INTRODUCING INTELLECTUAL CAPITAL MANAGEMENT IN AN INFORMATION SUPPORT SERVICES ENVIRONMENT

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Dedication

This work is dedicated to:

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Attachments

Opsomming

Alhoewel daar baie inligting aangaande filosofieë oor kennisekonomiebestuur beskikbaar is, verwys min daarvan na die toepassings binne die biblioteek- en inligtingsdienssektore. Daar was twee onderliggende kwessies wat aanleiding gegee het tot die studie. Eerstens is dit bevraagteken of biblioteek- en inligtingsdienste wel die 'nuwe' bestuurspraktyke toepas aangesien daar geen verwysing daarna is in die beskikbare literatuur nie. Tweedens bestaan die persepsie dat kennisekonomie-bestuursfilosofieë slegs werklik toegepas kan word wanneer kenniswerkers bestuur word. Tradisionele administratiewe of 'agterkamer-biblioteekdienste' word nie gewoonlik as die terrein van die kenniswerker gesien nie. Vir die doel van hierdie studie is daar egter aangeneem dat die voordele verbonde aan kennisekonomie-bestuurspraktyke sodanig is dat dit ook binne die 'agterkameromgewing' toegepas behoort te kan word.

Die doel van die studie was dus om die toepasbaarheid van kennisekonomie-bestuurspraktyke te toets binne 'n omgewing wat nie as voorbeeld van die tipiese kenniswerker se werksomgewing gesien word nie. Intellektuele kapitaalbestuur/ *intellectual capital management* is gekies as die kern bestuursfilosofie om toe te pas maar kennisbestuur/*knowledge management* en lerende organisasies/*learning organizations* is ook kortliks aangespreek. Ten einde vordering te meet is 'n verskeidenheid metodologieë ondersoek. Die mees geskikte metodologie, binne die konteks van die studie, was 'n aangepaste weergawe van die Kaplan en Norton *Balanced Scorecard* wat op sy beurt weer gebaseer is op die filosofie van die *Intangile Asset Monitor*, en wat aspekte van die *Value Chain Scoreboard* insluit. Die opinie is gehuldig dat monitering van ontwikkeling in intelektuele kapitaal op beide die persoonlike en die organisasievlak moet plaasvind ten einde van werklike objektiewe waarde te wees.

Die implementering van die bestuurspraktyk (intellektuele kapitaalbestuur) het in twee fases oor 'n periode van bykans 18 maande plaasgevind. 'n Situasieanalise is aan die begin van die navorsingsperiode uitgevoer. Die aangepaste weergawe van Kaplan en Norton se 'Balanced Scorecard' is gebruik om doelwitte te stel vir elk van die twee implementeringsfases. 'n Aangepaste weergawe van Sveiby se Affärsvärldenmodel is gebruik om spesifieke implementeringsaksies en inisiatiewe te identifiseer. Aktiwiteite is volgens menslike-, strukturele-, kliënte- en finansiële kapitaal gestruktureer. Dit is gedoen om te verseker dat alle soorte kapitale aangespreek word, maar ook om dit moontlik te maak om groei in elkeen van die areas te kan meet.

Aan die einde van die navorsingsperiode is 'n intellektuele kapitaalverslag opgestel om die resultate van die beoordeling te kan rapporteer. Die verslag het beide sterk- en swakpunte in die intellektuele kapitaal van die afdeling uitgewys. Uit die swakpunte is 'n aantal prioriteitsaksies geïdentifiseer terwyl die sterkpunte 'n aanduiding is van dit wat as goeie praktyk beskou kan word en waarmee voortgegaan kan word. Belanghebbendes/*stakeholder*s is genader om te help om slegs dié items wat aangespreek behoort te word na die voltooiing van hierdie navorsingsprojek, te identifiseer.

Die laaste hoofstuk van die verslag is benut om spesifiek

- die resultate wat bereik is, aan te spreek;
- die lesse wat geleer is tydens implementering te noem;
- aanbevelings vir die dienseenheid te maak; en om
- aanbevelings vir verdere studie te maak.

Dit is ten slotte moontlik om kortliks te noem dat daar gevind was dat intellektuele kapitaalbestuur 'n geskikte bestuursfilosofie is om binne die gekose diensomgewing te gebruik. Daarom was dit gepas om aan te beveel dat die filosofie na die res van die dienseenheid uitgebrei word.

Sleutelwoorde

Biblioteek- en inligtingsdienste
Intellektuele kapitaalbestuur
Kennisbestuur
Kennisekonomiebestuur
Kennisekonomiebestuursfilosofieë
Lerende organisasies

Summary

Knowledge economy management literature is prolific but very little of the retrieved literature relates to the application of these management philosophies within the library and information services industry. The assumptions that underlie this research are in the first instance that, if it is not reported in the literature, it is questionable whether library and information services are implementing the new management practices. Secondly, a perception exists that knowledge economy management philosophies are only truly applicable when managing knowledge workers. Although the traditional 'administrative' or back office library environment is not seen as a knowledge worker domain, for the purpose of this study it was presumed that the advantages of these knowledge economy management philosophies are such that they should also be applicable within the back office environment.

The purpose of the study was therefore to test the applicability of knowledge era management practice within an environment not associated with typical knowledge workers. Intellectual capital management was chosen as the core management philosophy to apply but the knowledge management as well as learning organization philosophies were also briefly reviewed. To measure success, a variety of measuring methodologies were investigated. Within the context of the research the most suitable methodology was identified as a hybrid version of Kaplan and Norton's balanced scorecard, based on the philosophy of the intangible asset monitor and including aspects of the value chain scoreboard. An opinion was expressed that the monitoring of intellectual capital growth needs to take place at both the individual and the organizational level if monitoring is to be of real objective value.

Implementation of the management practice (intellectual capital management) occurred in two phases and stretched over a period close on 18 months. A situation analysis was done at the start of the research period. Kaplan and Norton's adapted scorecard framework was then utilized to set objectives for each of the two implementation phases. An adapted version of Sveiby's Affärsvärlden model was utilized to identify specific implementation actions and initiatives to be taken. All activities were structured into human, structural, customer and financial capital related issues. This was done to ensure that all capitals were addressed and to be able to measure growth in all of these areas.

Measurement results were reported in an intellectual capital report, which was prepared at the end of the study period. The report identified both strengths and weaknesses in the intellectual capital of the service section. From the weaknesses, a number of priority actions were identified while the strengths provided a good lead as to what could be considered the good practice that should be continued. Stakeholders were asked to make use of a list of priority actions and to assist in identifying only those items that should be addressed after the completion of the research.

The last chapter of this report was used to:

- report and reflect on the results achieved;
- identify the lessons learnt in the process of implementing intellectual capital management;
- to make recommendations for the service unit; and
- to provide recommendations for further study.

In brief it is possible to say that intellectual capital management has been an appropriate management philosophy to use within the chosen service environment. It was therefore seen as appropriate to recommend that the principles and practices of intellectual capital management be rolled out to the rest of the service unit.

Keywords

Library and information services
Intellectual capital management
Knowledge management
Knowledge economy management
Knowledge economy management philosophies
Learning organizations

Chapter 1
Introduction

To practice a discipline is to be a lifelong learner. You never 'arrive'; you spend your life mastering disciplines. You can never say 'We are a learning organization,' any more than you can say 'I am an enlightened person'. The more you learn the more acutely you become aware of your ignorance (Senge, 1990, p 11).

1.1   Background

The knowledge economy differs significantly from any of the previous economies familiar to the seasoned worker of today. The challenge is for these workers to adapt and make use of the opportunities brought about by the new work environment. On the other hand it is an important requisite for the current work environment that the integral link between the skills, capabilities and talents of workers as individuals (but also as contributors to the outputs of a fluid group of co-workers) and the success of the enterprise be recognized. For the managers of an enterprise, the challenge lies in identifying the tools and mechanisms that will both support the creation of skills and stretch the capabilities and talents of the employee. This is in the belief that the knowledge era employee is the building block that will ensure the long term sustainability of the enterprise. A statement that resulted from the *Tactics for Becoming a Successful Knowledge Business Conference* that was held in June 2002 in Johannesburg, support this opinion. *To be competitive in today's technologically dependent business world, more and more successful enterprises are recognizing that the only differentiation in the long term is their people and the knowledge they hold. Knowledge of customers and their preferences; knowledge about markets and competitors; knowledge about procedures and problem-solving methods; and knowledge about how to win* (du Toit, 2002, p 22).

This *technology dependent business world*, that du Toit refers to, spells a change in productivity. Duffy (in Wiig, et al., 1997, p 23) provides a reminder that the tools driving productivity in the new knowledge economy are computers, advanced telecommunications, robotics, biotechnology, materials sciences, laser technology, and energy technology. In this regard it is said that *History will pity the managers of the 1990s. The Internet touched down in their midst like a tornado, tearing up the old game book, disrupting every aspect of business, and compelling them to manage for a new economy* (Brown and Duguid, 2000, 74). However, it must be remembered that the new technologies enable farmers to produce more food with fewer people, manufacturers to produce better goods with fewer work hours and less materials and energy, and a variety of service providers to provide more and better service with fewer people and less energy. Similarly, librarians and information workers who are able to adapt and take advantage of the opportunities and the enabling technologies of the knowledge economy not only contribute to the success of their clients but are also successful in their own right.

Many authors have speculated about the work and the workplace that could be associated with the knowledge economy. For example, the work of Apgar (1998, pp 121-127), Duffy (in Wiig, et al., 1997, p 26), Julies (1998, p 15), Malone and Laubacher (1998, pp 146-152) and Wallace (2000, p 10) predict that:

- a large section of the modern workforce will work from home;
- there will be a continued move away from large corporate to small and medium enterprises;
- employees will be increasingly responsible for their own careers and will not necessarily remain loyal to one company;

- it will become very difficult to find and retain desired employment. Therefore employees will need to learn to be more tough-minded and independent;
- a company will need to invest in its employees if it is to retain a talented and highly motivated workforce;
- organizational structures will need to be flatter, more flexible and less defined than ever before;
- trusting in unconditional, lifetime employment will be outdated;
- global competition will force a constant search for means of improving productivity at the cost of job security;
- the relationship with customers and suppliers will change dramatically;
- the majority of jobs will be information-related; and
- virtual work environments will increase.

Wallace (2000, p 5) also drew a comparison between the traditional workplace (physical presence of the worker, attachment to time and space, and a place to go to) with that of the future place of work (not bounded by visual and physical proximity, mobility of staff, and virtual products delivered by virtual teams). The predictions listed above, combined with Wallace's comparison call for a critical review of the current work environment. They indicate a number of new opportunities and challenges waiting to be discovered.

The objective of this study was to recognize these predictions; to investigate what the impact of the knowledge economy is expected to be; and to identify the most appropriate knowledge economy management philosophy within the given context. This knowledge is then applied within an information support services environment. Finally, the impact of the implemented actions is measured, conclusions are drawn and recommendations are made based on the experience gained. The context within which the study took place is set out below.

1.2 Context

Firstly, this research was carried out specifically within the South African context. This has special relevance due to a perception that, in the process of building organizational structural capital, the relationship between suppliers and organizations functioning within certain geographic regions will in future play a significant role. Secondly, the study was carried out within the context of a large research organization that is striving to remain one of South Africa's leading examples of an efficient learning organization. This has relevance because the knowledge economy requires that an enterprise is confident of its own focus, which impacts on the role and position of a library and information service (L&IS) within that organization. Thirdly, the study was carried out within the context of the wider L&IS profession. This study has specific relevance to the special L&IS sector. This is of importance because the focus and drive within special libraries differ from that of academic and public libraries. Lastly, this study was carried out within the context of a converged L&IS where both front and back line activities take place. It is also a service where both internal and external customers are served. This study is relevant only to back-line activities and focuses on services maintained specifically for internal customers. The specific research problem that was addressed is discussed in section 1.3.

1.3

1.3   Research problem

Knowledge economy management literature is prolific but very little of the retrieved literature relates to the application of these management philosophies within the L&IS industry. If it is not reported in the literature, it is questionable whether current L&IS management strategies have kept pace with the developments required by the knowledge economy. Figure 1.1 is based on the model created by Davenport and Prusak (1997, p 34), which is discussed in more detail on page 2.25. The figure depicts some of the pressures that impact on current library and information services.

Fig 1.1: The current library and information services environment (based on the Davenport and Prusak (1997, p 34) ecology model)
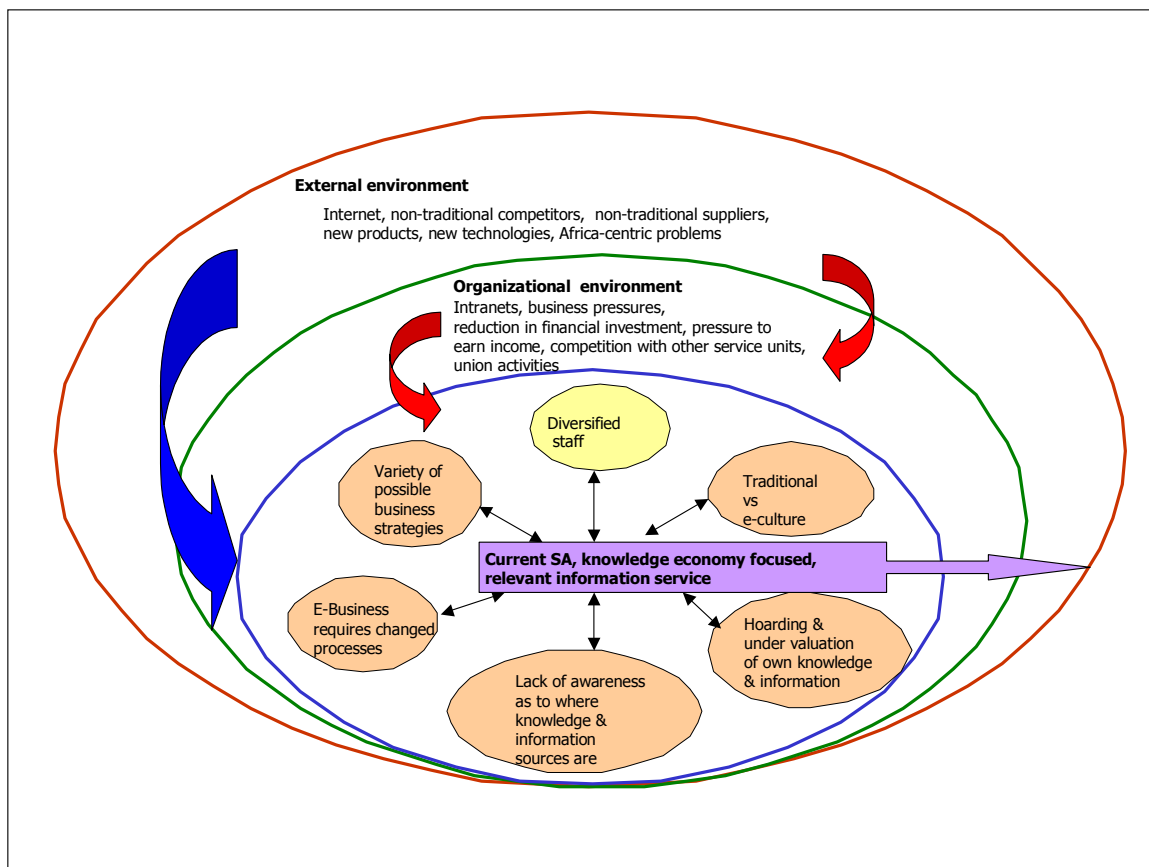
From the figure it can be seen that internal pressures arise from:

- a diversified staff complement with varying skill and competency levels;
- the need to move from the traditional L&IS to one which is in line with the knowledge economy's e-culture;
- a tendency to hoard knowledge as well as to under-evaluate the skills of information staff;
- lack of awareness as to where the expert knowledge within the profession and the service itself can be found; and

- recognizing the need to change business processes to be in line with an e-business approach but not being able to select the best processes from the wide selection of business approaches available to choose from.

External pressures relate to financial constraints as well as to new products, technologies, competitors, and suppliers. Additional pressure stems from being part of Africa and the need for a company to juggle 'what-is-good-for-Africa' with 'what-is-good-for-business'. The information professional has to adhere to the requirements for running a successful business and take the needs of both clients and staff into consideration in an environment in which there is no clear indication as to which management philosophy will be the most successful. There is a firm belief that the leader's personal style and preferences play a role in the choice he or she makes in terms of the philosophy to follow. The interaction between the information service manager and staff members is not one directional. The style of management impacts on staff but the actions of staff members also have an effect on management. Apart from the direct impact of having to manage the pressure stemming from the environment, the leader also needs to be aware of the impact environmental pressures may have on each other or the service may be caught unawares.

Having established the characteristics of the environment typical of a L&IS, the following question was formulated: *Keeping sustainability as well as the knowledge economy in mind, what is the appropriate management philosophy to follow when required to manage a library and information services support group?* From this question a research problem was defined.

> The perception is that knowledge economy management philosophies are only truly applicable when managing knowledge workers. The perception is challenged because the advantages of these philosophies are such that they should also be deemed applicable within a back office environment – and more specifically within a L&IS back office environment.

This research is intended to be an exercise to test the applicability of intellectual capital management within the context of a large special L&IS. The research problem was subdivided into the guiding questions listed in Table 1.1. The table also provides an indication as to which chapters were utilized to address each of these questions.

1.5

Table 1.1: Guiding questions

	Question	Chapter
1	What does the knowledge economy involve?	
2	Which knowledge economy management philosophies are being practiced?	2
3	Of the available philosophies – which is the most appropriate to use within a library and information support services environment?	
4	What are the principles of the most appropriate knowledge economy management philosophy?	
5	What generic tools and techniques have been identified and are available to stimulate growth in the skills, competencies, capabilities and job satisfaction of the workforce?	3
6	Which of those tools and techniques are appropriate within the information support services environment?	
7	What are appropriate mechanisms for measuring and reporting on the impact of introducing a knowledge economy management style?	4
8	Which of those measures are of use and interest within the context of library and information services?	
9	What are the strategy and realities of implementing and maintaining a knowledge era management philosophy?	5
10	What is the impact of having introduced a knowledge economy management philosophy?	6

It was seen as appropriate to attempt to answer the first eight of the listed questions by consulting the available literature. The result of the literature review is captured in Chapters 2, 3 and 4 of this document. With the literature as background, actions were taken to implement and test the applicability of some of the methodologies identified. Research stretched over a period of 18 months. The implementation exercise is discussed at length in Chapter 5. Chapter 6 reflects the results of a variety of data collection methodologies. These methodologies were utilized to collect feedback and to measure growth in intellectual capital assets. More detail on the specific content of each chapter is provided in section 1.7. The section below provides insight into the status of research at the start of this project.

1.4   The status of research

Internationally, intellectual capital management research falls mainly in the commercial and management science sectors. It was not possible to trace evidence of research carried out in a similar L&IS context internationally. South African research as a rule also stems from the business and commercial academic departments (Hines, 2000; Kaes, 1999; Ramosedi, 2000; Robson, 2000; Zickner, 1996). Although relevant, most of this research is theoretical and none was conducted within the L&IS fields.

1.4.1 Existing theory

From the literature, it was possible to identify three relevant management philosophies: learning organizations, knowledge management and intellectual capital management. There is considerable overlap, in the scope of these philosophies. In brief, the focus of the learning organizations' philosophy is on the human activities associated with the creation, sharing, development and deployment of knowledge for competitive advantage. Knowledge management has tactical and operational perspectives. It is more detailed and focuses on facilitating and managing knowledge-related activities such as the creation, capturing, transformation and use of knowledge assets. Its function is to plan, implement, operate and monitor all the knowledge-related activities and programmes required for effective business operation management.

Intellectual capital management, in turn, is focused on building and governing intellectual assets from strategic and company governance perspectives with some focus on tactics. The main purpose of intellectual capital management is to take overall care of all the company's intellectual assets. All three of these theories are seen as fundamental building blocks, even cornerstones, in an effective management model for the 21st century.

1.4.2 Motivation for further research on the problem area

Within this research, it was the contention that none of the knowledge economy management philosophies should be pursued in total isolation. It was seen as appropriate to select a driving philosophy (intellectual capital management) but to, where necessary, interweave it with aspects of the other management philosophies (knowledge management and learning organizations) to achieve a sound, balanced view of modern management practice. As no proof was found that intellectual capital management had been applied within the South African 'special' L&IS context and as it is the philosophy being pursued by the Council for Scientific and Industrial Research (CSIR), it was seen as valid to test if it were possible to successfully apply the same principles within an environment not typically associated with knowledge workers.

1.5   Research design

As one of the initiatives to improve internal structures, it was decided during 2001 to appoint a senior CSIR director to drive an initiative to strategically align the CSIR's information services. Ten divisional services were consolidated into a single entity to form CSIRIS (CSIR Information Services). The change brought about many opportunities. This study is but one of these. As one of the relatively inexperienced managers who were appointed to manage CSIRIS, the researcher was expected to, with sufficient mentoring, acquire the necessary skills to grow and build the service to its rightful position within the CSIR's structure. Undertaking this study was seen as an appropriate method to ensure that both the researcher and the reporting staff would acquire knowledge and skills that would enhance the move to a knowledge era relevant information service.

Given the context, case study research was seen as an appropriate method to use. It was established that this type of research would be mainly qualitative (or more specifically interpretative qualitative) in nature. Schurink (in De Vos, 98, p 243) and Mouton (2001, pp 161-162) describe qualitative research as research where the researcher is concerned with:

- understanding rather than explanation;
- naturalistic observation rather than controlled measurement;
- focusing on implementation rather than on (quantifiable) outcomes;
- the subjective exploration of an insider opposed to an outsider perspective; and
- fostering improvement and self determination.

In the process of designing the research, the four-dimensional framework suggested by Mouton (2001, pp 144-145) was used. Within this framework, it was possible to categorize the study as follows:

- empirical research;
- using predominantly primary data;
- where data is predominantly textual; and with
- relatively low control.

This classification was confirmed by Mouton's (2001, p 149) analysis of typical case study research.

A literature study, completed partially by the researcher prior to the start of the case study work, provided insight into the background against which the case study needed to be conducted. In order to provide that background, it was necessary to find answers to the exploratory questions listed in Table 1.1.

The work of Ertmer (in Leedy, 1997, pp 157-158), Fouche and De Vos (in De Vos, 1998, pp 124-125) and Powell (1997, p 49) provided general information on the use of case study research. The research presented in this thesis was designed according to Fouche and De Vos's classification as a 'one shot' case study. 'One shot' case studies require adequate knowledge of the history of the unit so that the researcher can monitor and record changes that take place over a period of time. The intention is to find variables that may be associated with these changes. The researcher spent most of the research period on site with the research participants, which Ertmer saw as a prerequisite for case study research. Because the applicability of a management philosophy within the given context was evaluated, the case study could also be classified as an evaluative case study as described by Ertmer.

All authors consulted (Ertmer (in Leedy, 1997, pp 157-158); Fouche and De Vos (in De Vos, 1998, pp 124-125) and Powell (1997, p 49)) indicated that it is suitable to use a variety of data collection methods when carrying out case study research. Powell specifically provided insight into the data collection methods used within the

L&IS context. The data collection methods, identified for use within the context of this research, are the following: observation; focus group discussions; semi-structured interviews with individuals as well as within group context; a Delphi exercise; content analysis and a skills audit. Each of these is described in more detail below.

- **Observation.** *In essence observation relies on watching, listening, asking questions, and collecting things* (Powell, 1997, p 148). The researcher usually has a choice in terms of the degree of participation when he performs the role of observer. Within the context of this study, the researcher was, due to the designated position, also a participant. According to Powell, a participant position is advantageous because it allows the researcher to understand what is occurring without needing to deliberately introduce new stimuli. This technique was especially useful in terms of evaluating the personal growth shown by certain individuals within the case study group but also to observe the development within the group as a whole.
- **Focus group discussions.** Within the context of information services, focus groups are popular when testing client perceptions (Crowley, et al., 2002, p 206). The technique is, however, also appropriate for testing staff satisfaction. When testing staff opinion, it is recommended by the authors consulted (Chase and Alvarez, 2000, p 359; Monolescu and Schifter, 2000, p 172 and Zemke and Kramlinger, 1982, p 88) that no managers or staff members regarded as managers (within the given context they would, for example, be union representatives) are included in focus group discussions. Ideally, because focus group discussions make provision for diverse opinions, it is advisable that group members not know each other very well. Within the context of this research that was not possible. However, because staff satisfaction is largely determined by the interaction amongst colleagues, this was not seen as detrimental to the process. Chase and Alvarez (2000, p 361) reported a very similar situation in their research and did not identify any negative effects due to the focus group members knowing each other. Another deviation from the classical focus group technique is that communication technology was used to verify the data collected. Instead of making recordings of the discussion, only the main ideas, concerns and recommendations were recorded and these were then verified by allowing participants editing access (via a document management system) to the discussion record. Parent et al., (2000, p 56) warned that using technology in such a way might cause less satisfaction in the participants than they experience with the classical focus group methodology. Neither the facilitators nor the researcher observed any dissatisfaction because of the implemented adaptation. The researcher's role in the focus group exercise was to prepare guiding questions, to brief and provide training to facilitators and to analyse the results of the discussions.
- **Semi-structured interviews**. Semi-structured interviews were conducted at both an individual and group level. Research done by Kaplowitz and Hoehn (2001, p 245) indicated that interviews are complementary to focus group discussions. The researcher used the technique to gain feedback on both staff satisfaction and stakeholder perceptions. The advice provided by

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Westbrook (in Powell, 1997, pp 150-151) and Zemke and Kramlinger (1982, pp 101-103) for preparation and conducting semi-structured interviews was followed. Although an outline was prepared for each of the interviews, participants were requested to treat the interviews as feedback conversations. This generally allowed participants to move backwards and forwards in time and it also allowed the researcher to adapt both the sequence and the number of questions asked. Where appropriate, additional clarifying questions were added to the interview, as was suggested by the literature consulted.

- **Delphi exercise**. According to Powell (1997, p 49), the Delphi technique is a procedure that uses a number of sequential questionnaires. The technique dates back to the early 1940s. The purpose is to gain feedback from a variety of people and to then converge that feedback so that the joint effort can lend direction where there is no absolutely correct answer (Zemke and Kramlinger, 1982, pp 149-150). The Delphi technique therefore requires that opinions on a specific subject are compiled and shared amongst a group of experts for a set number of rounds until the group reaches consensus on the opinions expressed. The researcher can, during the initial round, either compile a questionnaire or request input from the target population. Within this research, the process was started with a very short prepared questionnaire. Traditionally respondents do not communicate directly with each other. The postal service is used as the delivery mechanism for communication between the researcher and the respondents. To make successful use of the Delphi technique, a researcher therefore needs to allow for an extended research period. Fortunately modern technology allows for deviations from the traditionally extended period necessary for the research. Within this research, the researcher made use of corporate e-mail and document management systems to collect and record feedback from clients (seen here as the informed individuals required to do the exercise). In terms of the number of iterations, the advice provided by Keeney, Hasson and McKenna (2001, p 198) was followed and the exercise was therefore restricted to three rounds.
- **Content analysis**. Essentially, content analysis involves a systematic evaluation of words, phrases and concepts (Powell, 1997, p 50). Mouton (2001, p 166) sees typical applications for this technique when propaganda, speeches, editorial statements, letters and annual reports are analysed. The researcher used the technique to analyse a staff newsletter, minutes of meetings and client feedback forms.
- **Skills audit**. The works of Lombard, et al., (1999), Marshall, et al., (1996) and van Deventer, Mbundu and de Bruyn (1999) were used to establish the skills required within a modern L&IS. A skills audit was carried out to establish a list of the available skills within the research group. This resulted in the creation of a skills development plan for the section.

Data was collected during as well as at the end of the research period. Data analysis took place during the research period but all analysis culminated in the preparation of an intellectual capital report, which was completed towards the end of the research period. The findings in the report were shared with stakeholders who in turn assisted in identifying priority actions for the next phase in the development of the case study group. No detail on the 'next phase' was included in this research.

1.6   Clarification of terms, concepts, acronyms and abbreviations

A number of terms, concepts, acronyms and abbreviations are used in this thesis. These are repeated here, in alphabetical order, for the sake of convenience.

CoP   Community of practice. The plural 'CoPs' is also used. A community of practice is a knowledge-sharing group in or between organizations. A community consists of a group of people who are bound together informally by their shared expertise and passion for a joint enterprise. Community members understand that by sharing their experiences, insights and understanding within the group, they develop new approaches and a better understanding of how tasks could be done (De Bruijn, 2001, p 2; Wenger and Snyder, 2000, p 139).

CSIR   The **C**ouncil for **S**cientific and **I**ndustrial **R**esearch was established by Parliament in 1945 as the central scientific research and development resource for South Africa. The CSIR remains South Africa's top technology and innovation agency. Today the CSIR is the largest research and development (R&D) organization in Africa, accounting for about 10 % of the entire African R&D budget. A staff complement of approximately 3 000 includes some of the top technical and scientific minds in the country, collaborating in multi-disciplinary teams, to put forward solutions of the highest standard in innovation and excellence.

CSIRIS   This acronym refers to the CSIR's Information Services programme. The unit resulted from the consolidation of 10 library and information services. The services were previously attached to the various strategic units within the CSIR.

DMS   Within the CSIR, this refers to a central **d**ocument **m**anagement **s**ystem, which is also linked to the e-mail system. It is a central repository for all significant documents and allows for both version and access control.

EbscoHost   The EbscoHost web site (http://ejournals.ebsco.com/login.asp) claims that the *EBSCOhost Electronic Journals Service (EJS) is a gateway to thousands of e-journals containing millions of articles from hundreds of different publishers, all at one web site.*

GAAP   **G**enerally **a**ccepted **a**ccounting **p**ractices.

GAELIC   The **Ga**uteng and **E**nvirons **L**ibrary and **I**nformation **C**onsortium. It is the largest L&IS consortium in South Africa and currently mainly caters for the needs of a select set of academic libraries.

ICT   Information and communications technology.

ILLs	Inter-library loans.
IMPS	The acronym used to refer to the information support section within CSIRIS. The section takes care of information management internally and the procurement of external information.
Information vs. Knowledge	Sveiby (1998b) provides a detailed description of information and the meaning of information within the knowledge economy. With that as background it is possible to come to the conclusion that if the difference between knowledge and information is not understood, it is very difficult to grasp the reason why knowledge and more specifically the management of knowledge is valued to the extent that it should be. Robson (2000, p 10) used a mailing list to illustrate the difference. Suffice to say that once the data on a number of people is structured into a database or list, it becomes information that can be used repeatedly. Once intellect is applied to create subsets or to merge one list with another in order to apply that information, the realm of knowledge is entered. It is said that knowledge is the modern worker's most important asset. It is therefore assumed that knowledge-based assets will be the foundation of success in the 21st century.
IT	Information technology.
Knowledge workers	In this study, knowledge workers refer to those members of staff who create knowledge through research and who consume knowledge through access to literature and regular contact with experts.
KRA	A **k**ey **r**esult **a**rea is an identified action/activity that forms part of the basis of the six monthly performance review discussions between managers and staff members within the CSIR.
L&IS	Library and information service.
M&BD	Marketing and business development.
Millennium	Strictly, Millennium is only the web interface portion of the L&IS system used to manage the CSIR's library collection but it has become a collective term to indicate the complete system. Millennium is used by academic institutions within GAELIC and is sometimes also referred to as III Millennium or Innopac. A single system is in use between CSIRIS and the University of Pretoria Academic Information Service. As a result, the institutions have a shared catalogue.
OCLC or OCLC/Pica	It was established from the OCLC web site (http://www.oclc.com) that OCLC is a non-profit membership organization serving 41 000

libraries in 82 countries and territories around the world. Founded in 1967 by United States university presidents to share L&IS resources and reduce L&IS costs, OCLC introduced an online-shared cataloguing system for libraries in 1971 that today is used by libraries around the world. The inter-library loan service was introduced in 1979 and since then has been used for more than 120 million loans among 6 928 libraries around the world. Pica is an equivalent European system and was recently acquired by OCLC.

R&D   Research and development.

SADC   Southern African Development Community. A collective term used when referring to countries geographically situated in the southern half of Africa.

Sabinet Online   Sabinet Online has 18 years' experience in the online information industry and established itself as a database publisher and provider of services on the web. Sabinet Online on their web site (http://www.sabinet.co.za/company.html) claims to:

- further resource sharing between libraries and information centres;
- promote the location of information sources;
- raise the cost-effectiveness of the acquisition and cataloguing processes in libraries;
- support bibliographic control in South Africa; and
- allow the flow of information within and between L&IS consortia.

ScienceDirect   The ScienceDirect web site (http://www.sciencedirect.com/) claims the following about the product: *Born out of an Elsevier Science® tradition in scholarly communication, ScienceDirect® has always followed a vision of the digital library of the future. Today they offer one of the world's most advanced web delivery systems for scientific, technical and medical information*.

SU   Strategic Unit is an acronym used within the CSIR to demarcate a unit or division responsible for a specific area of research. Eight SUs currently perform research in the following areas: mining, transport, information technology, buildings, environment, defence, biochemistry and manufacturing.

Tacit vs. Explicit   According to Roos and Roos (1997, p 415), the distinction between tacit and explicit knowledge refers to the interplay between what is in the mind (tacit) and what is captured outside the mind (explicit). Although tacit knowledge is recognized as the most valuable for an individual, it is only of real value to a company when it is converted to explicit knowledge. Top performers are said to be individuals with

highly productive tacit knowledge stores.

When a group or team share, use and rely on its tacit knowledge, it is usually able to boost its performance relative to other teams in the organization or elsewhere. High-performance teams therefore resist the embodiment and distribution of their knowledge.

Brown and Duguid (2000, p 76) state: *At both the individual and team level, tacit knowledge is un-embodied. It is held in memory or in the day-to-day business practices of a small number of people. Actual work practices are full of tacit improvisations that the employees who carry them out would have trouble articulating*. Turning tacit knowledge into explicit knowledge is part of the continuous cycle of learning, sharing, reflection and use of that knowledge. However, Jordan and Jones (1997, p 397) warned that too much formalization of the 'best way' could actually lead to less creativity and innovation. They are also of the opinion that when knowledge is primarily explicit in nature and routines are deeply embedded, it is difficult for individuals to think laterally ('outside the box'). In contrast, informal communication and opportunistic learning promote spontaneity that is a key element of creativity and serendipitous learning. The challenge is to balance the tension between the efficient exploitation of existing explicit knowledge and the exploration for more innovative solutions.

Tangible vs. Intangible	To understand the true value of knowledge management science authors started to divide organizational assets into tangible (visible or physical) assets and intangible (invisible and difficult to quantify) assets. Sveiby (2000a, pp 1-2) is of the opinion that all tangible physical products, assets as well as the intangible relations, come about because of human action and depends ultimately on people for their continued existence. As a result humans constantly extend themselves into their world by tangible means, such as papers, documents, craft, houses, gardens and cars, and through intangible associations with corporations, ideas, and other people. Sveiby's opinion is supported by the researcher. It is useful to remember that in contrast to tangible goods, which tend to depreciate when they are used, the intangible grows when used and depreciates when not used.
UP AIS	An acronym used for the **U**niversity of **P**retoria **A**cademic **I**nformation **S**ervice.

The next section provides more detail on the structure of this report.

1.7   Chapter distribution

This report is subdivided into seven chapters. Besides Chapter 1, the report is structured into the following chapters:

Chapter 2   The chapter gives insight into the information gathered through a review of literature about the knowledge economy. A number of available knowledge economy management philosophies were identified and investigated for appropriateness within the context of this research.

The management philosophies that were investigated are the following:

- learning organizations;
- knowledge management;
- intellectual capital management;

Chapter 3   The focus of this chapter is on the development of the following three components of intellectual capital:

- human capital;
- structural capital; and
- customer capital.

Most of this chapter was utilized to report on the investigation into:

- actions that need to be taken to develop human capital;
- methods to build structural capital; and
- principles of engaging in customer capital development.

The knowledge gained from the investigation was implemented within the case study environment, which is reported on in Chapter 5.

Chapter 4   Measuring the impact of intellectual capital management is difficult – especially when there is very little tangible proof of a service's value. The purpose of this chapter is therefore to determine if appropriate measuring tools are available that could be utilized within the context of this research.

Chapter 5   The chapter provides a detailed overview of the activities implemented at the CSIR Information Services' IMPS section where an experiment was conducted to assess whether intellectual capital management was an appropriate management philosophy to follow. The activities were structured over a period of 18 months and were implemented in two phases. Kaplan and Norton's (2001a, p 100) adapted scorecard framework was utilized to set objectives for each of the two phases.

A situation analysis was carried out at the start of the experiment and an adapted version of Sveiby's Affärsvärlden model (2000b) was utilized

to identify specific actions and initiatives to be taken as a consequence of the situation analysis findings.

The last section within this chapter identifies the indicators that need to be evaluated for growth as well as the tools utilized to establish how much growth has taken place.

Chapter 6   This chapter provides a report on the results achieved during and after the 18-month study period. Results were collected using a wide variety of methods. This culminated in the creation of an intellectual capital report.

Chapter 7   This last chapter is utilized to report and reflect on the results achieved and the lessons learnt in the process of implementing intellectual capital management, to make recommendations for CSIRIS, to provide recommendations for further study and to make a number of concluding remarks.

1.8   Summary

Chapter 1 provides an overview of the background and context of the research. It also provides a problem statement, the methodology used, motivation for further research and an overview of the chapters. The first of the literature overview chapters, where specific attention is paid to the knowledge economy, follows.

Chapter 2
The knowledge economy

These days, keeping your nose to the grindstone is a big, short-sighted mistake (Stewart, 1997, p xvii).

Though invisible and difficult to measure, knowledge and human expertise are starting to be seen for what they are: the source of value creation (Lank, 1997, p 406).

2.1   Introduction

What has become valuable in the work environment of the present belongs to what is known as the knowledge economy, the knowledge era, the knowledge age, the information age, the new economy and the new world. For the purpose of this study, the phrase knowledge economy will be used to include all of these terms. The general interest in the knowledge economy and its associated management philosophies, knowledge management, learning organizations and intellectual capital management, did not start as a whim. It came about as a direct result of the general evolution in the way in which work is valued. The shift from an agricultural economy to an industrial economy (and their associated work value systems) is at present relatively easy to recognize and understand. What is not yet as clear to most, is the impact of the shift from the industrial to the knowledge focused economy. There is, however, little doubt that the implication will be more intense and have a larger impact than that of any previous evolutionary step.

The knowledge economy, which is described in some detail in section 2.2, is typified by an oversupply of information. It is ironic that the concern with information overload is also contributing to the fact that individuals are swamped by information and that managers are unable to assimilate and use information that they require to run their businesses efficiently (Davenport and Prusak, 1997, p 134; Quintas, Lefrere and Jones, 1997, p 386). There is, for example, an abundance of literature on each of the knowledge focusing management sciences. Just as is the case with other sciences, much of the literature is repetitive. Each author uses a variety of catchphrases, jargon terms and models to convince individuals that the ultimate answer and solution to their confusion and information overload problems have been found. However, in fact each of the subject areas has only a hand full of experts. This is also true for literature on the knowledge economy, knowledge management, learning organizations and the focus area of this research, intellectual capital management. Each of the subject areas mentioned is discussed in more detail within this chapter. The crux of the matter is that experts writing about each of the management sciences indicate that it is no longer sufficient for the organization to focus on the company's bottom-line only. It is also no longer appropriate for only a select group to be responsible for the company as a whole. Companies no longer exist in isolation. An approach of looking at the whole company within its environment, and in conjunction with its suppliers, competitors and especially its clients, appears to be more appropriate.

It is difficult, and for the purpose of this study not necessary, to pinpoint the exact time when intellectuals realized the importance of a more holistic approach to managing the work environment. Of more interest is that it is clear that there was some form of serendipity in the development of the literature associated with the discipline.

Logically much of the literature relating to a more holistic approach to business management overlaps. Although it is done at times, the purpose of this study was not to concentrate on the differences amongst the management sciences. It is rather to establish the suitability of intellectual capital management principles within

a typical library and information service (L&IS) environment. Where it was found that literature, relating to the knowledge economy in general or knowledge management and learning organizations specifically, was relevant it was included to complete the study. This is of course in line with Obeng's (1997, p 115-119) observation that the knowledge economy requires one to rather use 'and' than to use 'or', also when selecting appropriate management tools.

It is not to say that all the valuable management tools and techniques that were previously of use are suddenly useless. It is just that the knowledge economy incorporates new dynamics, new rules, and new drivers of innovation (Jordan and Jones, 1997, p 393). As a result, the managerial challenge is to improve the processes of knowledge acquisition, integration and utilization. The only way that is possible is to understand how knowledge is acquired and harnessed within the modern organization. Lank (1997, p 409) states that it is unfortunately not a task that can be given to a person or section of the organization. To be successful, the knowledge economy requires that true cross-functional teams, that are not led from only one specific function within the organization, take up the responsibility for their own well being.

Even though it was found that very few authors specifically address the impact of the knowledge economy on the library and information profession, there is no doubt that information services need to adapt to stay relevant within the knowledge economy. It is therefore logical to assume that the management sciences associated with the knowledge economy would also be appropriate to use when managing a L&IS. The overall purpose of this study is to investigate the suitability, applicability and impact of intellectual capital management principles within a typical information support services environment. This chapter reflects the result of a literature review to:

- establish in detail what the knowledge era, knowledge management, learning organizations and intellectual capital management are;
- establish what the knowledge economy trends are and to speculate on the impact of these trends on the work environment in general;
- briefly look at the impact of the knowledge economy on the role of both the employer and the employee;
- understand the role of the leader in the new economy; and to
- specifically look at the possible impact of the economy on both the information service and the information professional.

2.2   Defining the knowledge economy and identifying visible trends

The knowledge economy refers to the knowledge work-based economy. The idea of knowledge work has been around for some time. Mintzberg (1983, in Garrick and Clegg, 2000, p 279) wrote extensively about knowledge intensive firms, outlining differences between knowledge intensive organizations and professional bureaucracies. In essence, this means (according to Shanhong, 2000) that the knowledge economy era is driven by a company's, and in effect an individual's, ability to effectively *identify, acquire, develop, resolve, use, store, and share*

knowledge. It is also driven by the ability to **apply** the tasks listed above to create an approach to:

- transform and share both tacit and explicit knowledge;
- raise innovation capability; and
- utilize the combined wisdom of the team.

It is not enough to acknowledge knowledge as an asset. Authors such as Mullen and Willigan (2000) make it clear that successful corporations of the 21st century will not be able to continue to rely only on the old levers of competition: labour, capital and land, for their success. Rather, they will have to manage these tangible assets along with intellectual assets and intellectual property: patents, trademarks and technology. Some managers may still think that these issues do not relate to their specific circumstances. In contrast, authors such as Jordan and Jones (1997, p 392-393) state that the strategic importance of knowledge assets extends to all firms, not just to those that are knowledge intensive. For example, cars have more microchips than sparkplugs; new aircraft are designed entirely by computers; lathes, drills and dies used in factories are numerically controlled; and only 20 % of the costs associated with Levi jeans go toward making the denim garments while approximately 80 % of the costs go into information (Stewart, 1997, pp 14-15). Stewart (1997, p 3-5) also used the progress made with the development of a beer can, from a seven-ounce steel can in the 1950's to the .48-of-an-ounce can used today, to illustrate the benefit of applying intellectual ability to an industry as a whole. As a last example, Groth (1994, pp 22-23) elaborated on the effect of 'mind capital' on the agrarian sector. New equipment, techniques and plant varieties have enabled a few to feed many.

From the examples above it cannot be seen where exactly knowledge has the biggest impact. It can, however, be assumed that mind capital or knowledge impacts on each stage in any given process. It makes 'efficiency and effectiveness' decisions relating to the end product, method, and resource allocation possible. In general an improvement in the value of the product-cost of the resource ratio has numerous benefits. Generally, an increase in this ratio contributes to an increased living standard. Efficiency gains, of course, free human, financial and tangible resources.

Mind labour also provided for new and more efficient techniques in farming. This does not imply that no physical labour is necessary when farming. Physical labour makes the application of the new techniques and practices possible. However, the success of techniques and application of new practices reduced the number of people required for physical farm labour.

Where the impact of knowledge on labour is concerned, authors may want to lead readers to believe that they have discovered the ultimate Eureka-factor. This is not the complete truth as intellect, knowledge, skills and experience, in all their variety of guises, have always been at the foundation of business. The most important visible trend is that employees now are realising the true value of their skills and competencies and are seeking the appropriate acknowledgement and development

opportunities. Similarly employers, realising that they no longer are able to control their most important assets, are seeking ways and methods to retain at least part of their investment in those assets. It is actually the first time that an employer has both the competitive incentive to manage intellectual output and/or knowledge as an asset and through the exchange of money for other opportunities, they have the means available to do so (Lank, 1997, p 406).

Trends and predictions

According to Jooste (1997, in Wiig, et al., 1997, p 84) there are two basic forces that are driving the visible trends in the knowledge economy. The one is globalisation and the other technology. As a result of these driving factors, Jooste (1997, in Wiig, et al., 1997, pp 84-101) identified the following as typical changes that have occurred as a result of the knowledge economy:

- The law of economics has changed. Knowledge and information have become the most valuable commodities.
- The very nature of 'work' has changed. There is a major shift to self-reliance and lifelong learning.
- The drivers for business success have changed. The new formula for successful business is: ½ x 2 x 3 = P+P (half as many people getting paid twice as much and producing three times as much equals profit and productivity). This is said to explain why attitudes towards roles, responsibilities and career paths have changed.
- The basis of competition has changed. Neither the competitor nor the competitive space is what it used to be.
- The concept of an 'organization' is changing. Organizations are flatter than ever before and employee teams need no longer work in the same geographical space.
- Personal values are changing. This is resulting in employers having to appeal to people's personal value systems when attracting them to the organization.
- Organizational values are also changing. It is no longer necessary to own and control everything.
- Products are changing and entire new products and services are developing.
- Client expectations are changing. Clients are expecting value addition in the products they require and services that provide quick access to reliable analysed information are in high demand.

Besides the changes identified by Jooste a variety of trends were collected and a combined list was created from the work of Fine (1998, pp 3-15), Garrick and Clegg (2000, p 279), Groth (1994, p 27), Jordan and Jones (1997, pp 392) and Lank (1997, pp 406-407). Significant trends to take note of within the current business environment are the following:

- the speed of change is in continuous acceleration mode;
- the business environment is more competitive than ever before;
- competition is global and very often from very unlikely competitors;
- the state of competitive advantage is very temporary;

- the shift to service-based businesses is a significant factor to keep sight of;
- the boundaries of traditional business have become fluid (supermarkets becoming bankers);
- the shift from a large, loyal staff body dedicated to a large, very often paternalistic corporate to the mobile, individual members of a virtual workforce is a reality;
- a huge qualitative change, brought about by the ability to produce, reproduce and communicate vast amounts of data and information electronically, is in progress; and
- technologies that enable global knowledge-sharing have been and are being developed and improved almost daily.

Several predictions about the knowledge economy work environment exist. Some of these are listed below:

- In terms of numbers of people, the ratio of physical/mind labour will continue to decline. However, physical labour, that offers an increasing value generation to labour cost ratio, will remain in demand.
- It is expected that mind labour will increasingly recognize the importance of specialized units of physical labour. Therefore, for the fortunate few, cost and value of a unit of physical labour will be acknowledged and increased appropriately.
- However, a large, and in fact growing, segment of the labour force will not be willing to adapt to the required changes. Therefore, the levels of unemployment will rise except in countries and regions that successfully adapt by altering the nature and characteristics of their physical workforce.
- The need for physical labour to develop skills and knowledge essential to allow for changes in application will accelerate.
- The 'system' will resist changes in the goals and methods of educating or re-educating the workforce.
- Relatively few of those currently in the physical labour segment will successfully make the transition to higher skills and knowledge. Instead, a 'new' physical labour force will displace them. The 'new' physical labourers will have acquired the skills and knowledge base to keep them employable.
- An exponential growth in the temporary workforce can be expected. In some cases industry will favour immigrant labour since they will be more flexible in attitude and have lower fringe costs. The greater demand for migrants will, however, foster increased resistance to migrant workers and generate greater social unrest. But, countries that successfully transform existing physical labour to 'new' labour will enjoy amplified benefits: they will have less social unrest and lower political risk; and they will also avoid the monetary and social costs of high unemployment.
- Mind labour will flow to those environments that offer the greatest freedom and rewards.
- Lastly, it is predicted that in general countries that provide an environment and culture attractive to mind and new physical labour will enjoy rich rewards.

The listed trends and predictions reflect what Obeng (1997) identified as the *New World*. He (1997, p 213) is of the opinion that the *New World refers to a set of conditions that determines that the business environment behaves in a complex and chaotic manner. The New World is associated with business environments where organizations actively pursue change, are global in terms of competition and makes use of information in order to ensure that most communication to customers, suppliers and employees is fast, global and accurate.*

There are of course knowledge economy trends that refer specifically to information services. These are mentioned in section 5.1.2 on . What is clear from all the listed trends and predictions is that the workplace in general and information services specifically will never be quite the same again. Similarly, and because of the work environment changing, workers will never be the same again. In the new economy both the intellectual as well as physical contribution of the members of a business, to all its activities, will be paramount. Any manager or leader ignoring this fact stand a chance of being taken by surprise when it can be least afforded. In the next section the actual impact of the trends and changes on the workplace will be discussed in more detail.

2.3 Impact of the knowledge economy on the workplace with Affärsvärlden as example

With regard to the workplace of the future, the following predictions were reported by Duffy (in Wiig, et al., 1997, p 26) to have been made in a *Business Week* of 1994:

- the office could be anywhere;
- No more unconditional lifetime employment;
- professional, managerial, technical and service jobs will gain in number while crafts, operators, labourers and clerical jobs will diminish in number;
- better technology, better processes and fewer but better trained workers;
- an increase in the number of part-time workers who will all be striving to be full-time workers;
- job skills, like businesses, will be ephemeral. Employers will assume responsibility for constant re-skilling of employees but the latter will have to assume responsibility for their own careers;
- younger people will find jobs harder to obtain and keep, will need more skills than today and will, therefore, have to be much more tough-minded and independent; and
- global competition will force a constant search for ways to improve productivity at the cost of more uncertainty in the workplace.

