	4	5
Knowledge of seagoing technical support processes and constraints.	N/A	1	2	3	4	5
Technical fault-finding skills.	N/A	1	2	3	4	5
Knowledge of combat system principles and technology.	N/A	1	2	3	4	5
Knowledge of naval Engineering standards.	N/A	1	2	3	4	5

Comments on any of the above

6. Unique Competencies

In-depth knowledge about specific combat systems.	N/A	1	2	3	4	5
Knowledge of RNZN technical policies and procedures, and associated information sources.	N/A	1	2	3	4	5

Comments on any of the above

Please put this form into the stamp addressed envelope provided and post it.

Thank you very much.

Appendix 33. ISS engineers: Cover note

(Written by researcher and included with the 360-degree competence feedback forms)

31/5/01

Dear Ian

re: Massey University Research Project Protocol PN 01/27

Thank you for consenting to take part in this research project.

In this envelope you will find the following:

- An Information Sheet in case you have mislaid the one given out with your consent form.
- A Competence Survey Form to complete on yourself.
- A Personnel Data Form for you to complete on yourself
- Competence Survey Forms to complete on four member of the ISS Team
- Competence Survey Forms to complete on Paul Johnson & Mark Worsfold
- A stamped and addressed envelope for you to return the forms to me.

Please complete all the forms and return in the envelope provided as soon as possible.

Your assistance is very much appreciated.

Yours sincerely

Heather Lees

Appendix 34. ISS engineers: Cover note written by the Commander

Heather,

I've forwarded an email that I sent to the technicians that are involved in the case study - fairly self-explanatory. I've got a letter drafted in response to your request for consent - the boss wants to discuss it with me tomorrow - I don't anticipate any problems.

Regards

XXXXX

-----Original Message-----

From: XXXXXXX ,CDR
Sent: Monday, 26 March 2001 13:03
To: Engineers Supervising Officers
Cc: Supervising Officers & other relevant personnel
Subject: Fleet Engineering Centre Personnel Competencies

1. I have started some work with a Massey University PhD student (Heather Lees), who is doing research into the validity of using competencies for the measurement of value, (known as intellectual capital) and in particular the linkage with any existing measures of success. I agreed to work with Ms Lees because I believe there is considerable opportunity to devise a means to properly represent the value of key people in our organisation. However, I need your input into the process.

2. Ms Lees is essentially working with a small number of organisations to produce a number of case studies. The idea is to look at the competencies of a small team, perform some clever weighting/statistical processing to derive an index, which can then be correlated with other performance measures. Your input into the process will be fairly straightforward and should take no longer than 15-30 mins to complete a couple of forms. Ms Lees will need access to PMIS data - essentially to find out what relevant training and work experience you've had. This information will be subject to the privacy act, and will require your consent for Ms Lees to use the information. I will forward a copy of the consent form to you.

3. I have compiled a list of the competencies that I believe you need to have to perform your jobs effectively. I would like you to do the following:

a. Read through the list (don't worry too much about the definitions of the headings), and think about whether there are any competencies that need to be added.

b. There is a column on the form to add more weighting (times two) to certain competencies. Where you think a particular competency is more important, please tick this column.

c. The final thing is to think about the relative weighting between "non-technical" and "technical" competencies. If, say, after reading through the list you think the technical competencies are twice as important as non-technical, then put 66% in the non-technical box, and 33% in the technical box. Perhaps you may think the split is more even, or that the weighting should be more towards the non-technical competencies.