At that time these predictions were regarded as science fiction and, although it is only eight years later, every single one of these predictions have materialised. The impact of new technology was predicted but what was not anticipated at the time is how perception of time and geography would be impacted by the wide scale use of the Internet.

In the fast moving knowledge economy the rules guiding customer relations, competition, and the employment relationship change daily. If companies, sub-sections of companies and indeed individual employees want to survive they must operate as adaptive systems and anticipate change. Hackett's research (2000, p 12-13) provides detail of companies reporting that they are able to:

- make decisions faster and closer to the point of action (increased sales/faster development);
- overcome internal and external barriers (reduce costs/improved customer relationships);
- provide more opportunities to innovate (no re-invention of the wheel/save costs);
- reduce product development time; and
- enhance customer relationships when they better utilize knowledge.

When a competitor is able to report that he is able to do so successfully and your own company is struggling to perform, the competitor has a distinct advantage. Fortunately, as companies look for new ways to compete effectively they are recognizing the importance of identifying or rediscovering assets they already have but are not using to their full potential. Quintas, Lefrere, and Jones (1997, p 385) as well as Roos and Roos (1997, p 413) report that management theory has gradually accepted that 'hidden' assets (knowledge of employees, but also customer and supplier relations, brand loyalty, market position and knowledge) increasingly will play a major role for the survival of companies. Notably, these assets are employees and information, but may also include patents, copyright, brands, research and development, licensing opportunities, innovative use of assets, such as databases, and so on. The total asset package provides opportunities to innovate, to cut costs, to save design time, and to reduce time-to-market. Perhaps the best way to illustrate what this means is to look at one case study in more detail.

Affärsvärlden example

Sveiby's (2000a) case study of Swedish trade journal publishers shows the clear competitive advantage knowledge-based firms have over those with a more traditional strategy. When Sveiby joined his company (the publisher Affärsvärlden) in 1978 it was under threat of closure but by 1995 it had become the largest trade press publisher. The company then published seven journals and had a staff of 150: 80 editorial, 50 in sales and marketing and 20 in administration. In contrast some of the largest competitors had shrunk in terms of staff, turnover as well as number of publications. The reasons Sveiby provides for the business success can be found in the way:

- staff members were managed;
- information was shared;
- technology was used; and
- customers were treated.

Each journal had its own editor and professional team but all teams shared the sales, marketing and administrative staff. In effect, the company had a variety of different climates and cultures, remuneration systems, motivation methods and working hours – as was agreed upon by the various team members. The editors were the ones binding the company together. Although the editors were running their magazines as independent business units and had profit responsibility, they were also part of the top management team. They had to interact with administration and marketing and were not able to withdraw to do their own thing. Organizational structure was more like a network of independent teams, albeit sitting in the same building, than a single entity. This may seem confusing to anyone using the traditional industrial perspective on management but what was established was that the top management team members had to devote most of their time to other issues than what was common amongst them. They had to be the 'glue' that held the fuzzy organization together. They had to initiate and encourage the flow of information and knowledge between the professional teams. The issue of knowledge transfer between the various teams became a crucial top management issue, as well as how to interact between, for instance, the marketing department and the editorial teams (Sveiby, 1995).

A considerable amount of internal information was needed in order to maintain the trust between the members of the organization and projects. The result was that journalists were able to use each other's fields of expertise for creating new angles on subjects. His experience at Affärsvärlden led Sveiby (1995) to the conclusion that creativity cannot be managed in organizations in the way that it could be done in the past. He recommended that managers learn how to manage a milieu encompassing both standards and creativity. Sveiby (2000a) therefore identified two further features that contributed to Affärsvärlden's success:

- In the first instance there was high editorial productivity, which involved the following:

  - recruiting highly educated staff;
  - creating a collaborative climate;
  - building a flat organization;
  - investing in new technology; and
  - computerizing analytical models – automating the gathering and analysis of statistics.

- Secondly, there was a low staff turnover, which was seen as a sign of staff satisfaction.

To refer back to the new technology and the analytical models: Sveiby (2000a) reported that he and his team were able to adopt and implement new technology at least one year and sometimes two years faster than their competitors. They were able to recognise faster that the technology would revolutionize their industry. The time required for business analysis was gained from the computerization of their analytical processes. This ensured that information was gathered automatically and that the analysis occured much faster.

Although Sveiby (2000a) did not specifically report on the interaction with customers, it is relatively safe to assume that the analysis of the business included continuous feedback from their most important clients and stakeholders. The feedback was gained from:

- seminars for readers;
- industry seminars;
- articles published in the journals;
- sharing and rotating jobs (staff members) with key customers;
- piggy-backing at interviews;
- focusing on high image customers; and
- building solid relationships with the best executives within industry.

From the Affärsvärlden example it can be seen that Sveiby's management team was an early leader in what is today known as the acceptable way in which to run successful knowledge businesses. The model that was developed as a result of Sveiby's experience at Affärsvärlden played an important role in defining what actions to take within the context of this research. It is therefore mentioned again in sections 3.4 on .

2.4   Relevant management philosophies

A variety of management theories have been developed in an effort to find the most effective way to harness the opportunities and challenges of the knowledge economy business. Three of these are discussed in more detail below.

A few years ago most people thought that the theory of knowledge belonged exclusively to the realm of a few philosophers and religious thinkers. The early use of the term knowledge was to describe the dynamic effects of an individuals' intellect. When managers and consultants started using the term, it became more focused on organizational development. For the last decade or so, there has been large-scale exploration into 'knowledge' by the business world's sharpest minds and practitioners. They have put 'learning organizations', 'knowledge management' and its close relation 'intellectual capital management' into practice on a global scale. Sveiby (2000b), who writes on both knowledge management and intellectual capital management, sees the proliferation of knowledge management literature as a LINUX experience. For, just as the LINUX developers continuously improve and add features to their product (by making use of global communication networks), management experts around the globe are all connected and contactable via the Internet. This leads to constant interaction and improvement to the theory of people and business management.

It is therefore not unexpected that there is considerable overlap in the scope of learning organizations, knowledge management and that of intellectual capital management. In brief, learning organizations focus very much on the human activities associated with the creation, sharing, development and deployment of knowledge for competitive advantage. Knowledge management has tactical and

operational perspectives. It is more detailed and focuses on facilitating and managing knowledge-related activities, such as creation, capture, transformation and use of knowledge assets. Its function is to plan, implement, operate and monitor all the knowledge-related activities and programmes required for effective business operation management. Lastly, intellectual capital management is focused on building and governing intellectual assets from strategic and company governance perspectives with some focus on tactics. The main purpose is to take overall care of all the company's intellectual assets. All three of these theories are fundamental building blocks – even cornerstones – in the effective management model for the 21st century. Even so it is also the contention that none of these should be pursued in total isolation. They should also be interwoven with other management considerations (such as change management and strategic management) to ensure a sound, balanced and competitive business.

What follows is a more detailed description of each of the three identified management theories. The intention remains to provide just a broad overview rather than an in depth analysis of each of these.

2.4.1   Learning organizations

Peter Senge, regarded as the father of the theory on learning organizations, published *The fifth discipline* in 1990. The book came about as a result of work done over a period of more than 20 years. This work highlighted the fact that if an organization's leadership as well as its staff members choose to do so, the rate at which that organization learnt could not only ensure the organization's survival, it could also turn the organization into the place all members of staff would choose to want to spend their energy and creativity. This is a far better goal than to use learning as a tool because it is seen as the biggest and only sustainable source of competitive advantage.

2.4.1.1   Background

Senge (1990, p 13) states that most people think that learning is synonymous with taking in facts. In his opinion, learning involves a fundamental shift or movement of the mind, which is much, much more than memorising or even collecting facts. He sees a learning organization as an organization that is continually expanding its capacity to create its own future. From this as well as from the work of Hackett (2000, p 11) it was established that organizational learning is the process that enables an organization to adapt to change and move forward by acquiring new knowledge, skills, or behaviours, and thereby transforming itself. It is therefore fair to say that in successful learning organizations:

- individual learning is continuous;
- knowledge is shared;
- the company culture supports learning;
- employees are encouraged to think critically and to take risks with new ideas; and
- all individuals are valued for their contributions to the organization.

2.11

2.4.1.2 Definitions

Malhotra (1996) followed Senge's lead and defined a learning organization as 'an organization in which you cannot not learn' because learning is so woven into the fabric of its life. He sees it as 'a group of people continually enhancing their capacity to create what they want to create'. Put differently *organizational learning can be seen as the ability of an organization to gain insight and understanding from experience through experimentation, observation, analysis, and a willingness to examine both successes and failures* (McGill, et al., 1992 in Malhotra, 1996). However, the entity only learns if, through its processing of information, the range of its potential behaviours is changed. According to Huber (1991, in Malhotra, 1996) it is useful to remember that:

- learning does not need to be conscious or intentional;
- learning does not always increase the learner's effectiveness, or even potential effectiveness; and
- learning does not necessarily result in observable changes in behaviour.

2.4.1.3 Major contributions relevant to this study

Most of the work consulted for this research dates from the era post-1997. It is, however, the work of Senge (1990) that became a personal inspiration for this study. The way in which his ideas were packaged first led to the realisation that it is not suitable to focus on any one particular management philosophy.

Senge (1990, pp 6-11 and 363) states that learning organizations can only be true learning organizations when at least five disciplines are at the same state of readiness. He anticipates that other disciplines may still develop and would in all probability be added to the list but, currently, the five disciplines are the following:

1. **Systems thinking** – which requires that the business is seen as one interrelated entity where every single action is related to or has an impact on another; and where it is possible to realise that if part of the business is not functioning properly, it will inevitably cause another part of the organization distress.
2. **Personal mastery** – which starts with clarifying the things that really matter to each and every individual within the organization and practising and learning to see current reality more clearly. Continued learning is seen to deepen vision, to aid objectivity and to ensure focused energy.
3. **Mental models** – which refers to an individual's ingrained assumptions, generalizations and images that influence the way that individual understands the world he lives in. The trick is to surface these models and allow staff members to expose their thinking effectively and to make their thinking open to the influence of other thinking.
4. **Building shared vision** – which involves building a shared picture of the future and getting people to commit to rather than comply with that vision.

5. **Team learning** – which is when individuals start with dialogue and learn to suspend assumptions when they genuinely start thinking together as a unit.

It appears that Senge's disciplines can be divided into two groups. The one group contains systems thinking, personal mastery and mental models while everything else falls into the second group. The reason is that it appears not to be possible to see the system as a whole unless some degree of personal mastery has been acquired and mental models can be surfaced and evaluated objectively. These disciplines work very much at the individual level. Building shared vision and team learning can almost be seen as the tools that bind these individuals together.

The learning organization picture would not be complete if Senge's disciplines are not linked to the 11 laws of the disciplines - for these laws provide the key to understanding why learning is successful … or not. Whenever a strategy or process did not work during the implementation phase of this study, it was usually possible to link it back to one of the laws of Senge's disciplines. The laws, as identified by Senge (1990, pp 57-67), are:

1. Today's problems come from yesterday's solutions. Often a solution shifts a problem from one part of the organization to another. In addition, those who solved the problem and those who inherit the problem are usually not the same people. As a result the symptoms are treated and not the cause.
2. The harder you push the harder the system pushes back. This law deals with over-compensating in order to ignore the facts. In systems thinking this is known as compensating feedback. To the man on the street, it is known as throwing good money after bad.
3. Behaviour grows better before it grows worse. This law is linked to compensating feedback. Treating the symptom always provides relief in the short term but in the long term the problem becomes worse.
4. The easy way out usually leads back in. It always is easiest to try and apply familiar or standard practices to try and solve a problem. The lesson to learn is that each problem is unique and needs a unique solution … even if it is possible to apply some of the learning from a previous experience.
5. The cure can be worse than the disaster. This is also known as 'shifting the problem to the intervener' or 'passing the monkey'. The worse part is that the intervener gains power every time he takes on the problem. In the end it is extremely difficult to function without the intervener. So, for example, many managers prefer to pass their human resources problems to a human resources department. This gap between manager and staff then becomes the root cause of a multitude of learning obstacles.
6. Faster is slower. It is best to remember that optimal growth rate and sustainable growth rate are not equal. Each system has an intrinsic growth rate with which it can cope. The trick is again to realise that there is not just one solution to all problems.
7. Cause and effect are not closely related in time and space. One is accustomed to thinking that an action has an immediate re-action. This is true but the full reaction very often is clear only when a large chunk of time has lapsed.

8. Small changes can produce big results – but areas of highest leverage are often the least obvious. As is seen with a ship's rudder, a relatively small 'part' is sometimes able to leverage a large mass. At the same time when one watches a ship turn it is difficult to recognise that the rudder is doing the difficult work.

9. You can have your cake and eat it too – but not all at once. Very often it is thought that one option excludes another (for example when you want to deliver quality you cannot reduce costs). The real leverage lies in seeing how both options can be accomplished. It may need one to focus on one element first (for example quality) but over time the other (lower costs) is also achieved.

10. Dividing an elephant in half does not produce two small elephants. This is particularly true during times when companies are outsourcing what they believe are non-core elements of the business. When only one aspect of an organization is visible from the angle it is approached, the full impact of actions taken will not be visible.

11. There is no blame. Within systems thinking there is no enemy outside the company. All are part of the same system and the cure for the problem lies in the relationship that is built between the role players.

Having said that, the most obvious question to ask is: 'How does one create a learning organization?' Some of the implementation ideas collected from a number of authors are reflected on in the next section.

2.4.1.4 Implementation strategies

There is little doubt that Senge's ideas made sense to a large number of senior executives. As a result, most organizations are putting strategies in place to foster, manage and exploit internal learning and knowledge. Bontis (1998, p 64) and also by Robinson and Kleiner (1996, p 38) confirm this statement. These authors report that firms that are thriving in the new strategic environment see themselves as learning organizations pursuing the objective of continuous improvement in their knowledge assets. Bontis is of the opinion that competitive, technological, and market pressures have made continuous organizational learning a critical imperative in global strategy effectiveness. As a result organizations that have been unable to enhance their knowledge assets have failed to survive and are left wondering what the fuss is all about.

It was established that successful organizational learning is said to occur in at least four stages, namely:

- information acquisition – when the organization becomes aware of new or different information;
- information distribution – when the information becomes generally known;
- information interpretation – which is the stage when information becomes knowledge; and

- organizational memory – which is when tacit knowledge is turned into explicit knowledge and therefore again becomes information that should be utilized during the acquisition phase.

To illustrate what is meant by the stages mentioned above, the works of Bontis (1998, pp 72-73); Hackett (2000, pp 16-17), Lank (1997, pp 406-407 and Malhotra (1996) were used as a basis to create Figure 2.1 on page 2.16. From the figure, it can be seen that information is gathered from a variety of sources. The gathering of information is obviously in line with the organization's goals and objectives. Capturing is at times formal – when databases are augmented, and at times informal – when data is not captured in any given system. Only the most obvious, such as scanning the external environment, deliberately collecting intelligence, doing research and development and making use of knowledge created within the company, are mentioned. The information gathered and captured is of little use if it is not distributed and shared amongst the employees (human capital) of the organization because it is at this stage that connections are made and information is analysed for trends and new developments. Once that is done a 'knowledgeable stage' is reached from which existing procedures can be improved and new products and services can be developed. The tangible knowledge then needs to be identified and captured. Capturing can again be via a database but it can also be in report format or just a list of lessons learnt. Once that task is completed, the knowledge can be re-used as information gathered to ensure continuous evolvement or learning of the organization as a whole.

As a result of this continuous process the following characteristics should be possible to identify:

- continuous activity;
- individual learning transformed into organizational learning;
- no boundaries in the sharing of information across the whole organization;
- a clear understanding amongst all about the creation, sharing and managing of information to meet specific business objectives;
- continuous improvement; and
- benefits that are continuous and to all stakeholders.

Fig 2.1: Flow of information within the learning organization
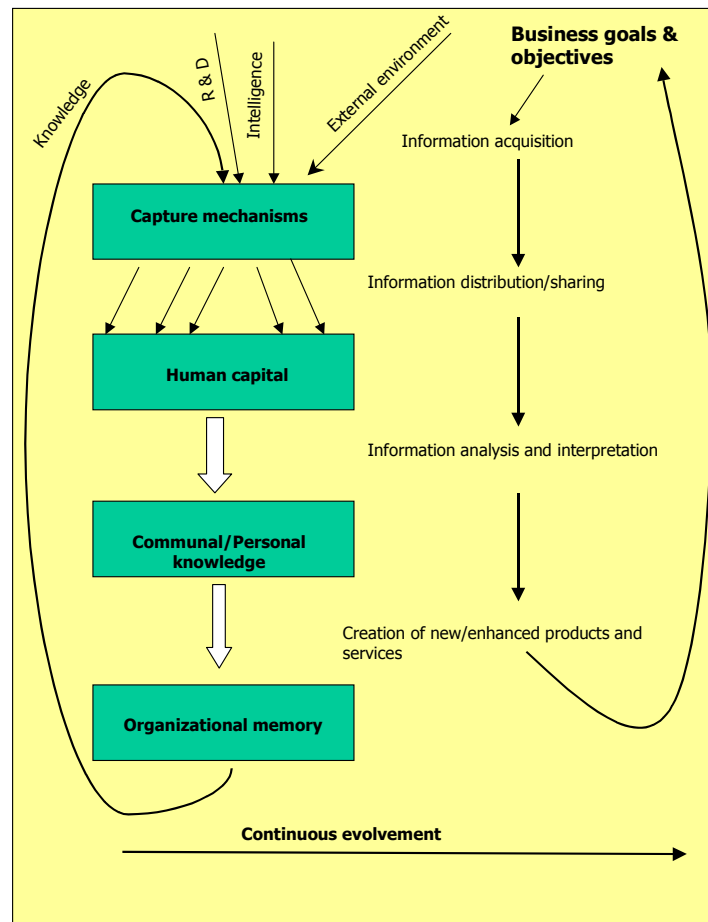
This model is of considerable value when the company's learning ability is in a mature state because, to assume that all learning is of equal value, is futile. Argyris and Schon (1978, in Bontis, 1998, p 72) identified three types of organizational learning, single loop, double loop and deutero learning. Figure 2.2 on the next page indicates these loops as coloured lines. Most businesses follow single loop (red line) learning that merely detects and corrects problems as soon as possible so that the organization can continue with their regular activities. Adaptive learning or single-loop learning focuses on solving problems in the present without examining the appropriateness of current learning behaviours. Adaptive learning is about coping. Adaptive organizations focus on incremental improvements, often based upon the past track record of success. They do not question the fundamental assumptions underlying the existing ways of doing work. Generative Learning or double-loop learning (green line) emphasizes continuous experimentation and feedback in an ongoing examination of the very way organizations go about defining and solving problems. Double loop learning not only involves the detection and correction phase of problem resolution, but also attempts to modify underlying norms, policies and objectives. Triple loop or deutero learning (blue line), unlike adaptive learning, requires new ways of looking at the world. It is the most advanced of the three and

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involves understanding the whole process. This links back to Senge's system theory discipline. Although the duetero concept is intuitively appealing, Malhotra (1996) states that many managers have yet to find a practical means to adopt the duetero-learning process. This is especially important within the context of this research because he predicts that managers who are not able to make provision for deutero learning will struggle to grasp and develop the full scope of intellectual capital.

Fig 2.2: Effective organizational learning – based on the work of Argyris (1982, p 163 and Bontis, 1998, p 72)
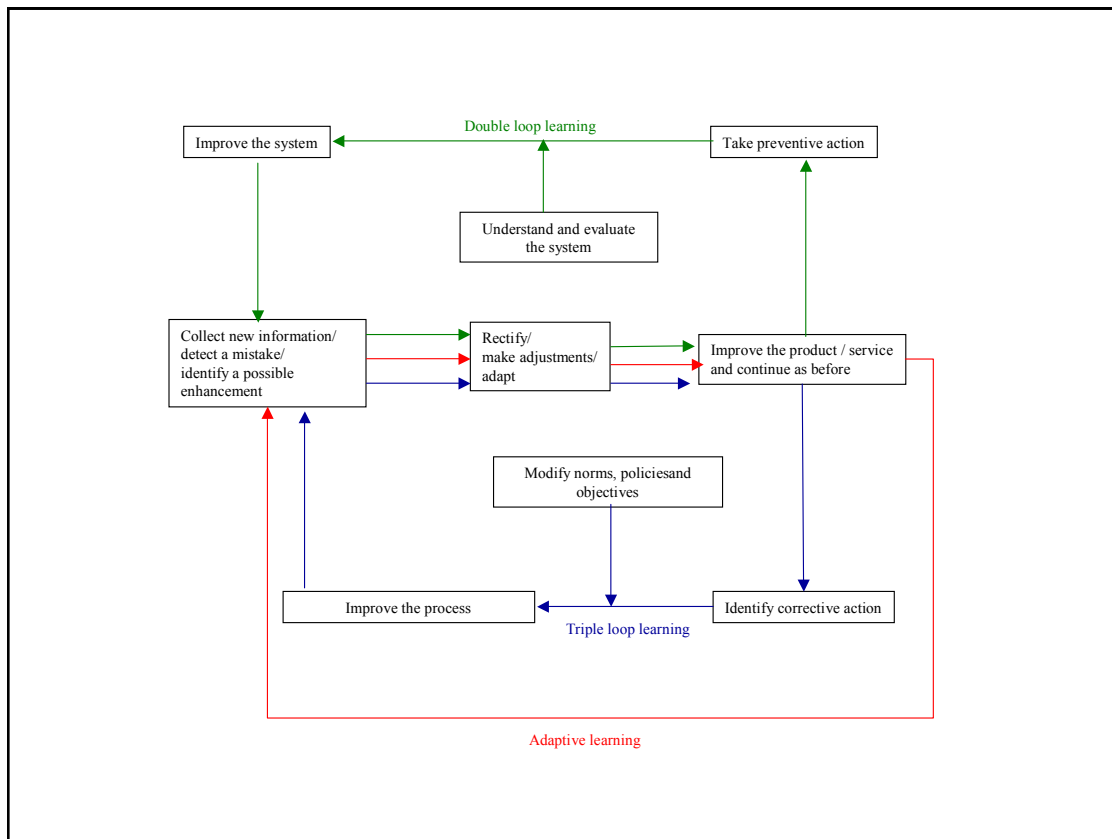
These learning loops were taken into consideration when it was decided to redesign the inter-library loans (ILLs) and cataloguing processes. Unfortunately the effect was not measured. An attempt is also being made to re-design the access to information system as a whole. This has specific relevance in terms of the move from paper to electronic sources. From this experience it is possible to say that the practicalities of duetero learning are as difficult as Malhotra (1996) reported, mainly because of financial and organizational constraints. These constraints are often beyond the learner's immediate control. What is important, however, is that the whole system is evaluated to identify the necessary changes. Implementation of these changes can then be done in stages as and when possible. It also remains important that learning is captured along the route of development or learning because learning and knowledge only become truly valuable when they are shared and preferably captured in tangible format. The capturing and packaging of knowledge is the focus area of the next management philosophy examined. First, a brief overview of this section of the study is given.

2.4.1.5   Learning organizations in brief

A learning organization is an organization in which the individual experiences learning and development as such a positive drive that it becomes an internalised activity … almost a craving to learn! Peter Senge's work, on the disciplines required for developing a true learning organization, is central to the development of literature relating to the topic. In particular the laws associated with the disciplines provide clues as to what one needs to keep in mind when leading in the learning organization. The crux of applying learning organization theory is that one should progress beyond the first stage or loop of learning where newly acquired knowledge is collected and applied. In a second phase, knowledge is used to improve individual processes while in a third phase acquired knowledge is utilized to redesign systems in order to have improved all the processes relating to the system.

2.4.2   Knowledge management

Sveiby (2000a) tells us that knowledge management is perhaps not an ideal term to use. He is not sure what this 'thing' will be called but reminds us that it is not up to us to decide that right now. (After all, the dramatic changes in the world economy experienced by those living in the late 18th century were not labelled 'The Industrial Revolution' until 100 years later.) For the time being though, 'it' is known as knowledge management. Because knowledge management has been identified as a 'hot topic', it is not remarkable that there is an oversupply of information relating to it. What is remarkable is that, as was reported by Demarest (1997, p 374), the call to knowledge is being sounded at all levels of economic analysis:

- at the macro level of global markets and economic trends:
- at the meso level of the inter-firm networks and value chains that construct and deliver value to customers; and
- at the micro level of the firm, the basic unit of analysis.

Even though authors are addressing all these levels in their writings Hackett (2000, p 47) does warn that *while the apparent benefits are becoming clearer, knowledge management still needs to be justified in business terms if it is to gain widespread support*. Fortunately technology costs are plummeting and most knowledge management can be leveraged effectively on infrastructure investments that were made in the resent past. Better planning and coordination should assist in getting knowledge management implemented in the right way.

However, coordination and planning are not the only constraints. Grant (1997, p 452) mentioned that the dilemma for any company is that *sustaining a competitive advantage requires barriers to knowledge replication by competitors, but to effectively exploit knowledge requires that companies have to be capable of replicating knowledge internally.* Uncertainty over the route to take, causes a 'wait and see' attitude. His advice on how to reach a state of action is to ensure that employees are mobile and that organizational capability depends more upon the firm's mechanisms of integration than on the extent of employees' specialist knowledge. He is of the opinion that *the greater the span of knowledge being*

integrated and the more sophisticated the integration mechanisms, the more difficult is it for any potential rival to accomplish replication. This opinion is supported. The associated risk, however, is that by concentrating too much on capturing knowledge the development of knowledge is forgotten.

Knowledge management is discussed in more detail below. It was seen as useful to start at the beginning and to provide the background to the establishment of knowledge management, the definitions available, major contributions to the subject area as well as to provide some implementation strategies.

2.4.2.1   Background

Knowledge management does deserve the attention it is receiving because knowledge has become the primary ingredient of what today's economy makes, does, buys and sells. As a result, managing knowledge, sharing it and selling it has become an important economic function of individuals, companies and nations. As was reported before, this is as a result of a basic understanding that the fundamental source of wealth has become knowledge and communication rather than natural resources and physical labour (Stewart, 1997, in Hines, 2000, p 2). There is also a general realisation that, in a fast changing, competitive, global environment, the ability to exploit knowledge is what gives companies their competitive advantage. Therefore, sharing knowledge with customers, potential customers, suppliers, and in some cases competitors is becoming a growing business practice (Bartlett, 1995 in Zickner, 1996, p 22; Hackett, 2000, p 13; Wiig, 1997, p 399).

Knowing that knowledge provides competitive edge and understanding its strategic importance is of course not the same. Joia (2000, p 68) states that the understanding of knowledge as a strategic weapon for a corporation is not recent. He reports that academics, researchers and practitioners have been highlighting the importance of the intangible assets of a corporation for a number of years. For example, Joia claims that in 1945, Frederick Hayek presented research about the use of knowledge in society and in 1962, in a seminal work, Fritz Machlup from Princeton University produced an eight-volume work under the general title *Knowledge: its creation, distribution, and economic significance*. As has Sveiby (2000b), Joia (2000) too noticed that the last 10 to 15 years of the previous millennium brought about a total explosion of documentation about the subject. With regard to the years since 1985, Sveiby (2000b) is of the opinion that the knowledge management literature and research from the last decade should be seen to have gone through at least three phases:

- The first phase was from around 1985 – 1990 when a few, not knowing of each other's work, were experimenting, writing and thinking in isolation. They were taking their inspiration from philosophers such as Wittgenstein and Polanyi and were exploring the value created by leveraging the competence and skills of people and knowledge creation. 'Knowledge Management' and 'Intellectual Capital' were not widely used as concepts.

- During the second phase (1991 – 1997) the IT revolution and the Internet started driving change in organizations. The IT solutions and management processes during this time were about reusing (existing) knowledge and how to avoid re-inventing the wheel. The misconception that knowledge could be 'managed' enthused managers and consultants around the world. The phrases 'knowledge management' and 'intellectual capital' became the highlights of conferences in both Europe and the United States. Both knowledge management and intellectual capital were seen primarily as means to increase efficiency. (Interestingly enough Sveiby (2000a) is also of the opinion that knowledge management became 'hijacked' by the IT vendors and intellectual capital was misconstrued as a way of measuring intangibles and publishing information in annual reports during this phase.)

- The third phase is post 1997. In this phase knowledge creation and innovation were regarded as 'hot' and the issues became much more human again. More and more people have come to realize that efficiency is not enough. Creating environments that enable all people to create knowledge are said to generate the real value for corporations and society. People are beginning to realize that human beings are at the core of value creation and not IT systems.

Sveiby (2000b) is of the opinion that it is because of the convictions of this third phase that efforts to manage knowledge (and intellectual capital) are now pursued with considerable success by many leading organizations. It is certainly evident at South African information professional conferences and discussions that knowledge management, especially, has entered a new phase. From these same discussions it is also clear that there is diversity in the understanding of what knowledge and knowledge management actually is. In an attempt to better understand the terminology, a variety of definitions were found.

2.4.2.2   Definitions

Sveiby (2000a), reports that there are two schools of thought when defining what knowledge is:

- The first group defines knowledge as **a justified true belief**. When somebody creates knowledge, he or she makes sense out of a new situation by holding justified beliefs and committing to them. The emphasis in this definition is on the conscious act of **creating meaning**.
- The second defines knowledge as **a capacity-to-act**, (which may or may not be conscious). The emphasis of the definition is on the **action** element: a capacity-to-act can only be shown in action. Each individual has to re-create his or her own capacity-to-act and reality through experience. Here knowledge is dynamic, personal and distinctly different from data (discrete, unstructured symbols) and information (a medium for explicit communication). Sveiby (2000a) is also of the opinion that since the dynamic properties of knowledge are most important for managers, the notion of individual competence can be used as a fair synonym for a capacity-to-act.

It is especially the second definition that is of importance within the context of this study. As a result, further definitions all support the notion of empowerment and ability to do tasks without supervision. It is the contention that modern management has little time for supervision and ensuring that staff members have created the correct meaning. Each employee should be empowered to make informed, knowledge-enabled decisions when necessary. 'Empowered' should be taken to include the necessary training and infrastructure to do so. In this regard Quintas, Lefrere and Jones's (1997, p 390) statements on knowledge are also of interest. They believe that *knowledge should be seen not as a set of facts or even skills out there which can be discovered, identified and utilized, but that knowledge should be seen as a process, a set of relationships in which power is heavily implicated. Not in the sense of knowledge is power, but in the proposition that power and knowledge are constituted together.* Power is seen here in a very positive sense. It indicates being in control of the situation or, again, being empowered and therefore having the ability to make informed decisions.

Since knowledge is the product that needs to be managed, it is perhaps also useful to briefly look at Grant's (1997, p 451) assumptions concerning the characteristics of knowledge and the circumstances of its creation. He is of the opinion that:

- Knowledge is the overwhelmingly important productive resource in terms of its contribution to value added and its strategic significance.
- Different types of knowledge vary in their transferability. The critical distinction is between 'explicit knowledge' which can be articulated (and hence is transferable at low cost), and 'tacit knowledge' which manifests only in its application and is difficult to transfer. The ease with which knowledge can be transferred also depends upon the capacity of the recipient to aggregate units of knowledge.
- Individuals are the primary agents of knowledge creation and, in the case of tacit knowledge, are the principal repositories of knowledge. If individuals' learning capacity is bounded, knowledge creation requires specialization. However, an increase in depth of knowledge normally requires sacrificing breadth of knowledge.
- Most knowledge is subject to economies of scale and scope. This is especially the case with explicit knowledge, which, once created, can be deployed, in additional applications at low marginal cost.

None of these assumptions could be challenged and therefore the actual act of managing knowledge was investigated further. Wiig's (1997, p 402) description, in a narrow, practical sense, is that knowledge management is a set of distinct and well-defined **approaches** and **processes**. The purpose is to find and manage positive and negative critical knowledge functions in different kinds of operations, identify new products or strategies, augment human resources management, and achieve a number of other, highly targeted objectives. In so doing, knowledge management addresses both managerial 'top-down' and individual 'bottom-up' activities. Based on this definition he claims that knowledge management focuses on eight important operational areas. This requires that knowledge managers:

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1. survey, develop, maintain and secure the intellectual and knowledge resources of the enterprise;
2. promote knowledge creation and innovation by everyone;
3. determine the knowledge and expertise required to perform effectively, organize the knowledge, make the requisite knowledge available, 'package' it (in training courses, procedures manuals or knowledge-based systems, for example) and distribute it to the relevant points-of-action;
4. modify and restructure the enterprise to use knowledge most efficiently, take advantage of opportunities to exploit knowledge assets, minimize the value-added knowledge content of products and services;
5. create, govern and monitor future and long term knowledge-based activities and strategies, particularly new knowledge investments such as R&D, strategic alliances, acquisitions and important hiring programs based on identified opportunities, priorities and needs;
6. safeguard proprietary and competitive knowledge and control use of knowledge to ascertain that only the best knowledge is used, that valuable knowledge does not waste away, and that knowledge is not given away to competitors;
7. provide knowledge management capabilities and knowledge architecture so that the enterprise's facilities, procedures, guidelines, standards and practices facilitate and support active knowledge management as part of the organization's practices and culture;
8. measure performance of all knowledge assets and account for them, at least internally, as capitalized assets to be built, exploited, renewed, and otherwise managed as part of fulfilling the organization's mission and objectives.

Demarest (1997, p 380) in effect supports Wiig in stating that knowledge management goals are focused on internal practices, sharing practices and increasing efficiencies. He advises that the following questions are continually asked:

- Does our knowledge work?
- How well does it work relative to other similar knowledge practices?
- How do we break down the prejudices and assumptive barriers?
- How do we create knowledge?
- How do we embody knowledge?
- How do we maintain and enhance knowledge?
- When do we scrap 'old' knowledge in favour of newer knowledge?

He claims that, without asking these questions, it is possible for the firm to lose focus of its real objectives. Demarest (1997, pp 378-379) is of the opinion that *all knowledge management programmes ought to be targeted directly at the firm's income statement: at revenue enhancement, cost reduction, or the management of risk associated with marketplace and financial performance. Ultimately, all knowledge management programmes and problems are local: unique to a particular firm and its knowledge economies. This implies that the only top-level metrics for a knowledge management system that ultimately matter are economic ones: market share, revenue, gross margin, concept-to-cash-flow cycle time, customer satisfaction*

and other commercial success metrics. Other metrics – concerned with the productivity and efficiency of the knowledge management process itself – have value to knowledge workers and knowledge managers, but an optimally efficient, high-volume knowledge system that does not lead to dominating market performances has no ultimate value to the firm. He sees the only reasonable purpose of an organized knowledge management practice in the firm, as *to increase the quality and quantity of marketplace performances: to enable the firm to sell more and sell better, to support more and support better, to create and keep more, better, customers.* Hackett (2000, p 12) confirms this by predicting that, by focusing on innovation and customer knowledge, breakthroughs and future growth within companies can be expected. He recommends that knowledge be seen as *the fuel that provides the energy for corporate innovation, wealth creation and workforce productivity.* Out of context these statements may sound as if uttered by a typical bottom-line driven executive. Looking at them in more detail, it can be seen that they deal with the goals of the organization and that these authors are correct in what they are saying. No knowledge management activity should ever be regarded as successful if it does not support the overall mission and goals of the organization.

In line with Wigg's definition above, authors such as Hackett (2000, p 5) define knowledge management as the art of creating value from an organization's intangible assets. He also sees it as *an integrated, systematic approach to identifying, managing, and sharing an enterprise's entire information asset, including databases, documents, policies, and procedures, as well as previously unarticulated expertise and experience held by individual workers. Fundamentally, it is about making the collective information and experience of an enterprise available to the individual knowledge worker, who is responsible for using it wisely and for replenishing the stock. This ongoing cycle encourages a learning organization, stimulates collaboration, and empowers people to continually enhance the way they perform work* (Hackett, 2000, p 5)*.*

Arora (2002, p 240) summarizes the opinions of other authors by stating that knowledge management has three broad objectives. These are to:

- leverage the organization's knowledge;
- create new knowledge and promoting innovation; and
- increase collaboration and hence enhancing the skills level of employees.

Arora continues by stating that the most common ways to ensure that the stated objectives are reached are to develop a knowledge repository and to nurture communities of practice.

Now that it is more or less clear what the term knowledge management means, attention is paid to those authors who seem to be prolific in their writing about the topic. Although quite a few were identified, it was specifically the research done by Davenport and Prusak (1997) that was seen to make a major contribution towards this study.

2.4.2.3   Major contributions relevant to this study

Davenport and Prusak (1997, p 3-4) confirm that information and knowledge are human creations and we will never be good at managing them unless we give people the primary role, but they see an organization as a 'living organism' thriving within a certain almost ecological environment. They therefore developed an information ecology model where the emphasis is on an organization's entire information environment: its culture, the politics, the behaviour and work processes as well as the technology. Because they attempt to address the organization system as a whole this is very similar to Senge's (1990, p 6) system thinking discipline theory. In brief Davenport and Prusak (1997, pp 34-45) describe the three interactive environments as follows:

1   Information Environment

Within the information environment, the following need to be taken care of:

Information Politics - Here the company's internal political strategy should be re-enforced by the information politics. Personal power politics encourages information hoarding whereas consensus strategy encourages sharing.
Behaviour and culture - sharing and gaining knowledge are too good to be left to chance. It has to be a management objective to do so.
Staff - The human role cannot be automated away. Humans are still the best identifiers, sifters, interpreters and integrators of information.
Strategy – The information strategy revolves around the question: 'What do we want to do with information within this organization?' Just as with any other business strategy, it should be expected that the information strategy is not static but that it changes together with changing needs.
Processes - Process improvement ensures incremental improvements whereas process re-engineering leads to radical innovations. No matter what process is used, both start off with a detailed description of the status quo.
Architecture – This is a guide to the structure and location of information within the organization.

2   Organizational Environment

The organizational environment deals with the:

Business situation - the firm's business strategy, business processes, organizational structure/culture and human resources orientation all influence the information environment.

Technology Investment - The overall IT investment will have a definite effect on both the collection and dissemination aspects of the information environment although an over-emphasis on technology drives out good information.

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Physical arrangement- physical proximity increases the frequency of communications within groups.

3   External Environment

This is where the organization needs to attend to the:

Business Markets – to create the general business conditions within a firm.

Technology Markets - the company needs to know what is available and if that technology could be of real value.

Information Market - this concerns both the buying and selling of information. Most companies can identify the information they need to buy but it is advisable that they also generate income from selling information.

Figure 2.3 below shows that all of the above have to interact to make for a sound information ecology.

Fig 2.3   The Davenport and Prusak ecology model (Davenport and Prusak, 1997, p 34)
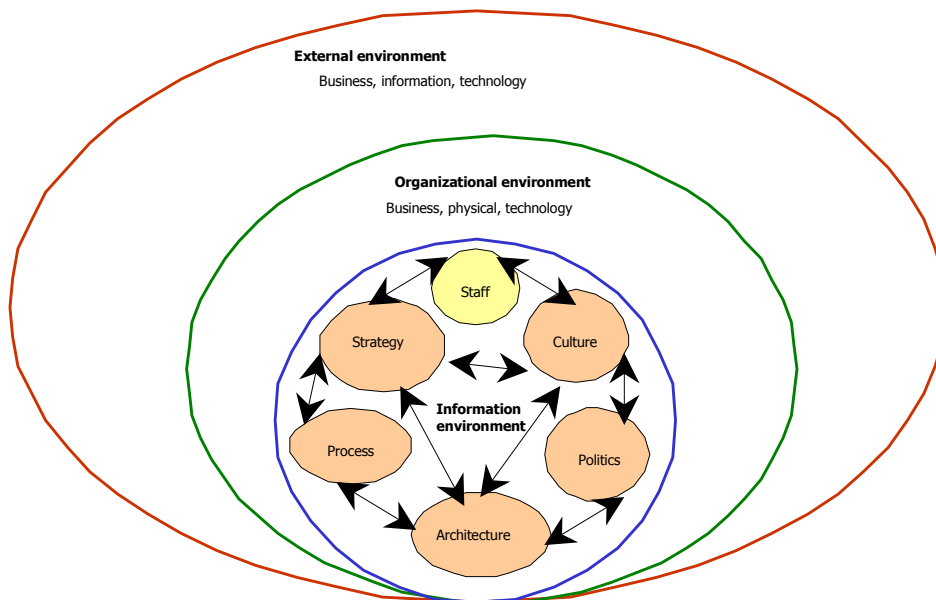
This ecology model is of importance because it links to the development of intellectual capital, which is discussed in detail in Chapter 3 of this research. In this regard, Davenport and Prusak's external environment could be tied to financial and customer capital while organizational environment, strategy, culture, politics, architecture, processes and strategy should all be regarded as structural capital. The

'staff' section could be equated to human capital. It is of course not the fact that the components are similar that is of importance. Taking cognisance of the interrelationships amongst the various components is.

Taking note of the interrelationships is of crucial importance during the implementation phase of knowledge management. There are, however, other issues to consider. These are discussed in the next section.

2.4.2.4   Implementation strategies

Davenport and Prusak (1997, pp 16-24) are of the opinion that in effect managing knowledge also requires effective information management. In this regard they have identified four modes of information management within organizations:

- Unstructured information management: this is the way information has been dealt with by individuals and librarians for centuries. It is predicted that in future the process of information collection and management will take place on an individual level rather than in a centralized group such as a library or competitive intelligence group.
- Structured information management but on paper: paper-based records and documents have been around as long as anyone can remember. However, even the best-managed paper collection is useless if it does not get used.
- Structured information management making use of computers: primarily this addresses highly structured data involving past financial or operational management within the organization. It usually excludes external market numbers, structured communications inside and outside the firm and text or graphics-based records.
- Intellectual capital or knowledge related information management: here organizations have started to encourage and reward staff for contributing to knowledge bases. Unfortunately, they have noticed that although theory and philosophy are very often in place many companies are still struggling with implementation.

With any one or all of these modes of information management more does not necessarily mean better. A knowledge base containing only repetitive knowledge is a waste of time and effort. Unlike material commodities, in the economics of information, more must mean different or it is worthless. Similarly to Hackett (2000, p 12), the advice on information management, as given by Davenport and Prusak (1997, p 135), is to focus on customer needs and satisfaction. In that way information management becomes more effective and may even be seen as knowledge with commercial value. In support of this statement the words of Demarest (1997, p 375) are worth mentioning *Good commercial knowledge, valuable knowledge is knowledge that works. The goal of commercial knowledge is not truth, but effective performance: not 'what is right' but 'what works' or even 'what works better' where better is defined in competitive and financial contexts.* Obviously ethical values need to be kept in mind but that again is a totally different subject. Ethical values are not what Davenport (1996) regard as major obstacles in getting

knowledge management to work. He is of the opinion that the 10 principles, to effective knowledge management, listed below, need to be attended to prior to implementation or else the actions are doomed to fail.

- Knowledge management is expensive – secure sufficient funds.
- Knowledge management requires hybrid solutions of people and technology – technology on its own will not be sufficient.
- Knowledge management is highly political – take care of the organizational politics or the system will never get going.
- Knowledge management requires knowledge managers – appoint appropriate staff.
- Knowledge management benefits more from maps than from models, from markets than from hierarchies – stop talking and do something to show results.
- Sharing and using knowledge are often unnatural acts – the behaviour therefore needs to be encouraged.
- Knowledge management means you have to improve the work process.
- Access to knowledge is only the beginning of knowledge management.
- Knowledge management never ends.
- Knowledge management requires a knowledge contract**.**

From these principles it is clear that senior management needs to be serious about the company's knowledge management activities or any activities will eventually boil down to a waste of money. From detail provided by Smith (1998, p 8), wasted money in terms of useless knowledge management activities could accumulate to large sums. He reported, for example, that the knowledge management bill for leading consulting companies such as Ernst and Young and McKinsey and Co, is on average between six and ten percent of revenue. When a company spends that much it had better show return on the investment!

Once the principles are in place, Hackett (2000, p 22-23) is of the opinion that knowledge can be 'managed' in two ways, namely: emergent, self-organizing, bottom-up model; or centrally designed commonly shared architecture, top-down model. Either the top-down or bottom-up implementation method may work and sustain positive results if it is aligned with organizational culture and local performance drivers. He warns that if there is a mismatch, the outcome may be more detrimental than good. Theory in and of itself does little good. Knowledge management suggests a dilemma that all managers have to grapple with: the organizational tension between process, the way matters are formally organized, and practice, the way things actually get done. For a company to make the most of its knowledge, to 'know what it knows', it needs to take practice, practitioners, and the communities that practitioners form seriously. First, managers need to learn what local knowledge exists. Then if the knowledge looks valuable, they need to put it into wider circulation (Brown and Duguid, 2000, p 76). Or, as Hackett (2000, p 17) puts it *For knowledge to have that effect it does mean that the knowledge needs to be created or identified, and that it then needs to flow among workers, workgroups, and business groups, and across the entire enterprise.* This in itself requires that the knowledge management system(s) have to make provision for collection processes,

quality standards and a maintenance process (for both the structures as well as content within the structures).

It is said that the test of a knowledge management system is ultimately whether it is a by-product of the firm's operations, or an explicit objective of the operations (Demarest, 1997, p 377). To confirm this Hackett (2000, p 22) is of the opinion that knowledge in an organization is analogous to oxygen in the human body: critical to sustaining life, but not necessarily a subject for explicit management, unless the natural organic systems are failing. He states that *the sign of an effective knowledge management system is a process and infrastructure aimed at supporting the creation, harvest, assimilation and leverage of knowledge*. Smith (1998, p 9) warns that such a process and infrastructure is people-intensive. Not in the sense of employing new members of staff but in the sense that all have responsibility towards making the system work.

A working system always, according to Davenport and Prusak (1997, p 85 and 182), occurs through a combination of technological and behaviour change. They warn that an organization's general approach to human resources can determine whether knowledge management initiatives succeed or fail. In this regard Brown and Duguid's (2000, p 74) opinion is shared. They feel that successful companies are not those that work around their problems; they are those that turn their problems to their own advantage.

To create robust bodies of knowledge that work for the company, methods and practices, ways of working with knowledge have to be developed. This means that the construction, embodiment, dissemination, use and ultimately maintenance of the knowledge need to be spelt out. Demarest (1997, p 381) sees successful knowledge management activities being influenced by three interactive 'role players'. These are:

1   **Infrastructure**: that which facilitates the day-to-day process of knowledge-building and which has to make provision for a:

- **Cultural infrastructure** - the knowledge management rewards embodiment and dissemination and incessant knowledge creation.
- **Operational infrastructure** - with focus on the individual knowledge worker and her team, and all have to be tied directly to the knowledge producing capacity of that team.
- **Technical infrastructure** - in the modern firm, knowledge travels through information technology.

2   **People**: those ultimately responsible for knowledge creation and building. Here the guiding principles should be that:

- senior management set the tone and show support;
- day-to-day reinforcement and coaching come from mid-level;
- learning and sharing are seen as equally important;
- trust is essential. It should be built to overcome the effects of 'not

invented here' and 'knowledge is power'. Managers should trust employees and employees on the other hand should be able to trust that sharing enhances employment status and does not undermine the business's need for them;

- human interaction cannot be replaced, especially for the sake of transferring tacit knowledge;
- rewards/recognition are carefully evaluated before implementation, so that unexpected and unintended consequences are avoided.

3   **Processes**: that which provides the methods of capturing knowledge. Here:

- key knowledge management processes must be defined which includes the capturing, sharing, and application of knowledge, the ways in which to develop new knowledge and protection of knowledge assets;
- process design includes content, scope and speed, intended use and expected outputs.

Again these interacting 'role players' can be linked to Davenport and Prusak's ecology model and ultimately to infrastructure and human capital, as discussed within the section on intellectual capital development. The interaction amongst a variety of elements is a continuing theme, which is perhaps why Hackett (2000, p 21) warns of the importance to remember that connectivity is more effective than capturing. Therefore facilitating the connections between people is more successful than trying to capture and sort knowledge for all potential accesses. Enabling/expecting people to learn, share, refine, and apply knowledge is the key element and therefore multiple channels of knowledge transfer must be supported. In line with Hackett's opinion Quintas, Lefrere and Jones (1997, p 387) suggest that implementation should make provision for the following knowledge management activities:

- disclosure of knowledge so that all members of an organization can use that knowledge in the context of their organizational roles;
- ensuring that knowledge is available at the precise location where it is most crucial for decision making;
- ensuring that knowledge is available when it is needed for a business process;
- supporting the acquisition of knowledge from external sources;
- ensuring that new knowledge is distributed;
- ensuring that everybody in the organization knows where knowledge is available.

The list of activities mentioned above appear to be very reactive but would ensure that existing and emerging knowledge needs are met. It is doubtful that these activities would pro-actively allow for the identification and exploitation of existing and acquired knowledge assets to develop new opportunities. It is therefore little wonder that Hackett (2000, p 57) came to the conclusion that, theoretically, knowledge management is a great accelerator of innovation and creativity but, in practice, most knowledge management projects are still conservative and focused on efficiencies. De Gooijer (2000, p 308) provides an explanation for this tendency. She remarks that there are a number of levels of skill in adopting knowledge

management and it is only during the most advanced of these stages that an individual can see and take advantage of new business opportunities. The stages of development as identified by De Gooijer are:

- being aware of but not using knowledge management tools or practices;
- seeking information about knowledge management;
- personal experimentation with knowledge management tools and practices;
- personal implementation of knowledge management practices;
- engaged with impact and consequences of knowledge management behaviour;
- actively collaborates in all aspects of work; and
- refocusing knowledge management skills on new business opportunities.