4. Please complete the form and return to TEQM (this week, preferably).

5. For CSE/CISE/TEQM - you should also complete the form.

Appendix 35. ISS engineers: Competence means and standard deviations

Competence	Nigel	Trevor	Ian	Yohann
Oral and written communication skills	3.75	3.50	4.00	3.25
	.50	.58	.00	.50
Generic problem solving skills.	4.00	3.25	3.50	4.00
	.82	.96	.58	.82
Willingness to share knowledge	4.00	3.75	4.25	3.75
	.82	1.26	.50	.50
Ability to recognise the needs of customers, and deliver accurate, timely service	3.50	3.75	3.75	3.75
	.58	.50	.50	.50
Ability to identify issues and initiate or direct rectification/improvement action	3.75	3.75	3.75	3.75
	.96	1.26	.96	.50
Ability to operate in a team environment	4.00	4.00	4.25	4.00
	.82	.82	.50	.00
Ability to manage workload and prioritise tasks	4.00	3.25	3.50	3.50
	.82	.96	.58	.58
Knowledge of other organisations with technical expertise	4.25	3.50	3.25	4.50
	.50	1.29	.50	.58
Knowledge of other people within RNZN with technical expertise and knowledge	3.75	4.00	4.00	4.25
	.96	.82	.82	.96
Knowledge of RNZN administrative policies and procedures, and associated information sources	3.75	3.50	3.25	3.25
	.96	.58	.96	.50
Ability to research information from internal RNZN sources (Intranet, DIXS, BRs, handbooks, packs, etc).	3.75	4.25	4.00	3.75
	.96	.50	.82	.96
Ability to confidently use Microsoft Office applications	3.50	3.50	3.50	3.50
	.58	.58	.58	.58
Generic Engineering knowledge	4.00	3.50	3.50	4.00
	.82	.58	.58	.00
Knowledge of seagoing technical support processes and constraints	4.00	4.00	4.00	4.25
	.82	.82	.82	.50
Technical fault-finding skills	4.00	3.50	3.75	4.25

Competence	Nigel	Trevor	Ian	Yohann
	.82	1.26	.96	.50
Knowledge of combat system principles and technology	4.00	3.00	3.50	4.25
	.82	.00	.58	.50
Knowledge of naval Engineering standards	3.50	3.75	3.50	3.50
	1.00	.50	.58	.58
In-depth knowledge about specific combat systems	3.75	4.00	3.50	4.50
	.96	.82	1.00	.50
Knowledge of RNZN technical policies and procedures, and associated information sources	4.00	3.75	3.50	3.25
	.82	.50	.58	.50

Key

1st line = mean

2nd line = standard deviation

Appendix 36. ISS engineers: Tables

Table 1

ISS engineers: Competences with a strong negative correlation with productivity measures (N: 4)

Domain	Competence	Ship Average	Engineering Advice	Repair Assistance	Logistical Support	Officer	ISS Ship
NT & M	Generic problem solving	-.105	.316	-.316	**-.949**	-.316	-.316
NT & M	Ability to manage workload and prioritise tasks	.316	.632	-.316	**-.949**	-.316	-.316
NT & Intr	Knowledge of other people within X with technical expertise & knowledge	**-.949**	-.316	-.316	.316	-.316	-.316
T & T/P	Generic Engineering skills	.000	.000	.000	**-.894**	.000	.000
T & T/P	Knowledge of seagoing technical support processes and constraints	**-.775**	-.258	-.258	-.258	-.258	-.258
T & T/P	Technical fault finding skills	**-1.000**	.000	-.600	.200	-.600	-.600
T & T'P	Knowledge of combat system principles and technology	-.400	.200	-.400	**-.800**	-.400	-.400
T & Uni	In-depth knowledge about specific combat systems	-.400	.200	-.400	**-.800**	-.400	-.400

Key

NT = Non technical competence

T = Technical competence

N = The number of study participants

M = Meta-competence

T/P = Trade/Professional

Intr = Intra-organisational

Uni = Unique

Table 2

ISS engineers: Competences with no strong correlations with productivity measures (N: 4)

Domain	Competence	Ship Average	Engineering Advice	Repair Assistance	Logistical Support	Officer	ISS Ship
NT & Intr	Knowledge of other organisations with technical expertise	-.200	-.400	.200	-.600	.200	.200
NT & M	Ability to identify issues & initiate or direct rectification/improvement action	*					
T & Std	Ability to confidently use Microsoft office applications	*					

Key

NT = Non technical competence **M** = Meta-competence **Intr** = Intra-organisational

Std = Standard technical **T** = Technical competence

N = The number of study participants

* = The four measures were all the same therefore there was no correlation result

Table 3

ISS engineers: Nordhaug domain subtotals correlations with productivity measures (N: 4)