Once the experimentation with these stages of knowledge management starts and positive results become visible, there is of course always the temptation to knowledge manage everything. However, companies that utilize their knowledge effectively focus their attention. In other words, they do not try to knowledge-enable everything the organization does. They rather identify which payback processes can yield significant business value (Smith, 1998, p 9). Examples of companies where knowledge management was implemented successfully are provided below.

2.4.2.5   Examples of implementation success stories and lessons to learn

A variety of publicly available case studies compete to prove that knowledge management has saved on costs and improved efficiency. Management consultancy firms were in all probability the first to implement the theory and report on their success in practice. In South Africa Ernst and Young is often used as an example of excellence. McLean (2002) recently shared the detail of their success. At the same occasion Schoemaker (2002) gave details of the strategy at AngloGold while Kuhn (2002) used Eskom and the Stellenbosch Farm Wineries as examples of knowledge 'wise' enterprises and Hiscock (2002) showed that Sasol is also achieving success.

Knowledge management is not always an obvious action that is taking place. Viedge (1997, in Wiig, et al., 1997, p 45) identified a variety of companies where knowledge management is so ingrained in the systems that neither they nor their customers are consciously aware that they are managing their knowledge. They only experience efficiency! These companies are, for example, Microsoft, Intel, 3M, McDonalds and Disney. Similarly, Cook (1997, in Wiig, et al., 1997, p 60) is of the opinion that Bell Laboratories are achieving excellent results due to the knowledge management activities of specifically their professional engineers.

As a last set of examples worth noting - Hackett (2000, p 5) has established that knowledge and learning initiatives at leading firms such as BP Amoco and Ford Motor Company have resulted in gains of more than $600 million each. This does not mean that knowledge management is a magical cure for all ills. There are several lessons to learn from before venturing into the realms of knowledge management.

Many of the lessons to learn are quite obvious when looking at the implementation strategies.

The first lesson is from Smith (1998, p 7). He advises that, before an enterprise embarks on a knowledge management mission, it should first examine whether it exhibits one or more of those elements that predispose it to intensive knowledge management. Elements that typify the need for knowledge management are:

- geographic dispersion;
- rapid growth and high level of turbulence in the work force;
- culture of autonomy;
- strategic mindset;
- highly competitive industry; and
- being aware that your 'product' is largely composed of knowledge.

If these elements are not yet in place it is perhaps not worth pursuing knowledge management at that specific stage.

Secondly Davenport and Prusak (1997, p 5) warn not to expect significant changes in the environment if only focused short term projects are used to try and make an impact on the environment. This implies that **how** people create, distribute, understand and use information is put at the centre of longer-term projects and that it is understood that:

- knowledge is not easily stored on computers because it is not data;
- the more complex the information model, the less useful it will be;
- information can take on many meanings in an organization; and
- technology is only one component of the information environment and is often not the right way to create change.

From the work of Davenport and Prusak (1997, pp 65-66, 107, 169, 174, 191-192, 220-226), it was possible to also identify a large number of lessons. The following items serves as general implementation advice:

- Senior management members have to buy into the idea of managing knowledge.
- The company has to have a clear strategy and consensus about what will make the business successful. Managers as well as senior staff should be involved in setting the strategy as well as to identify selection criteria and categories for the knowledge that needs to be managed.
- A senior manager should be responsible for implementing knowledge management activities.
- Information should critically increase the value of the products and services the company provides or else it serves no purpose to collect that information.
- There should already be efforts to collect good quality information about the operation and performance of cross-functional business processes.
- The company should be able to respond to changes in organizational structure and culture.

- The knowledge and capabilities of employees have to be understood. Employees should also be evaluated and rewarded for their information behaviour.
- Training should be provided to encourage the desired information behaviour.
- The nature and role of IT have to be understood. Needs should be clearly identified before new technology, to specifically address those needs, is purchased. Senior managers also need to understand how technology can assist or retard processes.
- It has to be easy for employees to communicate with each other.
- All should know whom the knowledge is being managed for. The audience has to be clearly defined.
- All available bits and pieces of information have to be reviewed prior to making decisions as to what to collect and what not. There should be a plan and an approach to identify and collect useful information irrespective of the format in which the information was captured.
- It helps to keep track of all sources of information, especially when there is a need to go back to the source for more information.
- Employees who need to share information should ideally be located in the same office in the same physical space.

Compiling an exhaustive list of lessons or items that need consideration can result in a never-ending exercise. The items above were seen as the most important and serve only as a point of departure. A brief summary of what knowledge management involves, is provided below.

2.4.2.6   Knowledge management in brief

As was seen the overall purpose of knowledge management is to maximize the enterprise's knowledge-related effectiveness and returns from its knowledge assets and to renew them constantly. This implies that tacit knowledge must be transferred to explicit, shared knowledge if it is to be of general and lasting value. Taking all of what was reported into consideration, one can only agree with De Gooijer (2000, p 307) when she declares that *knowledge management is a radical innovation or change to an organization's operations, and thus is to be regarded as an intervention on the organization's culture*.

It is very clear that knowledge management is not something that can be practiced in an exclusive centralized department of an organization. Before the benefits of knowledge management can be reaped, each and every possible contributor to the knowledge store needs to be enthused by the idea and the environment should be supportive as well as enticing. Most importantly, similarly to what Senge advised in terms of looking at the learning organization holistically, the bigger picture of interconnectedness as well as cause and consequence needs to be understood by all decision makers. It is clear that the previously well-established hierarchical structures of command do not necessarily lead to really useful bodies of knowledge. Therefore each and every contributor needs to be empowered and motivated for the whole process/system to be implemented successfully. To quote Lank (1997, p 412) *By focusing on the human factor and ensuring that your knowledge management*

processes give more than they take from employees, you may find yourself on a virtuous spiral to a step change in performance.

2.4.3   Intellectual capital management

According to Bontis (1998, p 64), the ascendancy of intellectual capital is that it has developed as a result of powerful forces such as global competition. As is the case with knowledge management, the publications relating to intellectual capital management came to the fore during 1997. One of the first indications of the dawn of a new management philosophy is the fact that *Long Range Planning* (V30 (3), June 1997), known for its strategic focus, devoted an entire issue to intellectual capital management. In 1999 the Franklin Pierce Law Centre reported that in one year, more than 600 titles relating to only intellectual property were added to its holdings (http://www.ipmall.fplc.edu/ip-library/ 1999ipl_acq.htm). During 2000 MCB University Press launched a new journal entitled *Journal of Intellectual Capital*. From this it is clear that there definitely is no shortage of intellectuals paying attention to and expressing their contributions to the topic. In fact the topic is receiving so much attention at present that some governments are in all probability already looking into the ways and means to tax intellectual and intangible assets!

2.4.3.1   Background

To illustrate intellectual capital, Roos and Roos (1997, p 413-414) make the reader aware that if the top 50 programmers suddenly left Microsoft, the share price of the company would be likely to drop dramatically. While the company may just have gone into 'intellectual bankruptcy', the short term profits may very well rise since costs will have been lowered! Edvinsson (1997, p 366) provides a very simple metaphor to explain the intellectual/financial capital distribution within the company. He equates the company to a fruit-bearing tree. He is of the opinion that the long term sustainability of an organization requires that focus be placed on nurturing the roots (intellectual capital) rather than on harvesting the fruit (financial capital). In the final analysis it shows that intellectual capital becomes at least as important as financial capital in providing truly sustainable earnings.

Edvinsson is seen as probably the most eminent intellectual capital practitioner in the field. He (1997, p 372) stated that intellectual capital management is more than just knowledge management. *Intellectual capital management is leveraging human capital and structural capital together. It is multiplying the interaction between human capital and structural capital. Intellectual capital value emerges out of these connections and relationships*. A variety of other definitions for intellectual capital were also traced. Some of these are reflected in the next section.

2.4.3.2   Definitions and concepts

It appears that there are three schools of thought regarding the definition of intellectual capital. Authors such as Brooking (1997, p 364), Edvinsson (1997, p 369), Stewart (1997, p 75), and Sveiby (1998c) see it as both the tangible and the intangible aspects of intellectual labour. Authors such as Bontis (1998), Jordan and Jones (1997) and Roos and Roos (1997) acknowledge the tangible but concentrate on the intangible (or human capital aspects). Lastly, there are also those like Rivette and Kline (2000a and b) who are only interested in the tangible aspects of intellectual capital, namely financial gain from intellectual property. For the purpose of this research, the tangible and intangible are considered to be inseparable components of intellectual capital.

In terms of the actual terminology used, there are also three variations. Sveiby (1998c) created the following table to compare the conceptual frameworks:

Table 2.1: Conceptual frameworks for intangible assets (Sveiby, 1998c)

		Contributing authors		
		Sveiby	Kaplan and Norton	Edvinsson
Concepts		Internal structure	Internal process perspective	Organizational or structural capital
		External structure	Customer perspective	Customer capital
		Competence of personnel	Learning and growth perspective	Human capital

For the purpose of this research a simplified definition of intellectual capital is as follows:

> Human capital (including innovation capital) +
> Structural capital +
> Customer capital =
> Intellectual capital

A variety of authors provide the reader with more complex versions of what should be regarded as intellectual capital. Bontis (1998, p 65) reported that John Kenneth Galbraith first published the term intellectual capital in 1969. According to him Galbraith believed that intellectual capital meant more than just 'intellect as pure intellect' but rather incorporated a degree of 'intellectual action'. Stewart (1997, p xv) reported that he coined the phrase intellectual capital as a result of a discussion between himself and Ralph Stayer, the chief executive officer of a company named Johnsonville Foods. Whatever the origin of the concept, most authors (Bontis, 1998, p 65; Groth, 1994, p 20; Mullen and Willigan, 2000; Robinson and Kleiner, 1996, p 36; Roos and Roos, 1997, p 413) now use the term intellectual capital to enable

them to verbally equate the intangible component of a company's resources or assets to that of its other assets and resources - notably then those assets that could be reflected on the company's balance sheet. Financial capital represents the company's book value and consists of the value of its financial and physical assets. Everything else could be defined as a company's intellectual capital. Lastly, however, one needs to pay attention to the warning that, although intellectual capital consists of assets created through intellectual activities and although the contribution of value from mind labour has increased relative to the contribution of physical labour, physical labour still translates ideas, discoveries and developments into reality (Groth, 1994, p 20)

Although Edvinsson is seen as the best-known practitioner, Thomas A Stewart could be regarded as the father of the present understanding of intellectual capital. He most probably has the right to say that *intellectual capital has been considered by many, defined by some, understood by a select few, and formally valued by practically no one* (Stewart, 1997, p 221). Edvinsson (1997, p 369) also quotes Stewart as having said that *intellectual capital is something you cannot touch, but it still makes you rich*. While Stewart himself defines intellectual capital as the *sum of everything everybody in a company knows that gives it a competitive edge. It is intellectual material – knowledge, information, intellectual property, and experience – that can be put to use to create wealth* (Stewart, 1997, p. ix-x).

Brooking (1997, p 364) is seen to support Stewart with her definition *Intellectual Capital is defined as the difference between the book value of the company and the amount of money someone is prepared to pay for it. Intellectual Capital represents intangible assets that frequently do not appear on the balance sheet*. Quinn (1996, in Zickner, 1996, pp 11-12 and 17) reiterates that very often intellectual capital is only seen as 'tangible attributes such as formal qualifications, skills and specific competencies. Less tangible items such as motivation, ideas and imagination are regarded as less important. His opinion is that professional intellectual capital, in increasing order of priority, should be seen as:

- cognitive knowledge (know what);
- advanced skills (know how);
- systems understanding (know why); and
- self motivated creativity (care why).

The first three of these usually exist in the systems, databases and operating technologies of the company while the last is embedded in the organization's culture.

Zickner (1996, pp 74-76) through her research established the prioritisation of intellectual capital elements in South African service organizations (mainly banking and financial companies). She followed an approach where human capital was equated to intellectual capital. When Quinn's categorization (as reported above) was added to the list it was interesting to read. The identified intellectual capital elements were the following:

	Zickner	**Quinn**
1	Formal qualifications	know what
2	Skills	know how
3	Specific competencies	know how
4	Company related knowledge	know what
5	Talent	know how
6	Motivation	care why
7	Commitment	know why
8	General knowledge	know what
9	Thoughts and ideas	know why
10	Intuition and imagination	know how

From this exercise it became more evident that, although all cognitive skills were identified to be priority areas, they are still the two lower order skills (what and how) that are most prominent. Zickner's (1996, pp 74-76) research confirmed that although organizations understand and realize that higher level, intangible skills allow a person and the organization to aggressively adapt to rapid changing environments, they still focus heavily on the more basic and systems skills and perhaps to some extent neglect creative skills. This could be because some may see intellectual capital management as a 'flavour of the month' management practice or a fad that may soon go away.

Wiig (1997, p 399) warns that both knowledge and intellectual capital management are far from the narrow management initiatives that may be considered fads or flavour of the month. They are fundamentally different from fads in both objectives and scopes. According to Wiig, both knowledge management and intellectual capital management *are broad, multi-dimensional, and cover most aspects of the enterprise's activities. In contrast, the fads have gained popularity by focusing on a limited scope to simplify the problem setting.* He reiterates that k*nowledge; intellectual assets and capital must be managed deliberately, systematically and with expertise to survive.* Bontis (1998, p 63) too reported that intellectual capital management is not receiving the attention it needs, even though management experts such as Drucker, Nonaka, Quinn, Toffler, Reich, Takeuchi, Von Krogh, and Young have all been warning that the management of knowledge-based intellect will be the most critical skill to sustain the competitive advantage of organizations wanting to flourish within the knowledge economy. Similarly Lank (1997, p 412) is of the opinion that it is recommendable that companies are taking intellectual capital and knowledge management so seriously that they are appointing Chief Knowledge Officers, Heads of Intellectual Capital, Directors of Knowledge Development and Knowledge Managers. However, she questions the formal structure or hierarchy. She feels that it goes against what the harnessing of knowledge and intellectual capital is all about. Accordingly, she suggests that it should be a requirement of each and every executive, and in fact every member of staff, to capture knowledge. She explains that ICL has taken the route of employing 'knowledge engineers' to create and take care of explicit knowledge as and when it is required so that front line staff would be able to access the knowledge if the need should arise again. For the

purpose of this study, Lank's opinion is shared. Each and every member of staff should share in the responsibility of building the organization's knowledge assets.

The measurement of and reporting on intellectual capital assets is discussed in detail in Chapter 4 of this study. It is sufficient to say that intellectual capital's value, both real and potential, is greater than that of the financial capital. Nevertheless, according to Wiig (1997, p 401) the management emphasis and attention given to intellectual capital management is usually far less that what the more tangible assets are receiving. It appears that, traditionally, the only way in which a company is able to tangibly prove its success is through an instrument known as the 'balance sheet'. What is not reflected on the balance sheet does not count. Edvinsson (1997, p 367), who was appointed as Intellectual Capital Manager at the Swedish company Skandia during the second half of the 1990's, is of the opinion that in a society where a major proportion of a company's investment stream goes into intangibles, there is a need for another mapping system. At Skandia they identified it as 'the need for a future accounting'. He continued to say that the idea is not to distort the financial information, but rather to supplement it.

To illustrate his argument Edvinsson (1997, p 366) used the following example. *In the industrial society, investment used to go into plant, equipment and capital tools. Today, a major proportion of the investment goes into knowledge upgrading or competence development leading to human capital. Another major investment stream goes into the development of information technologies leading to value added networks, global area networks. This is something that is invisible on the corporate balance sheet.* Stewart (1997, p 60) confirms this with his American Airlines example. The airline lists all its jetliners as assets yet its reservation information system, which is more profitable, is intangible and therefore not listed as an asset.

Fortunately it does appear that, since 1998 more and more organizations have recognized the importance of correctly identifying its intellectual capital. All organizations that pursue intellectual capital management emphasize that intellectual capital defines the **future** capabilities of the enterprise. The goal of managing and building knowledge assets is to improve the company's **value creation** capability through the more effective use of knowledge. Taking this a step further, the goal of intellectual capital is to improve the company's value generating capabilities through identifying, capturing, leveraging and recycling intellectual capital. This includes both **value creation and value extraction**. To explain this, Bontis (1998, p 67) indicates that when a manager receives a printout from a computer detailing the previous week's cost per transaction figures, he or she is reading information. The implications derived from the trends or underlying issues from the data are what is referred to as knowledge. Intellectual capital is the pursuit of the effective use of knowledge as opposed to effectively using information. With this in mind, it is possible to see that the management of intellectual capital is a process that can be facilitated, but which is not easily controlled. Managers therefore need to understand how to deploy their intellectual capital more productively while the company employs the 'human asset'. This would include putting in place structures

and procedures to capture and make available intellectual property that came about due to the deployment of its intellectual capital.

2.4.3.3   Implementation strategies

The development of knowledge/intellectual capital assets is discussed in depth in Chapter 3 of this study. For the purpose and within the context of this research, only human capital (including innovation capital) development, structural capital developments as well as customer capital development were addressed. Briefly it can be noted however, that when companies are unsure as to where and how to start building their knowledge assets, it is perhaps best to learn from the experience gained by those who implemented knowledge management and organizational learning systems. They started with small projects in areas where there was some understanding of, and enthusiasm for, putting knowledge into use. Once results were achieved they built on the positive experiences. Hackett (2000, p 19) remarked that having early, visible results served two purposes:

- it encouraged others in an organization to learn how knowledge management affects their part of the business; and
- it showed sceptical managers that there is value in new ways to create and share knowledge.

Difficult as it may be, Edvinsson (1997, p 372) is of the opinion that it is possible to know that one is pursuing the right goals in creating valuable knowledge assets when:

- a network of relevant connections has been establish and is growing rapidly;
- staff members are making use of collective effort;
- results are achieved from match-making and the exchange of ideas among people;
- the tension between internal and external worlds is managed effectively; and
- there is balance between words and numbers, between differences and similarities, and between the development of intellectual capital cultivation and cost rationalization.

Once a 'pool' of knowledge assets has been established, it is of little use if it does not contribute to the organization's development. The utilization of intellectual capital assets should provide the impetus for development and growth within the organization. The most important utilization of knowledge assets most probably relates to the transfer of competence between people within an organization. It is also to look at the environment that could foster the accelerated growth of competence. From the literature consulted it appears that, although it can be developed, intellectual capital cannot necessarily be 'taught' through education and training. Bontis (1998, p 65) as well as Jordan and Jones (1997, pp 392-393) go as far as to say that the most precious knowledge within an organization often cannot be passed on. The best one could do is to create an environment in which intellectual capital can prosper: a place, or space, where one can feel vibrancy – a fun place where work and a sense of personal accomplishment and success for all

are integrated. The challenge was to find examples of companies where such a knowledge asset creation environment was already flourishing. Only the most obvious of these are mentioned in the next section.

2.4.3.4 Examples of companies where intellectual capital management flourishes

Two examples of companies known for their intellectual capital value are competitors: Microsoft, the world's largest computer software firm, which changed hands at an average price of $70 per share during fiscal 1995 at a time when their so-called book value was just $7 per share; and Netscape, a company with negligible profits that ended its first day of trading with a value of $2 billion – a value based entirely on intangible assets (Bontis, 1998, p 64).

Another popular example of a knowledge-intensive organization that is internationally known for its products is Nike. However, as Bontis (1998, p 64) rightly remarks, *Nike is a shoemaker that makes no shoes. Its work is research and development, design, marketing and distribution*. *Almost all its activities are knowledge-based.*

The consulting industry provides the purest examples of intellectual capital valuation. McKinsey, one of the industry's leaders, does not employ traditional marketing methods; it sells by having clients come knocking to purchase the best analytical knowledge available (Bontis, 1998, pp 64-65).

Robinson and Kleiner (1996, p 38) use Royal Dutch Shell as an example of a company that has instilled mental model re-evaluation as a learning tool. They claim that because Shell was prepared to decentralize control, use the management-by-consensus technique and were ready to re-evaluate mental models, adaptation was made easier. As a result of using their learning and knowledge, Shell was therefore better able to respond to the 1973 oil embargo.

It does appear that large successful, international corporations such as Xerox are able to afford running the risk of experimenting with innovative management theory. This is most probably due to the fact that large companies, which no longer have to battle to survive, can afford to experiment. Consultants, on the other hand, prefer to try out new ideas on the large corporations so they could be used as case studies. In this way, large companies are constantly exposed to new ideas and yet their risk is minimal. In contrast, start-up or small companies are more bottom-line driven. Their risk for failure is bigger and as a result of the bottom line/risk combination they are set up for failure from the start. Grant (1997, p 454) confirms this. He states that, while business corporations are striving to adjust their strategies, structures and management systems to accommodate to the new realities of the knowledge-based economy and to the challenges of managing knowledge-workers, academics are exploring new perspectives on the theory of the firm implied by the characteristics of knowledge and its role in production. This challenge calls for a closer collaboration between academics and practitioners than has typically been the case in the development of management principles. There are signs that such partnerships are emerging. Management consulting companies such as McKinsey

and Company, Ernst and Young and Andersen Consulting; corporations such as Xerox with its Palo Alto Research Center; and university-affiliated units such as Senge's Center for Organizational Learning at the Massachusetts Institute for Technology (MIT) are advancing the development of knowledge-based management through linkages between practitioners and academics.

In contrast, Zickner (1996, pp 79-89) found during her research that in South Africa it appears that medium sized organizations (100-1 000 employees) seem to pay more attention to the acquisition, development and performance measurement of intellectual capital than small (less than 100 employees) or large (more than 1000 employees) organizations. She saw the reasons for this being that small organizations usually run in 'survival mode' and therefore are bottom-line focused rather than on developing employees. In contrast, large organizations tend to be more bureaucratic and formalized and therefore management loses focus of 'softer' issues such as human capital development. This needs to be investigated further as it could be a typically South African phenomenon. If not it could be an indication of the ideal size of the future organization.

Moving back to international organizations, large companies such as Dow Chemical, Andersen Consulting, Polaroid and Skandia are developing corporate-wide systems to track, access, exploit and create organizational knowledge, typically under the leadership of a director or vice-president of 'knowledge' or 'intellectual capital' (Grant, 1997, p 451). Because most of the intellectual-capital-authors repeatedly refer back to the Skandia model, it was identified as the foundation of the current thinking on intellectual capital management. Skandia is therefore discussed in detail below.

Skandia

In 1991 the Swedish company Skandia AFS formally established an Intellectual Capital function headed by a Director of Intellectual Capital – the first ever in the world (Edvinsson, 1997, p 366). This was because Skandia realized that human capital could not be owned, it could only be rented but that the structural capital could, from a shareholder's point of view, be owned and traded. By 1995, Skandia – the largest insurance and financial services company in Scandinavia – released its intellectual capital report under the heading *Visualising Intellectual Capital*, based on its navigator framework (Edvinsson, 1997, 370). Subsequently other companies, such as Dow Chemical, Canadian Imperial Bank of Commerce, Posco etc., to name but a few, entered this new era (Joia, 2000, p 69).

When Skandia first realised it needed a new management model, it created what is known as the Skandia navigator (see Figure 2.4 on the next page).

Fig 2.4: The Skandia navigator (Edvinsson, 1997, p 371)
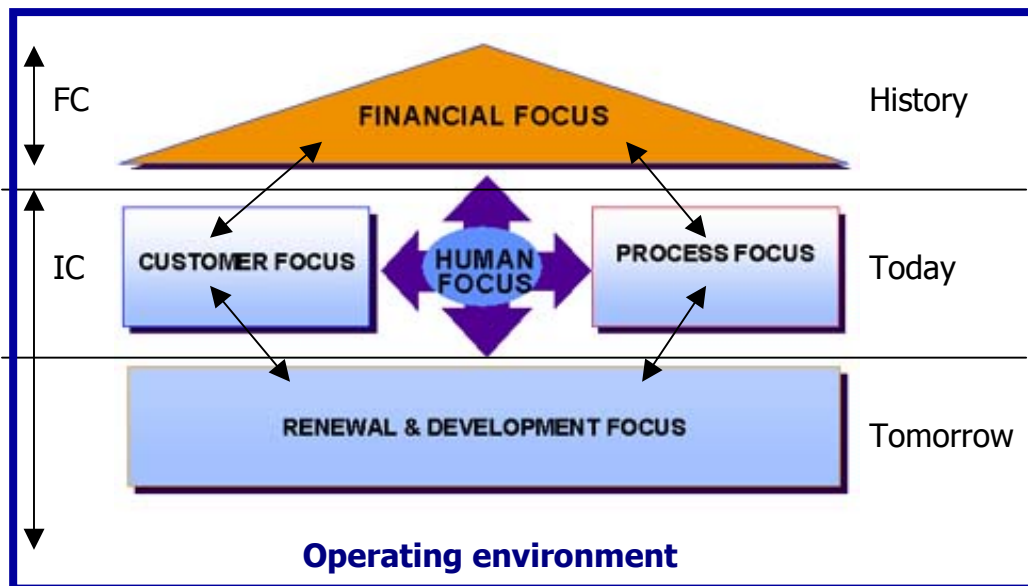
From the navigator the Skandia value scheme (see Figure 2.5) was developed (Edvinson, 1997, p 369). Authors such as Bontis, et al., (1999, pp 397-400), Sveiby (1998c) and Wiig (1997 p 401) then used these models to conceptualise intellectual capital.

In all probability the most important value of the navigator lies in the interaction amongst and the interconnectedness of the various components. From the model it is clear that the intention was for management to focus on the present, past and future of the company. Bottom-line driven management models of course concentrate only on financial capital and therefore the 'past' or history of the company. Realizing that intellectual capital could be used as leverage for sustainable financial growth as well as for renewal and development of the organization, the key task of Skandia leadership, at the time when they set out to change the system, was to transform human capital into structural capital. They, according to Edvinsson (1997, p368), adopted the following as their mission:

- to identify and to enhance the visibility and measurability of intangible and soft assets;
- to capture and support packaging and accessibility by knowledge transparency and knowledge technologies;
- to cultivate and channel intellectual capital through professional development, training and IT networking;
- to capitalize and leverage by adding value through faster recycling of knowledge and increased commercialised transfer of skills and applied experience.

With the Skandia navigator as the 'roadmap', Skandia developed a model through which the different areas that comprise intellectual capital, were put within the same

framework as financial capital. The non-traditional capitals were identified as being the following:

- human capital, consisting of the competence and capabilities of the employees;
- structural capital, consisting of the results of intellectual activities in data and knowledge bases, documents, models and drawings;
- customer capital, consisting of the value of the enterprise's relationships with its customers;
- organizational capital, consisting of embedded knowledge assets in the process and innovation areas;
- process capital, consisting of the enterprise's value creating processes such as its organizational structure, management practices, systems and procedures, infrastructure computer systems and the like;
- innovation capital, consisting of both explicit knowledge and hard-to-identify intellectual assets such as an innovative culture;
- intellectual property, consisting of documented and captured knowledge such as innovations, operational practices, patents, technology, educational programme corporate knowledge bases, and designs and specifications of products and services;
- intangible assets, consisting of the value of positive organizational culture and community image.

According to Kaes (1999, p 22), the Skandia model is based on work that was done earlier by Hubert Saint-Onge and Karl Erik Sveiby. The difference is that Edvinsson further subdivided structural capital into a variety of other entities, as can be seen in the Figure below.

Fig 2.5: The Skandia value scheme (Edvinsson, 1997, p 369)
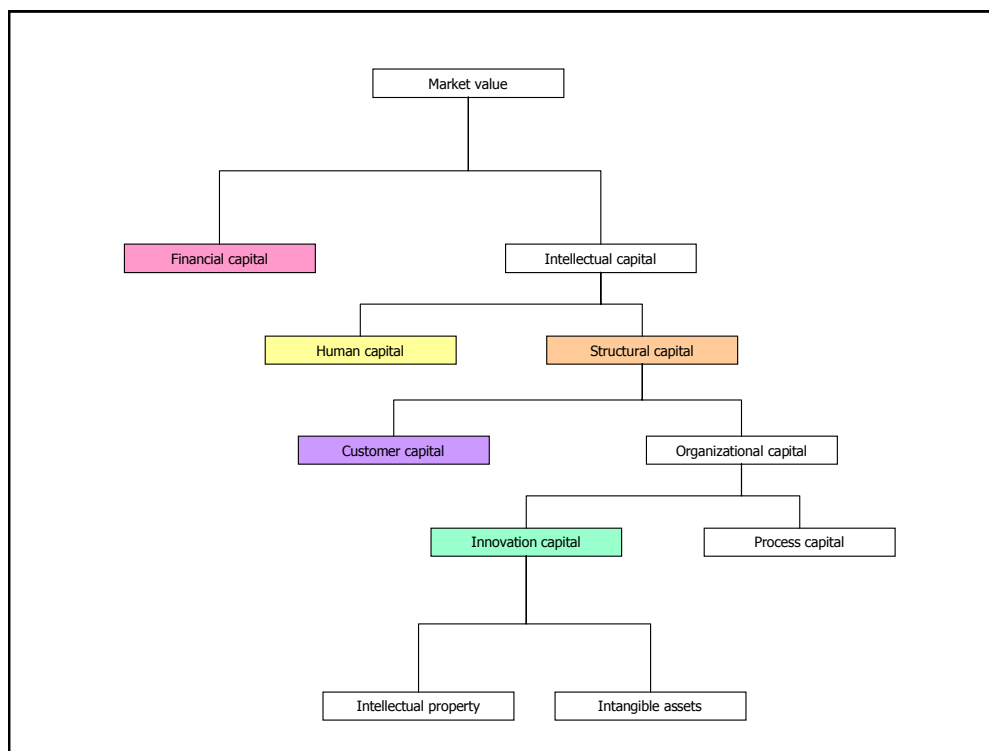
Within this research only financial, human, structural and customer capital are discussed in detail. Innovation capital is addressed to a limited extent.

However, it would have been relatively easy if it were possible to just copycat Skandia's model. Before adopting this model, it is necessary to understand that:

1. Soft assets or knowledge (intangibles) come in many shapes and sizes. They are stored in databases, printed on paper, integrated into enterprise policies and stored in an employee's memory. Manchester (2000) tells us that employees know instinctively that their knowledge is valuable. He sees it as a given that systems that allow employees to share this valuable asset of theirs with each other are necessary in today's economy. Yet, he warns that there is constant mental conflict because it is also known that, once knowledge is explicit, there is a risk of another employee taking it with him when he joins a rival company. Even worse, however, is that should one be torn between creating a positive innovative environment and a fear of losing valuable explicit outputs a state of inertia is created.

2. Finding information was always relatively easy because it was part of a standard procedure. Today technological information exists not only in a printed form, such as books, journals, documents, reports, directories, patent documents, standards, specifications and catalogues, but also in non-printed form such as audio-visual and machine-readable material, as well as in organizational and individual expertise transferred by the interaction of people attending meetings, seminars and training. It may also be embodied in products and services. On top of that, potentially useful technological information may be found in virtually all countries irrespective of their present level of technological development (WIPO, 1997, p 94). Turning all of that into a knowledge product or service is somewhat more difficult than just merely collecting and storing information generated by staff members.

3. There is no doubt that information is the foundation on which knowledge rests. Knowledge is a prerequisite for innovation and innovation is what keeps a company relevant.

Therefore, although it is possible to utilize the Skandia framework, each institution needs to develop and populate its own model. With the assurance provided by Kaes (1999, p 29) that all experts in the field of intellectual capital commonly divide intellectual capital into human, structural and customer capital, the challenge was to put these capitals within the framework developed by Kaplan and Norton (see Figure 4.5 on page 4.31). A small deviation was to include innovation capital as a sub-set of *human capital* and not as a capital on its own. More detail pertaining to this is provided in section 3.2.1 on page 3.4 of this report.

2.4.3.5   Intellectual capital management in brief

Edvinsson is perhaps the best-known practitioner and Skandia is seen as a role model for intellectual capital management, but Thomas A Stewart could be regarded as the father of the present understanding of intellectual capital. Intellectual capital is defined as the difference between the book value of the company and the amount

of money someone is prepared to pay for it; intellectual capital's value, both real and potential, is therefore greater than that of the financial capital. Put differently: intellectual capital represents intangible assets that usually do not appear on the balance sheet. It would however be a mistake to believe that intellectual capital management only has value for those companies where shareholders are the main stakeholders. The knowledge economy impacts on all individuals with no regard for the standing and purpose of either the individual or the company. In this section it was established that intellectual capital can be sub-divided into several other 'capitals' (that are also known by a variety of terms), but in effect the main components are human capital, structural capital and customer capital. It was also confirmed that financial capital is an integral and very important capital that cannot be ignored, but that financial gain should be seen as proof that the other three capitals are sound and well rather than simply focusing on the balance sheet as only indicator of success.

2.4.4   Conclusion with regard to the management philosophies

A better understanding of the knowledge economy philosophies led to the conclusion that one philosophy should not be utilized while another is totally excluded. Each has valuable components and as such these philosophies should rather be seen as three sides of the same triangle. Depending on the point of focus, one philosophy may be more prominent but all contribute to the success of the same structure. It therefore seemed inappropriate to correlate and establish which of these is better than the other. For the purpose of this research it was decided to concentrate on the activities and tools associated with intellectual capital management because it appeared to be the philosophy which best suits both personal style and the requirements of the development stage of the larger organization (CSIR) and the service in question. However, an approach of 'use-whatever-tool-is-appropriate-never-mind-what-management-philosophy-it-supports' will be used should it be necessary to do so.

In the previous sections of this chapter, the impact of the knowledge economy on business in general was mentioned. The resulting management philosophies were identified and discussed but the impact of the information ecology on the library, as a specific type of institution, has not yet been addressed. If companies, in general, were adopting management styles that are congruent with the requirements of the knowledge economy, it would be illogical to think that libraries and information services would not need to make similar adaptations in their own management style.

2.5   Impact of the knowledge economy on the library as institution

If the key purpose of information is to inform people, it is logical to see the key role of an institution such as a library as to **collect and supply** information. In the heyday of libraries, extensive, expensive buildings were erected to house ever-expanding collections – just in case someone would one day need to gain access to a specific publication. The library was recognised as an institution of learning and certain standards, processes and procedures (all very time-consuming) were expected to be in place. Unfortunately, that time has passed and today collections

are constantly weeded because collection space keeps on shrinking and clients now know that it is sufficient for the information service staff to ensure just in time delivery of a source. Delivery of course is preferably in electronic format! In actual fact clients all have the means to help themselves and suppliers are continuously developing their products to be more end-user friendly.

If the key purpose of knowledge is to enable people to act on information and people no longer need just information but rather knowledge, libraries cannot continue to only collect and supply information. An institution such as a library should then rather be concentrating on the analysis, packaging and distribution of information so that the information is ready for use (Davenport and Prusak, 1997, pp 3 and 45). This opinion is supported and one could argue that, if there were one efficient supplier of information in the traditional sense, all other services could concentrate on higher value-added services. Examples of such focus areas include the effective research and the development of knowledge, creation of knowledge bases, exchange and sharing of knowledge, training, speeding up explicit processing of the implicit knowledge and making sharing happen. Libraries and librarians represent an indispensable link in the scientific system chain. Libraries must therefore pay attention to diffusion and conversion of knowledge. To be able to do so Shanhong (2000) suggests setting up virtual libraries and establishing digitised knowledge services. This is of course merely changing the collection format from paper to an electronic medium, which is more accessible. It does not fundamentally change the library or any of its functions.

Traditionally the conventional functions of a L&IS are to collect, process, disseminate, store and utilize documented information to provide a 'free' service for and to society. To keep pace with the knowledge economy era, Shanhong (2000) recommends that the L&IS needs to rather be:

- *a treasure-house of human knowledge;*
- *a participant in knowledge innovation; and*
- *an important link in the knowledge innovation chain.*

It is unlikely that it will be possible to do so by using conventional L&IS management practices.

The question remains: 'Where does one start?' Heifetz and Laurie (2001, p131) believe that leadership needs to instigate change when:

- deeply held beliefs need to be challenged;
- values that made the company successful are no longer as relevant;
- legitimate yet competing perspectives emerge;
- companies find it necessary to restructure or re-engineer; and
- businesses merge.

All of the above are applicable within the context of this research. Major changes within the information industry are changing the belief that a library is the only source of reliable information. The Internet and perceptions about the Internet are

responsible for many of these changes. More and more companies are seeking alternative ways in which to gain access to information without carrying the burden of library expenses. Even when the L&IS is maintained, detailed cataloguing and indexing, which always was done locally, is now available for download from large repositories. The e-business technologies are making the re-engineering and even automation of processes possible and the merging and outsourcing of libraries are quite common. It is believed that, within such circumstances, it is especially those who head or lead the organization that have to adopt helicopter or balcony vision and take a first step for the new and exciting journey that lies ahead.

As a first step to accommodate the knowledge economy many L&IS managers, as is the case with CSIRIS, opted to migrate from a pure, library to an information service. One could argue that this was merely a change in name. However, in most cases, a definite change from the typical 'physical labour' environment to one where technology is for example, being used to automatically push selective dissemination and alerting services to clients, is common. A second example of more efficient labour is the internationally shared cataloguing process[1].

The pressure to keep pace with the knowledge economy can only be expected to increase. Time, technology, geography and finances are all contributing factors to the required changes. Local companies very often have international offices situated in a variety of time zones and geographical locations. Information services staff members are expected to ensure that these offices have access to exactly the same quality service as local offices get, as few companies still think it necessary to open a library or for that matter an information service at each location.

The pressure on financial resources is a universal problem. As a result there is at present a major boom in consortia formation. Within these consortia, the intention is not only to save money and negotiate advantageous contracts, but also to learn from each other and to share resources.

Given the current external environment, creating a growth environment within library and information services is a daunting and yet challenging task. Within CSIRIS IMPS, the impact of the knowledge economy was just as obvious. Previously uncoordinated attempts were made to weed stock, to consolidate cataloguing and to negotiate contracts with suppliers such as Sabinet Online. During the year 2001, concerted efforts were made to change the traditionally very labour intensive tasks of stock procurement, cataloguing, stock maintenance, ILLs and paper journal circulation into tasks that were done more efficiently.

Before addressing the actions to be taken for effective intellectual capital management within the information services context, the impact of the knowledge economy on the individual needs to be understood. The next section will therefore attempt to briefly consider the impact on workers earning their living in this new economy.

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[1] In South Africa specifically this effort is managed by the way in which contributions are made to the joint catalogue hosted by Sabinet Online.

2.6   Impact of the knowledge economy on the individual

There is no doubt that all workers are affected by the impact of the knowledge economy. The impact is perhaps felt most intensely by managers. Not only are managers expected to keep track of all developments and changes in terms of steering their organizations in the correct strategic direction, they also need to take cognisance of the change in the fundamental role they have to play. It appears that the only truly successful managers are those who are able to make the transition from management to leadership. The role of the leader is therefore discussed in much detail below. This was done because it is believed that should the leaders within the organization, specifically leaders in the library and information sector, not be able to take advantage of the opportunities made possible by the knowledge economy, there is little chance that the organization as a whole would be able to survive and prosper within this knowledge economy. This of course fits in with Obeng's (1997, p 4) opinion that in most organizations the people at the top limit (or accelerate) the speed of learning and therefore also the organizational potential.

In this section the impact of the knowledge economy on the worker is also discussed. It is especially reward and recognition that is addressed in more detail. Lastly the impact on the information services worker is addressed.

2.6.1   Impact of the knowledge economy on the role of the manager

Roos and Roos (1997, p 414) make the readers aware that until the 1980s the role of management was to figure out smart ways to combine products and markets - given the bargaining power of suppliers and customers, entry barriers, and potential substitute technologies and/or products. The strong message of the economist-driven 'industrial organization' line of thinking was to value the environment rather than the inside of the firm. During the 1980s some managers realised that this view was somewhat distorted. It slowly became acceptable to suggest that competitive advantage did not arise only via various product-market combinations. On the contrary, many realized that advantage was mostly due to differences in organizational resources. Managers started looking inside the firm to find the real sources for sustainable business. It was already quite clear by 1990 that it was no longer sufficient to have one person or a select few people within the organization learning for the organization: one leader was just not able to keep track of all developments and changes (Senge, 1990, p 4). Therefore staff members simultaneously needed to learn that leaders do not have all the answers and neither are they able to make all problems go away. Suddenly the most valuable manager was not necessarily the one with most knowledge about the external environment. The era of the knowledge focused leader had started, even though they still were referred to as managers. These managers knew that 'knowledge', regardless of whether it was called invisible assets, absorptive capacity, core competencies, strategic assets, core capabilities, intangible resources, organizational memory, or other concepts carrying similar meaning, was seen as equal to sustainable competitive advantage.

Knowledge focused managers realise that knowledge focused organizations do not maximize sales volume in monetary terms only. They select customers according to how much total revenues they bring, both tangible and intangible. Products and services are developed with the focus on the knowledge they bring to the customers and how they enhance the customer's capabilities to serve their customers. Therefore, information systems are developed for measuring intangibles and knowledge flows and the purpose is learning, not control. Sveiby (2000b), for example, tells us that a knowledge-focused manager creates learning opportunities, encourages knowledge sharing, sees staff turnover as a loss and considers recruitment too important to be delegated to the human resources department. However, from a manager's point of view, the creative knowledge age worker causes complications. Sveiby (1995) informs the reader that *the creative person tends to be more loyal to the task or the idea, or even the profession than to the organization.* The personality of the new worker tends to be contradictory to teamwork. These workers firmly believe that *a committee never designs an excellent article.* They do not like to make compromises. The typical knowledge age, talented individual is almost the polar opposite of the loyal subordinate – in short a nightmare to the manager in a large industrial organization. It usually therefore takes only a few interactions for the astute manager to realise that it would serve himself, the employee and the organization best if he opted for leadership rather than management principles.

Knowledge focused managers realise they cannot manage knowledge (it is impossible), nor people (it is less and less possible), but rather the environment in which knowledge is created. This space is both the intangible culture and the tangible environment, such as the office. The layout of the office thus emerges as a top priority – something which all consulted authors mentioned at one time or the other. It appears that knowledge focused managers recognize the value of the informal information networks, so they leave their hideaways on the top floor and move their desks on the same floors as the knowledge workers. The coffee machine (or water cooler) is recognized as a catalyst of creative encounters, so it is placed in the centre with ample social space and not tucked away in a corner.

It is clear that the knowledge-focused organization is different and that it is not an easy place to control with traditional industrial era means. The most important question managers ask is: 'How do you stay in control when the primary production factor – creativity of the staff – flourishes best when you don't control it?' Sveiby (2000b) advises that in such a world the managers' power base is their relative level of knowledge. The manager therefore needs to realise that his role needs to shift from one of supervising subordinates to one of supporting colleagues. To really understand what this means, one needs to only look at what is happening at the surviving 'dot-com' companies. As these companies mature, they employ experienced managers who can provide inventive, explosive communities of practice with the structure of process, but who will not suffocate practice while they are doing so (Brown and Duguid, 2000, p 80).

With the knowledge that the manager needs to support rather than supervise, the fundamental management problem is how to align the objectives of managers and

workers with those of the owners (or in the case of service organizations with the objectives of the stakeholders). Grant (1997, p 452) is of the opinion that if knowledge is the pre-eminent productive resource, and most knowledge is created by and stored within individuals, then employees should be seen as the primary stakeholders. The principal management challenge is therefore not reconciling divergent goals, but establishing the mechanisms by which co-operating individuals can co-ordinate their activities in order to integrate their knowledge into productive activity for the organization as a whole. Again this points to leadership rather than management and so the following section is utilized for an in depth look at the requirements for a knowledge economy leader.

2.6.2   Impact of the knowledge economy on leadership and the role of the leader

Leadership in contrast to management is a popular theme for many a book and article. What is clear is that a 'Do it as I say you do it, because I am the boss'-attitude will in all probability never again be an acceptable management style (Cialdini, 2001, p 72). The leader's role in the modern organization is defined rather as that of **designer, teacher, and steward**. The leader is seen as a person who can build shared vision; challenge prevailing mental models; and foster learning for everyone (Senge, 1990, p 340-360). The leader is seen to be responsible for building organizations where people are continually expanding their capabilities to shape not only their own future but also that of the organization. Lastly, the task of the leader is not about managing **hired hands**, it's about energising **hired minds** (Bontis, et al., 1999, p 391).

In terms of authority, Sveiby (1995) sees leadership as a case of 'managing the milieu'. He is of the opinion that doing so requires that the leader knows the profession in contrast to the traditional belief that a professional manager only needs to know how to manage. Cialdini (2001, p 72) states that the new business world of cross-functional teams, joint ventures, and inter-company partnerships requires leaders who practice the art of persuasion rather than managers who have a need to exert authority. Within an exclusively 'knowledge worker' environment, it should be possible to be leader only and to let each worker be responsible for what used to be management activities. It is however doubtful that this is already totally true within an environment where much of the daily work is routine. At times it may still be necessary to look at the possibility of combining the role of leader and manager.

The view expressed by Kotler (2001, pp 85-86) was, within the context of this study, regarded as advisable. He sees leadership and management as different but complementary actions. He makes the following distinction between the two elements:

- On the one hand management is about coping with complexity. Good management brings order and consistency. These are prerequisites for the quality and profitability of products. Management is about controlling and solving problems, both formally and informally. It is about planning, budgeting and staffing and it is about putting in place mechanisms to measure

results. It is the right thing to do when people have to complete routine tasks successfully day after day. Management is neither exciting nor glamorous.

- On the other hand leadership is about coping with change. It is about soldiering on in a business world that gets more competitive and volatile by the day. It is about setting direction and aligning staff and it is about articulating feasible ways to achieve goals. It is about motivating people to achieve and making work important to them. It helps people to grow professionally and enhances their own self-esteem. The following elements all form part of successful leadership:

Vision:	It is not so much the originality but rather how well it serves the interests of important constituencies, customers, stakeholders and employees and how easily the vision can be translated into a realistic competitive strategy. Senge (1990, pp 150) sees vision as the creative tension between the current reality and the place where one wants to be. He is of the opinion that vision is a true source of energy.
Planning:	But not in the same way as what was done before. Long term planning is time consuming and whenever something unexpected happens plans have to be re-done. It is therefore recommendable that a long term vision is supported by a series of shorter term, less cumbersome plans to reach the set goal.
Alignment:	In contrast to organizing and staffing where staff members are placed within a certain structure and within the right context, alignment is about communication and making sure that all staff members are all facing in the same direction. It is equally applicable to bosses, peers, colleagues, suppliers and even customers. Using charts and documents to show improvement in quality or reductions in costs are very important tools in supporting alignment.
Credibility:	This appears to be the key to success. It is the consistent link between words and deeds that builds a reputation for trustworthiness.
Empowerment:	When staff members are empowered, lower level employees can initiate actions without fearing retribution as long as it serves the same goal. When all are aiming for the same target, there is less of a chance that the one's actions will stall another's because they have come into conflict.

Kotler (2001, p 86) warns that the one (management) cannot be practiced exclusively of the other (leadership). He is of the opinion that managers promote stability while leaders push for change and it is only when an organization embraces both these elements that it will be able to survive the turbulent times ahead. This opinion is shared but with the proviso that the ratio between management and leadership should not be seen as 50:50. One should rather lean more heavily towards leadership. This may seem like a daunting task but fortunately Heifetz and Laurie (2001, p 140) assure the reader that leadership eases the burden of having to

know all the answers and bearing the entire 'responsibility' load. From the literature consulted, the conclusion was reached that solid management skills should be seen as the minimum acceptable entry-level standard and that, when leadership skills are added, the individual has the ability to become an extraordinary leader. With Heifetz and Laurie's assurance in mind, it was decided to investigate the art of leadership further.

The Harvard Business Review issue of December 2001 was devoted entirely to leadership and provided a good spread of overview, historical, case study and practical information articles, many of which were of particular value for this section. For example, Kellerman (2001, p 15), in her overview of must-read works on leadership, came to the conclusion that leadership is always contextual. What works in one era, setting or organization does not necessarily work in another. She also stated that there is a difference in writing about leadership and writing as a leader. She was able to identify seven leadership types as well as the most prominent writer(s) - should one wish to further investigate any specific style. Her findings are provided in brief in Table 2.2 below. To make the content more locally relevant, examples from current Southern African politics and the work of Grulke (2001) were utilized to augment the table with possible Southern African examples.

Table 2.2: Leadership styles

Leadership Style	Characteristics	Examples	Southern African examples
The pragmatist	A pragmatic leader: • Avoids issues that make him hateful or contemptible. His name is not associated with descriptive words such as variable, light, effeminate or pusillanimous; • Strives towards greatness, spiritedness, gravity and strength; and • Maintains order – even when at times it requires cruelty.	The Prince as described by Niccolo Machiavelli.	Cyril Ramaphosa (Johnnic) Thabo Mbeki (President)
The hero	Kellerman, as does Senge (1990, p 40), supports the notion that the human race needs heroes. It does appear however that the only requirement for a hero is to show strength of character when the opportunity arises. Once the opportunity passes the leader needs to fall back on another style or look for new opportunities.	Jack Welsh Bill Gates Lee Iacocca	Mark Shuttleworth (The first African in space)
The father figure	This leader realises that groups depend on their leader to give them identity and a sense of purpose. He understands that the need to follow grows from a childhood dependency on an omnipotent father and god. The father figure therefore sees himself as the primal father and believes that followers have a 'passion for authority' and a 'thirst for obedience'.	Freud	Nelson Mandela (Ex-President of South Africa) Raymond Ackerman (Pick 'n Pay)

Leadership Style	Characteristics	Examples	Southern African examples
The tyrant	Followers sometimes follow evil and incompetent leaders. It was established that rather than leading and protecting his followers this type of leader dominates, controls and terrorizes those who follow him. Hitler, as an example of this type of leader, was able to recognize and use the interdependence between the leader and his followers. This type of leader is seen as a motor that is able to swing a movement into action. Kellerman is of the opinion that the modern organizational version of this type of leader is where one person has too much control. It is typically where power, authority and influence are distributed inequitably.	Hitler	Robert Mugabe (President of Zimbabwe)
The organizer	This type of leader has had the major insight that organizations are essentially social organizations and that the business process that matters most is the social process. They realise that leadership does not annul the laws of nature nor does it substitute the elements that are essential to cooperative effort. Leadership does however give common purpose. It makes incentives effective and it makes cooperation possible.	Chester Barnard	Kader Asmal (Minister of Education)
The people's servant	Typically this leader is chosen to replace a previous regime. Here the most important characteristic is energy. Feeble leadership is not tolerated in such circumstances.	Hamilton, Madison and Jay in 'Federal Papers'	Mbazima Shilova (Major of the Egoli Metropole - Johannesburg)
The liberator	The name says it all. Kellerman used two Afro-Americans as typical examples of this type of leader. King is of course known for his civil rights writings while Friedan contributed towards the liberation of women.	Martin Luther King Betty Friedan	Mafika Mkwanazi (Transnet) Steve Tswete (deceased Minister of South African Police services)

It cannot be claimed that the table is truly an accurate reflection of all leadership styles. In all probability it is more correct to say that the successful leader needs to be aware of the wide variety of leadership styles. A good leader should have an ability to choose a style of leadership that is most appropriate for the applicable situation and environment. Once a new situation arises and it is appropriate, the style should be changed. Also, in all probability, a few favourite styles should suffice rather than ensuring that each and every style is practiced.