Domain	Ship Average	Engineering Advice	Repair Assistance	Logistical Support	Officer	ISS Ship
Meta-competences	-.089	**.864**	**-.701**	**-.795**	-.480	-.445
Intra-organisational	.048	.640	-.354	.074	-.346	-.154
Industry	.019	-.024	-.113	**-805**	.096	-.084
Non-technical subtotal	-.011	.247	-.315	**-.944**	-.066	-.211
Standard technical	*					
Trade/Professional	-.400	.200	-.400	**-.800**	-.400	-.400
Unique	.258	**-.775**	**.775**	-.258	**.775**	**.775**
Technical subtotal	-.200	-.400	.200	-.600	.200	.200

Key

N = The number of study participants

• = The four measures were all the same so there was no correlation result

Appendix 37. Gaming case study

The Organisation

The gaming organisation is described earlier in Chapter 6

Sample

The sample of workers who consented to be involved in the study was all of the fifteen service technicians from both regions. However, only eleven are in the analysis because the others still had one or more competence feedback forms outstanding at the time the original human resources and training manager departed. The sample was comprised of eight senior gaming technicians and three gaming technicians. All were male, their ages ranged from 21 to 58 and they had had between a third of one year and six years in their present job, and up to twelve years in the industry. Most of them had some electrical technician training and/or qualifications gained from sources such as the Navy, automotive industry, Telecom and appliance repairers. Five of them had a trade certificates, one had an advanced trade certificate and one had a New Zealand Certificate in electrical engineering. Equivalent years of tertiary education assigned for these vocational qualifications in this case study were three years, four years and four years respectively[111].

Competence profile

The human resources and training manager compiled an initial set of competences from ones downloaded from the Internet. These were from available generic competences for casino workers and the national framework standards for the hospitality and service industries. These were classified according to the Nordhaug typology and adapted for this organisation. The human resources and training manager did further research on available national framework qualifications, consulted with the managers and came up with a very different list. After further discussion she planned to discuss both lists and written descriptors with the managers again and combine these two lists into one. I took both lists and simplified, reduced and clarified the competences and emailed them to her

[111] These were not recalculated according to the OECD categories and average years taken as there seemed little point in it as the development of an HCI was not possible in this case study.

for approval. This list came back approved although with some minor changes. There are technical competences and non-technical competences. The competence profile was then developed into a competence feedback form. (See Appendix 29 for the list of competences classified in Nordhaug's domains and Appendix 30 for a copy of the competence feedback form.)

No weightings were given and used for the competences, as this was not finalised before the human resource and training manager departed. The human resources and training manager, in consultation with the two area managers, decided the proportional weightings to reflect the importance of technical and non-technical skills was 50:50.

Productivity measures

I was told a productivity measure had been scoped by the human resources and training manager and approved by the managers. It was not accessible to me, as it had to be calculated from the collected service data. It was to be time taken to fix a fault against an agreed standard time. It was planned that the new software programme to be introduced later in the year would automatically calculate this measure. Therefore manual construction of this measure would be developmental towards this goal as well as useful in my research. This measure did not eventuate.

The acting human resources and training manager made available the service analysis data from June to early August 2001 and from this I selected data related to the study participants to construct productivity measures. The first measure I compiled was the charge-out price, including site visits, but excluding installations and wilful damage. Because there was a great variation in the number of labour hours recorded there was a great variation in the charge-out price totals. The range in charge-out price totals calculated from this data went from $3,115 to $ 18,957. The second measure was the price of the charged-out labour divided by the hours of labour. This resulted in an hourly charge-out rate. Because there is a variation in the hours taken and the hours charged, this equates to a recovery rate application. This equation resulted in the given standard $45 per hour charge-out being represented by a range from $27.71 to $ 50.39.

Competence 360-degree feedback

The competence feedback forms (see Appendix 30), information sheet and the stamped addressed envelope were given to the human resource and training manager for distribution. The latter and the regional manager determined the peer for each study participant and there was also a self-rate and a manager rate for each one. I notified the human resources and training manager about outstanding forms until eleven study subjects had all forms returned and the human resources and training manager left the company.

Analysis

The means and standard deviations for the raters on each competence for all study participants are included in Appendix 28. Standard deviations are generally less than 1.00 therefore the mean rating is appropriate for the analysis of these results. There are a small number of deviations (ten out of a possible 253) that are greater than 1.00. These ten range from 1.15 to 1.53; five of these are associated with Nat's results. This difference is primarily because his manager tends to rate him at two points lower than his self-rate (and sometimes also than the peer rate) on the technical trade competences. Overall, however, there is considerable consistency in the ratings on the competences by raters for the eleven study participants.

There are no competences with a strongly positive or negative correlation with the two productivity measures. The competence 'Understands monthly machine analysis' has a positive correlation of .616 with the 'income from labour' measure and the competence. 'Able to cope with a moderate rate of change' has a positive correlation of .506 with the 'income from labour' measure. These are the only two positive correlations over .500. Negative correlations greater than -.500 are: 'Understands weekly gaming machine profit', 'Understands the X computer database management system', 'Provides effective internal customer service' and 'Provides effective external customer service'. Correlation results are displayed in Table 1 following.

Table1

Gaming technicians: Competences with a correlation greater than .500 (N: 11)

Domain	Competence	Unit rate $ hour	Income from Labour
Tech & T/P	Understands monthly machine analysis	.616	-.340
NT & M	Able to cope with a moderate of change	.506	.037
Tech & T/P	Understands weekly gaming machine profit	.330	-.610
Tech & Uni	Understands the X computer database management system	-.217	-.555
NT & Intr	Provides effective internal customer service	.037	-.530
NT & Intr	Provides effective external customer service	.058	-.597

Key

NT	= Non-technical competence	**M**	= Meta-competence
Intr	= Intra-organisational	**Tech**	= Technical competence
T/P	= Trade/Professional	**Uni**	= Unique

N = The number of study participants

_ = Is used to identify the correlation over 500 whether positive or negative

These correlations suggest a trend for the first two competences above to be associated with realised higher hourly rates and the last four indicate a trend towards being associated with lower income from labour.

In this case study there is an absence of any competence with positive correlations greater than .700 with which to construct a HCI. Therefore I decided to explore whether there were any relationships between competences performance totals, tertiary education, experience and the productivity measures. Competences performance totals were calculated for each study participant. No distinction for proportional weighting for the non-technical and the technical subtotals were made because it is equal at 50:50.

These competence total performance scores are in Table 2 below. These have been presented with the two productivity measures and the study participant's experience as years in the industry and in this job.

Table 2

Gaming technicians: Individuals' total performance competence scores and productivity measures

	Total Competences mean raw score totals	Unit rate $/hour	Income from labour	Experience In Industry	Years in current job
Rod	97.33	36.97	17,831	12	12
Nat	91.67	27.71	15,199	5	5
Ted	91.17	45.49	12,286	11	6
Larry	88.33	49.14	3,115	3.3	3.3
Ned	87.67	50.39	16,978	2	2
Ed	87.17	44.37	11,460	3.5	3.5
Yaap	84.50	33.34	5,331	3	3
Len	82.33	53.44	7,014	1.4	1.4
Neville	80.67	46.37	17,817	13	13
Stan	78.17	54.20	18,957	0.4	0.4
Savai	75	45	6,772	4.25	4.25

There does not appear to be any pattern of financial return measures or experience measures associated with the total raw performance scores for the individuals.

Personnel data

Correlations with available productivity measures were calculated for the personnel data: age, work experience, time in the job, years in the industry and equivalent years of tertiary education. There are no strong correlations. 'Income from labour' has a .500 correlation with 'years in the industry'. 'Tertiary education' has very weak positive and negative correlations with the two measures respectively (See Table 3 for these correlation results).

Table 3

Gaming technicians: Personnel data (N: 11)

	Age	Work experience	Time in job	Years in Industry	Years of Tertiary Education
Unit rate$/hour	.027	.168	-.465	-.364	-.058
Income from labour	.182	.210	.419	.500	.029

Key

N = The number of study participants

Domains

No domains are strongly negatively or positively correlated with either of the productivity measures (See Table 4). The total of the three technical domains did result in a negative correlation of -.500 with the unit rate. All of the domains have weak negative correlations with the 'unit rate' measure and all but the technical unique domain has weak positive correlations with the 'income from labour' measure.