Selecting an appropriate style does not in itself ensure that one practices good leadership. The editorial committee of the *Harvard Business Review* of December 2001 asked a number of acknowledged leaders to distinguish between good and bad leadership. The lessons these leaders (Eisner, et al., 2001, pp 27–38) have learnt through experience are reflected in Table 2.3 on page 2.53. In analysing the variety of opinions it was possible to establish that leadership is about action. It is about showing and not telling and it is about setting the right example. At least two of the

respondents felt that leaders should take up the challenge to employ staff members who could be regarded as intellectually more astute than themselves. Lastly, the processes of making sure that all staff members share in the set vision as well as the development of a sense to know what is happening at grass roots level appears to be the most prominent issues to take note of.

Table 2.3: The lessons learnt from leadership experience (Eisner, et al., 2001, pp 27-38)

Lessons	... and more lessons
Leadership surfaces when there is a quest for excellence. A passion for doing the best possible (Michael Eisner).	If you are too forceful and passionate you break the spirit in other people (Daniel Goldin).
Leading is about being compassionate (Percy Barnevik).	If you move too fast you lose followers. Move too slowly and the same happens. Equally bad is moving forward while followers have not yet bought into the process of change (Anne Mulcahy).
Strong leadership is about creativity that does not come from order, calmness and stability. It is about sorting through large, complex inputs. One should maximise the followers' well being and not necessarily their comfort (Chris Argyris).	If you are unaware of your own mistakes you are not able to respond to them (Chris Argyris).
If you want to lead, make quick decisions and hire staff members that are smarter than what you are (Ben Bradlee).	You may survive if you hurt shareholders and/or employees but you have no chance if you hurt your customers (Victor Meneses).
A leader's time is finite and should not be squandered (James Conlon).	Don't let short term concerns shape policy (Laura D'Andrea Tyson).
If you believe in something and have a passion for it, you should have the courage to stand up for it. You have to be persistent no matter how long it takes (Eleanor Josiates).	If an organization is to survive it has to be bigger than the founding member's ego (Ricardo Semler).
Even when you are sure you are right do not bypass the process of consensus building (Francis Collins).	Do not impose changes that are not supported by the organization's stakeholders or that do not fit in with the organization's mission (Laura D'Andrea Tyson).
Winning is about having the best people in your team. Look for staff smarter than you (Jack Welsh).	An inability to ask questions easily skews reality. Get to know what is happening at all levels within the organization not just at your own. Do not be afraid to ask seemingly dumb questions (Mike Parker).
If you have a strong set of values based on the organization's mission you are able to measure each decision against those values. If the decision passes the value test you need never to worry that the decision will be questioned (Noel Tichy).	The leader is the organization's main source of energy. To be able to be that source the leader needs to be able to tap into personal sources of energy (Noel Tichy).
It is not good enough to just do the right thing. You also have to have the right motives (Rajat Gupta).	Know your own strengths and weaknesses. Leaders earn respect through humility and not arrogance (Laura D'Andrea Tyson).
During the review phase of a project - always reflect on the three reasons why the project went right or why it failed. Learn from these lessons and then move forward (Mike Parker).	Don't let personal desires get ahead of good judgement (Dick Brown).
Incremental changes are rarely worth the expenditure of calories. Be bold and take chances (Dick Brown).	Arrogance does not equate leadership. Leaders listen and are hungry to learn. They are sensitive to other people (Noel Tichy).

As a further piece of advice on good leadership, it was established, through research done by Goleman, Boyatzis and McKee (2001, p 44) that a leader's mood and behaviour drives the mood and behaviour of his subordinates. They established that high levels of emotional intelligence create an atmosphere of trust, information

sharing, healthy risk taking and learning. In contrast, when emotional intelligence is low the climate changes to one of fear and anxiety. If this is then the case it is fair to say that the leader's most important management task is to manage a healthy inner self. They (2001, pp 48–51) therefore suggest that each leader asks and respond to the following five questions:

- Who do I want to be?
- Who am I now? (Typical 360º evaluation.)
- How do I get from where I am to where I want to be?
- How do I make the change stick?
- Who can help me?

The knowledge gained from the process of gaining the answers to these questions should enable the leader to at least identify personal focus areas. These focus areas, together with the principles identified by Heifetz and Laurie and those identified by Cialdini, as set out in the section below, should provide a leader with sufficient tools to align him with the latest trends in leading a winning organization!

To aid the leader Heifetz and Laurie (2001, p 133-137) identified six principles that are of use when one needs to lead in turbulent times. Cialdini (2001, pp 74-79) identified six more. Heifetz and Laurie's principles deal more with the practical aspects of leadership while Cialdini's principles stem from psychology rather than business. (He is therefore quick to remind the reader that the rules of ethics and honesty are inseparably part the principles.) It soon became clear that these principles fit in with those identified by Senge (1990, pp 373-377) for the disciplines of systems thinking, personal mastery and mental models. Senge's disciplines were mentioned as part of the section on learning organizations. Taking cognisance of both the practical and the more psychological seemed to make sense and a combined list of principles was created. This list, which was augmented with what is believed to be the appropriate discipline, as identified by Senge, is reflected below:

- Develop balcony vision. See the total picture so that you can identify mistakes and build on good practice. (Senge speaks of this as part of personal mastery.)
- Identify the adaptive challenges. Know what or who may cause the downfall of your business and why. (This links into Senge's mental model discipline.)
- Regulate distress. (A part of Senge's systems thinking discipline because it is necessary to make sure that the delicate balance between feeling a need to change and being overwhelmed by change is maintained.) To do so one needs to:

    o Sequence and pace work. Not everything is important. Do not start new initiatives without stopping others and do not start too many new initiatives all at the same time.
    o Understand that the leader is responsible for direction, protection, orientation, managing conflict and shaping norms. Each of these needs to be approached in an appropriate fashion. The leader is also

responsible for communicating to staff members that they are capable of tackling the tasks that lie ahead.

- Maintain disciplined attention. These items mainly deal with Senge's mental models discipline. The leader needs to step in, direct and re-focus when

  o staff focus only on the present technical problems instead of on the longer term goals;
  o sterile conflict replaces dialogue;
  o a need to blame the environment and the workload incapacitates staff members; and when
  o the team spirit fragments and protecting the own turf becomes more important than the goal.

- Give the work back to the people. This links back to personal mastery for this is where management learns to support rather than control and where workers accept and bear the weight of responsibility. As a first step staff members need to learn how to identify problems so that they, as a second step, can start seeking for solutions. Methods through which leadership can communicate and show support include the following:

  o participate in brainstorming sessions and workshops;
  o write newsletters;
  o provide staff with exposure to the public media;
  o become a pervasive presence;
  o demonstrate commitment through symbolic acts such as closing the executive dining room;
  o build collective self confidence – which comes from success and experience; and
  o allow staff members to take risks and back them when they make mistakes.

- Protect voices of leadership from below. Whistle blowers and creative deviants are often silenced when they speak out. It is however more useful when the leader assumes the balcony vision stance and enquires to gain clarity, understanding and impartiality rather than feeling personally offended. (Here as with the next six principles both the personal mastery and mental models disciplines make use of this principle.)
- Practice 'liking' people. People like those who 'sincerely' like them. To apply the principle would require that leaders uncover real similarities and offer genuine praise.
- Practice reciprocity – people repay in kind. To apply the principle would require that leaders treat staff in the way they want to be treated.
- Look for social proof – people follow the lead of similar others. To apply the principle would require that leaders make effective use of peer pressure. This is also known as deploying champions.
- Practice consistency – people align with their clear commitments. To apply the principle would require that leaders understand that there is a greater

chance that staff members would do what they say they will, once they have written the commitment in their own words. These commitments should be publicly made and visibly posted. A prerequisite is however that the staff member accepts the commitment and is not forced or tricked into the commitment.

- Ensure authority – people defer to experts. To apply the principle would require that leaders make their own expertise more visible – preferably more subtly rather than boastful.
- Remember the principle of scarcity – people want more of what they can have less of. To apply the principle would require that leaders understand that potential losses get a far bigger reaction than what potential savings or gains do. People also respond quicker and with more enthusiasm when they realise they have information that is not freely available.

To be able to do all of the above would require that leaders show strength of character and are capable of withstanding a multitude of varying pressures. Both Meyerson and Senge provide hope for those less sure of themselves. From the results of her research, conducted over a period of 15 years, Meyerson (2001, p 97) established that not all leaders are forceful and obvious. Many, especially those from minority groups as well as females, carry out their daily tasks in a reliable professional way. This happens to such an extent that they are barely noticed. However, the practiced eye is able to see the major changes they bring about without making big waves. These leaders, when given support from senior managers, are able to quietly challenge and change wisdoms, beliefs and values within the company. They gently provoke organizational cultures to adapt and change without causing confrontation and disruption. Meyerson's research is of importance within the context of this research. As is the case in most South African companies, part of the CSIRIS IMPS leadership challenge is the necessity to bring about changes in racial perceptions and attitudes. Neither confrontation nor disruption is known as the ultimate answer to changing either. Senge (1990, p 359) confirms that the most outstanding leaders very often are quite normal average people when measured against glossy magazine standards. What they do have however is a *clarity and persuasiveness of ideas and depth in their commitment*. He has found that leaders instil confidence in those around them. As a result *all are prepared to learn to achieve the results they truly desire*.

When functioning within a culture of true leadership, recruiting staff with the potential to be leaders is only the first step. Their career paths need to be managed. Kotler (2001, p 96) reports that corporations that do well in terms of leadership create challenging opportunities for their young employees. In doing so they understand that leaders need to gain experience by risking and making mistakes as well as by achieving success. To serve this end, it may be necessary to create a number of smaller units so that many challenging lower level management jobs become available. At the same time though, it is necessary to appropriately reward those senior staff members that successfully develop junior leaders. In doing so a culture of strong leadership is fostered.

Within the limited scope of this study it was difficult to identify suitable mentors for potential leaders. It was also found that the successful development of junior managers 'means different things to different people'. It could mean that the mentor looks for a slave to do all the tasks he is not fond of doing or also that the junior is set tasks that he or she is not yet experienced in dealing with. This results in continuous negative feedback and a feeling of despondency. From the followers' side there is at times an attitude that the 'chosen one' needs to come up with all the answers and responsibilities. Heifetz and Laurie's (2001, p 131) are of the opinion that *those followers who want comfort, stability and solutions from their leader are looking for a babysitter* is supported. It does however remain a challenge for junior managers to understand that real leaders ask hard questions and knock people out of their comfort zones. Leaders are responsible for managing the resulting distress. Once a leader understands the responsibility for the development of his own and that of the organization's human capital, he needs to know what will make learning happen: how to fast track learning and how to ensure that a learning curve grows exponentially rather than gradually for all.

The knowledge era does not only impact on managers and leaders. Followers too are feeling the impact and have to adapt to the requirements of working in the knowledge era. In the next section an attempt was made to identify and describe the impact of the knowledge economy on the typical knowledge era employee.

2.6.3   Impact of the knowledge economy on the worker

Fortunately, unlike conventional tangible assets, knowledge grows when it is shared. Each time a flow of knowledge between people takes place the resource is doubled. The most visible impact of the knowledge era is that there is a shift in focus from 'manual' skills and skill-formation to knowledge skills that enhances productivity and that improve economic competitiveness and personal effectiveness (Garrick and Clegg, 2000, p 283). Employees today, carry the tools of their trade with them - between their ears. *It is they and not their managers who are the experts and who must decide how best to deploy their know-how. As a result, what they do has more in common with work carried out by people in the professions and must be assessed not by the tasks they do but by the results achieved* (Stewart, 1997, p 48).

Badaracco (1991, in Preiss, 2000, p 328) talks of *migratory knowledge: capital that can walk out the door at any time*. To him the challenge lies in eliciting, representing and then prioritising the critical knowledge held in the minds of both managers and employees before they move on. Roos and Roos (1997, p 413) share this opinion and remark that the crux is that it is the individual, not the company, who owns and controls the chief source of competitive advantage. The knowledge era company therefore needs to serve and nurture the 'knowledge worker'. But at the same time knowledge workers need the value creating processes and infrastructure of the organization, as well as conversations with other knowledge workers to unleash and leverage their knowledge. It is foreseen that it may still take some time before both the organization and the knowledge workers find a 'win-win' balance that will work to mutual, maximum benefit.

Thinking 'win-win' does not mean job security. It is a fallacy to believe that the same number of staff members is retained when converting to knowledge era strategies. The successful utilization of knowledge means that less 'hands' are required. The staff members that are still employed as physical labourers are then also required to do the same if not more physical labour than their predecessors. Groth (1994, p 25-26) confirms that the trend towards greater use of mental-based skills and talents rather than the application of human physical power will accelerate. Physical labour that survives will do so most probably as a result of levering physical labour with tools and methods derived from mind labour. To accomplish this workers will be required to move away from functional silos (or the 'that-is-not-in-my-job-description-syndrome') that can create unnecessary boundaries within an organization. It can therefore be anticipated that the knowledge era workers would need constant skills training. Due to the expense of skills training it could be expected that some employers may hesitate to make training investments in areas that have long term returns. This is especially true when operations, measurement, and reward are done on a short term basis. Thus it may happen that a current labour force is exploited due to the fact that there is no further investment in the skills of the workforce. The cost of this strategy may remain hidden in the short term. But, just as failure to maintain and reinvest in plant and equipment results in a plant that is no longer competitive, the outcome of a deteriorating labour force, that no longer has value in a changing environment, will become apparent when the company could least afford it to show.

It is therefore essential for a knowledge worker to ensure that he is employed by an organization that values its employees as its source of competitive advantage. A sure sign of such a company is that it, at the very least, has an appointed senior member of staff who is responsible for the company's knowledge drive. This should of course not be a token appointment and Lank (1997, p 409) suggests that possible responsibilities for such a person should include the following:

- Identifying the tacit and explicit knowledge assets currently owned or accessible by the organization. In effect, this is answering the questions do we know what we know?
- Developing the appropriate mechanisms to create repositories, sharing mechanisms and maintenance processes for this knowledge base.
- Identifying knowledge gaps and mechanisms for filling them (recruitment, re-profiling, and so on). In other words, identifying what we do not know.
- Managing the investment in processes, information technology and roles to move knowledge and expertise around the organization and establishing measures to determine the return on that investment.

Appropriate skills and experience for this member of staff to have are the following:

Personal Qualities	Professional Experience
Change agent	Organizational development
Able to influence at senior levels	Business process development
Results-focused	IT expertise: Intranets, groupware
Systems thinker	Project management
Understanding of the business	Consultancy skills

Without such leadership the company would in all probability be paying lip service instead of ensuring real valuable development opportunities for its staff members.

However, to think that all responsibility rests with the company only is also not true. One of the core requirements for today's employees is to keep oneself employable. To stay employable one needs to live a life of continuous learning. The following list of characteristics displayed by learning individuals and created by Duffy (in Wiig, et al., 1997, p 33) tells it all. Through his research he established that learning individuals:

- think systematically;
- accept change, indeed are invigorated by it;
- have a high tolerance for complexity;
- are constantly alert for new information;
- welcome empowerment by the organization;
- link the pursuit of knowledge to life goals;
- see knowledge as fuel for personal growth;
- use information technology effectively to facilitate communication and access to knowledge;
- are creative;
- are willing to make decisions;
- never stop learning;
- are not afraid to question the status quo;
- are keen to solve problems and help colleagues to do so too;
- continuously search for ways to do things cheaper, better, faster;
- are willing to experiment;
- can work in teams;
- are willing to communicate and share knowledge;
- can interact with people as well as technology;
- are conscious of the dangers of information overload;
- are committed to their organizations when they are learning organizations;
- are not complacent;
- think work should be fun; and
- are strongly customer focused.

For the company to assist in developing its workers to display the characteristics mentioned above, it needs to understand the nature of its employees. Peter Drucker (1991, in Sveiby, 1995) divided workers into one of three groups, depending on what they can do to raise their productivity:

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- First category where ***productivity means quality***, like scientific work in a research lab. To raise productivity, the employee can only ask: 'What works?'
- Second where ***quantity and quality together constitute performance***. Examples are architectural draftsmen, reporters, nurses, and engineers. Raising productivity in these jobs requires both asking the question 'what works' and analysing the process step by step to make it work better.
- Finally, there are a good many 'industrialized' service companies (that do jobs such as filing, handling, making hospital beds, and so on) in which performance is defined by making and moving things: that is **largely *by quantity***. McDonalds fits into this category. Here the issue is – it works … how can we do more of the same?

Sveiby (1995) sees knowledge workers fitting into the second category. These employees have the competencies and skills to improve both quantity and quality. As a result the demands of knowledge workers, in terms of the terms and conditions of the employment 'contract' with the firm, are increasingly idiosyncratic, and increasingly expensive for the firm (Demarest, 1997, p 383). As a result it can be expected that the employer will continuously put pressure on productivity to claim their pound of flesh. In research done by Kelly and Caplan (1993, in Cook, 1997, p 60) amongst engineers at the Bell laboratories, they established that it was relatively easy to distinguish between star (or highly productive) performers and those who were middle of the road performers. They established that star performers all showed the following tendencies:

- They took initiative. They accepted responsibilities above and beyond the stated job. They volunteered for additional activities and promoted new ideas.
- They had strong networks. They, as a rule, immediately got direct access to co-workers with technical expertise and they also shared their own knowledge with those who were in need of it.
- They were able to self-manage. They regulated their own work commitments, time, performance level and career growth.
- They were effective team members. They assumed joint responsibility for work activities, co-ordinating work efforts and for accomplishing shared goals with co-workers.
- They showed leadership. They were able to formulate, state, and build consensus on common goals and work to accomplish them.
- They were also good followers. They helped the leader to accomplish the organizational goals and thought for themselves rather than relying solely on managerial direction.
- They were able to see from a variety of perspectives. They could see their own job in context. They could look at it from the point of view of the customer, co-worker as well as the manager.
- They were able to 'show-and-tell'. They were able to present their own ideas persuasively in written and/or oral format.

- They showed lots of organizational savvy. They could navigate competing interests, promote cooperation, address conflict and in general got things done.

The items listed are all 'soft' skills that mainly relate to communication and interpersonal relationships. This is not something that the 'middle-of-the-road' performance evaluation system would concentrate on. Neither is it easy to put an appropriate monitoring system in place that would be able to provide reliable feedback regarding this type of contribution.

As a result Demarest's (1997, p 383) warning that formal systems need to be in place or it is close to impossible to:

- assess the demands of knowledge workers relative to their contribution to the firm's knowledge bases;
- form an adequate strategic assessment of the damage done to the firm by the loss of an employee;
- systematically require high-value knowledge workers to embody their knowledge within firm products, services and practices to prevent the loss of intellectual capital when the worker in question leaves the firm;
- understand the knowledge worker in the context of her working network, so that promotions and assignment changes do not damage productive knowledge communities within the firm.

When appropriate systems are in place it is predicted that employers should expect significant pressure to individualize reward and recognition systems. The knowledge era worker expects to be paid well but monetary reward need not be the only appropriate way in which knowledge workers could be recognized. This issue is addressed in more detail in the next section.

2.6.4   Impact of the knowledge economy on reward and recognition

Reward and recognition will inevitably continue to play an important role in every worker's life. The modern employee is said to want more control over the structure of the reward system. Pedler, Burgoyne and Boydell (1991, p 207) make the reader aware that alternative reward systems break former taboos surrounding hierarchy. This means that staff members lower down the management hierarchy may earn more than their managers. According to Lank (1997, p 410) a variety of studies have shown that monetary reward is by no means the principal motivation for knowledge workers. Professional recognition and the opportunity to work in challenging areas with interesting people also act as significant motivators. It is also debatable if all cultures would be motivated through pay. This too could warrant research because it appears that South Africans do not appreciate any reward other than money.

'What exactly should one reward?' is perhaps also a question that needs answering. Although a ready answer is not available, it is essential that 'knowledge economy'

reward systems make provision for and in fact ensures that people take time out to share their knowledge (Jooste, 1997, in Wiig, et al., 1997, p 98).

The ultimate question remains 'How does one reward?' in these changed times. In the knowledge era 'money only' should in fact be the last resort as reward. Ideally rewards, recognition, and incentives should be seen as those actions that are able to expand the employee's self-mastery, his professional knowledge, his sphere of influence and potentially the sphere of responsibility. Hackett (2000, p 9) claims that their knowledge-sharing systems, which allow peers and management around the world to acknowledge and appreciate contributions by colleagues, often becomes reward in itself due to the recognition received. The *American Management Association* ([2002?]) in turn recommends the following as rewards:

- **Special assignments.** Offer staff not more of the same work they do daily, but interesting, challenging new work. Many find that stimulating.
- **Offer opportunities for high visibility.** Everyone wants to be acknowledged for doing a good job. And all it takes is to offer praise publicly. Mentioning members' contribution at staff meetings or via e-mail messages that tell key personnel of an individual's accomplishment is a technique that is free, easy, and well received by everyone.
- **Give time off.** Time away from work to take care of personal business or spend a little extra time with friends and family, or just stay at home, is another great way to recognize employees. It doesn't matter if it is a few hours or a full day; the opportunity to get away from the stresses of the office makes it a valuable — and beneficial — reward. Those who get time off will return refreshed and grateful for the recognition that they received.
- **Share information.** How is the company doing? What about the department? What about Project X? It may seem absurd to suggest that sharing such information will make employees feel more valued but that's very much the case. You want to know as much as possible about what's happening in your company. Likewise, so do your employees. Sharing what you know not only will make your employees able to make better decisions but also demonstrates to them that you value them.
- **Provide feedback.** We get so wrapped up in day-to-day routine that we forget how important it is to employees to know how they are doing in their jobs. Ask them to join you for lunch, and then ask them whether they have any questions or need help with their work. Provide them with feedback on their performance. Praise them for doing a good job—don't wait for the next quarterly review. Use this and every other opportunity to let them know how they are doing so they are better able to respond to your needs and to the needs of the department.
- **Make employees partners.** Involve them in decisions that affect them. Doing so demonstrates that you respect their judgments. Besides, employees are closest to the work and in the best position to see solutions when a problem arises. So the insights they offer can have a huge benefit for you, if you listen to them.
- **Empower them.** Let your employees do the work the way they see fit. Don't hover or over-control. Rather, give them the independence that their work demonstrates they deserve. Provide them with the necessary training and then give them the room to decide how they get the work done. It's a further step in making employees feel like partners in achieving the corporate mission.
- **Celebrate their successes.** Whether it is tea and cake in the morning, or pizza or sandwiches at lunchtime, call a break from the work to celebrate individual and group achievements. The group will appreciate the recognition and you will appreciate the loyalty that comes in return.
- **Provide flexible work hours.** Some jobs just can't be done at home but there are many that can. Give employees flexibility in deciding their own work hours and their own workplace. It can be very motivating.

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- **Increase employability via training.** In today's times, you can't provide job security but you can offer career security via training to keep managers and employees abreast of latest management and technological skills and developments. You'll see a return on investment in subsequent job performance and the employees' commitment to you as someone interested in their professional development.

Other rewards that could also be considered include performance related pay, consideration for personal constraints such as providing for workplace nurseries, security of employment, a flatter workplace hierarchy and royalties for ideas that are implemented or exploited (Pedler, Burgoyne and Boydell, 1991, p 207). Whatever the reward is, it remains recommendable that all reward systems are transparent and fair.

While all of the above have an impact on L&IS staff members, there are also some unique areas of interest that are reflected in the section below.

2.6.5   Impact of the knowledge economy on L&IS staff

Top MBA recruits no longer find as many positions in manufacturing companies. Nowadays, the career services offices of many business schools report that most new graduates secure positions with management consultants, accounting firms, investment banks, law firms, software developers and ***information brokers*** (Bontis, 1998, p 64). Information staff members need to realize that they too have new roles to play in the new economy. They do not need to unlearn everything they knew in the old paradigm but they do need to repackage their own knowledge and skills to suit the environment in which they have to live. Davenport and Prusak (1997, p 130) suggest that information workers see themselves as:

- information innovators: being creative and creating new information and presenting it in new ways;
- information editors: making information more meaningful and putting it in context;
- information directors: working closer to the client and adapting what is available to suit their particular need on time and under budget;
- information producers: focusing on selling information to those who need it in the format that they need it; and
- chief content officers: overseeing the information environment for the company making sure that content rather than technology is seen as the solution to business problems.

These roles fit squarely into Drucker's knowledge worker category (second category) as mentioned in section 2.6.3 on page 2.60. However, to be a successful knowledge worker the 'new' information professional is required to be *a person who engages with users rather than transfers facts, makes more money than what is spent, and innovates more than what she preserves* (Davenport and Prusak, 1997, p 133). This links to Toftoy's (2002, pp 46-47) opinion that information workers should see themselves as entrepreneurs and develop the following characteristics: passion and enthusiasm for what they have chosen to do; trustworthiness – it develops loyalty; creativity, inventiveness, originality and a daring nature – to become adventurous;

persistence, responsibility, flexibility, self-confidence, perceptiveness and salesmanship - to survive in the new work environment, and good communication skills – so that they can say what they are doing but also listen to feedback when it is given.

The question to ask, with the new roles and the characteristics in mind, is what should the key tasks for information specialists be? From the work of Church (2000, pp 22-24), Davenport and Prusak (1997, pp 121-127) and Johnson (1998, pp 53-55), it was possible to identify the following:

- Assisting users to deal with information overload. Pruning or sifting or gate-keeping - getting rid of the obsolete, the irrelevant - being an information editor.
- Providing context or making cross discipline connections - historical context will explain reason, comparison induces action and in a global society cultural and social context should not be ignored.
- Competing with other professions to provide the most appropriate access to the most reliable information supply chains.
- Enhancing style - adapt the style of presentation to the situation (use humour, slick graphical presentations, e-mail and post-it notes effectively), allows users to 'play' and interact and remember that dramatic presentation is much more likely to have a lasting impact.
- Managing the new communication technologies. Choosing the right medium, technology is allowing for more and more effective media (video conferencing, e-mail, hard copy, slides, sound), helping those who have to present information, to choose the right medium is an important value addition.
- Teaching and facilitating the use of information – having the ability to communicate and work with other people to ensure the correct results for your client.

To be able to perform these tasks requires an intimate understanding of the real information needs. That understanding does not come from hasty interviews or focused discussions. It comes from building a relationship and communicating over a prolonged period of time. According to Davenport and Prusak (1997, p 116) the trick seems to be in not only passively accepting user requests and delivering what is asked but to develop information sources, channels and programmes for users who don't yet know they need the information. Church's (2000, p 24) advice adds to this. He is of the opinion that the information professional should not wait for change to happen and then try to adapt to it. One should rather push the boundaries and let creativity reign!

Within the context that this study took place, it is very easy to think that none of the above is really applicable. This is however not true. Looking at the initiatives discussed in sections 5.4.1 and 5.4.3, it can be seen that it is very easy to choose a different technology to do a job more efficiently or to provide training to allow users to gain access to reliable information. Having the right attitude, proactively looking for opportunities and using appropriate skills to develop the products and services

that are required by the market hold the key to success – even for those information staff taking care of support duties!

2.7   Summary

It is not yet clear exactly what the impact of the shift from the industrial to the knowledge-focused economy will be. There is little doubt that the implication will be more intense and have a larger impact than that of any previous evolutionary steps. This chapter was utilized to identify the variety of available knowledge economy management philosophies. These philosophies have come about as a result of the realization that previous philosophies, although they provide valuable building blocks for what has become the preferred way of leading the workforce, do not address all the requirements brought about by the new economy.

The management philosophies that were investigated are the following:

- learning organizations;
- knowledge management; and
- intellectual capital management

In this regard it was established that:

- A learning organization is an organization in which the individual experiences learning and development as such a positive drive that it becomes an internalised activity … almost a craving to learn! Peter Senge's work, on the disciplines required for developing a true learning organization, is central to the development of literature relating to the topic. Especially the laws associated with the disciplines provide clues as to what one needs to keep in mind when leading in the learning organization. The crux of applying learning organization theory is that one should progress beyond the first stage or loop of learning where newly acquired knowledge is collected and applied. In a second phase knowledge is used to improve individual processes while in a third phase acquired knowledge is utilized to redesign systems in order to have improved all the processes relating to the system.
- The overall purpose of knowledge management is to maximize the enterprise's knowledge-related effectiveness, to gain returns from its knowledge assets and to renew knowledge assets constantly. This implies that tacit knowledge must be transferred to explicit, shared knowledge - if it is to be of general and lasting value. It is clear that knowledge management is not something one can practice in an exclusive centralized department of an organization. Before being able to reap the benefits of knowledge management, each and every possible contributor to the knowledge store needs to be enthused by the idea and the environment should be supportive as well as enticing. It is also clear that the previously well-established hierarchical structures of command do not necessarily lead to really useful bodies of knowledge. Each and every contributor needs to be empowered and motivated for the whole process/system to be implemented successfully.

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- Intellectual capital is defined as the difference between the book value of the company and the amount of money someone is prepared to pay for it - intellectual capital's value, both real and potential, is therefore greater than that of the financial capital. Put differently: intellectual capital represents intangible assets that usually do not appear on the balance sheet. It would however be a mistake to believe that intellectual capital management only has value for those companies where shareholders are the main stakeholders. The knowledge economy impacts on all individuals with no regard for the standing and purpose of either the individual or the company. In this section it was established that intellectual capital can be sub-divided into several other 'capitals' (that are also known by a variety of terms) but in effect the main components are human capital, structural capital and customer capital. It was also confirmed that financial capital is an integral and very important capital that cannot be ignored but that financial gain should be seen as proof that the other three capitals are sound and well rather than simply focusing on the balance sheet as only indicator of success.

It was also determined that, just as is the case with any other organization, libraries and information services obviously also require adaptations in management style. A better understanding of knowledge economy philosophies, led to the conclusion that library and information service managers should not utilize one philosophy exclusively. These philosophies should rather be seen as three sides of the same triangle! Depending on the point of focus, one philosophy may be more prominent but all contribute to the success of the same structure. For the purpose of this research it was decided to concentrate on the activities and tools associated with the management of intellectual capital because it appeared to be the philosophy which suits both personal style and the requirements of the development stage of the service in question best. However, an approach of 'use-whatever-tool-is-appropriate-never-mind-what-management-philosophy-it-supports' was accepted as the principle and was used when it was necessary to do so.

The last section of Chapter 2 considered the impact of the knowledge economy on the library as institution as well as on the individual as employee and as leader. In this context the impact on the information worker was also addressed. The influence of the knowledge economy on reward and recognition systems was briefly mentioned. Chapter 3 more specifically addresses the developmental aspects associated with building intellectual capital. As can be anticipated, some of the tools and techniques to do so are of course also relevant to either of the other two management philosophies.

Chapter 3
Developing intellectual capital

In the modern business world, worthwhile ideas that you don't harness end up in your competitors' hands (Brown and Duguid, 2000, p 74).

Creating a workplace where knowledge is shared and where people are encouraged to learn and to take action on those lessons learned is the surest way to compete in a market-driven economy (Hackett, 2000, p 14).

3.1 Introduction

In Chapter 2, three of the available knowledge economy era management philosophies were identified and discussed briefly. The philosophy found most suitable for the purpose of this research was intellectual capital management. As was mentioned in section 2.4.3.4 on , besides financial capital the three aspects of intellectual capital development that were implemented within the context of this research are:

- human capital (with some focus on innovation capital development);
- structural capital; and
- customer capital.

This chapter defines the selected 'capitals', identifies the phases associated with the development of intellectual capital, lists the questions to ask before implementing development initiatives and then discusses the means through which intellectual capital can be developed.

3.2 Defining the capitals

Given the advantages of the personal mastery discipline, as discussed in section 2.4.1.3 on , it was possible to reach the conclusion that the most important mind shift, when thinking of human capital development in contrast to staff training, occurs when an employer stops viewing the employee as an instrument to get work done. Such a mind shift allows both the employer and the staff member to see that a relationship exists between each person and the organization. This relationship rests on a shared commitment to ideas, values, and goals and to management processes. A successful social relationship is not a one-sided affair. Similarly, the key to a successful work relationship requires commitment to the relationship from both parties. Before human capital can be developed, an understanding of what is generally regarded as human capital is needed.

3.2.1 Human capital and innovation capital as subset of human capital

Three of the most prominent authors consulted (Bontis (1998); Edvinsson (1997); and Sveiby (2000)) see human capital in a very similar light. Human capital can be defined as the competence and capabilities of the employees. A logical deduction is that when an enterprise educates its employees, it increases its human capital. This does not mean that the company will have more control over its assets. As Edvinsson (1997, p 369) states *in a free society the enterprise cannot own, only rent, its human capital*. Sveiby (2000a) reiterates that people should be seen as *the only true agents in business; all tangible physical products, assets as well as the intangible relations, are results of human action and depend ultimately on people for their continued existence*. Bontis (1998, p 65) prefers to see human capital in terms of the contribution at an individual level. He defines human capital as a combination of the following four factors:

- genetic inheritance;

- education;
- experience; and
- attitudes about life and business.

Bontis (1998, p 65) sees human capital as a source of innovation and strategic renewal (*whether it is from brainstorming in a research lab, daydreaming at the office, throwing out old files, re-engineering new processes, improving personal skills or developing new leads in a sales rep's little black book*). He continues by stressing that the essence of human capital lies in the sheer intelligence and ingenuity of the staff members.

Hines (2000, p 2-3) confirms this description of human capital by defining it as the combined knowledge, skills, innovativeness and ability of the company's individual employees to meet the task at hand. It obviously includes intangibilities such as the company values, culture and philosophy. To further develop the concept of human capital, it is useful to consider the similarities between human and physical capital as identified by Parnes (1984, in Zickner, 1996, p 39-40). He is of the opinion that:

- it is a costly process to acquire either;
- both use resources that could have been utilized for other purposes;
- the acquisition is usually motivated by a desire to improve productivity;
- both types of investment can be private or public; and
- either can be evaluated from individual, societal or a combination of both perspectives.

Interestingly it was also reported, in 1993 already (Hudson, 1993, in Zickner, 1996, p 16), that in high income countries:

- return on investment (ROI) on human capital has exceeded ROI in physical capital;
- the rate at which human capital increases exceeds that of non-human capital; and
- the most important issue is the increase in the economic value of human time.

In contrast to physical capital, human capital cannot be owned by anyone other than the individual in whom the capital resides. At best the company can only rent the human capital and therefore it cannot be relied upon in the same way as could physical capital.

For the purpose of this study human capital is defined as the competence and capabilities of the employees. From this it can be concluded that the value of human capital is increased when:

- staff members are continuously educated and trained;
- the potential of individuals is harnessed and guided;
- opportunities are created where people can learn from each other; and
- learning is captured for the benefit of those who are not part of the initial learning process.

Also for the purpose of this study it was decided to include innovation capital as part of human capital. The main reason for this is that, in line with the definitions provided above, it is possible to say that all innovation stems from the motivation and intellect of the individual employees. Innovation capital is described in more detail below.

Innovation capital as subset of human capital development

The fact that innovation capital should be seen as human capital is supported by WIPO's (1997, p 47) statement that *Inventiveness and creativity are features, which have favoured the differentiation of mankind in the course of evolution from all other living species*. It is also said that *inventions and innovations are the most important and specific and least predictable of the intellectual creations of man, but that they make development and progress possible*.

Authors such as Sveiby (1998a) and Edvinsson (1997, p 369) see innovation capital as a subset of structural capital. In this study it is regarded as part of the human capital structure as human intellect ensures innovation and inventiveness, even at the lowest levels of the organization. It is true that innovativeness will result in an increase in structural capital but is initiated through human capital. Demarest (1997, p 381) states that all studies of innovation in the previous 20 years came to a relatively similar conclusion: *Innovation begins with the construction of a new kind of knowledge within the firm … and the knowledge is based on not repeating mistakes of the past which is stored in captured information*. No proof was found that Demarest was mistaken. He continues by saying '*In all cases, one can assume that innovation will occur without the support of formal knowledge management systems. It is therefore logical to ask why it is necessary to bother to formalize knowledge if innovation will occur anyway?* (Demarest, 1997, p 382). Studies of the factors affecting technological innovation have shown that the great majority of successful innovation is demand-led. Put differently, successful inventions are made 'just-in-time' to meet a specific market demand (WIPO, 1997, p 51). Innovation is therefore largely a collective process because technological innovation occurs when current information is augmented by new information. Because markets have become more fragmented and sparse, and market windows open for increasingly briefer periods of time, the key to economic viability is not innovation as such, but repeated innovation with increasingly high levels of reuse. A company will have to continuously innovate and do so within increasingly short spans of time if it wants to stay relevant. In this regard, Arora (2002, p 243) is of the opinion that companies need to make provision for innovation at two levels. Small innovations lead to incremental improvements while breakthrough innovations are mainly the outcome of cross-functional teams. Both these types of innovations should be encouraged and the knowledge created by the innovations should be captured within a company's well-developed structural capital.

Even within enterprises such as information services, the key strategic question is not 'Will we innovate?' It is rather 'Will we innovate fast enough, often enough and efficiently enough'? Smith (1998, p 8) confirms that rapid technological innovation is

narrowing the differentiation gap between competitors. He reports that companies are viewing the collective knowledge of their employees as a key competitive tool from which innovation can emerge, and are encouraging, supporting and rewarding the collaboration between people. Information staff members are not excluded from that process. Sveiby (1995) warns that, although innovation and inventiveness can be seen as key elements in developing both technologies and strategies that will ensure future survival, it should be remembered that in business *creative problem solving and routine production must co-exist side by side*. This advice is of course also applicable within the context of this study.

It is said that innovation occurs when a group of people face a complex problem and the group is forced to come up with an answer (Arora, 2002, p 244). Although human creativity tends to flourish in chaotic surroundings, creativity is not an unproblematic concept. To illustrate this Sveiby (1995) asks *Who is for instance interested in encountering a creative surgeon on a chaotic operation table? Or a judge interpreting the tax law in a new creative way*? Unbridled creativity is therefore not necessarily always good for business. On the contrary, business success is often firmly attached to the ability to repeat successful patterns over and over again. Providing room for creativity, innovation and incremental improvement implies that there is room for the business to grow and prosper. It does not imply that discipline and sound management practices should be ignored. Part of the discipline and good management practice is ensuring that structural capital is developed at every conceivable instance. The next section provides insight into what is regarded as structural capital.

3.2.2 Structural Capital

In Skandia they believe that *structural capital is what is left after the employees have gone for the night*. Skandia therefore sees structural capital as the results of all intellectual activities as captured in data and knowledge bases, documents, models and drawings (Edvinsson, 1997, p 368). Structural capital refers to the infrastructure that allows knowledge to be captured and shared. Structural capital provides the means to measure and build intellectual capital at an organizational level. Therefore structural capital is identifiable through the embedded knowledge that the organization owns. Knowledge is embedded in obvious media such as documents and databases but it is also within the routines of an organization, within the products and services of the organization and within the product innovations.

Bontis (1998, p 66) defines structural capital as *the mechanisms and structures of the organization that help support employees in their quest for optimum performance and therefore overall business performance.* He warns that *an individual can have a high level of intellect, and be motivated to deliver products and services of outstanding quality, but if the organization has poor systems and procedures by which to track his or her actions, the overall intellectual capital will not reach its fullest potential*. He is of the opinion that an organization with strong structural capital will have a supportive culture that allows individuals to try out ideas, to fail, to learn, and to try again. The crux is that the effort is captured so that it is not repeated at another stage, in exactly the same format by the same or another

employee. Obviously the experience, when structured within information systems, turns individual know-how into group property. In this regard Lank (1997, p 411) is of the opinion that, to ensure effective retrieval of information and knowledge, the structural capital systems and technologies need to make provision for access to information at three levels at least. These levels are:

- Retrieval for **referencing** purpose: this requires repositories of typically explicit information found in full text, electronic documents that vary from proposals to contracts to reports to lessons learnt. This type of knowledge ensures that efforts are not duplicated and that employees can leverage the learning curves of their colleagues.
- Retrieval to **establish expertise**: gaining access to tacit knowledge through expertise databases or lists, competency profiles and curriculum vitae (CVs). This allows employees to find the necessary expertise within the organization when it is required.
- Retrieval for **networking** and just-in-time feedback: staying in contact with customers and global experts through e-mail, video conferencing, telephones, and chat facilities. Here the idea is to overcome the barriers of time and geography.

All three levels of information retrieval are important because the codification of knowledge alone does not guarantee efficient dissemination nor does it necessarily result in more effective storage. Being able to gain access to expertise is perhaps the one aspect that needs attention. Nonaka and Takeuchi (1995, p 21) warn that: *knowledge, expressed in words and numbers, only represents the tip of the iceberg. Knowledge is not easily visible and expressible*. They also pointed out the difference in value perception between Western and Eastern cultures. Whereas Westerners tend to emphasize explicit knowledge, and the Japanese tacit knowledge they feel it is necessary to understand that human knowledge is created through social interaction between the tacit and the explicit. It would have been interesting to establish how Africans perceive knowledge but no reference to that was traced.

Jordan and Jones (1997, p 397) are of the opinion that explicit systems tend to record what was done but not why it was done or the context in which the action took place. They feel that explicit knowledge also has a tendency to gain a kind of legitimacy that tacit knowledge does not. If it is written down it is assumed to be correct and less open to challenge. Taking cognisance of Jordan and Jones' opinion and the fact that not all knowledge can be or should be captured, Lank's (1997, p 412) opinion is shared that an effective organizational knowledge base should enable employees to:

- waste much less time looking for information and expertise that exists somewhere within the organization;
- improve their own performance and employability through access to a wide knowledge and expertise base;
- lessen the personal stress levels caused by the last couple of decades of having to do so much more with far fewer resources.

In this sense knowledge base is not equated to database. It is interesting to note that web portal technology provides a very usable interface to gain access to both database and full text information.

For the purpose of this study, structural capital will include any capturing mechanism that enables employees to learn from each other. The actual infrastructure and platforms necessary to develop structural capital will not be discussed in detail as these are part of the enterprise-wide infrastructure and need no further development within the boundaries of this study. Structural capital provides a very strong link in support of the development of the last of the capitals to be addressed within this study. The next section provides clarification as to what is meant by customer capital.

3.2.3 Customer capital

A world where competition is limited and known and where the client's options are easily definable no longer exists. The age we live in requires that the relationships with clients go much further than the notion of 'the customer is always right' or even the later version 'the customer is king'. *Today the challenge is to really get to know your customers, which goes far beyond knowing about them, and to assess what contribution this relationship is making to the achievement of your corporate goals and objectives* (Duffy, 2000, p 14).

To establish the worth of one's customer capital, it is necessary to consider the value of the knowledge embedded in customers, suppliers, and associations with industry. These are all intangibles that are outside the formal structure of the firm. According to Bontis (1998, p 67) *the knowledge of marketing channels and customer relationships is the main resource for customer capital*. He maintains that managers often do not recognize that they can tap into a wealth of knowledge from their own clients. It is however not as easy as it may sound. He warns that, because it is the most external to the organization's core, customer capital is the most difficult 'capital' to develop. Fortunately, the client is much closer to the firm than ever before and, as Bontis (1998, p 67) also mentions, customer capital becomes more valuable as time goes on. The bottom line is that, in terms of the 'client's worth', it is good to know that the lifetime value of a client is of much value to a company as it is much more expensive to acquire a new client than to tend to an existing client. The knowledge workers who take care of these lifetime customers also need special attention because if they leave the possibility exists that their customers will leave with them (Ramosedi, 2000, p 18). These knowledge workers have special skills and traits. One cannot simply move another employee in to take over the responsibilities and assume that all will go well.

Fortunately, according to Sveiby (2000a) *knowledge-focused companies select their clients rather than the other way round. Such clients are selected not necessarily for the amounts of money they spend with the company but also for their contribution at an intangible level.* If the interaction with clients is to be turned into an asset or customer capital, attention needs to be paid to both the processes of collecting and maintaining information about the customer as well as the processes in engaging the

3.7

customer. Collecting and maintaining information about the customer is closely linked to the development of structural capital, but not exclusively so, while engaging with the customer rather refers to co-development of products and services as well as successful marketing to and building the relationship with the customer.

If it is such a difficult 'capital' to develop, it is essential to understand what is regarded as customer capital. The *Society for Management Accountants of Canada* (in Robson, 2000, p 22) sees the following (in alphabetical order) as customer capital:

- Brands
- Business collaborations
- Company names
- Customer loyalty
- Customers and the associated relationships
- Distribution channels
- Favourable contracts
- Franchising agreements
- Licensing agreements
- Value chains

Considering the literature available, any one of the items listed above could become a study in its own right. It is the intention within this research to gain an understanding of all of the above rather that to acquire in-depth knowledge about any one of these. The specific actions to develop customer capital are discussed in more detail in section 3.4.3 on page 3.44. The following serves as general background information about each of the components of customer capital.

(a) Brands and company names

Brand and company name are receiving much attention due to the fact that, in contrast to the speed at which global business develops, brand name establishment takes considerable time and a huge investment in marketing resources. However, taking into account the large number of choices available to consumers, it is predicted that branding will become more important than ever before. In this regard it is especially family and company branding that needs serious attention. This is not only true for consumer goods as is evidenced by the large consulting groups such as KPMG or McKinsey and the value that is associated with the De Beers name. Within the context of this research the value of the CSIR brand name also needs to be taken into account. As Rowley (1997, p 244), in a very comprehensive overview article, reports, branding allows producers to differentiate their product from that of their competitors and assists customers in their selection of an appropriate product or service. She describes branding as the seller's promise to deliver a specific set of benefits or quality or service consistently. Neal (1997, p 63) supports this and continues to include the idea that brand is about the way in which a company does business. A brand is of course identifiable as a logo (Nike), as distinctive text (Coca Cola) or both (Sasol). Brands usually have most of the following characteristics:

- easy to say, spell and recall;
- indicative of major benefits;
- distinctive;
- compatible with all products in the line;
- suitable for use on all media;
- can be legally protected; and
- difficult to counterfeit and copy.

It is perhaps obvious but necessary to say that brand goes hand in hand with the corporate identity and image. In the context of this research, the advantage and privilege of using the CSIR's brand has an impact on the way in which marketing material is designed for the external market, as it is an extension of the CSIR's identity and has an impact on the CSIR's image. The difference between identity and image is relatively easy. Identity is the way an organization sees itself while image is the way the customer or potential customer perceives the organization (Rowley, 1997, p 245; Neal, 1997, p 63). As was mentioned above, the customers have the advantage of guaranteed quality and easy recognition.

Obviously there are major benefits to the company when it brands its products and services. These advantages are listed in Table 3.1 on page 3.10. Neal (1997, p 64) warns however, that the virtual environment will in all probability change brand identity. This opinion is accepted but not necessarily shared. It is rather suspected that new brands will appear and that companies will do much more to try and protect their brand than is currently the case within the physical business environment. To illustrate this opinion one needs to look no further than the e-commerce arena to see the importance of brand as far as verification goes. It is anticipated that brand names will in all probability not survive as long as they have done in the physical environment.

As is listed in Table 3.1, there are also disadvantages to brands. The following is an adaptation of the advantages and disadvantages of branding as identified by Rowley (1997, pp 246 and 249):

Table 3.1: Advantages and disadvantages to branding

Advantages	Disadvantages
Seller: • Allows differentiation of products from that of competitors. It gives competitive advantage. • Provides an opportunity to do brand promotions. • Almost guarantees an increase in sales and business; also known as repeat business. • Maintains and improves market share. • Creates a favourable climate for future sales. • Can be used to inform and educate the market. • Creates competitive differences. • Improves promotional efficiency.	• Expensive to establish. • Difficult to change the attributes of a product. • Has costs associated with maintaining and protecting a brand. • Difficult to calculate the asset value of a brand.
Buyer • Reduces risk. You know what you are buying. • Saves time. It is easy to pick what you need off the shelf.	• Unwarranted loyalty. • Dubious perception of quality. • Integral part of the cost of the item. Sometimes the brand name represents the largest component of the cost.

The ways in which branding is developed is discussed in more detail in section 3.4.3 on page 3.45. The next section takes a brief look at customers and customer loyalty.

(b) Customers and customer loyalty

Jones and Sasser (1995, p 99) advise that *the Company that will survive and flourish in the long term is the one that continually works to understand the relationship between satisfaction and loyalty for each of its customers, for each of its business units, and for each of the industries in which it competes*. Harari (1999, pp 124-128) identified six trends that could indicate that a service company will lose its ability to create value for the customers:

1 Managers learn to become emotionally and analytically detached from their business. Here employees have a job not a calling and there is no 'love and passion' for either the customers or the company's products and services.

2 Managers become obsessed with short term financials, or 'meeting their numbers'. Regular cost cutting exercises and an inability to acknowledge customer complaints, employee frustrations, shifts in the market and new competitors in the field typify this trend.

3 Managers become overly cautious and conservative. They are not prepared to take risks and make investments in improving quality or developing new products and services.

4   Buying success becomes preferable to earning it. This trend is typified by the acquisition and merging of companies. Acquisitions and mergers are not an indication as such. It is rather when these activities are used as a smoke screen to hide internal inefficiencies that the customer loses out.