Table 4

Gaming technicians: Domain correlations with productivity measures (N: 11)

Measures	Meta-competences	Intra-organisational	Industry	Non technical total	Standard Technical	Trade/ Professional	Unique	Technical total	All competences
Unit Rate	-.059	-.306	-.439	-.355	-.447	-.460	-.428	-.500	-.455
Income from Labour	.215	.096	.290	.264	.146	.292	-.182	.155	.091

Key

N = The number of study participants

Competence, education and experience

A comparison was made of the correlations with productivity measures for the raw performance scores, tertiary education and years in the industry. There are very weak correlations with both measures for tertiary education. Total competence scores have a

weak negative correlation with the productivity measure 'unit rate per hour' (-.455) and the number of years in the industry had a weak positive correlation with the productivity measure ' income from labour' (.500). These results are not conclusive for any patterns or associations (See Table 5).

Table 5

Gaming technicians: Comparison of correlations (N: 11)

	Total of All Competences	Years Tertiary Education	Years in Industry
Unit rate $/hour	-.455	-.058	-.364
Income from labour	.091	.029	.500

Key

N = The number of study participants

Conclusions

The correlation results from this study yielded no competences with strong correlations with either of the two productivity measures. It was therefore not possible to proceed with the methodology used in other case studies to develop a HCI.

The two productivity measures taken from the service analysis data have large ranges in both the hours recorded and the charge-out rates. The correlation between these measures is weak (.182). There are technicians who appear to put in a large number of hours thereby leading to a larger income for the company but their associated hourly charge-out rate is lower than the $45 standard. Conversely there are technicians who appear to have a small number of recorded hours over the same time period but whose charge-out rate is greater than the standard of $45. Then there are all the variations between these two extremes. These results make me wonder whether hours worked are documented in a consistent fashion. A lack of consistency in price of work and the number of hours documented would lead to inconsistency in both productivity measures.

This case study, the only one for which it has not been possible to develop a HCI, highlights the importance of having productivity measure(s) that relate directly to the identified competences.

Appendix 38. Gaming technicians: Competence profile

Non-Technical

Meta-competences

Able to read and write fluently in the service technician context

Reasonably quick at picking up new concepts

Able to work in a workplace with diverse cultures

Able to cope with a moderate rate of organisational change

Intra-organisational

Provides effective internal customer service

Provides effective external customer service

Understands the purpose and significance of the job to the company

Manages time to meet job priorities

Contributes positively to the team

Industry

Personal presentation is suited to the industry

Communicates the benefits and the distribution process of the gaming industry to the stakeholders effectively

Technical

Standard technical

Data entry skills

Trade/Professional

Services gaming machines and components effectively

Understands compliance with rules and procedures for electronic gaming machines

Understands of weekly gaming machine profit return

Understands Monthly Machine analysis

Understands and can configure jackpot systems

Product and service knowledge is current and comprehensive

Unique

Provides service information to customers within the terms of the service contract

Securely manage the risk factors of coin handling at sites according to X guidelines

Able to operate X clerical systems and business procedures

Understand the X computer database management systems

Follows the occupational safety and health practices of X

Appendix 39. Gaming technicians: Competence feedback form

Research Project

Service Technician Competences Survey

Feedback on: _____ **Your first name:**_____

Your position_____

Directions

For each of the items below please circle the number that best represents your opinion of his/her competence. If there is a comment that you wish to add, please feel free to do so. A "not applicable" category, (N/A) has been included. Circle this if you have not been in a situation to observe or experience a competence. If you do not wish to give a rating for a particular competence do no circle.

Key

N/A	= not applicable	**1**	= no evidence of competence	**2**	= not adequate competence
3	= acceptable competence	**4**	= above average competence	**5**	= exceptional competence

Non Technical

1. Meta-competences

Literacy- Able to read and write fluently in the service technician context	N/A 1 2 3 4 5
Learning capacity-Reasonably quick at picking up new concepts	N/A 1 2 3 4 5
Cultural differences Able to work in a workplace with diverse cultures	N/A 1 2 3 4 5
Change-Able to cope with a moderate rate of organisational change	N/A 1 2 3 4 5

Comments on any of the above

2. Intra-organisational competences

Internal customer service Provides effective internal customer service	N/A 1 2 3 4 5
External customer Service Provides effective external customer service	N/A 1 2 3 4 5
Company approach Understands the purpose and significance of their job to the company	N/A 1 2 3 4 5
Time management Manages time to meet job priorities	N/A 1 2 3 4 5
Team participation Contributes positively to the team	N/A 1 2 3 4 5

Comments on any of the above

3.Industry competences

Presentation Personal presentation is suited to the industry	N/A 1 2 3 4 5
Industry communication Communicates the benefits and the distribution process of the gaming industry to stakeholders effectively	N/A 1 2 3 4 5

Comments on any of the above

Technical

4. Standard technical competences

Data entry skills	N/A	1	2	3	4	5

Comments on the above

5.Technical Trade competences

Servicing Services gaming machines and components effectively	N/A	1	2	3	4	5
Compliance Understands compliance rules and procedures for electronic gaming machines	N/A	1	2	3	4	5
Profit Return Understands weekly gaming machine profit return	N/A	1	2	3	4	5
MMA Understands Monthly Machine Analysis	N/A	1	2	3	4	5
Jackpot systems Understands & can configure jackpot systems	N/A	1	2	3	4	5
Product & Service Knowledge Product and service knowledge is current and comprehensive	N/A	1	2	3	4	5

Comments on any of the above

6. Unique to X competences

Service contract Provides service information to customers within the terms of the service contract	N/A	1	2	3	4	5
Security Securely manages the risk factors of coin handling at sites according to United guidelines	N/A	1	2	3	4	5
Administration Able to operate United clerical systems and business procedures	N/A	1	2	3	4	5
Management data base Understands the United computer database management system	N/A	1	2	3	4	5
Occupational safety and health Follows the occupational safety & health practices of United	N/A	1	2	3	4	5

Comments on any of the above

Please put this form into the stamp addressed envelope provided and post it.

Thank you very much.

Appendix 40. Gaming technicians: Competences means and standard deviations.

Competence	Ned	Ed	Ted	Rod	Yaap	Neville	Stan	Len	Nat	Savaii	Larry
Able to read and write fluently in the service technician context	4.00	2.67	3.67	4.00	4.00	3.33	4.00	3.67	4.33	3.33	4.33
	.00	1.53	.58	.00	1.00	.58	.00	.58	.58	.58	.58
Reasonably quick at picking up new concepts	4.00	3.67	4.00	4.00	3.67	3.67	3.67	4.33	4.67	3.33	4.67
	.00	.58	1.00	1.00	.58	.58	.58	.58	.58	.58	.58
Able to work in a workplace with diverse cultures	4.00	4.00	4.33	4.67	4.33	3.67	4.33	4.00	4.67	3.33	4.33
	1.00	1.00	.58	.58	.58	.58	.58	1.00	.58	.58	.58
Able to cope with a moderate rate of organisational change	4.33	3.67	4.00	4.00	4.00	3.33	4.67	3.67	4.33	2.67	3.67
	.58	.58	1.00	1.00	1.00	.58	.58	1.15	.58	1.15	.58
Provides effective internal customer service	3.67	4.00	4.33	4.67	4.33	3.33	4.00	3.33	4.00	3.67	4.00
	.58	1.00	.58	.58	.58	.58	.00	.58	.00	.58	.00
Provides effective external customer service	4.33	4.33	4.50	5.00	4.33	3.67	4.00	4.00	4.33	4.33	4.00
	.58	.58	.71	.00	.58	.58	1.00	1.00	.58	.58	.00
Understands the purpose and significance of the job to the company	4.33	4.00	4.33	4.67	4.33	3.33	4.00	4.00	4.00	3.67	4.33
	.58	1.00	.58	.58	.58	.58	1.00	1.00	1.00	.58	.58
Manages time to meet job priorities	4.00	4.33	3.50	4.67	4.00	3.33	4.33	3.67	3.33	3.67	4.00
	.00	.58	.50	.58	1.00	.58	.58	.58	1.15	.58	1.00
Contributes positively to the team	4.00	4.33	4.67	4.67	4.00	3.33	3.67	4.33	4.00	3.67	3.67
	.00	.58	.58	.58	.00	.58	.58	.58	.00	.58	.58
Personal presentation is suited to the industry	4.33	4.33	4.00	4.67	4.33	3.33	4.00	4.00	4.33	3.00	4.00
	.58	.58	1.00	.58	.58	.58	1.00	1.00	.58	.00	1.00
Communicates the benefits and the distribution process of the gaming industry to the stakeholders effectively	3.67	3.67	4.00	4.33	3.00	4	3.00	3.00	3.67	3.00	3.5
	.58	.58	1.00	1.15	.00	.00	.00	.00	.58	.00	.58
Data entry skills	3.67	4.00	4.00	4.00	3.00	2.33	3.00	3.33	4.00	3.33	3.00
	.58	1.00	1.00	1.00	.00	.58	.00	.58	1.00	.58	.00
Services gaming machines and components effectively	4.00	4.33	4.33	4.67	3.33	4.00	3.00	4.00	4.33	3.33	4.33
	.00	.58	.58	.58	.58	.00	.00	1.00	1.15	.58	.58
Understands compliance with rules and procedures for electronic gaming machines	3.67	4.00	3.67	4.00	3.33	4.00	3.00	3.67	4.00	3.33	3.67
	.58	1.00	.58	.00	.58	.00	.00	1.15	1.00	.58	.58