5   To boost sales and revenues, the organization victimizes salesmen and tries to buy customers. Here the sales force is removed from the operations and strategy of the business. They become less efficient and are also not able to assist with market-driven innovations. 'After sales service' is de-emphasized and therefore customer loyalty as well as word-of-mouth marketing are affected negatively. To 'buy back' these customers there are often 'sales' where prices are slashed. The warning is that no cheap price can buy back reputation.

6   The 'heroes' become the wrong people. Staff members who are not directly involved in operations and development such as financial or legal advisors dominate the management team. These managers will not be inclined to encourage risk nor will they inspire other staff members to try new avenues.

In contrast Harari (1999, p 128) lists the top-ranked assets and skills to obtain sustainable competitive advantage within the modern organization, in order of priority, as:

1   reputation for quality;
2   customer service and product support;
3   name recognition; and
4   the ability to retain good management and engineering staff
5   low cost of production;
6   financial resources; and
7   technical superiority

This list is of specific interest because of the prevailing perception that customers will always buy the product or service that is the cheapest.

(c) Value chains and distribution channels

When working with products the value chain refers to how goods move from one place to the other between the place(s) where they originated and the consumer. At each 'stop' (or sometimes detour) on the journey, the customer expects some value to be added. The more value is added, the more expensive the product becomes. Therefore, if it can be established where most value is added and intervene at that point while eliminating other unnecessary stops, both the customer and the supplier company could benefit. Put slightly differently: the one who owns the information about the value chain controls it. Stewart (1997, p 152-153) advises that to really understand what drives modern economy, the intangible value chains need to be considered rather than the tangible chain. Putting this into the information services context: a variety of distribution channels and value chains have been established between authors and consumers. Thinking logically where the most value is

perceived, it is not at the point where a paper document is handed over the counter. It is presumed that it is at the point when the researcher finds the reference and is able to link to the full text. This presumption obviously needs to be tested. It will therefore be necessary to investigate the variety of distribution channels and value chains that are available to customers and to then find the intangible value of each of these before a viable business can be built. This is because the shorter the value chains, the better the distribution channel and the more affordable the products and services become.

(d) Business collaborations, licensing agreements, favourable contracts and franchising agreements

The concern here is with partnerships, alliances, associations and convergence agreements. The reason to establish any one of these should be to enlarge the products or skills base made available to the customers of either party. It is however, not the number of alliances and associations that is of value: it is the quality and the range of services and products. Each of the methods to enlarge the company's skills base or product range could again be a research topic in its own right. None of these have reference value for the purpose of this study. Suffice to say that within the knowledge economy these aspects of intellectual capital development cannot be ignored but will not be discussed in any further detail.

Section 3.2 was utilized to establish what is meant when the term intellectual capital is used. The next section will be used to address the issue of developing each of the capitals associated with intellectual capital.

3.3   Developing intellectual capital

In terms of developing intellectual capital, the most important question is in all probability: where does one start? Several authors were consulted and, as could be expected, a variety of opinions could be identified. Dearlove's (2000) four phases model is just one example. He reported that the following phases in the development of intellectual capital could be identified:

- Phase one is to visualize intangibles from a reporting perspective.
- Phase two focuses on human capital where the search for talent, brainpower, and competencies is added.
- The third phase is the systematic transformation of human capital into structural capital. This focuses on the packaging of knowledge into recipes to be shared globally and rapidly. It is a shift of leadership focus from human capital to structural capital as a multiplier for human talents.
- The fourth phase is when structural capital can be manipulated to solve needs within the market. This is when the organizations can combine different types of structural capital to create new value constellations. At that point, the marginal cost is zero while the revenue potential is exploited.

Authors, such as Bontis (1998), Edvinsson (1997), Roos and Roos (1997), and Stewart (1994, in Zickner, 1996, p 20), reported slightly different phases or steps to

expect. Their opinions were distilled and reported. Table 3.2 on page 3.14 identifies the:

- requirements to adhere to;
- the steps to take;
- a strategy to follow; and
- the phases to expect when developing intellectual capital.

In terms of the prerequisites it was established that top management vision and commitment is not enough to ensure successful intellectual capital development. The organization as a whole needs to be at a stage mature enough to realise that the 'bottom line' is not the only measurement for success. The steps to take start with the process of setting a strategy to follow. It includes an analysis of your own and your competitor's skills, products and services. The audit then becomes input or guidance in terms of the investment required. This process of course gives rise to a 'continuous loop' activity. With the initial audit as the base line, setting strategy further involves setting roles and responsibilities for each and every member of staff. Here again one can identify a continuous cycle of audit, identification of gaps, investment in improvements and evaluation of success.

In terms of the phases to expect, the process may appear clinical and structured logically within Table 3.2. In reality, as Edvinsson (1997, p 370) warned, it was established that the development phases overlap and that they do not necessarily occur in the sequence reported here. This issue is again addressed in section 6.2 on page 6.4 when the process within the case study (reality) is measured against what was expected from the theory.

Recognizing that there are several steps and stages prior to achieving a perfectly functioning intellectual capital management initiative, the next step was to implement development initiatives. This is discussed in detail in section 3.4.

Table 3.2: Overview of what selected authors see as the process of developing intellectual capital

Requirements to adhere to	Steps to be taken	Strategy to be followed	Phases to expect
The overall objective of Roos and Roos's study (1997, p 414-417) was to develop and later test a process model of intellectual capital. By process model they meant a model that takes a dynamic view of intellectual capital that shows how intellectual capital grows/declines over time. From their research they were able to conclude that there seems to be **three prerequisites** before one should embark on developing an intellectual capital system: 1 The company/unit must be mature enough to have gone beyond the stage of discussing business performance solely in financial terms. 2 The company/unit must have a clearly defined business idea or direction. 3 There must be a clear operational commitment to moving ahead - which is visibly supported by top management.	Stewart (1994 in Zickner, 1996, p 20) identified a **six** step process for developing intellectual capital: 1 Set strategy, define the role of knowledge in the organization. That is the importance of intellectual investments to develop new products vs brick and mortar spending. 2 Access competitor's strategies and knowledge assets. 3 Classify your own portfolio (what do you have, what do you use and where does it belong). 4 Determine what your assets are worth (that is what do they cost, how much will it take to maximize their value and should you keep/sell/abandon them). 5 Invest. Based on the evaluation of your knowledge assets, identify the gaps that need to be filled in order to exploit knowledge and the holes that you need to plug in order to fend off rivals. 6 Assemble your knowledge portfolio and repeat the process ad infinitum.	Bontis (1998, p 70-73) developed Stewart's idea further and suggested that managers who are interested in strategically managing intellectual capital for their own organizations should follow the following **10** steps: 1 Conduct an initial intellectual capital audit. 2 Make knowledge management a requirement for evaluation purposes for each employee. 3 Formally define the role of knowledge in your business and in your industry. 4 Recruit and hire a leader responsible for the intellectual capital development of your organization. 5 Classify your intellectual portfolio by producing a knowledge map of your organization. 6 Utilize information systems and sharing tools that aid in knowledge exchange and codifying. 7 Send employees to conferences and trade shows and have them spy. 8 Consistently conduct intellectual capital audits to re-evaluate the organization's knowledge accumulation. 9 Identify gaps to be filled or holes to be plugged based on weaknesses relative to competitors, customers, suppliers and best practices. 10 Assemble the organization's new knowledge portfolio in an intellectual capital addendum to the annual report.	Edvinsson (1997, p 370) identified **six major phases** as a pattern for the development of intellectual capital. He, from the start warned, that although these phases may seem sequential they usually happen in parallel: 1. Missionary phase or the phase when the idea is sold - which compares to the first and second requirements identified by Roos and Roos. 2. Measurement phase when the appropriate language is developed and data is collected. Bontis refers to conducting an audit and creating knowledge maps - which seems to stop short of what it actually needs to be done for. 3. Leadership phase when it is time to learn from insights. It is also the nurturing phase. This phase again correlates with Roos and Roos' third requirement and Bontis feels this will be addressed by hiring a leader. 4. Technology phase when focus is placed on developing technology-based tools that will enable packaging and the fast delivery and communication of knowledge. This correlates with Bontis' knowledge codification step. 5. Capitalizing which deals with re-packaging and formalizing intellectual property. 6. Futurizing where the focus is continuous renewal and innovation. Bontis also puts emphasis on this during steps eight and nine.

3.4   Implementing intellectual capital development initiatives

Through their research Bontis and Girardi (1998) found that only a small number of authors (Bontis, Covin and Stivers, Dragonetti, Edvinsson and Malone, Jacobsen and Roos and Sveiby) provided practical advice and strategies for implementing intellectual capital management initiatives. Sveiby's Tango Business Simulation game is perhaps the most well known tool that provides participants with an introduction to the concepts of valuing and managing intangible assets. The Tango experience provides participants with an opportunity to rehearse novel approaches to managing intellectual capital. It provides for a low risk, learning environment. It is therefore possible to say that the Tango simulation can be used to achieve a mind-shift but, ideally, all managers and if possible all employees should achieve this 'shift' together, to affect real change. It is believed that the observations about the parallels between their simulated and real worlds prepare participants to transfer learning into practice (Bontis and Girardi, 1998). However, this tool is meant for use in areas where both knowledge work and intellectual capital are of high value. The CSIR IMPS environment does not fall into that category of business and developing intellectual capital cannot be seen in the same light as the high-end intellectual capital development simulated through the Tango game. It is therefore necessary to say that the intention of this study is to look at more traditional initiatives that focus on the development of:

- human capital (including innovation capital);
- structural capital; and
- customer capital.

It is accepted that there has to exist a constant interplay amongst human, structural and customer capital in order for an organization to leverage off its knowledge base. In an effort to establish what initiative to take, Sveiby's (2000b) guideline was found to be very valuable. The guideline is based on the experience gained at Affärsvärlden, which was discussed in section 2.3 on page 2.7. In the guideline he suggests that nine questions are asked when considering implementing intellectual capital development initiatives. Figure 3.1 on the next page provides examples of the implementation initiatives taken at Affärsvärlden in response to each of these questions. The questions are the following:

1. How can we improve the transfer of competencies between people in our organization?
2. How can the organization's employees improve the competence of customers, suppliers, and other stakeholders?
3. How can the organization's customers, suppliers and other stakeholders improve the competence of the employees?
4. How can we improve the conversion of individually held competence to systems, tools and templates?
5. How can we improve individuals' competence by using systems, tools and templates?
6. How can we improve the conversations amongst the customers, suppliers and other stakeholders so they improve their competence?

7. How can the competence of the customers, suppliers and other stakeholders improve the organization's systems, tools, processes and products?
8. How can the organization's systems, tools, processes and products improve the competence of the customers, suppliers and other stakeholders?
9. How can the organization's systems, tools, processes and products be effectively integrated?

In analysing these questions it is possible to say that questions one, two and five refer to the development of human capital, questions four, eight and nine point to developing structural capital and questions three, six and seven deal with the development of customer capital. The intention with these questions is to focus development efforts but also to ensure that all three aspects are addressed. It stands to reason that, when measuring the success of initiatives taken, the questions would again be taken into consideration.

Fig 3.1: Affärsvärlden knowledge focused strategy (Sveiby, 2000b)
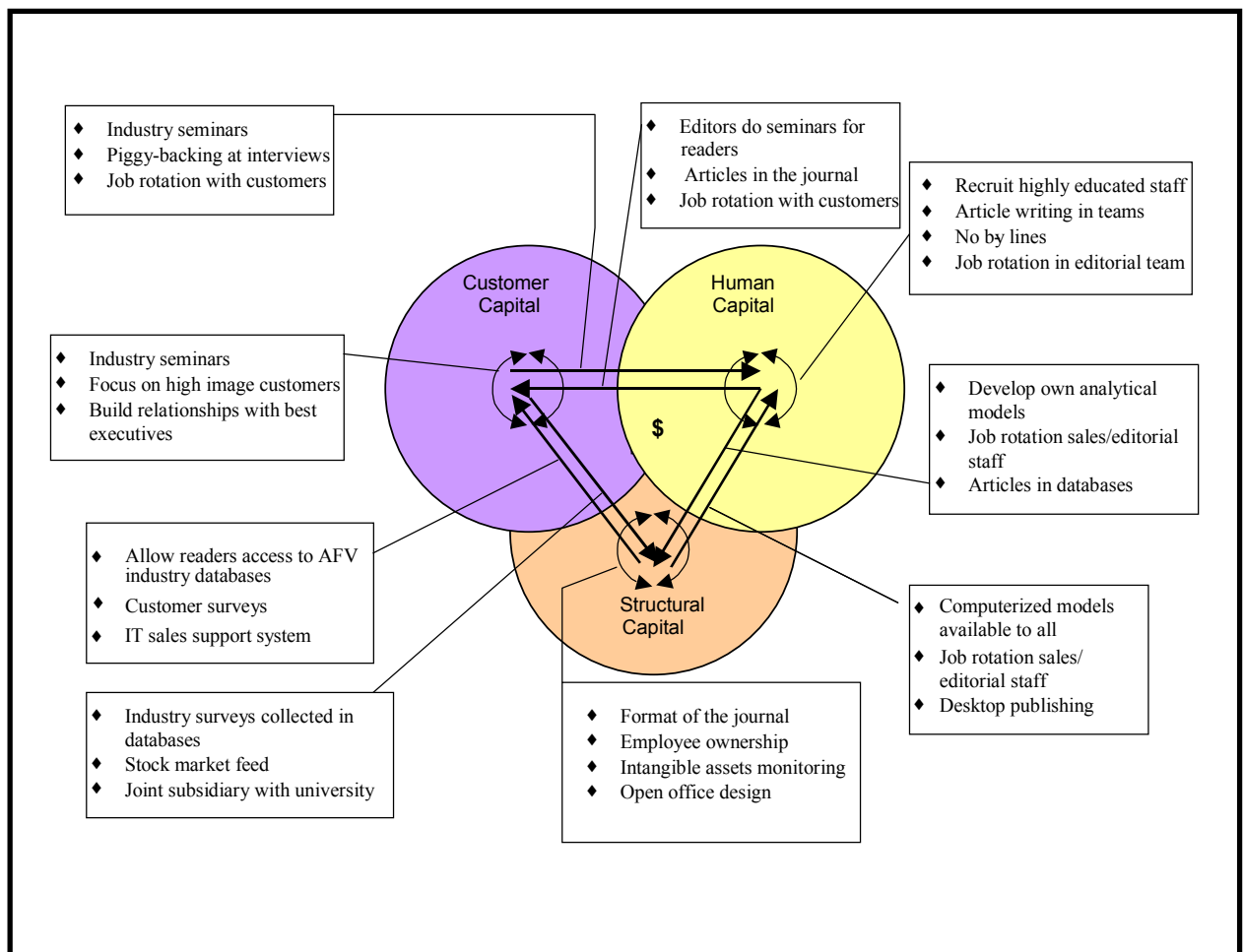
Kaplan and Norton (2001a, pp 99-101) identified that the constraints of service organizations called for an alternative measuring model (see Figure 4.5 on page 4.31). For the purpose of this study and with their advice as background, it was decided to augment Sveiby's model with a stakeholder section. In practice it has

become increasingly clear that the divide between the customers and stakeholders of information services needs to be bridged. It is also clear that information services have a definite role to play in facilitating the bridging process. The realistic focus area where such a bridge should be facilitated is in the area of financial capital. To test the workability of this idea, seven more relationships were identified and added to Sveiby's model. The associated questions to ask were identified to be the following:

10. How should we measure success and invest strategically to ensure that we are able to ensure access to important information?
11. What should we communicate to assist our stakeholders in making decisions with regard to continuous development of our infrastructure and finding alternative funding models?
12. What should we communicate to assist our stakeholders to make the right decisions with regard to human capital development?
13. What is our responsibility with regard to setting standards, participating in workgroups and utilizing infrastructure for the services' customers?
14. What can we do to ensure that human capital development is possible?
15. What is our responsibility with regard to investigating technology alternatives, financial support and technical expertise to ensure the development of an effective infrastructure?
16. How can we assist the stakeholders to make the right decisions in terms of our need to gain access to global information?

Fig 3.2: Information services' knowledge focused strategy – adapted from the Affärsvärlden model
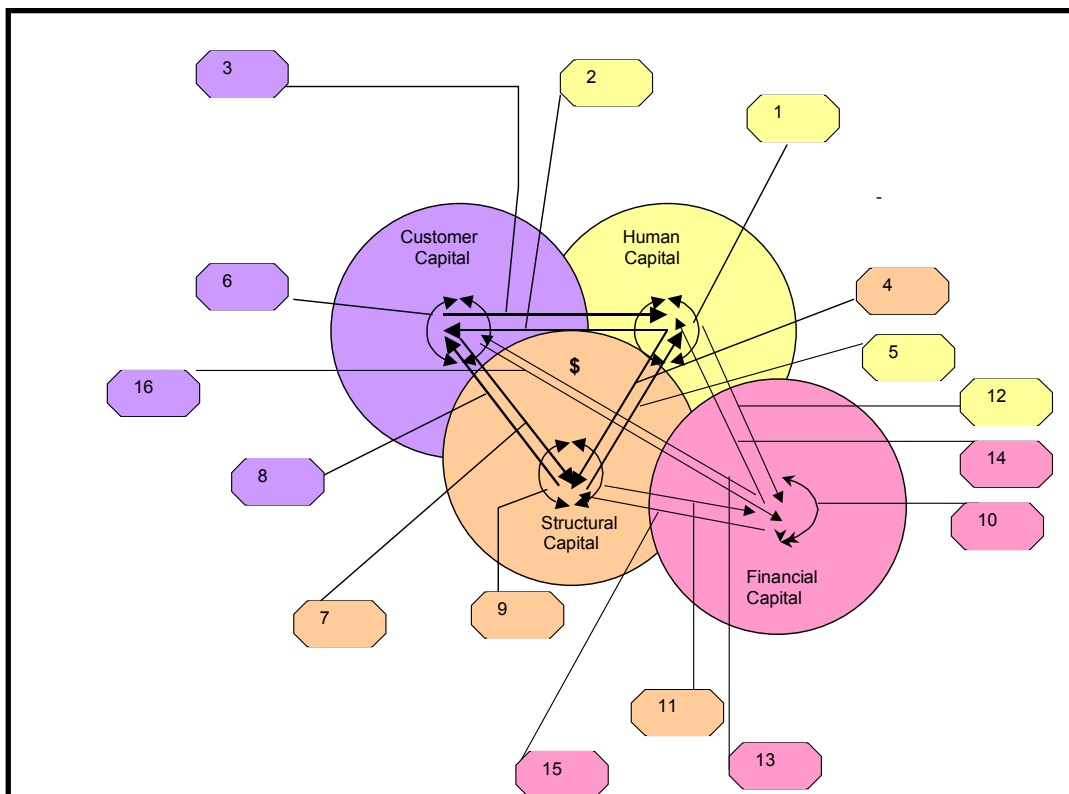
Figure 3.2 displays the various actions necessary within this adapted model. The numbers relate back to the questions identified within this section. The model, as well as the way in which these questions were addressed, was developed further in Chapter 5 or more specifically in Table 5.2 on page 5.16 and onwards.

Except for the interdependence amongst the various capitals, it is especially the communication activities within and between the sectors that provide for communication challenges. Because the communication starts and ends with humans, human capital was again seen to be the most important capital to develop. For that reason it was chosen as the topic to address first within the next section.

3.4.1 Developing human capital

It is not enough to hire, train and promote the brightest individuals. Organizations must also support and nurture bright individuals into sharing their knowledge and ensure organizational learning. Unlike physical inventory in traditional manufacturing settings, individual knowledge stocks that reside in human capital become obsolete. This obsolescence is not necessarily due to outdated knowledge. There is a behavioural explanation instead. *Human beings become unmotivated when they feel they are not being utilized or challenged* (Bontis, 1998, p 71). Fortunately Groth (1994, p 26) does remind the reader that greater increments or even quantum increases in value often stem from:

- finding a better way to do the same thing;
- developing a different way to achieve the same end; or
- discovering a new end.

Add to this Jordan and Jones's (1997, p 393) opinion that *if the specialist skills and knowledge of individuals can be efficiently accessed and harnessed, then it is possible to develop a sustainable position that is extremely difficult for competitors to imitate*, and it is soon clear what it involves to develop human capital.

Some may think that human capital development implies that everything possible should be done to foster invention and creativity only among highly paid, elite workers and ignore those whose work practices are thought of as purely routine. Brown and Duguid (2000, p 76) are of the opinion that this compartmentalization does not reflect the real way most businesses operate. Senge (1990, p 66) expresses a shared opinion when he warns against the compartmentalization of functions such as marketing or research. Information services or the library, as many still prefer to call it, fall into the same category. It is sometimes the people involved in seemingly routine work practices who have to be most inventive because the world they are working in changes so quickly.

In his research Ramosedi (2000, p 81) established that developing human capital requires an understanding that:

- knowledge workers require more flexibility and independence at work;

- organizations need to develop appropriate policies to retain and develop their knowledge workers; and
- people management strategies are more important than technology strategies when implementing management of tacit knowledge strategies.

It appears that in order to successfully manage and develop human capital, certain fundamental strategic changes are required. A strategic human resources development plan should therefore be developed to enhance the company's business plan. Hines (2000, pp 1-17) recommends that such a strategic plan should make provision for:

1. Motivation: companies need informed, loyal and motivated employees: employees who will not only incorporate their intellectual property but who will also be inspired to develop innovative and creative thinking to develop products that will exceed customer expectations.
2. Leadership: to employ the best skills available and to create systems within the organization, which will support the development and retention of these skills.
3. Human resources planning: where the focus of the plan is on the development of effective and competitive human capital but still ensuring that there has to be a strong link between these efforts and the organization's strategic objectives.
4. Career management: where the focus is shifted from 'employment for life' to 'employability for life'. Each employee needs to take responsibility for his/her own career while the company provides the tools, environment and opportunities for the development of the employee's skill.

In order to pay attention to the core business, Hitt (1994, in Zickner, 1996, p 23-24) advised that it may also be necessary to, through the strategic plan, make provision for:

- outsourcing divisions that are not part of core business;
- putting strategies in place to retain valuable employees during restructuring;
- creating an emphasis on human capital. This implies

    o participative management;
    o tenured employment;
    o job rotation;
    o on the job training; and
    o shallow hierarchies of authority;

- cultivating an effective corporate culture. This could be achieved through:

    o developing an entrepreneurial spirit among employees;
    o reducing the fear of failure; and
    o increasing the desire to pursue opportunities;

- promoting a long term vision;

- instilling a learning-oriented culture;
- focusing on high quality products and services; and
- investing in new technologies.

The aspects identified by Hitt were incorporated when the human capital initiatives, identified for the first developmental phase within the case study, were identified and implemented. More detail about the initiatives is provided in

In terms of the actual activities to develop human capital, it is necessary to mention that the workforce as a whole should embrace change as a constant and that they should proactively take charge of their own situation. It is believed that part of the reason why routine work inventions are not recognised is because the changes, especially those in processes, are not recorded. Therefore, a dilemma that all managers grapple with is the organizational tension between processes: the way matters are formally organized; and practice: the way things actually get done. However, successful companies are not those that work around the problem, they are those that turn it to their advantage. *For in the delicate art of balancing practice and process lies the means both to foster invention – by allowing new ideas to spark – and to further it – by implementing those same ideas* (Brown and Duguid, 2000, p 74). Along the same line Groth (1994, p 25) is, for example, of the opinion that rather than training to fulfil the need for 'current demand' simple tasks, people need to be educated so that each is capable, prepared, easily adaptable, and willing to accomplish a variety of emerging tasks essential for extracting value from a changing environment of opportunities.

A wide variety of methods through which human capital can be developed were identified. Training courses, seminars, conferences and other formal learning activities are obvious. Amongst the not so obvious, establishing communities of practice (CoPs) was seen as very promising. This conclusion was reached due to the following two reasons:

- Reading about the development of human capital and the sharing of knowledge led to the conclusion that learning needs to occur throughout the organization. All staff members therefore need to align to the idea of teaching (and learning from) each other if human capital development is to reach its full potential. Because effective teams learn faster than individuals, a second step would be to ensure that staff members belong to and actively contribute to team learning. The most obvious way in which that can be achieved is through CoPs. To balance the investigation, other methods of enhancing learning were also researched. It is acknowledged that traditional management practices will not change any organization into a learning organization. It is also understood that, when developing a learning organization, both the learners and the leaders have to understand that one can only create the environment in which learning efforts can be nurtured. Leaders cannot instruct learning to take place. Each learner has to take ownership of his own learning activities.

- The CoP environment encourages discussion and interchange of ideas. If nurtured properly it is predicted that the language barriers between individual professional White staff and Black para-professional staff could perhaps be bridged due to the fact that community members help each other understand and learn. Interpretation problems may therefore be addressed much earlier. It should also reduce the stress on an instructor to ensure that learning is taking place. As additional advantages the:
  - o financial investment required would be minimal;
  - o level of intellectual interaction in the staff room during tea and lunch breaks would rise; and the
  - o cultural divides may be bridged.

As a result CoPs are discussed in some detail below.

3.4.1.1 Communities of practice

There are a variety of definitions for CoPs. De Bruijn's (2001, p 2) definition is based on a combination from literature researched and practical experience gained at the CSIR. His definition is as follows *Communities of practice are knowledge sharing groups in or between organizations. They consist of groups of people who are interested in and passionate about certain knowledge, which they use for their job. By sharing their experiences, insights and understanding with peers they develop new approaches and a better understanding of how the job should be done. They are organic structures that need a definite nourishing approach if they are to flourish.* It is the emphasis on the purpose, namely to do a better job, which is especially relevant. The fact that communities of practice need to be nourished and not managed was also useful to note.

Wenger and Snyder (2000, pp 140-141) identified a number of ways in which CoPs add value to the organization. The advantages are that they:

- drive strategy;
- start new lines of business;
- solve problems quickly;
- transfer best practices;
- develop professional skills; and
- help companies to recruit and retain talent.

Even though CoPs have proven to be one of the most valuable forms of knowledge sharing, De Bruijn (2001, p 7) remarked that it is important to realise that they:

- lack a formal structure;
- are not standardized, although they can choose to set and follow standards for themselves;
- are hard to locate and define;
- have an exclusive membership defined by the community;
- are early warning systems and drivers of changes in the organizational ecosystem if properly cultivated and not managed; and

- break apart as easily as they are established.

Because they are not managed, more often than not, the value of CoPs can go unrecognised by senior and middle management. However, CoPs have most value when they are accepted as part of a systematic learning effort. Companies can provide resources, such as free time and meeting spaces, to support CoPs. They can also provide opportunities for bridging across communities or even to customers or suppliers. Infrastructure, such as Intranets, e-mail, and/or video conferencing, further ensures the probability that the benefits gained from an active CoP are reaped.

Hackett (2000, pp 25-26) identified more methods of aiding CoPs. These methods include:

- recognizing, acknowledging, and training the key support roles, such as facilitators, knowledge stewards, and knowledge/relationship brokers;
- helping to identify communities of practice that do or could exist in the organization and supporting their attempts to cultivate an effective group with visible commitment and extra resources;
- building the cultivation and nurturing of communities into business strategies;
- leading the cultivation and nurturing of external communities, including customers, suppliers, and the investment community;
- tapping a community's knowledge and potential for key projects; and
- leveraging the power of communities in terms of driving organizational change efforts.

As further background, Brown and Duguid (2000, pp 76-77) established that the notion of a CoP came from research at the Institute for Research on Learning and Xerox PARC in Palo Alto, California. The researchers there discovered that learning took place in and around communities of practice. As people find a reason to work together, they share stories and lessons learnt. In short, they teach each other the practice. At Xerox it was established that a quick breakfast could be worth hours of training. While eating, socializing and gossiping, the technicians continuously talked work. They posed questions, raised problems, offered solutions, constructed answers, laughed at mistakes, and discussed changes in their work, the machines and customer relations. Both directly and indirectly, they kept one another up to date about what they knew, what they had learned, and what they were doing. The technicians' group breakfast showed that work went on that formal processes did not capture. It also demonstrated that a job that seemed highly independent on paper was in reality remarkably social.

The research also showed that the technicians used one another as their most critical resources. In the course of socializing, the technicians developed a collective pool of practical knowledge that any one of them could draw upon. The pool transcended any individual member's knowledge, and it certainly transcended the corporation's documentation. Much of the knowledge that existed within working groups like the one formed by the Xerox technicians came from their war stories (Brown and Duguid, 2000, p 77). Storytelling is a technique used extensively by members of a

CoP. The constant storytelling about problems and solutions, about disasters and triumphs over breakfast, lunch, and coffee, serves a number of overlapping purposes. Stories are good at presenting things

- sequentially (this happened, then that); and
- causally (this happened because of that).

Thus stories are a powerful way to understand what happened (the sequence of events) and why (the causes and effects of those events). Storytelling is particularly useful for technicians for whom 'what' and 'why' are critical but often hard matters to discern. Storytelling helps to discover something new about the world. It allows the passing on of discovery to others. And finally, it helps the people who share the story to develop a common outlook.

A variety of other methods to develop human capital exist. Some of these are discussed in the following section.

3.4.1.2 Other methods and activities to develop human capital

The most important issue is to get colleagues to talk to each other for, of all the techniques discussed below, the crux of the success of each lies in the fact that the people who participate actively contribute to the discussion. The discussion can of course be based on the past, as with learning histories, or on the anticipated future as in futurizing. The tools and methods discussed below are only a few of those available. The intention is not that a company should use each and every one of these. It is rather desirable that staff members make use of those techniques that best assist them in spreading learning throughout the organization. It remains important in any of these activities to acknowledge the cultural, educational and vocational backgrounds of employees. Provision should be made not to allow these differences to interfere unnecessarily with communication. At the same time, though, communication should not be forced before addressing root problems in a sympathetic manner. Lastly, the most important rule to keep in mind is that it is the spontaneous, unstructured knowledge transfer that is vital to a firm's success and not the systems or the techniques that the firm deploys to facilitate the knowledge transfer (Davenport and Prusak, 1998, p 89).

The first of the alternative learning activities addressed is the creation of a learning history.

(a) Learning histories

It appears that in contrast to what occurs on the personal level, organizations do not learn from experience. To make matters worse: when organizations do try and establish learning opportunities but do not take cognisance of the organizational culture, management may think that the organization is learning when it is in fact not. When the culture rewards those who report on the victories and punishes those who report on failures, the smart decisions are recorded and never repeated while the mistakes are hidden and repeated often. Kleiner and Roth (1997, p 137-138) are

of the opinion that managers have too few tools that will assist staff members to capture experience, disseminate the lessons learnt and then translate the lessons into effective action plans. In their opinion learning histories provide for a narrative format, based on the ancient practice of community storytelling, to capture events that could then be utilized by trained outsiders and knowledgeable insiders to identify recurrent themes, pose questions, and raise 'undiscussable' issues. The most important value from learning histories are that they provide a mechanism through which the lessons of the past are turned into effective action (Kleiner and Roth, 1997, p 140).

In essence a learning history is a two-column document. The purpose of the document is to, in the one column, reflect the thoughts, opinions and factual recollection of events that took place as told by those who were directly involved and affected. The other column reflects the analysis and commentary by the external or independent historian/facilitator as well as the knowledgeable insider. This document is then used as the basis for group discussions. The discussion group is usually the group wanting to do the learning. So, for example, a successful marketing campaign would be recorded and when another group plans to do its own marketing campaign it would read the previous learning history (a product recorded within the organizational memory system) and discuss the recorded history. It does not become a blind action of copying the lessons learnt from the previous group. It is more a process of finding the reasoning behind certain actions and then discussing the validity of that action within the new circumstances.

Kleiner and Roth (1997, p 143-144) regard the following as the most important advantages of learning histories:

- They build trust because all opinions are taken into consideration. They provide the opportunity to clear the air and the process facilitates a 'confidence in each other's attitude.
- Issues that would ordinarily not be discussed in the open are discussed.
- Knowledge is built successfully because lessons are not just transferred. The process allows for objective reasoning prior to adopting new tasks or projects.
- A general body of management information is built. From this knowledge it is not only possible to establish what works and what does not but also the reasons why success is attained or not.

There is however one concern. The process of establishing the learning history is time consuming and as a result a company would have to employ a member of staff to create the record. The job of analysing the information collected also needs to be done at a senior level and preferably by an outside consultant. In total, although it would not be difficult to prove its value, those who have to ensure that the process gets implemented may regard the creation of learning histories as too costly an exercise. Within the context of this research, this is unfortunately also the case. This lead to an attempt to establish the viability of knowledge fairs as another alternative to develop human capital.

(b)   Knowledge fairs

Here the specific purpose is to create the space and the opportunity for staff to share knowledge across the lines of departments and business units (Davenport and Prusak, 1998, p 93). Although the purpose of the activity is very well defined and the occasion itself should be well organized, the actual interaction should be unstructured. The function usually works in much the same way as fairs where physical goods are sold (in South Africa the flea markets could serve as example of what is meant). Although the idea is not to sell but to share knowledge, a 'stall keeper' would need to understand that he is essentially still busy with a selling exercise. Staff members are able to wander from one stall to the other and engage in conversation in an unplanned and informal way staying longer. Although this concept seems very inviting, it is definitely not suitable for the environment in which the CSIR IMPS functions. It was thought that actions pertaining to the tearoom would be more appropriate.

(c)   Tea rooms, water coolers and collaborative conversations

Many managers have in the past seen and still see staff room chats as a waste of time. According to Davenport and Prusak (1998, p 90), it has been scientifically established that, although some conversation may be about sport and the weather, most of these conversations could be classified as efforts at transferring knowledge. They warn that the value of face-to-face contact is being underestimated and that it is time to redefine 'productivity' so that it can include productive yet casual conversation and periods of reflection and learning. So, for example, they argue that a company, which claims to value knowledge but then discourages reading and talking on company time, sends mixed messages. They see the availability of slack time for reading and discussions as a very reliable metric of a firm's knowledge orientation (Davenport and Prusak, 1998, p 93).

It was therefore interesting to establish how effective this mode of knowledge transfer is in the case of a less knowledge intensive environment. What is of concern is that as a generalized perception, Blacks are said to culturally prefer narration as a mode of learning and females are perceived to enjoy working while talking. These groups should therefore be excelling at knowledge transfer and yet, within the given environment, this is not the case. A variety of reasons could exist (jealousy, a lack of learning challenges are but two). It was unfortunately not the purpose of this study and should be investigated as a separate issue.

(d)   Futurizing and anticipatory action Learning

Action learning is about understanding the circumstances within which one finds oneself, to identify possible future outcomes, deciding on the best course of action to improve the situation and to then take action to reach a new set of circumstances. The purpose of action learning is to empower all members of a discussion group with the ability to participate in discussions about their common future. The opinions of all participants (irrespective of their hierarchical status within the company) have equal standing. It therefore allows all participants to anticipate but also make the

future happen. It is not as easy as it may sound. Stevenson ([2002?], p 4-6) reports that there are three major obstacles in making action learning work efficiently. In addition, there are also a number of practical issues that need to be considered. It is difficult to:

- identify participants who are willing and able to participate;
- establish a communication framework when both experts and laymen participate; and
- distinguish between action for action's sake and action that opens enquiry and influences decision-making.

In addition the following need to be noted as well:

- More vocal, experienced or articulate participants may inhibit those who may feel lesser skilled.
- It is difficult to balance expert and layman opinions.
- When group members get to know each other too well the group can easily fall into convergent thinking or groupthink.
- Different cultures value verbal communication differently. Care has to be taken when group members come from a variety of cultural backgrounds.
- It is difficult to, during conversation, challenge prevailing wisdom. Groups are surprisingly effective at silencing anyone going against what is acceptable norm.

Action learning differs from scenario planning. (Stevenson, [2002?], p 5) is of the opinion that scenario planning builds on the past and explores a number of future options whereas the goal with anticipatory action learning is to explore all future options, to identify the most appropriate outcome and to plot the route ahead. It is also taking deliberate actions to avoid unwanted future outcomes. Seen within the context of this study, the technique was thought to have definite advantages and its use was explored. However, because of the size and expertise levels of the group, the technique was not found to be useful, although it should be useful whenever a number of staff members from sister institutions are invited to participate in learning events.

The next technique explored, workplace storytelling, was to some extent addressed as part of communities of practice. More detail is provided below.

(e)   Workplace storytelling

Storytelling is a fundamental part of human nature. It is the way that historic knowledge, culture and social values are transferred from one generation to the next. War stories and workplace storytelling have most probably been part of how humans learn from before management authors realised it was possible to capture knowledge. Brown and Duguid (2000, p 78) are of the opinion that most of the knowledge within any group can be traced through the group's war stories. The reason they give for this is that the *stories provide insight into both triumphs and disasters from the sequential (this happened and then that) and the causal (this*

happened because that was done) angles. Stories therefore provide the worker with a powerful tool through which to understand complicated technical sequences. Storytelling also allows for knowledge to be passed on to others while the group as a whole develops a common understanding. Pedler, Burgoyne and Boydell (1991, p 125) assure the reader that stories can produce the unexpected, illogical jumps and transformations that do not appear reasonably possible while Brown (1991, p 166) goes as far as to say that successful team learning only comes about as a result of using the storytelling technique. This type of learning could be seen as gaining access to the ultimate 'expert system'. A system that provides *a storehouse of past problems and diagnoses, a template for constructing a theory about the current problem, and the basis for making an educated stab at the solution*.

The storytelling technique was initially not encouraged formally as it was known to be used extensively. As could be expected, when this behaviour was rewarded usage easily increased. Digital storytelling, the next technique mentioned, provides for a technological format through which storytelling can take place. Even though it was found not to be suitable for this study, it was worth investigating.

(f)   Digital storytelling

With digital storytelling, the power of modern technology is used to enhance the storytelling technique. Digital storytelling is based in the artificial intelligence and virtual reality domains. Ordinarily it offers the author(s) of a story a variety of options and by choosing these options a unique story evolves. There are, however, three role players in developing successful digital storytelling software: the authors of the story, the writer of the software and the domain specialist – the person who can be regarded as the expert in the training subject. It is only when the domain specialist is involved that the technique has true training value (Dörner, Grimm and Abawi, [2002?], p 2).

The most important difference between conventional storytelling and digital storytelling is as follows *In traditional storytelling the listener just listens and occasionally asks questions; in digital storytelling the listener is not passive. He can participate and actively shape the way in which the story develops* (Dörner, Grimm and Abawi, [2002?], p 1). Obviously also technology allows for animation. Participants experience the adrenalin and the positive feelings associated with experiencing 'real' situations. They also see themselves as playing rather than learning. But the most important stumbling block in using this learning technique is the technical skill level of the participants. It is anticipated that as the capabilities of the software are developed and enhanced, the technique's popularity will grow.

Digital storytelling can, with right, be seen as a subset of storytelling because the principles are much the same. The difference lies not so much in the fact that technology forms an integral part of the technique, but rather that the stories are imaginary and one has control over the inputs and the outcomes. As with any simulated, high technology learning technique, both the learner and the tutor stand in danger of allowing technology to overshadow learning. It is foreseen that this technique will grow in popularity because it fits in with the growth in digital or

computer games and it also takes care of the need to be entertained and to be active while learning. Dörner, Grimm and Abawi ([2002?], p 9) admit that users find the complexity or 'mightiness' of the systems daunting at present. As such, this may be a useful development to track in future but at present, within the environment and background of this study, traditional storytelling would be of more use. The storytelling technique was not tested formally within the research period and is therefore not discussed any further. It was, however, observed on a variety of occasions after the introduction of the IMPS personal monitor where staff members were rewarded for training each other (see Attachment 2).

There is often the impression that only traditional formal training builds human capital. The fact that different techniques could be used to ensure that workers share their knowledge and learn from each other is encouraging. When intellectual capital activities were introduced within CSIRIS IMPS, the growth phase of the group required that much of the attention be focused on skills development – see Table 5.2 on page 5.16. As a result activities such as the items listed above did not play any significant role. It could be expected that these would become more important as staff members grew and developed their own intellectual capital further. Besides the growth phase of the group, there are a number of other obstacles to face while implementing human capital development activities. Some of these are mentioned below.

3.4.1.3   Obstacles to the successful implementation of human capital development activities

The implementation of organizational learning on an organization-wide basis can be expensive and politically sensitive. Making long term investments and being politically sensitive are not difficult concepts to grasp, especially if the payoff is considered *building deeper customer relationships with a fully engaged workforce. A workforce that will use knowledge to adapt quickly, seizing opportunities and improving products and services, and of course, just as important, to renew the way workers define themselves, think, and operate* (Hackett, 2000, p 5-7)*.* It is not very difficult to convince staff members to attend formal training activities during work time, yet it is very difficult to set human capital development activities into motion. The question is what then are the real obstacles?

It was no surprise to establish that most of the major obstacles to successful human capital development are not issues of budget, the market, customers, suppliers or competitors. Hackett (2000, p 47), for example, found that every major study on knowledge management or organizational learning indicated that the lack of a knowledge sharing culture is the key barrier to success. The development of a knowledge-sharing or learning culture relies on:

- shared vision;
- value-based leadership at all levels;
- open and continuous communication; and
- rewards and recognition.

A poorly developed knowledge sharing culture is, according to Hackett (2000, pp 7-8), due to some or all of the following reasons:

- The fact that the **need** to manage knowledge is not clearly articulated or understood is seen as the most important stumbling block. It is anticipated that this lack of understanding will decrease over time. However, when top leadership is not 100 % in support of identified human capital development activities the situation is aggravated. Cynicism of fads most often contributes to the fact that leadership is reluctant to support the activities. Some managers still perceive the knowledge economy as a fad.
- A culture of hoarding knowledge is the second biggest barrier to successful knowledge management efforts. This includes a lack of trust amongst colleagues and a workspace that tolerates such behaviour.
- Developing functional silos is the third most frequently cited obstacle to sharing knowledge. Very often these silos can be associated with a tolerance for internal politics. The way to get around this obstacle is to actively work at breaking down divisional barriers. It is suspected that the primary reason knowledge management has grown so quickly is that it offers the means to work across functions, business units, as well as regional, and hierarchical boundaries. Knowledge management tools and techniques work well to break down the walls and ceilings that often limit communication and knowledge flows. Some firms deliberately establish their strategic knowledge management teams with representatives from the human resources department, the information technology department and at least one strategic business leader.
- Not rewarding and recognizing knowledge-sharing behaviours is another major barrier. Not only the sharing but also the adoption of knowledge needs to be rewarded.

From the obstacles mentioned above, it can be seen that investing in a sophisticated information technology system for knowledge sharing could, for instance, be a waste of money if the organization's climate is highly competitive. In such circumstances only low value information will be shared. Similarly, a reward system that encourages individual competition will effectively block efforts to enhance knowledge sharing.

Lank (1997, p 410) also mentions the importance of the appropriate reward and recognition systems but expands Hackett's list of obstacles by saying that contribution to the organizational knowledge base will depend upon the:

- approaches to personal recognition;
- integration with key business processes; and
- information technology infrastructure and training to familiarize people with the relevant information technology tools.

In terms of a technology obstacle, it is necessary to state that when it is difficult or cumbersome to contribute to a knowledge base, people are discouraged to contribute. Similarly Hackett (2000, p 23) reports that if sharing efforts arrive as a

pre-defined package from the centre, where the organization culture is more autonomous, any possible positive result is supplanted by the following negatives:

- psychological ownership is rejected ('this-is-your-system-not-mine' syndrome);
- the system may fall to the classic problem of a technology in search of a problem ('now-that-we-have-it-what-should-we-do-with-it' syndrome);
- the taxonomy of best practice may not match the local needs and common language ('but-we-are-different' syndrome); and
- the platform imposed from the top may not match local history, preference, or outside sharing potential ('they-don't-know-what-we-really-do' syndrome).

Two further obstacles identified by Hackett (2000, p 23) relate to the reward system. Firstly he is of the opinion that a centrally led effort often looks to financial incentives to spur use and overcome resistance. (When the effort is local and contribution is entirely voluntary, contributors are motivated by intrinsic rewards such as professionalism, the ability to contribute, peer recognition, and being part of something larger than yourself.) Not only do cash incentives cost money, they appeal to the wrong sort of drivers for knowledge workers who should be the biggest contributors, users and beneficiaries of knowledge stocks. It leads to *everything needs to get rewarded or it does not get done* behaviour. Intrinsic rewards are deeper, more lasting, and less open to manipulation and gaming behaviours. Secondly, he feels that when sharing knowledge carries more weight than using the shared knowledge, systems are flooded with information that is often of low value. It is therefore not only the sharing but also the receiving and implementation of knowledge that must be understood or the actual sharing becomes just as big an obstacle. On a slightly different vein, it is necessary to mention that Ramosedi (2000, pp 70-71) found significant differences in perceptions around knowledge sharing between higher and lower qualified staff members. During his research, he established that lower qualified staff did not perceive the organization to be encouraging staff to share their knowledge. He assumed that this is because higher qualified staff members have better ways of accessing data and that different levels of information at different levels of complexity are required in the organization.

A last serious obstacle was identified through the work of Lank (1997, p 410). The issue here is job-security or rather the lack of it. Employability is now seen to be a desirable goal, leading to employees' expectations that their organizations will invest in their personal development. If part of employability is the knowledge and experience that you hold, the motivation to share that knowledge with someone else within your organization is at threat!

Human capital development is a long term investment and should not be seen as a magic wand that will increase the bottom line immediately. Once that is acknowledged, the chances of success and sustainability in the long term increase exponentially. It is especially at individual level that workers can gain tremendously, providing it is possible for them to overcome the cultural barriers and providing management does not inadvertently, through the reward and recognition programme, encourage competition and adolescent behaviour.

As is becoming clear, there is a close relationship between developing human capital and providing the infrastructure that allows for easy sharing of acquired knowledge. The next section takes a closer look at developing the appropriate systems and infrastructure to ensure that the company's structural capital develops at the same pace as it human capital does.

3.4.2 Developing structural capital

Because it is tangible, it may seem like an easy task to create and maintain structural capital, but as Sveiby (1998b) reminds the reader - *In our mass media rich societies, information is – from the receivers' point of view – more like chaos than facts. The receivers have to make a choice not between amounts of information but between information channels in an information rich chaos*. This in itself provides major opportunities for information specialists but it is a topic that should be addressed in further research, as it is not the intention to do so here.

What it really means to build and develop structural capital is perhaps best explained by providing a working example. Brown and Duguid (2000, pp 79-80) tell of the Eureka project launched at Xerox. Eureka refers to a database of tips and best practices established to assist especially the remotely located technicians. Instead of managers 'managing' the database, responsibility was handed to the technicians themselves. Similarly to a scientific writer's peer review process, the tips and best practices entered into the database are calibrated, tried and tested to reflect true best practice. Technicians are not rewarded in monetary terms. Reward is rather in terms of the recognition given by fellow technicians. At one level the individual employee is a winner: what they know is taken seriously, codified and rewarded. However at another level, personal knowledge has become a valuable corporate resource and assists fellow workers to deliver faster and more efficient service. Xerox, according to Brown and Duguid (2000, p 80), estimates to have saved at least $100 million as a result of the Eureka content.

The lesson of the story is that should an organization make its entire knowledge base available to its employees, they are able to serve the customers to the best of their ability and achieve personal growth and development. It remains the obligation of every employee to contribute aspects of their know-how to the organization, thus converting some of their personal learning into structural capital for the organization. Linking back to the obstacles identified when developing human capital, employees must feel there is something in it for them to contribute to an organizational knowledge base. Similarly, managers must feel that they will gain from investment in knowledge management processes. Trained in the tools for the industrial era, managers are often uncomfortable with things that cannot be measured and as a result the development of structural capital is very often neglected (Lank, 1997, p 408).

Krogh, Ichijo and Nonaka (2000, pp248-258) also provide an example of what is involved when building structural capital. In a case study of the Gemini consulting group, they describe efforts to ensure knowledge sharing. It was established that

the following barriers first had to be addressed before the company could capitalize on its knowledge sharing activities:

- strategic barriers, which was done by creating and communicating a strategic view of knowledge throughout the company;
- organizational barriers, which was addressed by establishing a supportive reporting structure and building an enabling IT infrastructure;
- process barriers, which was done by standardizing knowledge capturing and knowledge access processes;
- infrastructure barriers, by ensuring that both the hard- and software within the company is standardized;
- cultural barriers, by concentrating on establishing a shared corporate culture and a common language amongst employees;
- individual barriers, which was addressed by teaming beginner consultants with experts and ensuring that the environment is non-threatening in terms of experimentation with new ideas.

It is fair to say that these barriers are not unique to Gemini consulting. Individual barriers, for example, appear to be a common concern for all. The best advice in this regard is probably to design system usability around the requirements of the users (both managers and employees) and then to adapt the reward system to encourage acceptable behaviour. Lank (1997, p 410) is of the opinion that if the knowledge-sharers become the heroes in an organization, then the value of knowledge will be recognized not just at a business level but by every individual. It also does much good if the needs of these heroes were used to fine-tune systems. It is taken for granted that Lank, as was suggested by Hackett in the previous section, by implication includes knowledge users in the group of heroes. Fine-tuning systems and rewarding the right heroes will however not by itself ensure the development of valuable structural capital. Finding the time to create and develop structural capital is a next important issue to address. Lank (1997, p 411) warns that if building structural capital is seen to add a further load to already overloaded people, then even the prospect of significant reward and recognition may not suffice to encourage the required behaviour.

When structuring, creating and maintaining structural capital, it is useful to remember the four key elements of information ecology as identified by Davenport and Prusak (1997, pp 28-33). They suggest that one should make provision for:

- The integration of diverse types of information. A system should be able to fully service the needs of any client. It should not only direct the client to one type of information. It should rather integrate and package the information to address the personal need of the client.
- An evolutionary change both in terms of the need for and the information itself. The information management system should therefore be able to address both these aspects.
- Observation and description as a first step. Overwhelming as it may be, it is essential to describe 'who' has 'what' information, the various information

sources, how information and knowledge are used in work processes and the organization's intentions and objectives for information.