Competence	Ned	Ed	Ted	Rod	Yaap	Neville	Stan	Len	Nat	Savaii	Larry
Understands of weekly gaming machine profit return	3.00	3.33	3.67	4.00	3.00	4.00	2.33	2.67	3.67	3.33	2.5
	.00	.58	.58	.00	.00	.00	.58	.58	1.15	.58	.58
Understands Monthly Machine analysis	3.00	3.33	3.67	4.00	3.00	4.67	3.00	3.00	3.67	2.00	2.5
	.00	.58	.58	.00	.00	.58	1.00	1.00	1.53	.00	.58
Understands and can configure jackpot systems	3.67	3.67	3.67	3.67	2.33	3.00	3.00	4.00	4.33	3.33	4.00
	.58	.58	.58	.58	.58	.00	.00	1.00	1.15	.58	.00
Product and service knowledge is current and comprehensive	3.67	3.67	4.00	4.00	3.33	4.00	2.67	3.67	4.00	3.33	4.33
	.58	.58	.00	.00	.58	.00	.58	.58	1.00	.58	.58
Provides service information to customers within the terms of the service contract	4.33	4.00	4.00	4.00	3.67	3.33	2.33	3.33	4.00	3.00	4.00
	1.15	.00	1.00	.00	.58	.58	.58	.58	1.15	.00	.00
Securely manage the risk factors of coin handling at sites according to X guidelines	4.00	4.00	4.00	4.00	4.00	2.67	3.33	4.00	4.00	3.00	4.33
	1.00	1.00	1.00	.00	.00	1.53	.58	1.00	1.00	.00	.58
Able to operate X clerical systems and business procedures	4.00	3.50	4.00	4.00	4.00	4.00	2.50	3.00	3.00	3.00	3.67
	.00	.58	1.00	.00	.00	.00	.58	.58	.00	.00	.58
Understand the X computer database management systems	3.00	3.00	3.50	4.00	3.50	3.00	2.00	2.00	3.00	3.00	3.50
	.00	.00	.58	.00	.58	.00	.00	.00	1.00	1.15	.58
Follows the occupational safety and health practices of X	3.00	3.33	3.33	3.67	3.67	3.33	4.33	3.67	4.00	3.33	4.00
	.00	.58	.58	.58	1.15	.58	.58	1.15	1.00	.58	1.00

Key

1st line = mean

2nd line = standard deviation

Appendix 41. Comparative summary of the case studies

Table 1

Comparative summary of the case studies: Samples

Sample	Law firm New Form	Law firm Existing Form	Bank CSR's	Bank CSO's	Supermarket	Not -for-profit	Gaming
Sample Role	8 Level 1, 2 & 3 lawyers	9 Level 1, 2 & 3 lawyers	11 CSR's	7 CSO	7 Departmental Managers	4 Engineers	11 Service Technicians
Selection	two matched groups		2 groups-high & low on incentive score	representative branches invited	All 9 managers invited	All in this section	All 15 consented- 11 forms returned
Tertiary Education	4 or more years 2 Degrees/cojoint: LLB+		Range- none- MA	Range-none- BA	None- Trade certificates NZC's	Advanced Trades, NZC's Naval training	Trade Cert- Advanced T C NZC's
Gender	3 males Five females	Four males Five females	5 males 6 females	2 males 5 females	5 males 2 females	4 males	11 males
Ethnicity					Staff raters multi ethnic		
Age	24-31	24-33	21-55	21-56 (males=20's)	31-57	36-40	21-58
Size of organisation	Large national	500 +	Large multi-national 3000+		270+	National 2,800	70+