- An ability to focus on people and information behaviour. Information behaviour is a vast untapped dimension of information management. It is no use introducing or changing a system if it is not going to change the behaviour of the people who are required to make use of it.

From the issues raised above, it is clear that developing structural capital is not just a question of creating a database and then sitting back while all staff members automatically and enthusiastically start using and building the company's valuable structural asset. Continuous and deliberate attempts have to be made to structure, maintain and develop the structural capital. The next section addresses some of the techniques that could be implemented to do so.

3.4.2.1 Structuring organizational knowledge into useful entities

It is not good enough if structural capital is developed primarily to serve only those aspects that have been completed (also known as organizational memory). Malhotra's (1996) point of view is that information systems should also serve the processes of:

- knowledge acquisition;
- information distribution; and
- information interpretation.

This point of view is shared. Knowledge acquisition is of course not only the procurement of books, journals, articles and e-products. It also includes capturing market research and competitive intelligence in appropriate systems. In addition, the effective use of technology such as groupware tools, Intranets, e-mail, and bulletin e-boards can facilitate the processes of information distribution and information interpretation. Some of the activities to ensure that structural capital is developed are the following:

- collecting lessons learnt;
- establishing best practices;
- creating corporate memory systems;
- doing competitor analyses;
- establishing benchmarks; and
- experiencing simulations and microworlds.

Each of these is discussed in more detail below.

(a) Lessons learnt

The true value of a lessons learnt system is sharing experiences with others. The bottom line is that it is too costly today to learn only from personal experience. A person not only learns faster, but it is also much cheaper to learn from other people's experiences as well. Mowry (1999) states that the lessons learnt process is

a systematic approach for identifying, validating, resolving, closing and sharing both positive and negative experiences or feedback. A lesson learnt is knowledge or understanding gained by experience. The experience may be positive, as in a successful test or mission, or negative, as in a mishap or failure. Lessons learnt include any information (e.g. causes of variances, reasoning behind corrective actions taken) gained during an activity that would be useful to others for their completion of a similar activity. A lesson learnt issue is a significant specific event that occurred during a project, that had an effect – and the effect could be either positive or negative. Issues that need to be captured include operating costs, internal/external customer relations, inter/intra departmental procedures, and how project planning/scheduling/execution were impacted. Again this appears to be a daunting task but Mowry (1999) also stipulates that a lesson must be:

- **significant** in that it has a real or assumed impact on operations;
- **valid** in that it is factually and technically correct; and
- **applicable** in that it identifies a specific design, process, or decision that reduces or eliminates the potential for failures and mishaps, or reinforces a positive result.

Capturing the lessons is the most crucial portion of the 'lessons learnt' model. Unfortunately the cliché that 'without input there is no output' remains true. As is reported in section 5.4.1.2 on page 5.24 the lessons learnt while this research was conducted were captured and made available via the Intranet interface.

Mowry (1999) recommends that valuable sources for 'lesson' identification are:

- progress meetings;
- status and completion reports;
- requests for feedback;
- customer satisfaction surveys; and
- lessons learnt/post mortem meetings.

Because lessons learnt and best practice identification go hand-in-hand, these sources are also useful to identify pockets of best practice activity.

(b)   Best practices

Best practice theory stems from the notion that when there is no effective method of capturing and making available the best practice, world-class and mediocre performance co-exist within the same company (Davenport and Prusak, 1998, p 167). Identifying a company's best practices is not easy. Firstly, there is a large gap between what a task looks like in a process manual and what it looks like in reality. Secondly, there is often a gap between what people think they do and what they really do. Therefore, managers who want to identify and foster best practices need to pay very close attention to practices as they occur in reality rather than as they are represented in documentation or process designs. It also needs to be accepted that even when one does pay close attention, it still is possible to miss the tacit knowledge produced during improvisation and innovation. Shared learning that

comes about as a result of storytelling and which is embedded in the communities that form around activities is virtually impossible to capture. This is however not a totally lost case for, as Brown and Duguid (2000, p 79) assure the reader, when he is at least armed with a sense of what really happens on the ground, it is possible to design processes that prompt improvisation rather than ones that are blindly prescriptive.

Because there was no doubt that capturing best practices would be of real value within the CSIR IMPS situation, the option was pursued. When efforts did not have the desired results, it was possible to link the cause of failure back to Hackett's (2000, p 11) warning that current efforts focused on repositories of best practice may become less and less important for the following four reasons:

- best practices are very specific to context (most learning may be learning from mistakes);
- the repository is easier to fill than to access and reuse, for both technical and psychological reasons;
- in a world of greater speed, firms need to look to knowledge flows more than knowledge stocks, and therefore more toward linking of people (e.g. employees, customer, and suppliers); and
- repositories almost by definition do not link to end-to-end processes, where managers and employees can see the impact and integrate them.

Through the work of Senge (1990, p 11), a further warning was identified. He is of the opinion that *the practice of 'best practices' can lead to copying and the art of playing catch-up and in the process more harm than good is done*.

(c)   Corporate memory systems

There are several well-acknowledged reasons for the development and maintenance of a corporate memory system. The most important of these were identified by Demarest (1997, p 383) to be the following:

- Experienced staff leave firms or retire and take along their know-how when they do so.
- Work sharing is expanding and as professions get more specialized, work is tending to be more co-operative. It is becoming more difficult to establish conventions between people if they do not have access to the same information.
- Companies have notoriously poor memories. The problem with this forgetfulness is that staff members are unable to learn from the past mistakes and neither are they able to build on previous successes.

The reasons for establishing a corporate memory system are valid. The question as to how to go about building such a memory system is more difficult to answer. Establishing a memory is seen as a daunting task. As a result, there are several opinions as to which is the best route to follow when establishing a memory system. In the words of CSIRO (2000) *What is needed is the technology to support sufficient*

automation for corporate memory systems to yield enough benefit to justify their implementation. In the long run, an effective corporate memory would capture information automatically and in the background from tasks and other work activities. The information (records) would be structured and kept permanently in a way that would support a systemic generation of answers to the questions. A corporate memory could also construct explanations and synthetic presentations as part of answering questions. Similarly Mowry (1999) advises that a corporate memory system be designed to facilitate an understanding of how things were done. Employees should be able to ask various questions about the company and its processes and obtain answers and stories from experts ranging from the most senior to the most junior members of staff.

On the other hand, authors such as Euzenat (1997) see corporate memory as a repository of knowledge and know-how from a set of individuals working in a particular firm. This does not imply that stating knowledge in an electronic medium is sufficient. The information available should promote communication among individuals. It should also allow for confrontation against standard or analysis tools. Euzenat (1997) claims to have based his opinion on numerous experiments with knowledge bases in the domain of molecular genetics. These experiments led to the identification of four types of knowledge, which need to be represented:

- descriptive knowledge;
- methodological knowledge;
- behavioural knowledge; and
- non-formal annotations.

As a result he advises that corporate memory:

- must be formalized to the greatest possible extent so that its semantics is clear and its manipulation can be automated;
- where it cannot be totally formalized, formal and informal knowledge must be organized such that they refer to each other; and
- in order to be useful, it must be accepted by the people involved (providers and users) and thus must be non-contradictory and consensual.

It is useful to remember that neither organizational nor individual learning develops from capturing information but rather from distributing the captured information to others. Information is of no value unless others can use it and therefore any effective corporate memory system should ensure that information is reliable, available and searchable. Within the context of this research, it was found that deliberate actions were initially necessary to ensure that corporate memory was built. Once some staff members were able to identify the benefits of having the memory in place, it was much easier to convince them and others to contribute.

(d)   Competitor Analysis

In the words of the expert Porter (1998, p 47*) the objective of a competitor analysis is to develop a profile of the nature and success of the likely strategy changes each competitor may make, each competitor's probable response to the range of feasible strategic moves other firms could initiate, and each competitor's probable reaction to the array of industry changes and broader environmental shifts that might occur*. Gathering intelligence about competitors is not a new idea. The systematic study of competitors and other firms is a recommended first step for new ventures, change projects or strategic planning (Drew, 1997, p 428). Yet Porter is of the opinion that few companies do truly reliable analyses due to the fact that it is very difficult to gather appropriate information. His book *Competitive strategy: Techniques for analyzing industries and competitors* provides extensive practical advice to do comprehensive competitor analyses. In short he suggests that one looks at the competitor in terms of its current strategy, its current skills and capabilities, its future goals and the assumptions about the competitor within its own company, the industry and the customers.

Porter (1998, p 50) advises that one not only looks at the current competitors but also at possible new competitors. It is also useful to consider possible mergers as mergers can suddenly make fairly small competitors formidable or strengthen an already large competitor. For the purpose of this research, Porter's model for competitive intelligence was re-visited and slightly adapted to make provision for technological advances since the model was developed in 1980. The augmented model is reflected in Figure 3.3 on page 3.38. (Items added are indicated in red.) Step one is obviously to identify all possible competitors keeping in mind one's own company's vision and strategic direction. The next step would be to collect data and information about these competitors in a systematic and comprehensive way. The information is then compiled in a uniform way to allow an analyst to compare 'apples with apples'. The system should obviously make provision for the uniqueness of each of these competitors.

The next step is to 'catalogue' information so that it is retrievable. It is clear that structural capital not only supports the 'cataloguing of the data' part of the process but it is also at this stage that the structural capital is expanded. When competitor intelligence is done as part of the routine information services provided to clients, this is usually where the information workers' contribution stops. It was found that, when gathering competitor intelligence for information services, the skills to progress to the next stage in Porter's model had to be developed.

During the last phase of the analysis process, the information collected is digested and analysed. As the last step, the analysed information is communicated to appropriate staff members within the organization. When looking at building structural capital, it is essential to add the analysed information as well as the reasons for reaching certain conclusions to the database so that they too becomes part of the next cycle of analysis.

The ethics involved when collecting competitor intelligence are not addressed as part of this research. However, the most important aspect to remember, while doing competitor analysis, is that information that is available from the public domain must be made use of. As indicated in Figure 3.3 the following were identified as the most obvious sources for competitor intelligence:

- reports filed publicly;
- speeches by management;
- the business press;
- salesmen;
- customers;
- inspection of products;
- analysis and estimates of the firm's human capital; and
- the company's web site.

Fig 3.3: Model for competitor intelligence (an augmented version of Porter's (1998, p 73) model)
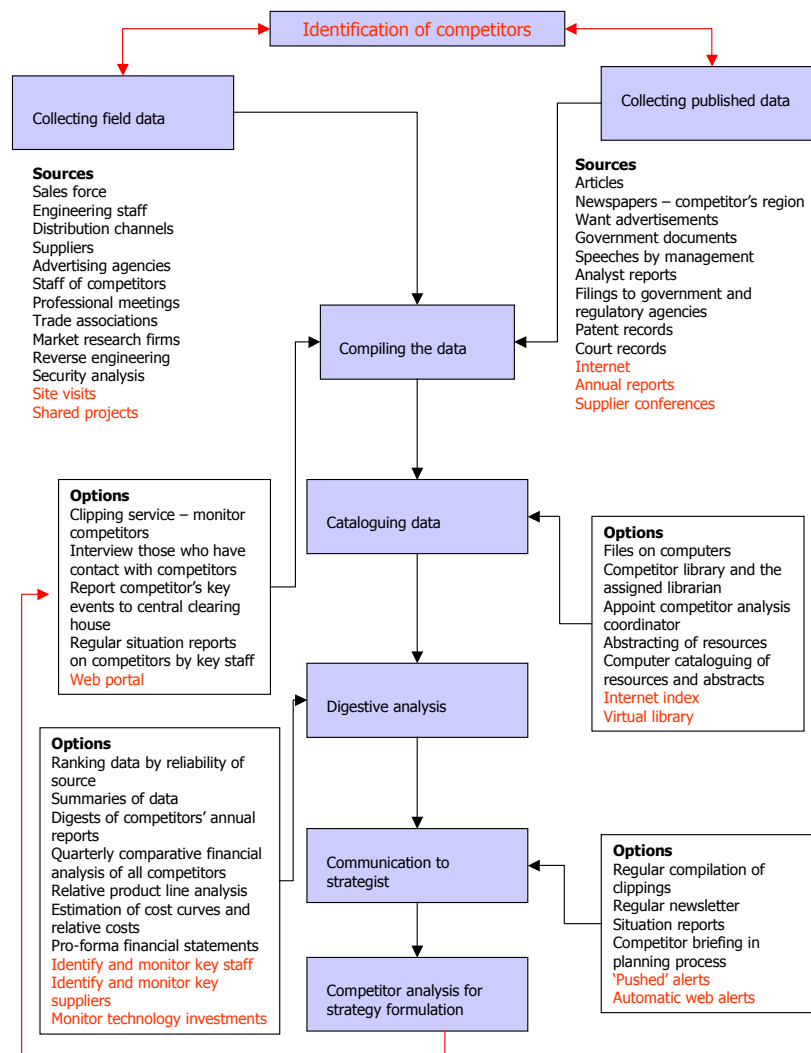
Within the context of this study and given the nature of the information services industry, it is highly unlikely that an in-depth analysis, such as that discussed by Porter, would be necessary or completed for the CSIRIS IMPS competitors in the foreseeable future. The real value from the process came from evaluating and correlating e-journal suppliers and their products (see section 5.4.2 on page 5.24.)

When comparing other company based information service providers, it appears appropriate to make use of benchmarking to establish what possible 'competitors' are providing in terms of similar and enhanced products and services.

(e)   Benchmarking

Drew's (1997, p 428-429) work was essentially used to gather basic information pertaining to benchmarking. He defines benchmarking as the art of finding out, in a perfectly legal and above board way, how others do something better than you do so you can imitate and perhaps improve upon their techniques. He also reported that benchmarking has become one of the most popular tools for strategic management and that almost every type of organization now engages in some form of benchmarking study. Not all of these are doing so with the same degree of rigour and formalism. Therefore, before embarking on a benchmarking exercise, Drew (1997, p 429) advises that it is necessary to understand that:

- benchmarking is not, in itself, a strategy for achieving competitive advantage in product or resource markets;
- although the maxim adopt, adapt and improve is often advocated, benchmarking is not, *per se*, a technique of organizational creativity;
- benchmarking is much more than merely gathering competitor intelligence.

Again from the work of Drew (1997, p 428) three types of benchmarking were identified. These are:

- process benchmarking, which is used to compare operations, work practices and business processes;
- product/service benchmarking, which is used to compare product and/or service offerings; and
- strategic benchmarking, which is used to compare organizational structures, management practices and business strategies.

All three of these were found to be appropriate and applicable within the context of this study. Benchmarking was found to be a fairly objective way in which to measure to what extent your customers and the customers of sister organizations are provided with similar services and products. More importantly though, benchmarking gives an indication of processes that need to be re-engineered and strategies and practices that need to be adapted. The details of the activities and outcome of one such a benchmarking exercise are reported in Attachment 1, section 3.4 on page A1.27.

(f)   Micro-worlds or simulations

Traditionally, the classroom has been a dominant method of transferring knowledge. Today, with global operations, widely dispersed workforces, and the continuing need for instant access to updated knowledge, the classroom has to be supplemented, perhaps supplanted, by a much more diverse range of knowledge-transfer methodologies (Hackett, 2000, p 17). When investigating the use of technology to build structural capital and transfer knowledge, it was useful to look at the progress in virtual reality and artificial intelligence systems. Simulations and computer-based training can today be utilized for almost any training need. They are especially useful when students choose to study at their own pace or in instances where the risk associated with the training needs to be reduced. The most important aspect is that they provide an alternative to the traditional classroom style of learning. With micro-world technology, the aim is to give both trainee and more experienced leaders the ability to simulate real life situations and to gain immediate feedback on their actions. In real life it is often the case that the delay between the action taken and the result of that action is so far removed in time that most leaders fall into the trap of treating symptoms rather than root causes. Because classroom and the actual environment have so little in common in the business world, Bontis and Girardi (1998) question if managers actually learn any practical skills if they are only exposed to a classroom environment.

Senge (1990, p 315) also sees the use of micro-world technology as critical for implementing learning organization disciplines. He regards the technology as an ideal medium through which to re-discover the power of learning through play. Micro-world games provide leaders with the opportunity to identify a variety of paths to reach organizational goals rather than being bogged down by a single route that is not achieving desired results.

Although a variety of artificial intelligence programs are available to use as micro world training media, not all micro worlds are computer based. As far as non-software games are concerned, it is especially Sveiby's Tango game that is seen as a very useful training tool within learning organizations. Bontis and Girardi (1998) established that, after completing the Tango 'training', participants were more favourably disposed to intellectual capital than ever before. The candidates were also more aware of the skills that were lacking within their leadership fraternity.

The value of micro-world creation as a technique to build structural capital is perhaps obvious but, within the context of this study, it was not a feasible option as it requires more time and effort than what was available within this limited research period. It was therefore not investigated any further but it should be considered for a later stage. There is no doubt that the effective use of technology, in general, is essential. Creating 'micro-worlds' is but one way in which to do so. The next section addresses, in broader terms, the role that technology plays in developing intellectual capital.

3.4.2.2 The role of technology as enabler in developing structural capital

It is obvious that knowledge economy business and knowledge economy work is technologically dependent. Davenport and Prusak (1997, p 78), however, see *technocratic utopianism* (thinking that technology will be a quick fix to all weaknesses) as the biggest crime to distract managers from the real issues of information governance. They (1997, p 184) are of the opinion that the latest technology is not necessary for a strong information environment. Arora (2002, p 240) supports these opinions. Smith (1998, pp 8-9) goes as far as to warn that, without active oversight, Intranets may just add to the information glut that the knowledge worker has to cope with. These opinions are supported. In this regard Smith's (1998, p8) point of view captures the sentiment. He remarked that *knowledge sharing technology does not equate knowledge sharing, for the same reason that an exercise machine does not equal exercise. Knowledge sharing is something that people 'do'. Machines help, but the programme is doomed to fail before it is initiated if it concentrates on the machines and ignores the necessary changes in*

- *business processes (which must change to incorporate activities for harvest and leverage);*
- *organizational roles and responsibilities (who captures and who maintains the information); and*
- *incentives (why should anyone contribute their knowledge).*

Even though it is a major misconception that there is a specific panacea technology on the market that addresses all information and knowledge management needs, there are many available and emerging technologies that will address at least part of the challenge. Everyday life has been changed by the introduction of the Internet, e-mail, discussion lists, chat rooms, virtual communities, electronic shopping (or e-commerce), online banking, and organizations' home pages. These communication technologies have generated new social forms and new ways of communicating with others (Chase and Alvarez, 2000, p 357). Intranets, for example, mean that employees can now, by using simple and effective search and retrieval mechanisms, easily access the entirety of their organization's electronic information and knowledge store. Web technology is not the only technology tool that supports knowledge sharing. Hackett (2000, pp 25-32) in his research identified eight technologies that assist in sharing knowledge. Shanhong (2000) felt there were several more. From their work it was established that the technologies in question are essentially the following:

- electronic mail and messaging, group calendaring and scheduling software;
- skills inventories, yellow pages and subject expert lists;
- electronic meetings;
- virtual communities;
- document management and creation/workflow systems together with storage architectures which enable information resources sharing and on-line analytical processing;

- workgroup utilities and groupware development tools;
- data visualization and knowledge mapping tools;
- Internet, Intranet and Extranets;
- database management systems which include metadata, information retrieval, data acquisition and gathering as well as dissemination through push and pull technologies;
- middleware;
- multi-dimensional analysis; and
- data mining tools.

In the year 2002 many of the technologies listed above have become so much a part of the daily life that they are almost taken for granted. Smith (1998, p 9) identified 'spin-offs-from-university-research-programme' technologies that are perhaps less known but which should also become increasingly more essential. Some examples are:

- Collaborative filtering: facilitates the sharing of information between people with similar interests.
- Semantic modelling: charts the relationship between various concepts and enables users to access a range of information with the entry of search terms.
- Passive group memory: eases the process of placing information that is produced by an employee in a place where it can be accessed by the enterprise.
- Content extraction: analyses text and boils it down to a core meaning for use in summaries or as answers to questions.

With such an array of technologies available, it is not surprizing that executives find it difficult to know what to implement. Hackett (2000, p 21) advises that the technology should fit the work, not vice versa. Technology does not eliminate the need for people to meet. Workers will continue to need face-to-face contact to build trust and freely interact in problem solving. Old methods, such as teamwork, process management and benchmarking, are more effective to create and build knowledge than is technology. Balance between technology and personal contact is perhaps the issue for, as Lank (1997, p 410) cautions, the opposite of *technocratic utopianism, technophobia*, can be a significant obstruction in shifting to a knowledge-based organization.

It is not only identifying the correct technology that is problematic. With all the benefits provided through the proliferation of Internet and Intranet technologies, as well as other advanced information sources, many employees are drowning in a sea of information. If employees are struggling to locate the information that is applicable to their jobs, too much information can become an even bigger barrier in business than not having direct access (Smith, 1998, p 8). Quintas, Lefrere and Jones (1997, p 388) assure the reader that the metaphor of the computer as a filing cabinet, text processing or calculating tool is being replaced with the metaphor of the computer as a communications device - a window, a channel, or perhaps a lens that may be focused, through which to access information. Information and communication technologies are therefore seen to support *the emergence of new*

organizational forms and working patterns that are in many ways transforming the ways in which organizations function, and especially the ways in which they interact and communicate.

With the spread of technology infrastructures and the move to globalisation, the roles of headquarters and common workspace have been greatly reduced as the repositories of knowledge. Cross-functional teams and cross-organizational projects are an increasing part of how work gets done. Fortunately, today's workers are more technology-literate than any previous generation. There are now powerful information technology tools for sharing knowledge on a global scale. However, the success of a knowledge-based organization will always depend on the willingness of its people to share their knowledge and expertise (Lank, 1997, p 406). Because the way people work has and is continuously changing, ever-present and portable communications technology has become a necessity rather than a 'nice-to-have'. Staff should be able to communicate anytime, almost anywhere, and at a relatively low cost. Work groups are entitled to capture communication in simple-to-use but sophisticated databases. The information collected should be available for data mining so the right people can use it when they need it (Hackett, 2000, p 13). The technology that allows people to share knowledge has of course also put more information into the customer's head. Companies can no longer compete primarily on price. Real growth and real profit are coming from deepening customer loyalty. One way to ensure that loyalty is by providing connectivity and reliable information to the customer when he needs it. If the customer is also able to contribute to the system it makes the system so much more valuable!

As a last comment on the role of technology in developing structural capital, it is useful to take note of Smith's (1998, p 9) categorization of the way in which organizations use technology for the management of their knowledge. He identified three types of organizations:

- Type A companies, commonly known as the innovative organizations that view IT as the basis for success, rely on tacit knowledge as the basis for new idea generation. Type A enterprises will justify knowledge management by emphasizing the importance of sharing and reusing information and the relation of the information use to reducing cycle times.
- Type B companies seek efficiency and effectiveness via investment in IT. Therefore, these enterprises will justify knowledge management through the realization that competitive advantage comes by way of knowledge reuse.
- Type C companies invest in IT largely to reduce risk and costs. They will balk at implementing a knowledge management process regardless of the technology involved. The likeliest approach for a Type C enterprise is to use external content providers (they outsource knowledge management).

It is believed that the Type B sentiments are relevant and applicable to this study. Arora's (2002, p 248) statement that *a good technology infrastructure is not a sufficient condition for success of knowledge management activities but a necessary condition for it*, confirms this opinion. Technology is therefore definitely viewed as an enabler rather than the core of the business. No single technology is seen as the

ultimate answer to all challenges. It is rather the skilful combination of the appropriate technology from all that is available that makes most sense. In sections 5.4.1.2 on page 5.24 and 5.4.3.2 on page 5.41 more attention is given to the way in which especially web technology was used in conjunction with workflow and groupware. In this regard it is perhaps fair to say that it is a common belief that the key to the success of developing structural capital is to make both the individual and the organization win. Web technology provides the means to democratise the workplace and the marketplace. It has the potential to provide visibility for an individual and the artefacts of their work and their knowledge, as well as the accessibility to the knowledge they need to do their jobs without having to go through traditional hierarchies. The Web has become the place of business. It is the place for people to connect, communicate, relate, share, work, and learn (Hackett, 2000, p 56).

Section 3.4.2 was utilized to address the development of structural capital. A variety of methods through which knowledge could be collected and structured so that it could be made available to the full staff complement were referred to and, lastly, the role of technology in providing the infrastructure to capture knowledge was discussed. The next section will be used to discuss the development of customer capital in more detail.

3.4.3 Developing Customer Capital

Ramosedi (2000, p 79) established that the key issues in managing customer capital are the following:

- knowledge sharing should be part of the employee's performance evaluation;
- informal forums where employees can share ideas need to be implemented;
- rewards should be aligned with the knowledge sharing practices;
- senior management should be involved in sharing knowledge; and
- staff members should be encouraged to record experiences while implementing projects.

These pre-requisites are much the same as those needed for the development of human and structural capital. The difference therefore lies in the methods used to develop this very important 'capital'. The section below is used to discuss some of these methods.

Methods through which to develop customer capital

The methods to develop customer capital were identified as branding, customer relationship management, marketing, which of course includes 'e' marketing, service, and supplier relationship management. More detail on each of these is provided below.

(a)   Branding

Knowing that branding has definite value, it is necessary to understand how to develop a brand. A number of different approaches to branding were established. Rowley (1997, p 245) identified five of these:

Table 3.3: Approaches to branding

Approach	Description	South African Examples
Individual branding	Each product has its own identity	Omo Castle Lager
Family branding	A family of products use the same brand name	Koo Ouma Cadbury's
Company name branding	Branding happens on the basis or reliability of the company's name	Sasol De Beers Nederburg
Supermarket or retailer own label products	The manufacturer is not identified. The retailer accepts responsibility for the quality and often rivals known brands.	Pick 'n Pay No Name Woolies Babes
Generic brands	This is an extension of own label products. No brand is clearly visible and differentiation is based on price.	Asprin Mealie meal

Very often the brand name of one product is used to launch a second onto the market. This is known as either brand extension (for example when well known sweets also become ice creams) or brand licensing (when a manufacturer of stationery may use the name of a new film to promote and sell his products).

For the purpose of this study, Rowley's list should be augmented with an industry or 'knowledge worker group' branding approach. Lawyers, doctors and accountants are associated with certain characteristics, both positive and negative. Similarly, there are definite established connotations associated with libraries and information services. As far as information services are concerned, this 'brand name' can be associated with both image and identity perception problems. There is no doubt that this needs to be addressed but it is not the intention to do so within this study. It too should be researched further in a separate study.

If the purpose of a brand is to make it easy for the customer to identify a product or service, one of the biggest challenges for the CSIR's information services was to decide which strategy to follow when branding the service inside the CSIR. Within the CSIRIS context of this research, it was also important to look at the role supplier brands (for example Sabinet Online, ScienceDirect and EbscoHost) could play in

developing the services' image. This is not discussed in much detail, as the impact on the IMPS section specifically was relatively inconspicuous.

Branding for the external market, did not present any problem as the CSIR's approach to branding is monolithic. This makes matters such as chosing logos and deciding on image an easy task. The associated responsibilities when using the company brand, as well as ensuring that all promotional material adheres to the set standards, then became the biggest challenges.

(b)   Customer relationship management

One could ask why customer relationship building has become as important as it has. The answer most probably lies in the change in the nature of business in general. Harari (1999, p 122) quotes several authors who, logical as it may seem, deliberately remind the reader that a business is only in business because customers have a need for their products or services. Therefore, everything possible needs to be done to get and keep customers. Fortunately, pinpointing actual behaviour, in contrast to reported behaviour, has become very easy and cost effective by utilizing technology effectively. This is a major benefit as there can be an enormous disparity between the information given verbally by the client and his actual behaviour. Rather than asking customers about their behaviour when using your products and services, information should be gathered from information systems where and whenever possible. For example, rather than asking a person how long he visited what country the last time he travelled overseas, his ticket purchase record could be utilized to gather the same information (Postma, 1999, p 10). Caution is required, however, as it is anticipated that increasingly more pressure will come from consumers regarding their privacy and the use of their personal information. This anticipation is supported by preliminary research done by KPMG (2000, p 3).

Gathering information from systems may lead to the view that customer relationship management is about putting another software application into place. Fortunately the experience with knowledge management software and applying common sense shows that relationships are about people and machines just make managing that relationship easier; they are not the crux of the relationship. Although software and particularly database software has a very important role in effective customer relationship management, there is more to it than using efficient technology. Customer relationship management is about building long term relationships between people as individuals. It is about ensuring that a customer stays a customer and it is about increasing customer share (in contrast to increasing market share). An example when this is not the case is when efforts to use ex-employees for building marketing relationships lose value because alumni programmes are delegated to an administrative function. The secret is that a data repository only improves an individuals' capacity to act when the database is made to be highly interactive and because it holds meaning for the individual using its content (Sveiby, 2000a).

Therefore, as was mentioned, it is in the first instance important to remember about customers that one is dealing with humans and not with companies or machines.

Customers cannot be owned and neither should they be flooded with attention the one instant and neglected the next. They want to be seen as individuals and their individual needs have to be addressed in a personalized fashion. Collecting and maintaining intellectual effort so that it can be packaged to meet the needs of the whole range of clients and ensuring that staff members have the capabilities and motivation to package 'market units of one' for the customers is therefore the crux of current business. The customer needs to experience that his service or 'package' is unique but that does not necessarily require that the individual components are also unique. This flexibility allows not only for internal efficiencies. It also ensures that the client feels appreciated and understood. Put differently, the most important aspect of building a positive relationship with a customer is that the focus of your energy goes into understanding how the customer's needs (both known and unknown to him) can be satisfied. The focus of the energy is not on improving sales targets. To be able to be of real use to the customer, it is essential that one becomes 'obsessed' with the customer (again - rather than obsessing about the profit). This means that the service company understands the customers' needs, wants, experiences, challenges and businesses. Harari (1999, p 113) expresses the intention clearly *it is necessary to 'hang out' with them, to find out what makes them 'tick' – not only today but also in the future*.

From the research reported by Harari (1999, pp 111–112), it appears that the trend for a knowledge intensive 'service' company is to have a selected number of anchor clients around whom the company is able to 'wrap' itself. In effect this allows the 'service' company to structure itself in terms of 'client' companies and not in terms of internal divisions or departments. Each of the client teams then ensure that they work very closely with the client to ensure efficiencies and continuous development for the client. Theoretically, this makes sense but in practice one may find that the 'service' company may have duplications in effort (where two members of staff do exactly the same work without them knowing about it) as well as productivity ebbs and flows (times that are extremely busy and lull times). If, however, the supporting structural capital is functioning to perfection, many of the associated problems could be managed.

Anchor clients do not appear from nowhere. Customer loyalty only comes after the client has proof that his unique and individual needs are met and that the products and services he is paying for truly add value to his own. For this to happen the 'service' company should look at its products and services not as individual components but as a continuous effort to add value for the customer. To retain customer loyalty is even more difficult. It is only when the customer feels that he is totally satisfied by what he is receiving that the customer will stay loyal. Loyalty also develops when it is easy for the 'client' company to make a lifetime commitment to the service company. However, as soon as there is the slightest drop in total satisfaction, loyalty can drop enormously (Jones and Sasser, 1995, p 92). The effective use of customer satisfaction measures and the improvements made possible by the analysis and use of customer satisfaction survey information have therefore become indispensable for survival. Although it is reactive in nature, making improvements after receiving feedback from customers has to happen or gathering customer satisfaction information is a futile exercise.

More pro-active is rewarding customers for their loyalty. Reward schemes conjure up images of bribery and corruption. That is not what rewarding one's customers means. Appropriate rewards both ensure repeat business and are a reliable way through which a company can collect information to ensure client satisfaction. Examples of such 'rewards' are the frequent flyer programmes utilized by most airways and bonus points that accumulate into discounts at shops that sell anything from books to clothes. Naturally the first one to think of a reward scheme is the one who reaps most benefit from it, especially when the competitors are slow to respond. Information services could use 'first access to trial products and services' as a useful reward. Similarly the use of selective dissemination of information techniques could assist in pushing appropriate information of a more personal nature to selected clients.

It is logical that when all competitors use the same reward system, buying patterns should return to normal. It could also be expected that, as soon as the reward system, instead of the customer, becomes the focus point, fraud may be prevalent. A further warning comes from KPMG (2000, p 9). When reward schemes are used as a gimmick to quickly gain additional clients, customers often become disillusioned and move to another supplier. Mishaps in the South African banking sector serve as a prime example of this trend. 'Word-of-mouth' is still the most effective way of marketing and it is therefore recommended that a company identifies its most influential customer base and that it then finds incentives to reward those customers for their loyalty.

Rewarding 'good' behaviour is not the only positive action to take. Jones and Sasser (1995, p 98) established that the most important strategy to ensure customer loyalty is linked to the company's ability to react when something goes wrong. The strategy includes a well-designed support service to guide the customer when there is a need for it as well as efficient recovery processes to ensure that the product or service gets back and stays on track. In conjunction with this, a more difficult issue to deal with is when customers become detrimental to business. These customers are typically the ones that inconvenience other customers, who are unable to understand reason and who inevitably waste time that could be spent more productively in serving loyal customers. The trick is to know when to stop trying to satisfy their needs and allow them to move on to a next supplier. It is in all probability a good rule of thumb to make that decision when the customer's behaviour and demands have (or will have) a detrimental effect on loyal customers.

Reward, recovery and the intention to place the customer in the centre of one's world is unfortunately not sufficient on their own. Value for money requires a quality standard that is congruent with the expectations of the customer. In the words of Harari (1999, p 120) *Quality is not merely meeting specs and delivering error-free product – quality encompasses the individual customer's entire experience with you and your organization*. It is clear that the old mass-market style of dealing with customers is no longer acceptable. Hines (2000, p 2-15) equates the development in the relationship with customers to the development in education. To illustrate this, Hines relates that in the old school with an industrial age approach teachers were

active learners while learners were passive. In the new school, that model is almost reversed. In much the same way, customers, employees and employers will all become active and more importantly interactive learners. With the speed of development continuously gaining momentum, the company is confronted almost daily by situations where the client needs to be part of the process. The trick is not to see this as a threat but to effectively use the energy from the process and to capitalize from one situation in order to have a head start for the next. Fortunately Stewart (1997, pp 155-163) identified the following six rules of thumb to assist in these circumstances:

1. Innovate with your customers. Do not work in isolation. This ensures that the product has an immediate market and the customer shares responsibility and risk along the way.
2. Empower your customers. Do not hide data from them. Give them a chance to provide feedback before you make costly mistakes.
3. Focus on customers as individuals. This rule is linked to the strategy to gain share-of-customer rather than share-of-market. To rather have a select few reliable large customers than many small volume customers.
4. Share the winnings with your customers. This very often leads to a partnership rather than a straightforward buying/selling transactional relationship.
5. Learn your customer's business and teach him/her yours. The better you know each other's businesses the better it is for both of you in terms of cross selling as well as on selling. To do that it is necessary to provide feedback as well as input in terms of R&D, manufacturing, quality, logistics, accounting, as well as planning.
6. Become indispensable. If you provide a vital service to a customer, it makes it harder for him to switch to another supplier. Also intra-company trade is much less pricing sensitive than arm's length trade between unrelated companies.

Utilizing these rules of thumb does not imply that each individual employee 'gushes' over each customer. In research done by KPMG (2000, p 3), it was established that two thirds of the clients interviewed preferred to have a single contact person in the supplier company. Just more than 70 % of the respondents reported intense irritation at having to repeat personal details every time they make contact with the supplier. Interestingly enough, the clients who express annoyance most vehemently also did not want their personal detail retained and the recommendation from KPMG is that suppliers need to collect sufficient information to personalise service but at the same time they need to avoid antagonising their clients. In contrast to what many a customer relationship management author has to say, Brown (2001, p 82), in his fascinating article, makes the following statement *Consumers are sick of being pandered to. They yearn to be teased, tantalized, and tortured by marketers and their wares. Just like in the old days.* He is of the opinion that being mindlessly devoted to the customer leads to me-too products, copycat advertising campaigns and marketplace stagnation. Brown is not frivolous and neither does he negate the value of customer relationship management information. He has, in all probability,

been able to embed the very essence of what modern marketing practice should be about. This is discussed in more detail in the section on marketing which follows.

In conclusion, just because customer relationship management has become a catch- or jargon phrase, it does not mean that customers were never looked after before. (Public relations have been part of marketing practice for as long as one may care to remember.) Previously, however, it was done as and when necessary. Today it is or at least should be an indispensable activity, which ensures constant contact with, and feedback from the client.

(c)   Marketing

Ansoff's matrix to depict the product/market expansion relationship is well known (Kotler, 1997, p 79) and it most probably formed the basis of more marketing strategies than one would care to know.

Fig 3.4: Ansoff's marketing strategy model

		Products and Services	
		Current	Future
Customers	Current	Market penetration strategy	Product development strategy
	Future	Market development strategy	Diversification strategy

It may be asked whether this model is still valid within the customer capital development context where it is preferable to choose customers rather than allow them to choose you. No reason to doubt its applicability could be found. Due to the change in the relationship with the customer it does appear, however, that much activity is set to take place in the market penetration and product development quadrants. When additional income needs to be generated, as is discussed in more detail in section 5.4.3.3 on page 5.48, the market development strategy is the most obvious to follow. Only in exceptional cases would one want to pursue the diversification strategy.

In terms of putting strategy into action, current thinking has it that the 'marketing mix' consists of the following seven 'P's: products, price, place, promotion, process, physical evidence, and people. The essence of marketing remains, however, human behaviour. It all depends on the communication of information – which, according to Postma (1999, p xi), will replace the traditional view of product, price, place and promotion. He warns that two big mistakes often made is to think that human tendencies will be changed by new developments and to forget that old forms will co-exist with new forms (Postma, 1999, p 100). This does not mean that mass marketing is dead but, as was mentioned earlier, customers resist unsolicited contact

from companies that are not regular suppliers (KPMG, 2000, p 1; Postma, 1999, p 4). Technology has made it possible for a client to respond to the supplier and to make his wishes, preferences and needs known. For example, Amazon.com is able to identify specific interests and inform customers of new publications relating only to those interests rather than doing blanket promotion every time new publications hit the shelf. It is possible to say that *in the new marketing era bombardment is replaced with dialogue* (Postma, 1999, pp 5-6). The new marketing era also requires that:

- Marketing management is done in conjunction with information held in marketing databases rather than with information gathered doing market research or generic models.
- Using the media to raise awareness rather than doing generic advertising.
- Personal client relationships are managed. This is in contrast to managing target groups.

From the literature consulted it appears that collecting information about customers in powerful databases and linking personal data to products and services should by this stage be seen as an entry level requirement. However, not all authors are equally enthusiastic about using information collected for customer relationship building when doing marketing. Brown (2001, p 84) claims that consumers miss the days when transactions were just that and not a lifetime commitment to a valued relationship. He claims that 'customer-relationship-management-inspired' tactics should be seen as something similar to stalking. One could therefore easily make the mistake of thinking that Brown (2001, pp 82-84) does not take cognisance of the value of customer relationship management information. It is however in all probability more correct to say that he goes beyond just using a database to market to consumers. To make it possible to use his principles of retro-marketing one would need to collect and analyse masses of information (mainly through automated systems) and then apply intellect (human capital) to go at least one step further. The principles Brown advocates are exclusivity, secrecy, amplification, entertainment and 'tricksterism'. Table 3.4 below provides more detail as to what is meant by each of these:

Table 3.4: The principles of retromarketing (Brown, 2001, pp 84-88)

Principle	Clarification	Examples
Exclusivity	Create the illusion that there isn't enough for everyone. Only a select few can afford/appreciate the item.	De Beers diamonds Harley Davidson Warner's Beanie Babies
Secrecy	Drip feed selected information to the market and promise much, much more but not sufficient stock for all.	Harry Potter and the goblet of fire
Amplify	Ensuring that the item which is 'hot' (or 'cool') is talked about and that there is much talking about the talking (speculation). Surprise or unexpected marketing campaigns also amplify previous efforts.	Dean Kamen's 'Ginger' invention

Principle	Clarification	Examples
Entertain	Marketing must divert. It must engage. It must amuse. It is about glitz and glamour. It's mischievous and mysterious. It is fun.	The treasure hunt linked to the remake of *Planet of the Apes* The prize money linked to the release of *Swordfish*
Tricksterism	This is not equal to downright cheating. It is about charlatanry with panache, exaggeration, and chutzpah to make the unacceptable acceptable.	Tango's launch of a non-carbonated version of their fruit juice

Brown (2001, p 88) does offer an acronym to remember his principles by. To find the acronym he insists that the reader takes the first letter of each of his principles and then writes these letters in reverse order. The acronym (TEASE) typifies what he sees as the essence of modern marketing practice. This view is perhaps controversial to those who practice marketing as a serious business. The challenge was to take marketing seriously but to also ensure that activities relating to marketing were kept from being stale, repetitive exercises.

Obviously the rapid changes in technology need to be taken into consideration when planning any marketing activities. Electronic and Internet marketing form a natural addition to usual activities. It is however more complicated than merely transferring some activities to a new medium. Electronic marketing should rather be seen as an extension to other activities and, as such, some of the peculiarities of this medium are discussed in more detail below.

(d)   Electronic and Internet marketing

Resnick and Taylor (1994, pp 145-146) reported that the Internet's high-income demographics, its low cost and its huge size and fast growth will make the Internet irresistible to any marketer. He anticipated that it would be much more of a mainstream medium than what it was then. He felt that it was therefore safe to bet that there would be continued commercial activity on the Internet that entrepreneurs would start making serious money in cyberspace and that larger businesses would become more interested and more involved in the network. Since then many .com directors did make large sums of money but then these companies as a rule went bankrupt. As a result people, in general, are more cautious about business on the Internet. However, to take advantage of the opportunities provided by the new technology one needs to make sure that you are part of the community which is at present taking the Internet for granted because ignoring electronic and Internet marketing would be a grave mistake.

Electronic marketing does not mean that everything previously known about marketing is forgotten. The acquired knowledge just needs to be applied slightly differently. Electronic media performs the same function as the traditional trade shows with the associated advantage of 24 hour per day, permanent exhibition facilities (Postma, 1999, p 8). It is useful to remember that on the Internet the generic rules of sales and marketing are turned upside down. Not only does junk mail fall on deaf ears, but also it often drives away the customers it was meant to

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attract (Resnick and Taylor, 1994, p 111). Furthermore, web marketing and web selling is not the same thing. Web marketing refers to a strategy to use the Internet to market the products and services one has on offer. There is no limitation on the combinations of products or set prices. Web selling on the other hand refers to the typical Amazon.com scenario – where the product range is set and prices are linked to all products. Lewis and Lewis (1997, p 29) suggest that it is established which one of the two needs to be done prior to attempting to do either.

Blitzing the Internet with junk mail is not the only mistake marketers can make. Resnick and Taylor's (1994, pp 112 and 121-122) findings may be a bit dated but they still are very relevant. Some of the mistakes he identified were the following:

- Lumping all Internet users together: although many are highly educated technological professionals there are also college students, senior citizens, sports fans and just about any other socio-demographic grouping. This links back to the one to one relationship craved by the customer.
- Tacking up a press release and walking away: you need to earn credibility - therefore join a discussion group and actively participate. Presence not advertising is the key that will unlock the commercial opportunities on the Internet. Here again it serves to remember that loyalty does not come automatically and if you alienate people in one forum by violating a guideline, others on the service are likely to hear about it.
- Doling out information stingily: to get something from the Internet you need to give away something, preferably for free.
- Ignoring the Internet culture: time invested on reading about the Internet and browsing through messages posted on discussion groups do not only teach you about working with the community, it may also make you friends and win you allies.
- Thinking that the Internet is the only place to market. For the time being successful marketing campaigns will still require that more traditional formats are used to pull customers to the Internet.
- Believing that all customers have access to the Internet. It is anticipated that it will take quite a while before all South Africans, even all the young upward professional people, will use the Internet away from the office.
- It is easy to market via the Internet. By contrast, on the Internet, users jealously guard what they regard as their last bastion of non-commercial, non-advertising computer space. It is useful to remember that once you alienate users on the Internet, it can be difficult to return to their good graces for Internet users have long memories.

Once Internet marketing is identified as the way to go, it is useful to know more about the market. An analysis of any market begins with its size and demographics. Unfortunately, just as there was no real scientific way to track the number of individuals and companies that join the Internet at the time when Resnick and Taylor reported on this in 1994, there still is no known tool that provides accurate, reliable information. The Internet is, however, a tremendous tool for achieving market equity with larger corporations and even for breaking into expensive, but potentially lucrative, foreign markets: markets traditionally only reached through personal visits,

attendance at international trade shows, or expensive worldwide advertising campaigns (Resnick and Taylor, 1994, p 118). If demographic information is necessary, it is easy to launch a competition to gather the information. It provides an opportunity to be innovative. It is possible to grab attention by either providing a very 'different prize' or making it sound inviting.

As was established earlier, there is very little use and need to try and organize Internet customers into groupings. Internet users have already done so themselves. Lewis and Lewis (1997, pp 26-28) identified the following categories of web surfers:

- Directed information seekers: they are looking for particular pieces of information.
- Undirected information seekers: people just hungry for information.
- Bargain hunters: looking for freebies and discounts.
- Entertainment seekers: looking for ways to avoid boredom.
- Directed buyers: make sure that your ordering process and backroom operations are functioning smoothly.

The customers grouping that Information Services needs to target mostly relate to direct information seekers. Other groupings can, however, not be ignored for it is amongst these that one is able to pick up the tricks and tips that ensure that customers return to a specific web service. Of course – before the customers will return to the service they first need to be made aware of the existence of the service. There are a number of ways in which to reach these Internet users effectively, directly and inexpensively. Mailing lists and discussion groups that range in variety from Star Trek to medieval literature are as a rule freely available. When looking at the Internet for marketing activities it is useful to remember that the Internet is in a state of flux. What works today will in all probability not work tomorrow. It was however possible, from the work of Resnick and Taylor (1994, pp 125-140) and Lewis and Lewis (1997, pp 73-81), to identify the following methods to use to reach these groups:

- direct e-mail shots to associations or established groups;
- press release postings on ListServes;
- electronic billboards;
- relationship marketing: joining a discussion group where your company can provide the answers to some of the questions, boosting your visibility;
- display advertising: colourful virtual shopping malls;
- cross promotion of web sites: mutual referrals by partners;
- registering with major web indexes and search engines;
- getting yourself mentioned: getting yourself into the publications that your customers read;
- promoting your web presence everywhere: business cards, stationary, print advertisements, corporate gifts and even, if you can afford it television advertisements;
- keeping the company site name as simple as is possible: mnemonic is even better;
- stressing the benefit of the electronic service with every chance you get; and

- always exploiting the interactivity of the medium: gathering customer information whenever possible - using sophisticated techniques is acceptable but there is nothing wrong with also providing the client with the option to ask for and to be given more information.

Again, as is the case with non-electronic marketing, further advice is that time should be spent getting to know the target market or group. This means exploring the current conversations, paying particular attention to what potential customers want, how they like to interact, and what level of seriousness, professionalism or information is most apt. It is important to remember that the first rule of Internet marketing is to keep the message short. Traditional advertising copy with its generous helpings of style, metaphor and image is likely to fall flat. Resnick and Taylor (1994, p 143) advise that it is much better to place a message with commentary on industry trends, to create an electronic newsletter or to enter into dialogue with the forum about surrounding issues than to launch a formal advertising campaign on the Internet.

The main advantages of using the Internet for marketing is obviously its community of upscale, well educated, and likely to be more highly paid and to be early technology adaptor members. More importantly, though, other advantages for the marketer are:

- There is greater participation by the viewer, which provides for immediate feedback, testing and response.
- The opportunity to present more information, one is not limited by the format or any printing costs. Both in-depth and comparative information can be posted.
- Timeliness - almost up to the minute. As soon as information becomes available you are able to make it available to your customers.
- On the Internet no one knows how large your company is, so one-person shops can create an advertising and marketing presence in cyberspace that rivals the presence of much larger competitors. If you want to compete merely make your presence known and offer customers an irresistible deal.
- Lower costs. There are considerable savings in printing and publishing costs.
- Relationship building - it is easy to both talk to and learn from customers.
- Audience sizing becomes relatively easy because technology allows one to establish how many people visited the web site.
- Convenience because of the 24-hour availability.
- It is possible to make quick adjustment to market conditions, for example, adding new products and changing prices.

For the customers some of the obvious advantages include the following:

- Fewer hassles: they do not have to maintain a collection of information, it is always there and available whenever necessary.
- They do not have to deal with persuasion and emotional factors when doing purchase research.
- Privacy: the Internet almost guarantees anonymity.

Because of the major advantages of electronic marketing specifically and marketing in general, it is tempting to believe that it is enough to engage and retain customers. Unfortunately this is still not the full picture. Service levels, which are discussed in some detail below, hold the real key to what it is that customers return time and again.

(e)   Service

Service is difficult to describe in tangible physical terms. It is however possible to use tangibles such as facial expression, tidy office space and professional image to enhance perceptions about service. Furthermore, service is about being knowledgeable (getting facts straight), reliable (delivering what is promised), responsive (sticking to deadlines), reassuring (displaying confidence in your products and your ability to provide the service), and empathetic (not sympathetic). Harari (1999, p 120) warns that the days are gone when any individual or company could base their business on the customer's ignorance. In today's connected world the client knows what he is entitled to and where to find the service he needs if he is not satisfied with what he is getting. Quality of service is not merely delivering to the set specifications. *Quality encompasses the individual's entire experience with you and your organization*. This is in line with Stewart's (1997, p 144) observation that customers can no longer be treated as adversaries with 'take it or leave it' arrogance.

The natural reaction to Stewart's statement is that it does not apply to anyone known any more. However, it is exactly what Anderson and Zemke (1991, p 36) identified as 10 'controllable sins' when it comes to providing excellent service. Each of these 'sins' is epitomized by the attitude associated with the following statements:

1.   'I don't know'. Here they suggest that one admits to not knowing but 'I'll find out and let you know' should form part of the vocabulary.
2.   'I don't care'. Customers want to know that you care about them and their needs or they will find the service somewhere else.
3.   'I can't be bothered'. When a customer is ignored due to the fact that personal issues take precedence, he will also abscond and find better service elsewhere.
4.   'I don't like you'. Customers are sensitive to this attitude and will remember it for all the wrong reasons when they depart.
5.   'I know it all'. Customers expect you to listen to what their needs are. Jumping to conclusions before the need is analysed may appear to save time but it often leaves the customer feeling he was 'bludgeoned into submission'.
6.   'You don't know anything'. Belittling perceptions and incorrect facts may make you feel as if you are in control but customers remember the feeling when they walk through the doors of a different service provider.
7.   'We don't want your kind here'. Prejudices show. All customers have the right to be treated with courtesy and respect.

8. 'Don't come back'. The whole purpose of business is to encourage customers to do repeat business. Thanking customers for patronage and loyalty allows relationships to grow and mature.
9. 'I'm right and you're wrong'. Customers are not always right but it usually does not cost anything to give them the benefit of the doubt.
10. 'Hurry up and wait'. When you respect your customer's time they more often than not reciprocate.

Service is therefore not about merely giving the customer what you perceive his requirement is. It is very often about the attitude or perceived attitude that is linked to service delivery.

Unfortunately, in service industries, it is not only the customer that is affected by the service provider's attitude. In information services the relationship with suppliers plays a crucial role in effective service delivery. This relationship is discussed in some detail below.

(f)   Supplier relationship management

The role of supplier relationships is changing rapidly within the L&IS environment. However, no published evidence could be found that this relationship is specifically being addressed. In essence, the reverse of customer relationship management is required to make sure that information service clients are able to gain access to, for example, full text articles from their desktops. The responsibility to ensure that products and services are developed and enhanced to serve the needs expressed by information customers is of course central in managing this relationship. It is also about developing the necessary knowledge and skills to do effective and realistic negotiations on behalf of these information service customers. It is further about having sound knowledge of license agreements and copyright legislation. Lastly, it is about developing the ability to develop a relationship that leads to win-win solutions where both suppliers and customers gain fairly from the negotiated contract. It is suspected that this specific aspect will become increasingly important and it therefore warrants investigation separate from what is the intention of this research.

It is also anticipated that the role of being an expert supply chain selection agent will become increasingly important in terms of the way in which the role of information services will be developed within the CSIR. This is depicted in the integrated services model (see Figure 5.2 on page 5.7), which was adopted by the CSIRIS group. From the model it is clear that one of the most important value contributions, to the CSIR is to make reliable information supply chain selection recommendations to research staff members. Part of the challenge is to ensure that researchers are aware that information staff members have the required competency and skills in making these recommendations as well as in negotiating suitable contracts.

3.5   Summary

The focus of this chapter was on the development of the following three components of intellectual capital:

- human capital;
- structural capital; and
- customer capital.

The fact that human, structural and customer capital are intertwined and work together was discussed in detail. It was established that it is not enough to develop any one of these separately. To truly gain leverage from its knowledge base, a company needs to realise that intellectual capital development requires a constant interplay amongst human, structural and customer capital. For example, isolated stocks of knowledge that reside only in the minds of some employees (because it is never codified into the organization's structural capital) will not have a positive effect on the customer's opinion and not influence future business performance.

It is a mistake to think that all knowledge can be captured and stored in some form of structural capital. It is more correct to say that the most precious knowledge within an organization often cannot be passed on. The best that can be done is to create an environment in which intellectual capital can prosper. The environment necessary to develop intellectual capital as well as the stages to expect during the development of intellectual capital were discussed.

Most of this chapter was utilized to investigate the

- actions that need to be taken to develop human capital;
- methods to build structural capital; and
- principles of engaging in customer capital development.

Much of what was investigated will be developed or implemented during the implementation and measuring phases of this study. Several items that would not really be of use, such as in-depth competitor analysis, were also identified as impractical for implementation. During the next phase of this study, the measuring of intellectual capital and the implementability of those measurements within the given environment will be dealt with in more detail.

Chapter 4
Measuring intellectual capital

It is tempting to try to design a measurement system equivalent to double-entry bookkeeping with money as the common denominator. It is an established framework with definitions and standards and therefore common sense. But this is precisely the reason why we should break with it. If we measure the new with tools of the old, we won't be able to see the new (Sveiby, 1997, p 155).

4.1   Introduction

It is said that what is measured in companies is also what is managed. What is not said is that very often what is important is too difficult to measure and therefore it does not get measured and neither does it get managed. The crux of the matter is that time needs to be spent on identifying items that will provide tangible proof that intangible growth (or decline) is taking place. The best way of measuring is by ensuring that goals and strategy are known. Without that it becomes very easy to either measure for measurement's sake or to measure only those items for which measuring tools can be found.

Industrial age companies needed balance sheets to show their value to investors. In the knowledge economy the balance sheet, as tool, is no longer sufficient to provide the assurance that a safe investment is being made. However, alternative methods of measuring and evaluating intellectual capital have been slow to develop. This is, in all probability, because investors, through ignorance or short sightedness, have continued to value balance sheet information.

To facilitate the process of managing intellectual capital, there have been several attempts to create formulae that will capture and measure the real value of intellectual capital in the organization's balance sheet (Filios, 1991, in Zickner, 1996, p 42-43; Stewart, 1996, in Zickner, 1996, p 37 and Sveiby, Lloyd and Joubert, 1995, in Zickner, 1996, p 41). Kaplan and Norton introduced the 'Balanced Scorecard' technique to help managers combine performance measurements from different perspectives. Building on the Balanced Scorecard approach, Skandia is seen as one of the pioneering companies in developing and implementing a systematic way of visualizing and measuring intellectual capital (Roos and Roos, 1997, p 415).

Accountants are not yet ready to make significant changes to a 500-year-old system (Robson, 2000, p 13). It is therefore not strange that it is generally seen as an enormous step forward that efforts to capture intellectual capital more appropriately are being made from the accounting domain. According to Robson (2000, p 15), the movement away from the black and white balance sheet information is known as the 'colourizing' of balance sheets, which in today's world of colourful multimedia appears to be a very apt description! It is however also worth noting Kaes' (1999, p 140) concern. She is of the opinion that so much emphasis is placed on **measuring** intellectual capital that some forget it is actually about **managing** the intellectual capital.

The Gartner Group estimates that intellectual assets are worth approximately three to four times an enterprise's book value (Smith, 1998, p 8). The dilemma remains that, even though intellectual capital can outweigh physical assets enormously, it is very difficult to find measures that will accurately reflect their value within an instrument such as the balance sheet. Physical and intellectual capitals have different properties and should therefore have different valuation methods. When a company has mainly physical assets, output is more predictive than for those with mainly intellectual assets. (For example a mine produces 'x' tons of ore annually. The probability that it would produce a similar amount of ore is fairly predictable.

When an advertising company launches 'x' number of successful marketing campaigns one year there is very little that can be used as an indication that the same would happen in the following year.) The dot.com valuation problems can be closely associated with the fact that inappropriate predictive measures were and are being used to value these companies.

Fortunately if, as Roos and Roos (1997, p 417) indicate, the growth or decline of the intellectual capital of the company is increasingly interpreted as an early warning signal of subsequent financial performance, most managers will eventually realise that it is of the utmost importance that appropriate measures of performance, other than balance sheets, are developed. In support of Roos and Roos, Lank (1997, p 408) is of the opinion that the interest in intangible assets gives the opportunity to develop new and creative business measures that are much more likely to be indicators of future business success than the traditional rear-view mirror financial measures. However, knowing that new measures are necessary does not necessarily mean that these measures are developed. Despite the feverish interest and exponential growth in literature relating to knowledge management and intellectual capital management, Bontis and Girardi (1998) state that *the majority of literature relating to the development and measurement of the subject:*

- *has an introductory flavour;*
- *lacks substance; and*
- *tends to be repetitive*.

Research for this project confirmed the statement. It was therefore not strange to find that intellectual capital research done at South African universities stems from the Business departments where many MBA candidates are and have investigated the options available. To date no results indicate that an absolutely reliable solution to the problem has been found. There are, however, a number of different angles from which the measurements challenge has been approached. It was also found that, despite the fact that intellectual capital management reflects the ***human*** aspect of business, most research is being done in the financial or business administration sectors of business. When measures are given, the measures as a rule relate to means to improve balance sheet information. Convinced of the importance of managing knowledge, intellectual capital, or intangible assets, one is still none-the-wiser as to what practical measures can be utilized to prove the value and the changes brought about by intellectual capital management practices.

Liebowitz and Wright (1999, p 99) established that there are two schools of thought in terms of measuring knowledge. They are of the opinion that researchers either try to find the appropriate metrics for knowledge or they (such as Davenport and Prusak (1998, in Liebowitz and Wright, 1999, p 99)) are of the opinion that knowledge in itself cannot be measured and therefore they look for indicators of knowledge. They support the latter school of thought as in their opinion only the outcomes of knowledge activities are measurable. The opinion, expressed within the context of this research, follows suit as there will be an attempt to identify metrics that will prove that knowledge is being harnessed to improve the wider company's value chain, which is the creation of knowledge.

Before measuring intellectual capital, four pieces of advice should be taken seriously. First of all Stewart's advice (1997, pp 243-244), as supported by Roos and Roos (1997, p 419), was seen to contain one of the most important lessons to learn. Stewart is of the opinion that no single measurement will ever describe a company's full quota of stocks and flows in intellectual capital. Therefore, when devising measurements, instead of developing one ultimate measuring tool, one should:

- keep it simple;
- measure only what is strategically important; and
- measure activities that produce intellectual wealth.

A second piece of advice comes from Bontis (1998, p 73). He is of the opinion that *it requires people to rethink their attitudes on intangible assets and to start recognizing that measuring and strategically managing knowledge may make the difference between mediocrity and excellence*. This change in attitude was seen to not only reflect the change necessary in the eyes of the clients (in this case the senior managers within the CSIR) but also within the IMPS programme itself. Put differently, it is very difficult to convince others that an item holds value when the owner does not believe in that value himself. The way to see and experience value increase is to find an appropriate 'mirror' where growth and decline can be seen. It is anticipated that a personal scorecard may be an appropriate tool to do this.

The third piece of advice was that of Demarest (1997, p 378). Demarest remarked that the only reasonable purpose for organized knowledge management practice in an organization is to increase the quality and quantity of the company's **marketplace** performances. Measuring should therefore target those activities that achieve at least one of the following:

- enable the organization to sell more and sell better (relating to activities that encourage human capital development);
- support more and support better (relating to activities that encourage structural capital development); or
- create and keep more/ better customers (relating to activities that encourage customer capital development).

Duffy's (2000, p 13) advice, that the risk of miscommunication is reduced when there is a common understanding of the jargon used and the processes followed, was also embraced.

The last piece of advice is twofold and came from Kaplan and Norton (2001a, p 102). They state that measurement is not only about reporting what happened in the past. More importantly it is about creating focus for the future. Finally, their reminder that *ownership and active involvement of the executive team is the single most important condition for success* (Kaplan and Norton, 2001b, p 155) is taken for granted.

To recap: although advice on devising measures is available, intellectual capital and knowledge managers find it difficult to identify useful measures because the key question for many firms has been how to exactly measure, reflect and communicate

the impact of knowledge management on business results in financial terms. However, when dealing with knowledge economy assets, one should not get caught, in the short term trap of looking at the bottom line only. At the same time heed shoukld be taken of the warning iterated by Zickner (1996, p 36) *unless the value created by the intellectual asset can be measured (the intangible asset leads to a tangible result) it is difficult to understand the significance of intellectual capital*. The rest of this chapter will therefore review a variety of meaningful methods through which an attempt could be made to measure the impact of intellectual capital management practices on information services. Within the CSIR's IMPS environment, identifying such measures appears to be challenging. There is, however, also a significant opportunity to be forward thinking and creative when designing measures that would be able to convince internal business managers to invest in a programme that should be developed and grown for their own sustainability.

4.2 Measuring the impact of intellectual capital management

Sveiby (1998c) uses the metaphor of a natural fountain or well to explain the use and the measurement of a knowledge body. Supposing one is tasked to measure the water in a spring, the solution to the task will depend on the purpose of the measurement and also on whom the measurer is and his/her values. To top it all, one would always, while endeavouring to measure, run the risk of altering and even killing off the source of the 'water'. The question, therefore, is what the purpose of measuring the intellectual capital activity should be. Hackett (2000, pp 50-51) reports that customer satisfaction or customer value is the primary measure most often cited by senior executives. He continues to say that, as is the case with training and other forms of investment in human capital, too many variables can prevent the development of a formula that leads to a proof. Therefore, most firms rely on the evidence such as cost savings, speed to market and customer satisfaction. Recording the number of hits on knowledge databases or activity on a corporate intranet can also be a useful proxy. A standard measure of success for knowledge management efforts: improved productivity at the individual and the organizational level, remains difficult to identify.

Although actual measures may be lacking, authors recognise that in order to measure intellectual capital effectively, a framework to guide the analysis needs to be developed. Robinson and Kleiner (1996, p 36) states that meaningful measures are a prerequisite to measuring the effectiveness of programmes designed to increase intellectual capital. They opted to develop a structure based on the work of Leif Edvinsson. Their structure has general categories:

- The first category refers to 'structural capital' and includes *that portion of intellectual capital that is left behind when the workers leave the company -* the documented or captured knowledge. This is also where patents, licenses, trademarks and trade secrets reside and it is the part of intellectual capital that is probably the easiest to measure because it is tangible and is very often seen as a source of income generation. A start could therefore be to count the number of patents and licenses in a firm. The first complication arrives

when it is realized that, to be of value to the firm, the patents must have market value. The market value of patents and licenses will continue to change as market conditions change. This complication has meant that Robinson and Kleiner have accepted that, within their framework, any measurement of intellectual capital will always be subject to change.

- The second, and more difficult side of intellectual capital measurement, refers to 'human capital' and includes the human skills of know how, problem solving, technology development, decision-making and learning.

A point of concern is that Robson (2000, p 81) reports that the experts he interviewed came to the conclusion that the valuation of intellectual capital is more of an 'art' than a 'science'. In true knowledge era style, they believe the person doing the valuation reflects the value of the valuation. This is an indication that subjectivity is accepted as an integral part of intellectual capital measurement. As such it could be expected that consultants specializing in the field of 'subjective measuring' will become sought after. It is, however, ideal that more objective ways in which to establish value should be developed.

Whether objective or subjective, when designing measures it is important to remember that it is not sufficient to be a smart employee. One needs to be an effective member of the firm (Robinson and Kleiner, 1996, p 38). Rather than measuring an individual's ability to deliver products, the most important aspect to measure is rather how well the knowledge workers communicate with the company's customers (Sveiby, 1997, in Ramosedi, 2000, p 14). In order to communicate well with customers, staff members have to communicate well with each other and therefore contribution to and usage of the internal network becomes the next important issue to measure.

Measuring intellectual capital does not only ensure that important issues receive the attention they deserve, it is also seen as an important step in determining how to measure general productivity improvement appropriately. Joia (2000, p 68) was able to show that, although knowledge may be intangible, it does not mean that it cannot be measured. Even so Zickner (1996, p 84), through her research on South African companies, Ramosedi (2000, p 77), in his research at a large financial institution, and Robson (2000, p 68), through his interviews with 10 senior executives, established that, notwithstanding the fact that a concerted effort is made to understand the impact of intellectual capital, evaluators still fall back on valuing and wanting to measure tangibles/hard numbers. No true accountant would, by merely listing indicators of intangible value, be able to bypass the generally accepted accounting practices and simply add intellectual capital to the company's balance sheet. None of the authors consulted suggested that the balance sheet be totally ignored but, if the balance sheet is not the answer to the problem, the questions to ask are the following:

- What is a more appropriate tool?
- What alternative structures for value reporting are available?
- What does one measure?

- How does one measure?
- How does one calibrate the results?

This chapter attempts to answer these questions. However, before discussing the alternatives to balance sheets it is perhaps useful to briefly pause and look at the developments where intellectual capital becomes part of the balance sheet.

4.3   Financial formulae and measures

The accountancy-profession is guided by generally accepted accounting practices (GAAP). These practices can be seen as universal 'rules' according to which a company's books are balanced. GAAP tend to be very conservative and treat items like R&D and human capital as expenses. It is accepted that if the return on capital is greater than the cost of capital, then value is created and a project should be implemented. If one then wants to pursue the financial statement avenue, this financial theory of capital should be used as a model from which to develop the measurement of intellectual capital.

Trying to put intellectual capital into a company's balance sheet may sound logical and the research documented by, for example, Joia (2000, pp 68-83) showed that it could theoretically be factored in quite easily. Joia (2000, p 70) claims to base his findings on research carried out by a number of experts (Edvinsson and Malone (1997); Roos et al., (1997); Sveiby (1997); and Stewart (1997), in Joia (2000, p 70)). He reports that it is proposed that a corporate capital taxonomy be used when determining intellectual capital value for the sake of reflecting it in the balance sheet. Edvinsson and Malone (1997, in Joia, 2000, p 74-75) suggest that intellectual capital is the arithmetic mean of all its components. Intellectual capital components are: human capital, innovation capital, process capital and relationship capital. To change all this information into a financial formula one can say that:

$$BV + IC = MV$$

Where:

MV	**=**	**Market Value**
BV	**=**	**Book Value = (MC + PC)**
MC	**=**	**Monetary Capital**
PC	**=**	**Physical Capital**
IC	**=**	**Intellectual Capital = (HC+IVC+RC+SC)**
HC	**=**	**Human Capital**
IVC	**=**	**Innovation Capital**
RC	**=**	**Relationship Capital/Customer Capital**
SC	**=**	**Structural Capital/Process Capital**

This equation shows that MV has a tangible portion BV, in addition to an intangible component IC. Hence, supposing MV minus BV is greater than zero (MV - BV > 0), it shows that the company needs to make provision for managing and measuring its

intellectual capital. It can be assumed that the more knowledge-intensive the company is, the greater the IC value will be.

Differing depreciation policies might of course influence the book value calculation of a company, which is where the Tobin q value comes in. This ratio measures the relationship between a company's market value and its replacement value (i.e. the cost of replacing its assets) and was developed by the Nobel Prize-winning economist James Tobin. In order to circumvent the differing depreciation policies used by accountants world-wide, Tobin in 1969 suggested the use of replacement cost - q. He defined q as (market value)÷(replacement cost of the assets). If q is greater than one, the asset is worth more than the cost of replacing it; thus it is likely that the company will seek to acquire more assets of this kind. When using Tobin's q, a company with a stock market value of R100 million and a book value of R25 million will have a Tobin's q ratio of 4.00. In the long run, this ratio will tend towards 1.00, but evidence shows that it can differ significantly from 1.00 for very long periods of time. For example, companies in the software industry, where intellectual capital is abundant, tend to have a Tobin's q ratio of 7.00, whereas firms in the steel industry, noted for their large capital assets, have a Tobin's q ratio of nearly 1.00. According to Joia (2000, p 70), the formula becomes:

$$MV + (MV/q) = IC$$

As was seen with the depreciation of BV, it also needs to be considered for the IC part of the formula. Joia (2000, p 83) quotes the work of Argote, et al., (1998) and Jelle (1979) to inform the reader that there is a substantial component of organizational knowledge that depreciates rapidly. More research is necessary to identify the factors that affect the rate of learning and 'forgetting' in organizations. Similarly, Yelle (1979, in Joia, 2000, p 83) also indicated that identifying factors favouring an accelerated rate of learning is a promising area of future research. Knowing more about these two issues could allow investments on training and innovation to lead to better and quicker results than those achieved at present. Neither knowledge acceleration nor depreciation form part of this research and will therefore not be taken into consideration but it should be researched within the information services environment.

Fortunately Joia (2000, p 74) suggests that it is not important to try and establish an absolute monetary value for intellectual capital. Rather variations should be tracked within its component values over the course of time. Joia did however test his intellectual capital measurement model in a case study with actual data. He found his model more accurate than that of Edvinsson and Malone. Yet he came to the conclusion that *A long and arduous road still needs to be negotiated before we have reliable measurements for intangible capital* (Joia, 2000, p 82). His results did indicate that a lack of investment in the development of more efficient and effective internal processes plus a disregard for the players involved (customers, suppliers and banks) lead to the fact that the intellectual capital score is jeopardized. In addition, the effects of heavy investments in human and innovation capitals take a while to be

fully implemented and felt. A 'snapshot' measuring methodology does not take these aspects into account.

The Joia research reiterates the fact that the current balance sheet and income statement tools are able to present an X-ray or 'snapshot' of a firm. Balance sheets provide indications of how the company appears within a specific period, but are not reliable tools to perceive a company's future performance. From further literature consulted, it is clear that the measuring of and reporting on intellectual capital should be seen as a tool separate but complementary to the balance sheet. Robson's (2000, p 91) research also confirmed that financial experts do not see it as a feasible option to include intellectual capital on the balance sheet of a company within the current accounting framework. It confirms Stewart's observation about the balance sheet not being the right instrument to record intellectual capital. This opinion is supported by Kaplan and Norton (2001a, p 88). Their argument is specifically directed at the fact that balance sheets usually reflect those items that have a direct impact on revenue and profit. Where intangible assets are concerned, there is usually no direct link between cause and effect and the time variation also depends upon uncontrollable circumstances. They see the balance sheet as an additive tool. In contrast, they are of the opinion that intangible assets need a multiplicative tool (Kaplan and Norton, 2001a, p 89).

Nevertheless, it will in all probability still take a long time before both financial managers and investors take note of Stewart's remark that balance sheets and income statements *are part of the framework that fits the industrial enterprise, not the intelligent one* (Stewart, 1997, p 58). Until then it will remain important that additional measures exist side by side with the traditional. These measures need to make provision for the facts that, within a knowledge era company:

- The most valuable employee is the one who is capable to perform at an expert skill level and is able to transfer that expertise to appropriate colleagues. Capturing or embedding that expertise within a system that is independent of the individual is 'first prize'. If it is to be successful the measuring system needs to take into consideration all the stages between embarking on new learning experiences and transferring knowledge to appropriate systems.
- Customers are the engines of growth (Duffy, 2000, p 10) and success begins and ends with customer satisfaction (Fine, et al., 2002, p 72). No measuring methodology or tool is more important than providing a product or service that the customer is willing to support. Measuring customer capital and making use of the results of the measurement to ensure growth is fundamental in ensuring long term sustainability.

In line with these two facts, Garrick and Clegg (2000, p 280) report that although measures for intellectual capital have grown from dissatisfaction with conventional economic measures of value, the most desirable results remain in terms of profit margins or observable (measurable) outcomes. They stress that financial objectives represent the long term goal of the organization: to provide superior returns based on the capital invested in the unit. De Gooijer (2000, p 303-304) warns that most of

the solutions offered are geared towards profit-making commercial firms. She is of the opinion that solutions have had limited application for public sector management, especially when applied to measuring cultural change within an organization. As a last comment Lank (1997, p 409) asks: *Would an investor put his money in a business that didn't keep track of its financial assets?* The answer to the question is quite obvious. It is therefore anticipated that, before too long, investors may be asking, as a key aspect of their due diligence process, how intangible assets are managed and this will indeed focus management attention onto this invisible and intangible source of value. The bottom line is therefore that appropriate measurements need to be established and developed urgently.

A large number of measuring methodologies, where both balance sheets and intangible assets are evaluated, do exist. Fortunately Sveiby (2001a) identified 21 of these and provided structure in terms of what the aim of each method is. A table reflecting all the methods (Table 4.1 on page 4.13) is provided but, in short, according to his categorization there are four approaches to measuring intangible assets, namely:

- Direct intellectual capital methods (DIC) – where components are identified and valued.
- Market capitalization methods (MCM) - where the difference between market capitalization and stockholders' equity is calculated.
- Return on assets (ROA) – where tangible assets and the annual financial growth figures are compared to the industry average. Above average earnings are then utilized to estimate the value of intangible assets.
- Scorecard methods (SC) – where the various components of intellectual capital are identified and reflected in terms of scorecards or graphs.

The purpose of measuring intellectual capital growth within the context of this research, in all probability, differs vastly from that of a listed company with investors. Listed companies would want to provide proof that the company is viable and that it would continue to make a handsome profit. Within this research the aim is rather to provide proof of sustainable, efficient service and that the investment made by the company is to the benefit of all the knowledge workers within the company as a whole. It is also to establish ultimately where the service fits into the company's virtual structure: is it purely support or truly an indispensable part of its learning cycle. Taking the context of this study into consideration, it is especially the scorecard-type methods of measuring intangible assets that were found to be of interest.

4.4   Available measurement methodologies

It was thought that the work done by Robson (2000), where he investigated the internal valuation of intellectual capital, would contribute largely to this research. Unfortunately this was not the case. He did confirm the opinion that internal valuation forces management to acknowledge that they are responsible for more than just the company's tangible assets. Management is in effect 'forced' to focus on the real drivers of value in a knowledge-based organization. However,

disappointingly he came to the conclusion, from the experts he consulted, that the valuation of individual components is seen as too time consuming and intensive to do regularly. The experts would *base valuations on the interaction of all the company's assets, rather than value individual assets and then aggregate these values into an implied valuation for the entire company* (Robson, 2000, p 94). The same valuation of tangible assets was therefore still being used irrespective of the company's asset base. In effect the difference between physical and intellectual assets were ignored. Robson ascribed this tendency largely to the absence of reliable measuring methods, which of course is a useful excuse to fall back into comfort zone techniques.

In reporting on the results of his research, Robson (2000, pp 84-85) indicated that, notwithstanding the fact that experts see the danger of over-simplifying complex and inter-related concepts when trying to take advantage of the opportunity inherent in intellectual capital management, they also believe that instinctive judgement of the value of intellectual capital was sufficient as a basis for making management decisions relating to the value of internal intellectual capital. In his opinion a broader understanding of intellectual capital as a concept should improve the situation but, for the present, an instinctive 'gut-feel' to decide if one is creating or destroying intellectual capital was thought to be sufficient for 'day-to-day' management of a company. Again the complexity of the valuation methods was seen to prohibit the collection and recording of intellectual capital values over time. He acknowledged that there is a need to establish how to value 'potential' if there is no historical data. He acknowledged the danger of speculation about either the future earnings or the future market size as both have the risk of flawed and biased judgement. He conceded that if it is not possible to improve the valuation, the answer was to establish a method to evaluate the valuation and the evaluator rather than evaluate the company. This may be logical but it appears to be an academic exercise rather than finding a simple solution.

After the initial brush with balance sheet type measures and the disappointing conclusions from Robson's research, it was decided to follow the advice given by Sveiby (2001a) and Bontis, et al., (1999, p 392) and start at the beginning. This meant gaining an overview of all the available techniques before attempting to identify any one reliable technique. Fortunately the task was less daunting than expected. Authors such as Bontis, et al., (1999) and Sveiby (2001a) had already attempted to collect and evaluate all the available measuring techniques and the exercise was therefore a fairly easy one. Kaes (1999) gave in depth insight into the rationale, purpose, approach, tools, advantages and disadvantages of a number of the measuring techniques. Sveiby's (2001a) list of possible measuring techniques is, however, more complete and is reflected in Table 4.1 on page 4.13. Although Bontis, et al., (1999) identified only four of the groupings (their research was published two years prior to Sveiby's), they did provide the advantages and disadvantages of some of these techniques. As a further enhancement of Sveiby's work, the activity based costing methodology for human capital valuation, identified by Leibowitz and Wright (1999, p 102), was added. Lastly, Table 4.1 also gives an indication of the elimination process followed to establish which methodologies to investigate/not investigate any further.

Table 4.1: Overview of intangible assets measures (modified[1] version of Sveiby (2001a))

DIC - Direct Intellectual Capital Methods
MCM - Market Capitalization Methods
ROA - Return on Assets
SC - Scorecard Methods

Label	Major Proponent	Category	Description of Measure	Suitability within the research context
Technology Broker	Brooking (1996)	DIC	Assesses the value of the intellectual capital of a firm based on a diagnostic analysis of a firm's response to 20 questions covering four major components of intellectual capital.	Has possibilities but appears subjective. The questions will have to be evaluated for relevance. It also appears to require an advanced stage of development that is not realistic within this research. **Not suitable**
Citation-Weighted Patents	Bontis (1996)	DIC	Calculates a technology factor based on the patents developed by a firm. Intellectual capital and its performance is measured based on the impact of research development efforts on a series of indices, such as number of patents and cost of patents to sales turnover, that describe the firm's patents.	No patents were or are being developed. **Not suitable**
Inclusive Valuation Methodology (IVM)	McPherson (1998)	DIC	Uses hierarchies of weighted indicators that are combined, and focuses on relative rather than absolute values. Combined Value Added = Monetary Value Added combined with Intangible Value Added.	Appears to be too complex for the context of the research **Not suitable**
The Value Explorer™	Andriessen and Tiessen (2000)	DIC	Calculates and allocates value to five types of intangibles: (1) Assets and endowments, (2) Skills and tacit knowledge, (3) Collective values and norms, (4) Technology and explicit knowledge, (5) Primary and management processes.	Taking the context of the research into consideration, accounting methodologies were not seen to be suitable. **Not suitable**

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[1] The work of Liebowitz and Wright was not reflected in Sveiby's (2001a) version of this Table.

Label	Major Proponent	Category	Description of Measure	Suitability within the research context
Intellectual Asset Valuation	Sullivan (2000)	DIC	Methodology for assessing the value of Intellectual Property.	Supporting literature was not retrieved but based on Sveiby's categorization this methodology will in all probability be too complex within context. **Not suitable**
Total Value Creation, TVC™	Anderson and McLean (2000)	DIC	A project initiated by the Canadian Institute of Chartered Accountants. Uses discounted projected cash flows to re-examine how events affect planned activities.	Taking the context of the research into consideration accounting methodologies were not seen to be suitable. **Not suitable**
Accounting for the Future (AFTF)	Nash H. (1998)	DIC	A system of projected discounted cash flows. The difference between AFTF value at the end and the beginning of the period is the value added during the period.	Taking the context of the research into consideration, accounting methodologies were not seen to be suitable. **Not suitable**
Tobin's q	Stewart (1997) Bontis (1999)	MCM	The q is the ratio of the stock market value of the firm divided by the replacement cost of its assets. Changes in q provide a proxy for measuring effective performance or not of a firm's intellectual capital.	Taking the context of the research into consideration accounting methodologies were not seen to be suitable. **Not suitable**
Investor assigned market value (IAMV™)	Standfield (1998)	MCM	Takes the company's true value to be its stock market value and divides it into tangible capital + (realised IC + IC erosion + SCA (Sustainable Competitive Advantage)	Stock market value is not an appropriate measure within the context of this research. **Not suitable**
Market-to-Book Value	Stewart (1997) Luthy (1998)	MCM	Considers the value of intellectual capital to be the difference between the firm's stock market value and the company's book value.	Stock market value is not an appropriate measure within the context of this research. **Not suitable**

4.13

Label	Major Proponent	Category	Description of Measure	Suitability within the research context
Economic Value Added (EVA™)	Stewart (1997)	ROA	Calculated by adjusting the firm's disclosed profit with charges related to intangibles. Changes in EVA provide an indication of whether the firm's intellectual capital is productive or not.	Bontis, et al., (1999, p 392) report that complicated adjustment procedures are required, governance structure in the interest of shareholders only is assumed and that net assets are set up versus the market value of the assets. These aspects are not appropriate for this research. **Not suitable**
Human Resource Costing and Accounting (HRCA)	Johansson (1996)	ROA	Calculates the hidden impact of HR related costs, which reduce a firm's profits. Intellectual capital is measured by calculation of the contribution of human assets held by the company divided by capitalised salary expenditures.	Financial measures and formulae are not appropriate within the context of this research. **Not suitable**
Human capital valuation	Liebowitz and Wright (1999)	ROA	Based on activity based costing. Uses the accounting convention of historical costs. Enables the valuation of human capital to be integrated into traditional accounting models.	No proof could be found that this method has been applied successfully within similar circumstances. Within context it is not deemed sufficient to only concentrate on human capital **Not suitable**
Calculated Intangible Value	Stewart (1997) Luthy (1998)	ROA	Calculates the excess return on hard assets, then uses this figure as a basis for determining the proportion of return attributable to intangible assets.	Too complex for the requirements and context of the research. **Not suitable**
Knowledge Capital Earnings	Lev (1999)	ROA	Calculates knowledge capital earnings as the portion of normalised earnings over and above expected earnings attributable to book assets.	Too complex for the requirements and context of the research. **Not suitable**

4.14

Label	Major Proponent	Category	Description of Measure	Suitability within the research context
Value Added Intellectual Coefficient (VAIC™)	Pulic (1997)	ROA (does not quite fit any of the categories)	Measures how much and how efficiently intellectual capital and capital employed create value based on the relationship to three major components: (1) capital employed; (2) human capital; and (3) structural capital.	Does not make provision for customer /stakeholder capital. **Not suitable**
Human Capital Intelligence	Jac Fitz-Enz (1994)	SC	Collects and benchmarks sets of human capital indicators against a database. Similar to HRCA.	No benchmark database is readily available. The context of the research does not warrant the effort in creating such a database. Within context it is also not deemed sufficient to only concentrate on human capital **Not suitable**
Skandia Navigator™	Edvinsson and Malone (1997)	SC	Measures intellectual capital through the analysis of up to 164 metric measures (91 intellectually based and 73 traditional metrics) that cover five components: (1) financial; (2) customer; (3) process; (4) renewal and development; and (5) human.	May be too complex but further investigation is required. **Possibly suitable**
IC-Index™	Roos, Roos, Dragonetti and Edvinsson (1997)	SC	Consolidates all individual indicators representing intellectual properties and components into a single index. Changes in the index are then related to changes in the firm's market valuation.	May be too complex but further investigation is required. Bontis, et al., (1999, p 392) report that this method is flexible; dynamic; allows for partial external comparison; and can also be utilized by not-for-profit organizations **Possibly suitable**
Intangible Asset Monitor	Sveiby (1997)	SC	Management selects indicators, based on the strategic objectives of the firm, to measure four major components of intangible assets: (1) growth (2) renewal; (3) efficiency; and (4) stability.	Appears to be applicable within the context of this research. **Possibly suitable**

4.15

Label	Major Proponent	Category	Description of Measure	Suitability within the research context
Value Chain Scoreboard™	Lev B. (forthcoming)	SC	Arranges a matrix of non-financial indicators in three categories according to the cycle of development: Discovery/Learning, Implementation, Commercialisation.	Holds promise as its fits in with the strategy of the mother organization. **Possibly suitable**
Balanced Scorecard	Kaplan and Norton (1992)	SC	Measures a company's performance through indicators covering four major focus perspectives: (1) financial perspective; (2) customer perspective; (3) internal process perspective; and (4) learning perspective. The indicators are based on the strategic objectives of the firm.	Appears to be applicable within the context of this research. Bontis, et al., (1999, p 392) claim that the methodology has powerful logic; clear correlation between indicators and financial performance as well as well-developed and consistent literature. **Possibly suitable**

4.16

4.5 Selected measuring methodologies

What appeared to be a fairly superficial evaluation - as reflected in Table 4.1, proved to be valuable in deciding to investigate only the scorecard methods of evaluation. As a group, within the context of this study and taking the wider CSIR into consideration, these techniques were deemed more appropriate.

4.5.1 Skandia Navigator™

Skandia regards its Navigator as a future-orientated business-planning model. The Skandia Navigator, which shows similarities with the balanced scorecard, was developed in 1994 to provide Skandia with a measuring and reporting tool. It makes provision for historical measurements (financial focus), present day measurements (customer and process focus) and the measurements required of a future organization (renewal and development focus) (Skandia, 1998, p 5). According to Edvinsson (1997, p 366), Skandia makes use of the same model when it does employee performance appraisal and rewards assessment. This ensures that the reward system is balanced: that both the financial and the non-financial aspects feature as focus areas. This information was confirmed in their 1998 annual report.

To develop their Navigator, Skandia identified almost 200 indicators to take a snapshot of the six different subsets of their intellectual capital (human, structural, customer, organizational, innovation and process). Some of these are reflected in Table 4.5 on page 4.39. From the Skandia intellectual capital report it appears that subsidiary companies each select the indicators that are relevant to that specific company, which is appropriate when considering the reason why the Navigator was developed.

Leibowitz and Wright (1999, p 101) and Kaes (1999, p 137) criticise the Navigator for the following reasons:

- There is an amalgam of both quantitative and descriptive measures without a common basis of measurement.
- The measures are infused with subjectivity that is difficult to generalize over organizations. Kaes goes as far as to say that the use is limited because of the unstandardized approach that underlies the index.
- There is an inadequate treatment of the external environment, i.e. the exclusive focus on customers.
- The static intellectual capital flows are not incorporated.
- The index was designed specifically for a service company which limits its applicability to other industries.

In addition to the criticism expressed by Kaes and Leibowitz and Wright, it is also necessary to add that, although the Navigator is seen as the benchmark in measuring intangible assets, the multitude of measuring elements is not appropriate in the given environment. It also does not appear to make provision for the full picture within the context of this research, which is in all probability due to the fact that the company backgrounds differ to the extent that they do.

4.5.2 IC-Index™ and its related activity digital IC-landscaping

Skandia, recognising some of the weaknesses in the Skandia Navigator, developed a method through which to manipulate and display the results. Basically it requires that a number of indicators be devised or identified. The indicators are then consolidated to form a measurement tool that can dynamically describe intellectual capital and its development over time. It allows for the comparison between changes in intellectual capital and changes in the company's market value, thereby gaining a prognosticating value (Skandia, 1998, p 5). With the exception of the reference to digital landscaping, no literature referring to the IC-Index published after 1998 could be traced. Sveiby's (2001a) description of the methodology, the disadvantages identified by Bontis, et al., (1999) and the definition provided by Skandia pointed to this being a methodology that concentrated on growing shareholder value. As such the methodology would not be suitable and as a result further investigation was abandoned. For interest sake, it was, however, decided to briefly look at the development of digital landscaping as it is based on the IC-Index™ methodology.

Digital IC-landscaping

Digital IC-landscape is a methodology based on multi-dimensional scaling and mathematical statistics. It supports the *pedagogical display of IC complexity, migration of IC-affecting knowledge, exploratory retrieval of high IC efficiency, investment planning and forecasting* (Edvinsson, Kitts and Beding, 2000, p 263). To illustrate their point, these authors investigated 11 companies using 20-40 essential variables and a number of free parameters. In contrast to the value chain methodology, which is described in section 4.5.4 on page 4.21, Edvinsson, Kitts and Beding (2000, p 264) are of the opinion that value addition no longer occurs in a linear fashion. In classical value chain style, a product moves from the supplier, to the company, to the customer and finally to the customer's customer. In the knowledge economy, the value chain turns into a value cluster constellation where all are interlinked. Figure 4.1, below, represents the formations graphically.

Fig 4.1: Value chain and value cluster constellations
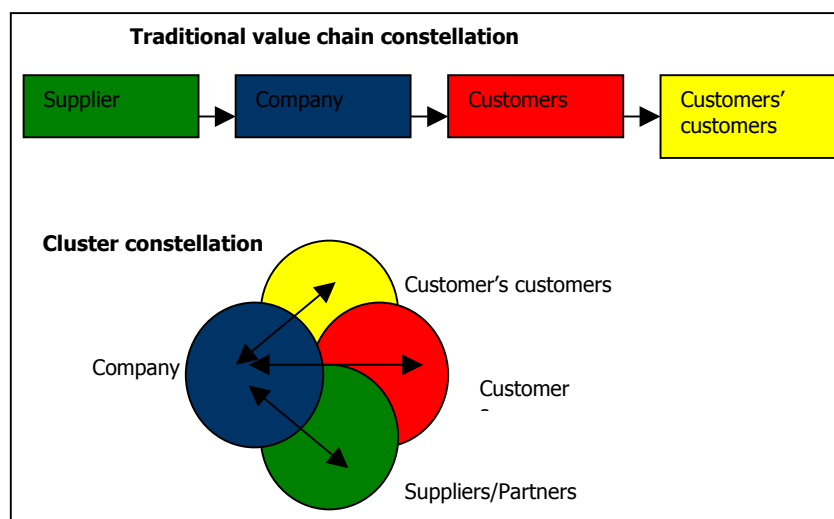
The purpose of digital IC landscaping is to collect 'flat' information and to put it into the digital environment where it is possible for managers to play 'what if' games in terms of their intellectual capital development. The result strongly resembles a geographical map where the peaks and valleys are depicted by contour lines. Fascinating as these 3-D graphs are, they were seen to be far too complex for application within the context of this study and as a result were not investigated any further.

4.5.3 Intangible Assets Monitor

The Assets Monitor framework makes provision for both tangible and intangible assets. Intangible asset indicators are then grouped into three subsets, namely external structure, internal structure and individual competencies. Each of these framework items requires that the growth rate, the renewal activities, the efficiency and the associated stability or risk be investigated (Sveiby, 1998c). In contrast to the common assumption, Sveiby (2001b) claims that the intangible asset monitor was conceptualised, independent of the balanced scorecard concept, in Sweden between 1986 and 1987. He argues that the measure should not be seen as yet another control mechanism and that the results of the measure should be used to learn and to enter into dialogue. He admits that the asset monitor shows the following similarities with the balanced scorecard:

- it suggests that financial indicators need to be complemented with non-financial indicators to measure sustainability;
- it categorises the non-financial indicators into three components;
- it argues that the non-financial indicators must be moved from being operational in nature to the strategic level;
- it sees strategy as the key driver of the metrics that are designed;
- it sees change should be seen as the most important aspect of the measure;

The theoretical differences between the two systems lie in the following factors:

- The assets monitor is based on the notion that people are an organization's only profit generators. People are not seen as a cost but as revenue creators and the source of wealth creation.
- The Asset Monitor treats profits generated as signs of success and not as the originator of success;
- The Asset Monitor acknowledges that intangible 'structures' are created as a result of human actions. These structures can be directed outward (contact with customers and suppliers) or inward (work teams). The structures in themselves also have value.
- The assets monitor is based on the stock-flow theory, which is the basis of traditional accounting theory. As a result the monitor sets out to measure the change in assets such as development, growth, renewal, efficiency and the risk associated with losing the assets.
- The external structure includes customers, suppliers and other external stakeholders. Especially not-for-profit and public sector companies find it

difficult to see their 'customers' in the same light as commercial companies do.

- The assets monitor requires that companies go through a redesign process. The purpose would be to be more knowledge focused. The company is therefore not just rolling out its strategy better but is also improving the quality of the strategy itself.

The latest development in Kaplan and Norton's (2001a, p 101) balanced scorecard for public sector companies, where the value creation component and stakeholders were added, was in all probability an effort to compensate for at least some of the differences identified by Sveiby. It does appear though that the main difference between the Asset Monitor and the Balanced Scorecard lies in the focus of each. It appears that the Intangible Asset Monitor focuses on human capital while the Balanced Scorecard focuses on strategy. In terms of the disadvantages of the Intangible Asset Monitor, Kaes (1999, p 137) did point out the following:

- the strong focus on employees might lead to neglect of important areas of structural capital;
- inadequate treatment of the external enviroment, i.e. the exclusive focus on customers;
- the explicit focus on service and know-how companies which makes it less relevant to other industries;
- the static intellectual capital flows are not incorporated; and
- there is no link to financial capital performance.

Notwithstanding the weaknesses, the Intangible Asset Monitor did appear to be a suitable methodology for measuring progress within the context of this research. Because it is already visible that there are overlaps in what is required for measurement and because of the clear advantages in the next two methodologies to be discussed, it is already anticipated that it would in fact not be one single methodology that would be appropriate for use but rather a combination of methodologies that would provide the most suitable solution.

4.5.4 Value Chain Scoreboard™

The idea behind the value chain scoreboard is to find and score appropriate measures for each of a number of value chain stages. The purpose is to ensure that growth occurs to ensure that the company is able to keep pace with the increase in speed requirement of the new economy. The original work could not be traced but, according to Sveiby (2001a), Lev's value chain identifies discovery, implementation and commercialisation stages. These stages are similar to the discovery, investigation and consumer testing phases identified by Czerniawska and Potter (1998, pp 74-85). Because their work particularly refers to a typical research environment, which is the context of this study, it was decided to use that rather than to refer back to Lev.

Evaluation or scoring of the value chain cannot be done at leisure. Speed (of delivery) is the single most important factor that impacts on knowledge economy

businesses. Therefore, the company's value chain also needs to allow for the acceleration of delivery of products and services (at least at the same level but preferably an improved level of quality) to its customers. If this is not possible, the company has not yet made the shift into the knowledge economy competitive arena. Without that basic understanding, it will be even more difficult to understand intangible value chains.

Napster, a web service that allowed for the sharing of music in MP3 format, is often used as an example to illustrate value chains within the e-business environment. It is also often quoted as an example to illustrate that, if one does not understand the impact of the changed environment upon your value chain, you could, as the music industry has done, lose all control over the really valuable portion of the supply chain. By succeeding to close Napster down, the industry opened the opportunity for a number of anarchists who are now devoted to making music files available free of charge and who are causing huge losses to the formal industry (Fine, et al., 2002, p 69).

The identification of a virtual (or intangible) component to value chains comes from work that was published in 1995 by Rayport and Sviokla (in Czerniawska and Potter, 1998, p 67). They argued that within physical value chains, information is part of the supporting infrastructure. Once the value within the virtual value chain is understood, it becomes an asset to be managed just as a physical value chain. The reason why the virtual value chain is, more often than not, not valued is that both the processes (making connections between disparate pieces of data and selecting, analysing, extracting and distributing data) as well as the customers (staff members within your own organization who need the information for their own processes) are virtual. To explain the concept, Czerniawska and Potter (1998, p 67) provided an analogy of the modern school. The physical value chain refers to the children moving through the system from one grade to the next until they are able to leave having attained an expected minimum standard of education. When analysing the virtual value chain, the strengths and weaknesses of both teachers and children are assessed. The state of knowledge within the children is established prior to class and the effect of the teaching is measured afterwards. The aim would be to change and improve the teaching to the class as a whole and to individual children. The overall effectiveness of the school could then be measured and benchmarked against other schools. The first step is therefore to monitor and improve the virtual process. Within the information services this would refer to personalization of both end user training and access to information sources.

When the intangible value within the chain has been maximised, the next step is to replace processes where necessary. A library example of this is where patrons, who were previously expected to visit the library to gain access to information, now have desktop access to electronic full text which was scanned from a physical document and forwarded electronically, or where the information specialist has negotiated access to a publisher's full text content and taught the member of staff to help himself.

As a third step in value chain methodology utilization, it is also possible to create new products for new customers, if the value chain is exploited to its full potential. Linking back to the library example, the information gained from patron feedback could be sold to (or exchanged with) suppliers to improve their products. Needs that are expressed could be sold to other role players so that new products to address those needs could be created. Once the benchmark identifies your service as the best in the market, it is of course also possible to sell the service to customers outside the company walls. Perhaps what is most valuable from the whole process, is the continuous positive, active cycle (or chain) of innovation and improvement that works to the benefit of all parties involved in it.

The faster the development is in underlying technologies of a product or system, the more likely it is that the relevant section of the value chain will be prone to rapid innovations. It is therefore more likely that one would require higher ongoing knowledge investments to maintain technological competency (Fine, et al., 2002, p 72). The best growth position to be in is when a section of your value chain has competitive advantage in an area where there is high customer importance evaluation and technologically there is a relatively fast rate of development. The trick is to identify and take advantage of such a niche area. Similarly, if it is cheaper to outsource a section of the supply chain, where the company does not hold competitive advantage, to a reliable supplier, the company should do so.

As was mentioned at the beginning of this section, Czerniawska and Potter's work (1998, pp 74-85) is of particular interest because they identified an intangible value chain within a research environment. Their value chain refers to the discovery or creation of a new idea, the investigation of the feasibility of that idea and then lastly the testing of the idea on the consumer. This value chain could easily be adapted to indicate the significance for and the impact of information services on the various stages of both the tangible and intangible value chains of a research organization. Figure 4.2 on the next page is an attempt to illustrate the significance of the value chains for information services.

4.22

Fig 4.2: Value chains in information services
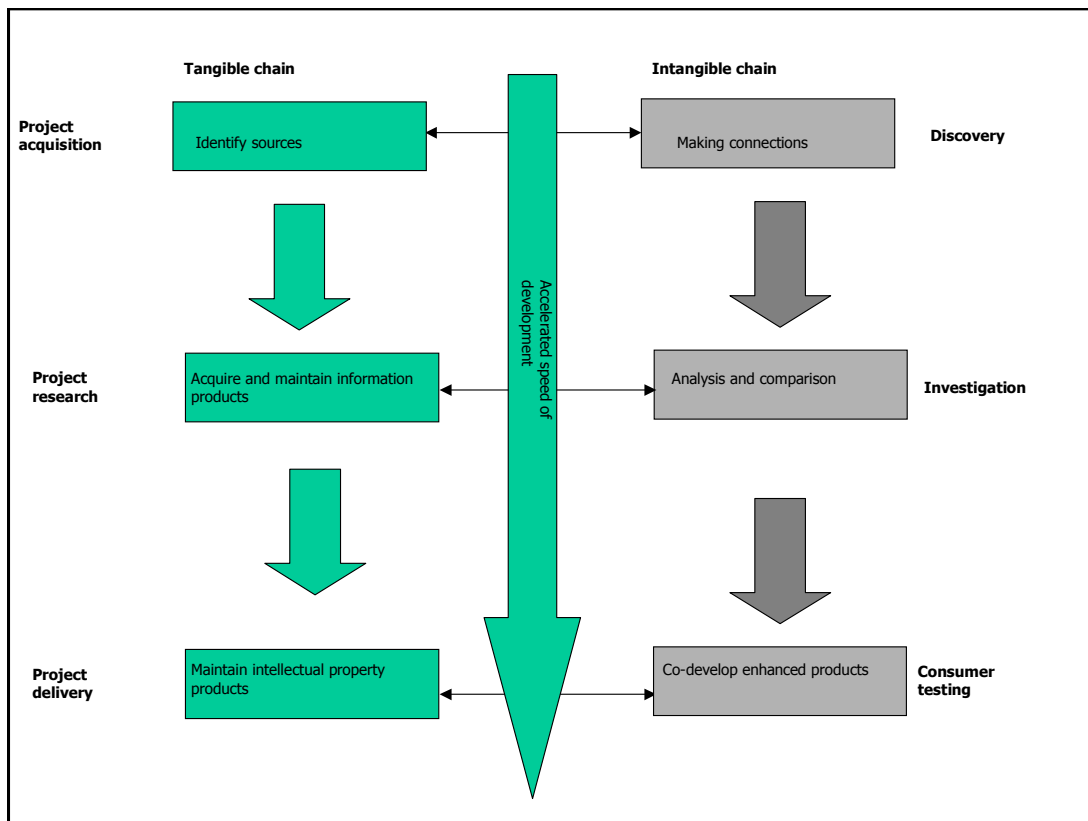
Looking at the physical value chain of a research organization and the contributions information specialists/librarians make to it, it can be clearly seen that much of the visible or tangible contribution is reactive-proactive. The customer is not aware of any activity prior to the identification of a project. The researcher requests information and only then does the information specialist start identifying appropriate sources of information. During the research phase, the information products are acquired and maintained while some assistance is given to maintain and or develop intellectual property products (typically research reports) after the research is completed. Within the intangible chain, the information specialist pro-actively ensures that connections are made and maintained not only to sources but also to a variety of minds (knowledgeable people). During the investigation phase, the information professional compares and analyses sources of information in order to recommend the most reliable or most suitable when the researcher needs to gain access to it. During the consumer testing phase, the information professional either co-develops with the researcher or prepares products and services that can be utilized as direct input by the researcher. This idea is developed further through Table 4.2 on the following page. The table was created from a combination of Czerniawska and Potter's ideas and the skills identified by Marshall, et al., (1996).