Table 2

Comparative summary of case studies: HCI components

HCI components	**Law Firm** New Form	**Law Firm** Existing Form	**Bank** CSR's	**Bank** CSO	**Supermarket**	**Not -for-profit**	**Gaming**
Comps profile Not/Extensive development Existed/ New	Existing-extensive development From another firm	Existing currently used due for review Not extensive development	Developed for the research Not extensive development	Developed for the research Not extensive development	Developed for the research Not extensive development	Developed for the research Not extensive development	Developed for the research Not extensive development
Number	34	25	32	28	31	19	24
Non -technical	25	17	24	22	18	11	12
Technical	9	8	8	6	13	8	12
Weighting							
Non-technical	50	50	60	65	55	60	50
Technical	50	50	40	35	45	40	50
Productivity Measures Existing/New	Existing	Existing	Existing	Existing & additions	Existing	Existing data modified & additions	Existing data modified
	In Use	In Use	In Use	Partial Use	Not used	Not for individuals	Not used
Bottom line/ Qualitative scale	Bottom line	Bottom line	Qualitative & quantitative	Qualitative & quantitative	Qualitative-external assessor	Qualitative some retrospective	Bottom line Incomplete
Scope	Comprehensive	Comprehensive	Comprehensive	Partial results	Comprehensive	OPDEF focus	Partial-results
Span	4 months	4 months	6 months	I month	1 year	6 months	4 months
Family	Family	Family	Family	Family	Family	Family	No-Two
Performance Appraisal							
Existing	Existing	Existing	Existing	Existing	Informal	Existing-to revise	Has been one
360	Not 360	Not 360	Not 360	Not 360	Not 360	Not 360	Not 360

Table 3

Comparative summary of case studies: Results

Results	Law Firm New Form	Law Firm Existing Form	Bank CSR's	Bank CSO	Supermarket	Not -for-Profit	Gaming
Domains Strong positive Correlations	No technical Intra comps[112]s	No technical 1 intra comp	None- (Meta & Intra close*	Meta Intra Non-technical	Intra & Ind Non-technical Standard tech Tech Trade	Meta Unique	None
Reliability Check	97%	100%	100%	100%	66%	89%	96%
Experience Years in the workforce		None	None	None	Leadership Compliance	Engineering Advice	N/A
No. strongly Correlated comps	Total = 6 T = 1;NT = 5 (validation no T	Total = 1 T = 0;NT = 1	Total = 7 T = 1;NT = 6	Total = 7 T =1; NT = 6	Total = 12 T = 3;NT = 9	Total = 8 T = 2;NT = 6	Total = 0 T = 0;NT = 0
HCI of .7 + HCI weighted Validated Tertiary Ed	Yes .905 & .786 Yes .952 & .810 Yes-.893 No	Yes .727 & .747[113] Not calculated No No	Yes .727&CC** Yes .727 &. Yes .7+ 3rdquarter No	No.694 Yes .772 No No	Yes .784 Not calculated No No	No -.632 Not calculated No No	Not calculated Not calculated No No
HCI Acceptable HCI 10-point range	No too specific Possibly	No too specific Possibly	Yes Prefer specific no.	Yes But not for managers Yes	No Yes	Yes Yes	N/A N/A

Key Intra- = Intra organisational Meta= meta-competences Ind = Industry Tech = technical

* over .65

** CC= Customer Care measures for all 3 quarters .7+ (.727=1st quarter composite measure)

_ An underlined result depicts a result correlated with the 'total financial contribution' law firm productivity measure.

[112] Correlations for the total ratings of the domains of intra-organisational and industry had less than a full sample as some competences were not relevant and therefore not rated for some lawyers- extrapolated form individual competence results.

[113] One month only