4.23

Table 4.2: Information specialist contribution to the intangible value chain activities of a typical research organization

Intangible value chain stage	Activities	Methods	IS Inputs to the new value chain	Skills required
Discovery	• Synthesise your own and others' ideas • Take an existing approach and modify it for a new situation • An idea that was introduced in one context can be applied in another • Experiment with a definite goal to see what will happen	**Old** • Read • Attending conferences • Hold discussions with colleagues **New** • Communication technology is utilized to accelerate the exchange of ideas • The Internet allows the researcher to choose his sources where previously he depended upon an intermediary to choose on his behalf • Information is always on tap – one just needs to identify the source	• Assess and evaluate information supply chains • Enable access to reliable information sources • Negotiate favourable deals with reliable information suppliers • Provide staff with access to push, pull and push-pull information • Provide access to information generated internally • Transfer information from the physical (paper) to the virtual (electronic) domain **Value created** • Client experiences an increase in speed and scope of information • Increased productivity of the researcher • Increase in efficiency of the researcher	• Overview (balcony vision) • Critical evaluation • Technical/ICT manipulation • Negotiation – with suppliers and users • Ability to make connections – connecting minds and data • Sifting, sorting, maintaining information collections – virtual and physical
Investigation	• Experiment to find feasible solutions • Develop drawings • Develop proto-types	**Old** • Laborious, labour intensive laboratory tests • Expensive (and sometimes risky) in-situ tests **New** • Mathematical models are run against a database of possible solutions • Making designs	• Maintain databases of possible solutions • Identify and track experts • Capturing lessons learnt • Automating literature searches • Teach users to exploit the full capacity of available commercial	• Database creation, maintenance and manipulation • Communication skills • Training • Facilitating communities of practice and cross functional teams • Expert searching skills including the creation and maintenance of

Intangible value chain stage	Activities	Methods	IS Inputs to the new value chain	Skills required
		available for comment and improvement by peers – in a 24 hour working shift of global participation • Virtual testing in simulation environments • Cross functional teams	information products • Monitor new developments and pushing the information to the researchers **Value created** • Access to 'free' solutions for the researcher (cost saving) • Re-invention of the wheel minimized (increased productivity) • Reduced lead time (time saving)	SDI and alerting facilities of databases and the Internet • Expert indexing, reducing retrieval of noise
Consumer testing	• Exposing customers to the result of the research conducted • Turning an experiment into a viable business opportunity	**Old** • Marketing to clients after prototype has been tested • Variety of attempts to gain funding **New** • Co-development by known customers • Inputs from unknown customers (via the Internet for example) • Individualization or personalization of consumer goods • Physical domain testing is the very large test at the end of the process	• Pro-active identification of potential customers • Building customized portals and extranets and identifying/main-taining content in collaboration with customers and consumers • 'Market scanning' and analysis • Maintaining a database of records of interactions, actions taken, lessons learnt **Value created** • Adding to the efficiency and professional image of the researcher	• Analytical skills for needs identification and analysis • Identification and selection of relevant information to be shared between all partners • Skills to use relevant technology effectively – includes expert knowledge of web and database applications

Both Figure 4.1 and Table 4.2 provide valuable insight into the intangible aspects that needed to be considered when developing human capital.

4.25

4.5.5 Balanced Scorecard and its sub-entities

If literature volume was the only criterion to use, this methodology would easily be judged as the most popular. This is in all probability part of the reason why the sub-entities: knowledge management performance scorecard and balanced scorecard strategy maps, came into being. The balanced scorecard approach, to measure corporate performance, was developed and introduced in 1992 because Kaplan and Norton realised that companies, even though they may understand the value of non-physical assets, were not able to reliably measure the non-tangibles (Kaplan and Norton, 2001a, p 88). They saw that there was a widening gap between the short term financial goals and the longer term strategic goals and identified a scorecard that they felt would give companies a means to bridge the gap. In addition Kaplan and Norton (1996, pp 75-77) identified four 'new' business processes for those who introduced their balanced scorecard methodology. These processes were:

- *Translating the words in the company's vision and strategy* into an integrated set of objectives and measures that all executives could and would agree on.
- *Communicating and linking* the company's vision and strategy so that the organization as a whole could understand the long term strategy.
- *Integrated business planning,* which allows for the allocation of finance and other resources to initiatives that work towards realising long term goals.
- *Feedback and learning* not only from the short term financial point of view but from three additional perspectives, namely customers, internal business processes and staff learning and growth.

Keeping the above in mind, it is possible to say that the crux of the balanced scorecard methodology is that it provides management with the tools to learn at executive level – where strategic learning needs to take place. It provides the opportunity to translate company vision and strategy into measurable objectives with targets and initiatives. Mooraj, Oyon and Hostettler (1999, p 484) confirm this by stating that, even though it can be regarded as a control mechanism, they regard the balanced scorecard as part of the planning cycle of management science. Kaplan and Norton saw it fit to identify four areas in which to develop these objectives, namely:

- financial (to succeed financially how to appear to shareholders);
- internal business processes (to satisfy your customers and shareholders what business processes should you excel at);
- learning and growth (to achieve the vision how to sustain ability to change and improve); and
- customers (how to appear to customers).

Figure 4.3 on the next page provides a graphical representation of the above.

Fig 4.3: Balanced scorecard framework (in Mooraj, Oyon and Hostettler, 1999, p 481)
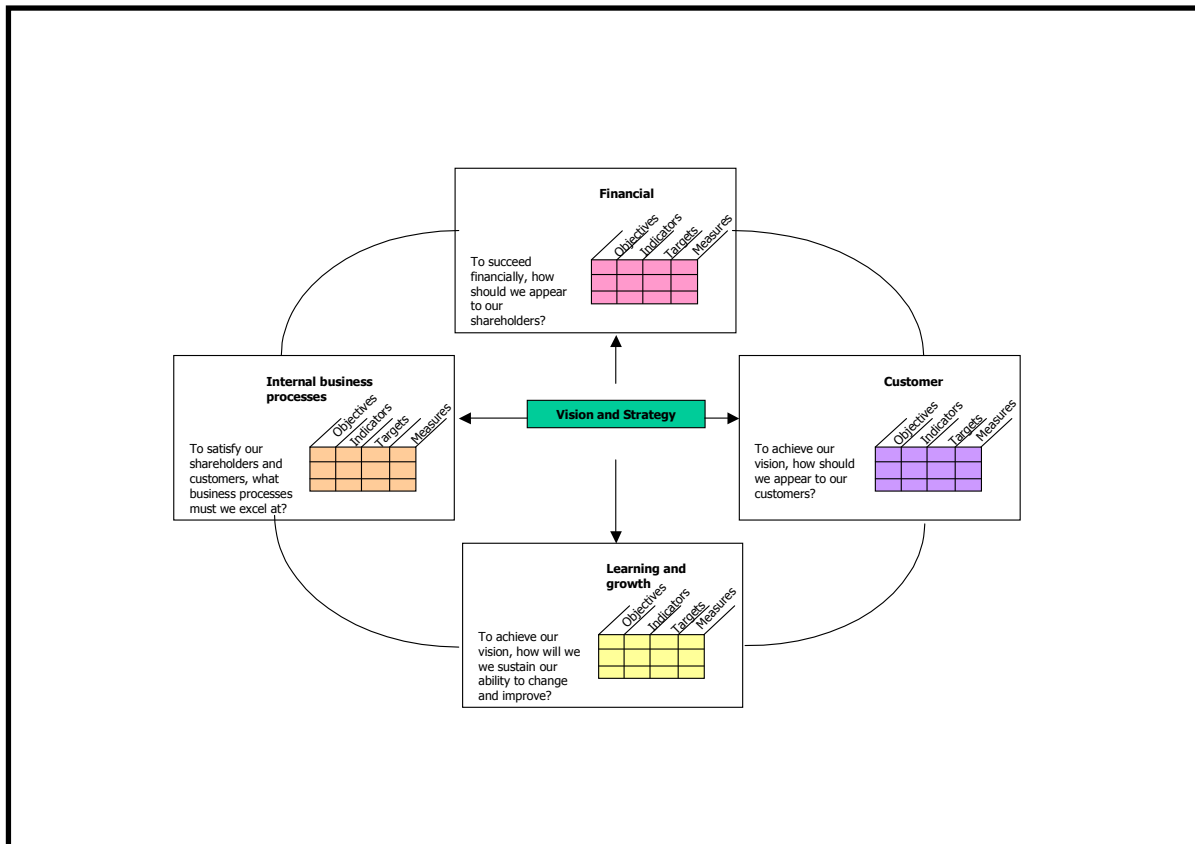
The intention is that management sets objectives for each of the four business objectives. Indicators to measure are then identified for the objectives. Targets are set for each of the indicators and initiatives are identified to ensure that targets are met. The balanced scorecard is meant to be more than just developing a checklist to measure managers' performance. Kaplan and Norton (2001a, p 87) are of the opinion that the only way to ensure that the scorecard does not become a checklist is to continually emphasise the linkage with strategy. It is easy to recognize that the scorecard encourages the development of human, structural and customer capital. This technique therefore appeared to be very suitable for measuring the impact of intellectual capital activities on the development of a service such as that provided by CSIR IMPS.

Kaplan and Norton (2001b, pp 147-155) identified five principles to be upheld when using their methodology. These principles are the following:

- translate the strategy into operational terms;
- align the organization to the strategy;
- make strategy everyone's everyday job;
- make strategy a continual process;
- mobilize leadership for change.

It is a good start to define and communicate vision and strategy throughout the organization. However, to ensure that each individual aligns with the activities Kaplan and Norton (1996, p 80) advise that each employee is informed and receives education as to what the scorecard activities really mean, that each and every employee sets goals in alignment with the company's strategy and that the company links rewards to performance measures. When this is managed correctly, each individual's responsibility towards the company achieving its goals can be identified. Looking at the matter from another angle, the contribution of each individual to the company reaching its goals can be identified and, in effect, his/her reward determined. The danger/risk lies in the fact that, as soon as reward is linked directly to a measure, the measuring instrument becomes more important than the contribution, that is being measured.

A further point of concern, which is directly applicable for this study, is that in a commercial company where financial gain is the goal, the customer who pays for and receives the service is usually one and the same. In not-for-profit organizations this is usually not the case. In not-for-profit organizations those who pay do not, as a rule, directly reap the benefits derived from the investment. Because of this, these not-for-profit organizations usually put the stakeholders instead of financial gain at the top of their 'scorecard'.

De Gooijer's work, reflected in the next section, is an example of this. Kaplan and Norton (2001a, p 99) suggest that, instead of placing the stakeholder in such a prominent position, the mission should in such cases rather be placed at the highest level. (For example a law enforcement agency will have a safe and crime free environment as the highest level of the scorecard or an information service could have the development of an informed, information literate body of staff members as its mission.) As a result of their observations, Kaplan and Norton adapted the original scorecard framework specifically for not-for-profit organizations as indicated in Figure 4.4 on the next page.

Fig 4.4: Adapted balanced scorecard framework (Kaplan and Norton, 2001a, p 100)
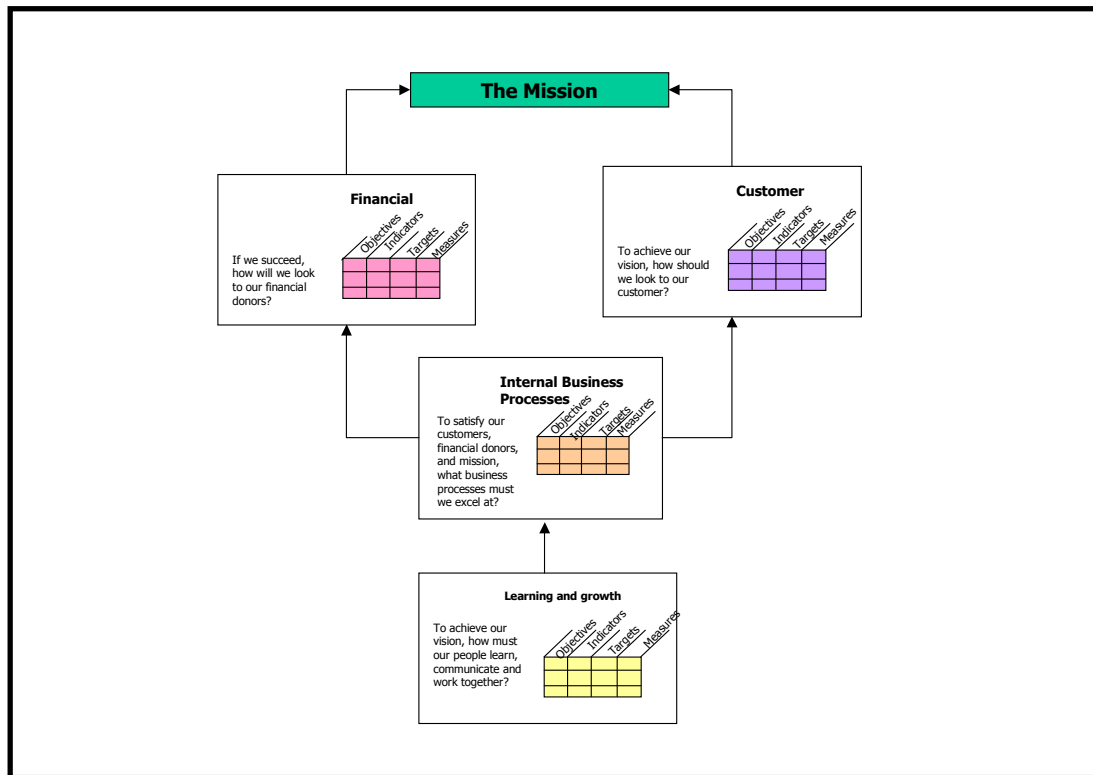
Kaplan and Norton realised that, even when the scorecard framework is adapted, the advantage of having the service does not get sufficient attention. They therefore developed a model through which public sector agencies could develop their objectives. This model (Kaplan and Norton, 2001a, p 101) was utilized to create the model reflected in Figure 4.5. The model makes provision for the development of objectives and measures in terms of the four items identified previously (finance, customers, processes and growth) but brings in the notion of value addition. It also places the customers and the stakeholders at the same level.

Fig 4.5: Framework for the evaluation of information services (adapted from Kaplan and Norton (2001a, p 101))
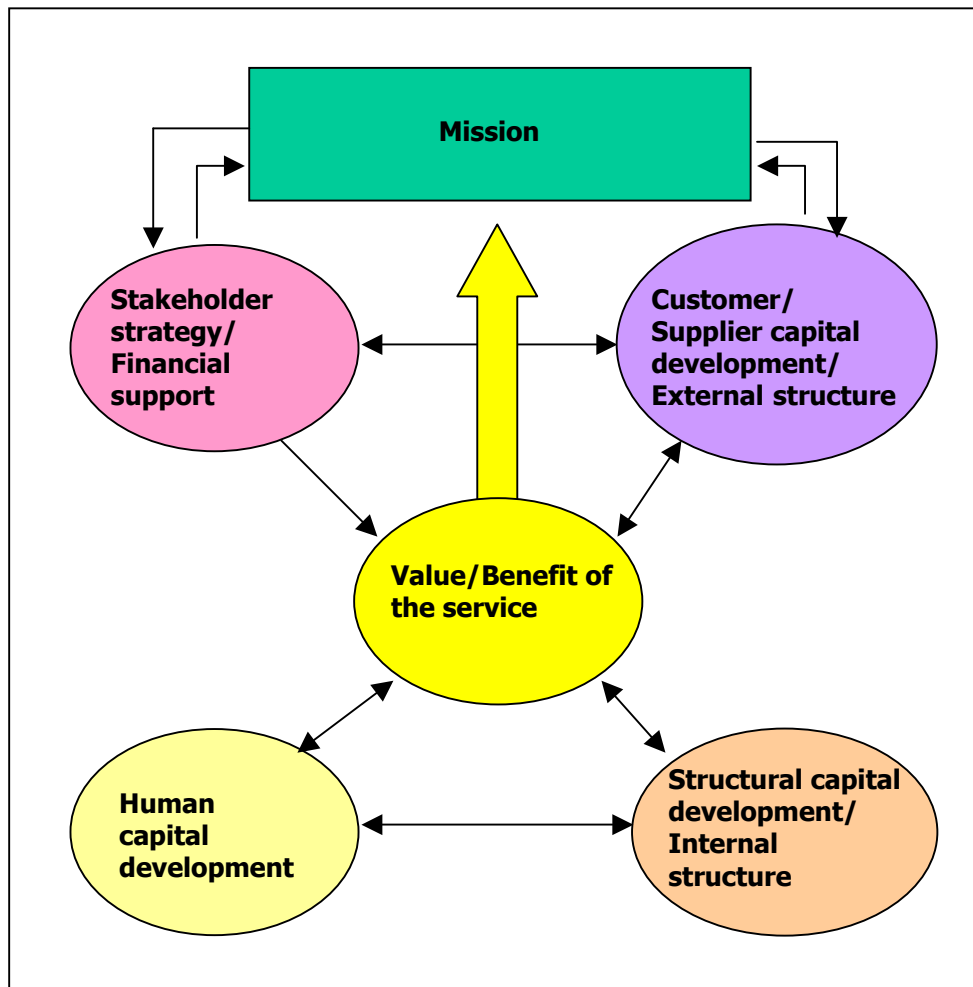
From Figure 4.5 one can determine that the development of both human and structural capital is subordinate to the value of the service. Value should be measured against the mission of the service. The model makes provision for the fact that not all human capital can and should be transferred to structural capital and, similarly, customers are also able to add value by providing feedback and engaging in interaction. Stakeholders may not benefit directly from the value provided by the service but, by ensuring that the mission of the service is in line with stakeholder strategy, stakeholders ensure alignment with their own focus. Customers benefit from the value created with stakeholder support (usually in monetary format) but need to be in direct contact with stakeholders as well. Such contact ensures that stakeholders are aware of their needs when providing input to the development of the service mission.

In general, literature consulted was very positive about the use of balanced scorecards. Mooraj, Oyon and Hostettler (1999, p 484-486) identified the following advantages of using the methodology:

- a dramatic increase in productivity;

- a significant increase in an individual's ability to identify his role in the success of the business;
- communication and understanding of the holistic system;
- balanced information in a concise way;
- an environment which is conducive to learning;
- elimination of the uncertainty of which control system to use in what situation;
- a good tool to define and disperse core values; and
- prevention of conflict where each employee knows what to do as well as the reason behind what needs to be done.

However, of particular interest was the warning that culture has an influence over the success of a balanced scorecard. Mooraj, Oyon and Hostettler (1999, pp 487-488) identified the following three types of culture to take into consideration:

- National culture (for example the Americans are very much focused on creating shareholder value, the Europeans for rewarding all who have an input and the Japanese on creating long term relationships).
- Professional culture (some professions have unwritten or informal rules. When an attempt is made to turn these into formal rules it apparently causes problems.)
- Organizational culture (a scorecard that is not congruent with the organizational structure and management style will cause confusion throughout the organization).

Should a balanced scorecard methodology be deployed, it will be necessary to ensure that it is in line with the existing CSIR scorecard or basket of measures. Professional culture was not seen as a particular threat as none of the employees affected by this study belong to a profession other that that of information services. No proof could be found that any research has been conducted where the impact of African and specifically South African culture on the use of a scorecard had been measured. Because of the staff mix (White females and Black males), it is anticipated that there would be an indication of this aspect coming through. This should, however, be a research study of its own.

Other points of concern identified by Mooraj, Oyon and Hostettler (1999, pp 484-486) are that:

- There is a lack of the unplanned. The scorecard ensures so much focus that employees are inclined to ignore new opportunities.
- The employee is given no room for spontaneous reflection. This can be extremely debilitating to creative individuals.
- No place is provided for the management of the unintended strategy. This links to the facts that nothing is unplanned and that employees are given little room to reflect on what they are doing.

Fortunately these disadvantages can be managed and Mooraj, Oyon and Hostettler (1999, p 489) came to the conclusion that the balanced scorecard could be both a necessary and a useful tool for the knowledge economy company. They are of the

opinion, however, that each organization needs to create its own unique scorecard with its own unique priorities. It is also useful to remember that a balanced scorecard on its own will not necessarily ensure competitiveness and profitability. It is the setting of goals and identifying suitable initiatives and measures that will do that.

The balanced scorecard appeared to be the most suitable measurement methodology but it was thought appropriate to identify a similar situation (not-for-profit company or a library or an information service) that had utilized it successfully. The literature search lead to the work of De Gooijer, which is reported on below.

4.5.5.1   Knowledge Management Performance Scorecard as sub entity of the Balanced Scorecard

The Knowledge Management Performance Scorecard is an adapted version of the balanced scorecard approach. It is of interest because it was developed for the non-commercial environment. Just as with Kaplan and Norton's balanced scorecard, the Knowledge Management Performance Scorecard measures performance in four key result areas:

- financial performance;
- internal business processes;
- 'stakeholders' instead of 'customers'; and
- 'people' instead of 'growth'.

De Gooijer (2000, p 305) did her research in a not-for-profit governmental department. She made some assumptions about a knowledge management performance management system. These are:

- A Knowledge Management Performance Framework is not in isolation from the organization's business performance framework.
- There is clear and direct alignment between individual work plans, team goals, business unit objectives and the organization's key result areas.
- There are clear benchmarks against which performance can be measured.
- Performance indicators are unambiguous.
- Knowledge management is a business principle and is embedded in all aspects of the organization's work.

She also used as input the knowledge management map concept that stems from the information ecology framework (which was discussed in section 2.4.2.3 on page 2.24 of this report), the tacit to explicit knowledge transfer processes as well as the notion of sense making which comes from electronic mediated communication. For very valid reasons, De Gooijer (2000, p 306) changed the Balanced Scorecard's categories of customers to stakeholders and growth to people.

In order to design the scorecard, she then asked the following three questions:

- What business processes do we need to excel at?

- How should we appear to our stakeholders?
- How will we sustain our ability to learn and develop?

For each of these questions the expected outcome, the initiatives and the performance indicators were identified. Indicators included items such as the number of times a frequently asked questions (FAQ) list was accessed as well as how well the staff room was utilized. The 'concerns-based-adoption-model' was utilized to identify the various levels or stages through which behaviour could be classified. In an adapted version of the classification system, the levels of skill and associated roles can be indicated as follows:

Table 4.3: De Gooijer's levels of skill and roles to play

Level	Skill	Role at this level
0	Awareness but non use	Maintainer of status quo
1	Actively seeking information	Early learner
2	Personal experimentation	Follower
3	Personal implementation	Implementer
4	Refining the impact and consequences of implementation activities	Problem solver
5	Active integration into all aspects of work	Leader
6	Refocusing skills on new business opportunities	Innovator/Investigator

Theoretically this classification system makes much sense, as it should be possible to categorize each of the identified scorecard items in any of these six categories. However, practically, based on experience, any classification system with as many variations causes confusion and unhappiness. For example, the difference between levels three, four and five are rather subtle and, similarly, the difference between levels zero and one are negligible. Within IMPS it was decided to opt for a three level classification system.

Table 4.4: IMPS roles and skills classification

Level	Skill level	Expectations for this skill level
1	Beginner/Learner	Needs assistance.
2	Experienced/Worker	Able to work/implement independently. Able to identify alternatives.
3	Mentor	Able to teach and train others. Able to implement alternatives and enhancements.

This classification was used as the basis upon which skills levels were determined during the skills audit, as discussed in section 5.4.3.1 on .

In terms of the tools and infrastructure required to enable and monitor the scorecard, De Gooijer (2000, p 309) identified Lotus Notes, team rooms, the Intranet, access to internal and external information, an electronic library of internal documents and objects, and community of practice participation.

This research still needed to be implemented and unfortunately no further reference to it could be traced.

4.5.5.2 Balanced Scorecard strategy maps

As an extension of their original work and as a result of extensive scorecard consultancy, Kaplan and Norton (2001a, p 90) are able to create strategy maps that specify the critical elements and their linkages to an organization's strategy. They claim that a strategy map should be seen as a diagnostic tool that can assist in finding and remedying flaws in balanced scorecards. This work is of significance because they also found that not-for-profit organizations in general concentrate on a key performance or operational excellence strategy rather than looking at the total strategy. To them it is typical that a scorecard for a not-for-profit organization would indicate attempts to

- work more efficiently;
- at lower costs;
- with less defects; and
- faster.

They believe that such a method of working is very inward looking and limited in scope. (This cycle of continuous improvement of existing processes is also very typical of the situation within libraries.) To break out of the inward looking cycle, they (Kaplan and Norton, 2001a, p 88) suggested that one takes note of the following linkages in what they refer to as the service management profit chain:

- investment in employee training improves service quality;
- improvement in service quality leads to higher customer satisfaction;
- higher customer satisfaction leads to increased customer loyalty; and
- increased customer loyalty generates increased revenues and margins.

Taking the service management profit chain into consideration, it was decided to adapt the strategy map created by Kaplan and Norton (2001a, p 92) and to create a map that could fit in with the framework for information services. The map is reflected in Figure 4.6 on the next page.

The map sets out to, at the highest or strategy level, recognise that staff, customer as well as stakeholder satisfaction are the objectives and a prerequisite for success. Staff satisfaction depends upon setting targets for a motivated workforce and the continuous improvement of structural capital. Customer satisfaction requires activities or targets to address product/service attributes, the relationship with the customer as well as the image of the products/services the customer pays for. Lastly, in line with the CSIR IMPS situation, stakeholder satisfaction depends upon healthy financial management that includes reliable supply chain selection and improvement in customer productivity.

The overview of the methodologies mentioned lead to the conclusion that a combination of the Balanced Scorecard, the Asset Monitor and the Value Chain

Scoreboard types of methodology would be the most appropriate to follow. It also became clear that measurement should be done at both an operational (or personal level) as well as at a strategic or organizational level if it is to be truly useful. Once it was decided which methodology to use, the questions still remained what actually had to be measured, what measuring tools should be utilized, and how measuring should be done.

Fig 4.6: Balanced scorecard strategy map for information services (based on the Kaplan and Norton (2001a, p 92) model)

4.6 The 'what' and 'how' of measuring

Bontis, et al., (1999, p 392) suggested that it might be useful to ask the following questions before starting to identify the most suitable measuring tools:

- How possible is it for accounting tools, that were developed 500 years ago to help merchants in the feudal era, to make the key success factors of the knowledge economy possible? This question prompted the decision in principle to ensure that suitable measuring elements should be identified so that all focus areas are addressed at both the operational and strategic levels.
- How does one choose among the many alternatives suggested by different authors? Keeping the context of the research in mind, this question led to the decision to, in principle, identify measures that are known within the environment, that are simple and easy to use but that gives results that could be graphically displayed. (In other words it should be possible to put numbers to the results so that graphs can be drawn.)
- How can the urge to jump from one faddish instrument to the next be prevented when all promise success and competitive dominance? This question led to the decision to, in principle, create a measuring instrument (with the assistance of the staff members) that was unique to our own set of circumstances. The rationale is that one is much more loyal to one's own creation than to any adopted methodology/instrument.

Bontis, et al., (1999, p 400) came to the conclusion that no single method of evaluation is perfect. One can only attempt to find a measuring tool that is most appropriate within the set circumstances. They warn, for example, that a good tool used in the wrong circumstances can do more harm than good especially in terms of the undesired side effects. This statement led to a fourth principle, namely to design a measuring tool that was unique to CSIR IMPS but that had ample staff input continuously.

Having identified the guiding principles, the next important aspect of the exercise was to identify what exactly should be measured. It was taken for granted that possible measures, within the context of this study, have to address all of the following: human capital growth, structural capital development, customer focus and financial health. Again available literature was researched to find both suitable indicators to be measured and the appropriate tools to use.

Roos and Roos (1997, pp 417-423) stated that the vehicle for measuring intellectual performance is a set of indicators used for each intellectual capital category. Their advice, which was also re-iterated by Duffy (2000, p 14), in terms of indicators includes the following:

- To be a useful measurement mechanism, the indicators should be grounded in:
    - the drivers of the vision and/or direction expressed;
    - the intellectual capital categories selected; and
    - inter-capital flows.

- The intellectual performance system must be rooted in the language of the company or unit. Important concepts used in conversations and texts around the vision, mission, strategy and success factors must be identified, and the meaning of these concepts must be uncovered.
- To be measured, intellectual capital obviously needs to be categorized. Categorizing must be more of a top-down than a bottom-up process.
- Any intellectual capital model must be scaleble; it should make sense for large as well as small companies, and for organizations, parts of organizations as well as individuals.

They also identify the fact that there are many difficulties in dealing with indicators. Examples of these difficulties are:

- selecting the right indicators among the almost limitless number of potential ones;
- ranking the importance of indicators for a specific category;
- ensuring high precision for indicators;
- establishing reliability of numerical values of indicators;
- tracing all sources of error or noise in the logic used to identify indicators, which may otherwise lead to erroneous or irrelevant indicators; and
- tracking the high multi-co-linearity among many of the indicators, meaning that the indicators are not reciprocally independent.

Looking more at specific indicators to use, Robinson and Kleiner (1996, p 38) advised, in terms of human capital development, that if a direct measure of a skill is not available, the use of an 'indicator' of the skills will need to be used. There are various counts and ratios that have been and are being used as a means of assessing intellectual capital. But again the presence of these practices is probably best thought of as an indication of intellectual capital, not as a measure of intellectual capital: just as the measure of training is really just an indicator that intellectual capital is being created or maintained (Robinson and Kleiner, 1996, pp 37-38). Indicators include:

- the numbers of patents, good ideas or articles published per person;
- various ratios of employee output;
- the value-chain support activity called technology development;
- benchmarking studies to identify the best decision-making practices in a R&D setting;
- the use of cross-functional teams;
- the use of post-project audits; and
- analyzing best practices including charts where quality of execution is plotted versus frequency of use.

Liebowitz and Wright (1999, p 101) created a table (see Table 4.5) of sample indicators, as used within the Skandia Navigator.

Table 4.5: Sample of the metrics developed for the Skandia Navigator
(Leibowitz and Wright, 1999, p 101)

Capital asset	Example indicators
Human	• Replacement and acquisition cost • Generalized training and employee development cost • Percentage of outsourced personnel resources • Development of cross-functional team structures • Internal control and ethics
Customer	• Creation and development of external relationships • Brand loyalties • Customer service expectations • Market share
Process	• ICT infrastructure • Logistical efficiencies • Administrative procedures
Innovation	• Renewal and development costs • Change in product development and delivery cycle • Adoption of industry quality standards

Peters and Waterman (1982, in Robinson and Kleiner, 1996, p 39) identified further traits that can be used as indicators. These are:

- 'management by walking around' or ensuring that the manager/leader is visible and available;
- lack of barriers to communication flow;
- toleration of failure and experimentation; and
- the concept of a champion.

In terms of the valuation of customer capital, Duffy (2000, p 12) suggested the following:

- to use anything that would indicate that you are really keeping your customers happy;
- monitor your competitive position;
- monitor which customer-related investments were showing a better return than any other;
- establish what type of customers were best for your company; and
- measure the effectiveness, the efficiency and the return on investment of the tools and techniques that were designed to improve the relationship with the customers.

In further work Liebowitz and Suen (2000, pp 55-62) compiled a complete list of indicators identified by a variety of authors. For their research, the metrics work conducted by some of the most prominent intellectual capital authors (Edvinsson, Lev, and Bontis) was correlated. Unfortunately, their work did not include that of Stewart, Sveiby or Kaplan and Norton. They came to the conclusion that the metrics

identified were perhaps not sufficient within the knowledge era and as a result they complemented their list with that of the KPMG online assessment tool called The Value Enhancer. From the comprehensive list, it was clear that all items would not be applicable within the context of this study. Below is a selection of the items they identified as metrics:

Human capital

Training expense per employee
R&D investment in basic research
Years of service with the company
Revenues per employee
Profits per employee
Percent of employees with advanced degrees
IT literacy
Motivation index
Savings from employee suggestions
New solutions/products suggestions
Training efforts
Competence development
Employee satisfaction
Age distribution
Time in training
Re-use of available knowledge
Number of ideas that were turned into projects
Number of apprentices that staff mentor
Interactions with academics, consultants and advisors

Structural capital

Processing time
Contracts filled without error
Number of new products
Number of lessons learnt and best practices applied

Customer capital

Number of new customers
Sales per customer
Time from customer contact to sales response
Average customer duration with the company
Customer satisfaction index/customer rating
Productivity index
Number of processes renewed
Market share
Customers lost
Customer size

Financial capital

Profits/total assets
Revenues resulting from new business operations
Profits per employee

In all probability, the lack in background knowledge of/or experience in utilizing the available scorecards and monitors leads to the perception that the listed indicators would not be of particular use (as a directly transferable group) within the context of this research.

All of the information within this section of the research did not make the selection of appropriate measures any easier. It was therefore decided to utilize the strategy map (Figure 4.6 on page 4.37) and to use it as a point of departure to at least focus the measuring activity. It was anticipated that if the correct questions were identified within such a strategy map, the correct indicators would follow. The following were identified as further principles to note in compiling a measuring tool if it were to be useful within the context of this study:

- It is not possible to measure a department or organization's 'combined' score if you have not established a 'score' at an individual level. The tool should therefore make provision for the easy integration of personal scores into a departmental or organizational monitor/scorecard.
- Provision needs to be made for growth at an individual level as well as for contribution at a team level if you do not wish to fall into the internal competition trap.
- A review of the current rewards and recognition system will need to form an integral part of the study.
- It would be necessary to benchmark skills levels and to set appropriate standards before attempting to measure an individual's human capital 'value score'.
- Some system of weighting or point allocation, which will have to be standardized, would have to be established for 'intangible' contributions (for example positive feedback from a customer).

Keeping these principles in mind, the following two tables were developed.

Table 4.6: Substance for an organizational/departmental value monitor: testing against mission and measuring leadership (see page 4.43); and
Table 4.7: Substance for an operational or personal value monitor: measuring human capital development (see page 4.44).

In Table 4.6, on the next page, measuring is looked at from the departmental point of view. Here, specifically the aim would be to measure growth in terms of human capital development, customer satisfaction and stakeholder commitment. It also should measure the enhancements and growth in terms of structural capital. Growth in all these areas could be regarded as an indication that leadership is moving in the right direction. Alignment with the mission should be tested in terms of human, structural and customer development. The items evaluated as part of the financial capital component all have a direct link to the mission of the service.

Table 4.6: Substance for an organizational/departmental value monitor – testing against mission and measuring leadership

Measurement category	What needs to be measured	Tools to use
Human capital **growth** or staff satisfaction.	Motivated and prepared workforce. Alignment with mission.	Personal monitor. Staff satisfaction monitor. Action on staff satisfaction survey results.
Structural capital **enhancement** or infrastructure utilization.	Continuous improvement of available infrastructure. Alignment with mission.	Infrastructure quality monitor. Content review. Action on review results.
Growth in customer capital or customer satisfaction.	Operational excellence perception. Customer intimacy perception. Product leadership perception.	Customer needs identification. Customer satisfaction analysis. Action on customer feedback.
	Customer retention. Customer acquisition. Alignment with mission.	Customer statistics.
Growth in financial capital or stakeholder commitment.	Reliable and effective supply chain selection.	Benchmarked preferred supplier list.
	Improving customer productivity.	Independent usage statistics from the suppliers.
	Healthy financial management.	Balance sheet.

Table 4.7, on the next page, formed the basis of the personal monitor that was developed to measure individual contribution to the success of the service (see section 5.4.3.2 on page 5.38). What became evident while compiling Table 4.7 is that it should not be the aim to measure each and every component (answer each and every question identified in Table 4.7) at every evaluation or measuring opportunity. It is rather a case of ensuring that each of the broader categories (human, structural, customer and financial capital) is addressed and that one category is not forgotten or receives considerably more attention than the others. As was established with the personal monitor (see section 5.4.3.2 on page 5.38-41), the process of introducing monitoring systems is not achieved perfectly the first time round. The introduction process also needs to go through a learning cycle.

When initiating the monitoring process, it is better to start small, use technology as far as is possible and, most importantly, to test results against reality. The last piece of advice would be to follow-up on feedback received. If such a stage is not built into the measuring process, one is simply measuring for the sake of measuring!

Table 4.7: Substance for an operational or personal value monitor (measuring human capital development)

Measurement category	What needs to be measured	Personal contribution to both the tangible and intangible value chains	Contribution to IMPS/Value added
Human capital - motivated and prepared workforce	Appropriate skills and competencies	What skills do I need to do my job? What additional skills do I need to learn? At what skill level am I functioning?	What did I teach to whom? How did I contribute to benchmarking our competencies and skills
	Appropriate resources	How well am I able to utilize the resources I am supposed to be using?	What role did I play in identifying appropriate resources for our group?
	Positive work environment	What did I do to make work a pleasurable experience for me?	What did I do to our shared work environment?
Structural capital - continuous improvement	Build the service (innovation process)	What am I doing to identify new and better ways to do my work?	What am I contributing to our overall innovation process?
	Increase customer value (customer management process)	What am I doing to ensure that my customer is getting the best price for what he is buying?	What am I contributing to the best value for money benchmarking exercise?
	Operational excellence (operations and logistics processes)	What am I doing to ensure that the customer is getting the best service as fast as is possible?	What am I contributing to our overall operational success?
	Increase supplier reliability (supplier management processes)	Did I continuously check that both the supplier and I adhere to the agreement between the supplier and IMPS?	Did I contribute to improving the relationship between the supplier and us? What did I do to identify our most reliable suppliers?
Customer capital - customer acquisition	Price	Am I utilizing our pricing schedule correctly?	Did I assist in benchmarking and calibrating the pricing schedule?
	Quality	What do I do to ensure good quality work? How often do I need to re-do work?	Do I share my quality improvement lessons with my colleagues? Did I share the learning gained from re-work? Did I capture the learning gained from re-work? Did I assist in benchmarking and calibrating the quality of our service?
	Time	What is my turn-around time for difficult solutions? What is my turn-around time for easy solutions?	What am I contributing to improve / maintain the customer's perception of our turn-around time?

Measurement category	What needs to be measured	Personal contribution to both the tangible and intangible value chains	Contribution to IMPS/Value added
	Product/Service	What do I do to ensure that I know my customers are getting what they need? Do I know what products and services my competitors provide?	What is my contribution to establishing the customer's needs? What is my contribution to analysing the customer's needs? What is my contribution to enhancing our current products and services? What is my contribution to identifying new products and services? Do I assist in analysing our competitors?
Customer retention	Service level	What feedback am I getting with regards to the service I am providing?	What do I contribute to the improvement of our service to customers?
	Relations	What contact do I have with my clients outside my normal duties? What have I done to improve the customer's perception of IMPS?	What did I contribute to finding new ways to improve our relationship with our clients?
	Brand	What do I do to ensure that my customers are familiar with our brand?	What did I contribute to enhancing and enforcing our brand?
Financial capital - reliable and effective supply chain selection	Improve cost efficiency	Am I using the appropriate suppliers?	What contribution am I making in identifying the right suppliers?
	Efficient financial management	Are my timesheets completed? Are my invoices done in time? Am I buying supplies that make me more efficient?	How much income did I generate for IMPS?
	Increase value for customer	What am I doing to identify new, better or more effective products and services for my customers?	How am I contributing to the selection of products and services IMPS is providing to our customers?
Improving customer productivity	Decreased dependency	Am I assisting and training my customers?	What am I contributing to decrease the customers' dependence on our physical presence?
	Improve asset utilization	Am I exposing customers to products and services other to my own?	How am I contributing to ensure that all the IMPS assets are utilized?

4.7   Summary

Measuring the impact of intellectual capital management is difficult, especially when there is very little tangible proof of a service's value. In the introduction of this chapter it was said that the crux of the matter is that time needs to be spent on identifying items that will provide tangible proof that intangible growth (or decline) is taking place. The purpose of this chapter was therefore to determine if appropriate measuring tools are already available to utilize. The specific intent was to establish if available tools and methodologies were appropriate to measure the impact of intellectual capital development activities within the CSIR IMPS environment.

The complete list of available methodologies, as identified by Sveiby (see Table 4.1 on page 4.13), was used as a starting point. Keeping in mind the context of this study, all the methods closely associated with financial measures were then eliminated. This resulted in an evaluation of the scorecard-type methodologies. The methods investigated (see section 4.5 on page 4.18) were the following:

- Skandia Navigator™ which was found to be too complex to be realistic within the given environment.
- IC-Index™ and its associated digital IC-landscaping. These were found to be too complex for the context of the study.
- Intangible Asset Monitor. It was found that the philosophy behind the methodology is appealing and should be integrated.
- Value Chain Scoreboard™ which could hold much potential if integrated with the balanced scorecard and/or intangible asset methodologies.
- Balanced Scorecard. The later developments which focus on public sector or not-for-profit type organizations appear to be especially useful.

The words of Kaplan and Norton (2001b, p 158) *It is not only what is measured but also how the measurements are used that determines organizational success* led to the conclusion that it also does not matter what the methodology being followed is called. In the case of the CSIRIS IMPS, the most suitable methodology should be designed as a hybrid of Kaplan and Norton's Balanced Scorecard with the individual measured elements as well as the application rather linking back to the philosophy of the Intangible Asset Monitor and including aspects of the Value Chain Scoreboard. The opinion was expressed that monitoring needs to take place at both the operational/individual and the strategic/organizational level if monitoring is to be of objective value.

Chapter 5
Case study

The task of leadership is to create the environment for managing knowledge. It requires less emphasis on what we own and more emphasis on what we know. It is not about managing hired hands, it's about setting context and energising hired minds (Bontis, et al., 1999, p 391).

5.1   Introduction

The Council for Scientific and Industrial Research (CSIR) is the largest of the South African research councils. This study could be seen as part of the evolutionary learning experience gained from an exercise by the larger organization (CSIR) to maintain its position as one of South Africa's leading examples of an efficient learning organization. According to Basson (1996, pp 139 - 142), this exercise started in 1985 when the White Paper on industrial development strategy was published. In 1991 the journey gathered momentum when a comprehensive international benchmark study was commissioned. The current phase of development can be attributed to the fact that all Western research organizations are adapting to the demands and pressures of the environment in which they operate. Obviously, entities within the organization need to do the same. The CSIR's information service (CSIRIS) has had to undergo significant changes, not only to keep track with the requirements for change within the organization but also to gain control over the changes within the information environment that held, and still hold, major opportunities. One such opportunity was for section leaders to choose the way in which they wished to lead and strategically position the section that reported to them. As manager of the Information Management and Information Procurement (IMPS) section, a decision was made to undertake a study of knowledge economy management tactics and, because of that study, to implement and test actions that could ensure the longer term sustainability of the section. The possibility of doing so was discussed with the CSIRIS Director and a proviso was set that activities that were not part of the common management activities would be discussed with him prior to implementation. All implemented activities are discussed in more detail in section 5.4 on page 5.16 but some examples of actions that were initiated are:

- an effort to benchmark skills and the subsequent skills development plan;
- the capturing of lessons learnt;
- the development of organizational memory;
- measuring staff and front line customer satisfaction;
- negotiations with 'new' suppliers;
- the introduction of a personal monitor; and
- the establishment of a benchmark intellectual capital report for the IMPS section (Attachment 1 of this report).

To provide the context within which this case study was developed, the section below provides general background information on the CSIR and more specific detail about CSIRIS.

5.1.1 The CSIR

The CSIR's website (http://www.csir.co.za) states the following: *Established by Parliament in 1945 as the central scientific research and development resource for South Africa, the CSIR remains the country's top technology and innovation agency. Today the CSIR is the largest research and development (R&D) organization in Africa, accounting for about 10 % of the entire African R&D budget. A staff complement of approximately 3000 include some of the top technical and scientific*

minds in the country, collaborating in multi-disciplinary teams, to put forward solutions of the highest standard in innovation and excellence. Although its total staff complement is given as 3000 it is fair to say that not all of these can be regarded as knowledge workers. Only 1443 members of the full staff complement are registered as users within the library and information services (L&IS) system. These members of staff are the clients for the services provided by CSIRIS.

The CSIR prides itself on being a knowledge intensive technology organization (KITO). Its focus is the creation and packaging of innovative knowledge-based technologies. It is also a large consumer of knowledge. The CSIR is committed to supporting innovation in South Africa to improve the quality of life of all South Africans and support national competitiveness in the global economy. Technology services and solutions are provided in support of various stakeholders, and opportunities are identified where new technologies can be further developed and exploited in the private and public sector.

The core of the CSIR's activities can be grouped into the following:

- strategic management of innovation;
- research, development and implementation services;
- global science and technology links and perspectives;
- specialised technical and information consulting services;
- venture establishment;
- technology transfer and technology assessment;
- prototyping and pilot-scale manufacturing;
- software development and products; and
- policy and strategic decision support.

Clients in both the private sector (micro, small, medium and large enterprises; formal and informal), as well as in the public sector (national, provincial and local government), make use of the CSIR's services. Its staff members deal with public enterprises and institutions, national safety and security establishments, and development structures. Internationally, the CSIR has a network of clients and partner organizations as part of a global sphere of influence on matters of technology. With a strong emphasis on relevant and developmental work, it has strong roots in various communities, and collaborates with various donor and funding agencies. Finally, the organization also liases closely with tertiary educational institutions.

The CSIR's core technology focus areas include:

- food, biological and chemical technologies;
- building and construction technology;
- defence technology;
- water, environment and forestry technology;
- manufacturing, materials and textile technology;
- information and communications technology;
- mining technology; and

5.3

- roads and transportation technology.

It also drives the following collaborative initiatives:

- crime prevention technologies;
- support to small medium and micro enterprises;
- manufacturing support;
- environmental impact assessments;
- outreach programmes and national human resources development; and
- sport technology.

As is the case in many modern organizations, the CSIR has undergone a number of restructuring exercises. After 1990 but prior to 2000, the organization was highly silo-like in structure. A number of different divisions each functioned independently and often in competition with each other. Each had its own support services, which in effect meant that much duplication of effort was taking place. For example, each division (also known as strategic unit) housed its own L&IS. Although some services were conducted centrally, the divisional library and information services functioned independently. Traditionally these services were seen as part of the support function.

As one of the initiatives to improve internal structures it was decided during 2001 to appoint a senior CSIR director to drive an initiative to strategically align the CSIR's information services. The 10 divisional services were consolidated. Thus CSIRIS came about. Change brings about many opportunities. This study is but one of those. Another is that the Director was able to provide the relatively inexperienced managers, who were appointed to manage the function, with sufficient mentoring so that they could acquire the necessary skills to grow and build the service to its rightful position within the CSIR's structure.

5.1.2 CSIRIS

Each of the 10 divisional services brought with it its own mission and role within the various operational strategic units. Therefore, as a very first step, a unified vision was established. This vision is that:

> CSIRIS is a world-class, market-responsive **business** that is significantly **self-funding** and is characterized by its eagerness and ability to **adapt** to the demands of a changing environment.

The mission of the service as a whole is to:

- Manage the delivery of appropriate information
- Facilitate tacit knowledge connectivity by for example:
    - Leveraging the efforts of knowledge workers
    - Finding the best minds
    - Connecting to the networks of minds
- Preserve intellectual property

To be able to live out the vision and accomplish the mission, it was acknowledged that there was a need to make provision for both front and back office services, and the service was structured to do this. It was decided that the traditional L&IS functions (labelled back line or back office work) would be performed centrally while the front line would be decentralized to provide personalized services directly to the researchers. Although not exclusively so, it is especially the first and the last points in the mission statement that have relevance to this study. Similarly, the second point within the mission statement directs the focus of the front line activities.

A decision was made to centralize all traditional L&IS functions (also referred to as back office tasks) as well as the paper collections within one building in Pretoria. It was also determined that it would be best to base the management team within the same building. The structure of the service was kept as flat as possible. The front line was distributed within a variety of buildings over a large area within Pretoria as well as at a number of remote locations. Figure 5.1 indicates that five managers were appointed. Three of these were tasked with the responsibility to take care of the relationships with the front line, one to take care of the back office (Manager IMPS) and the remaining one, SADC initiatives manager, to co-ordinate activities planned within the SADC region. Figure 5.1, on the next page, represents the management structure. The focus area for this research study is coloured blue.

Fig 5.1: Structure of the CSIRIS
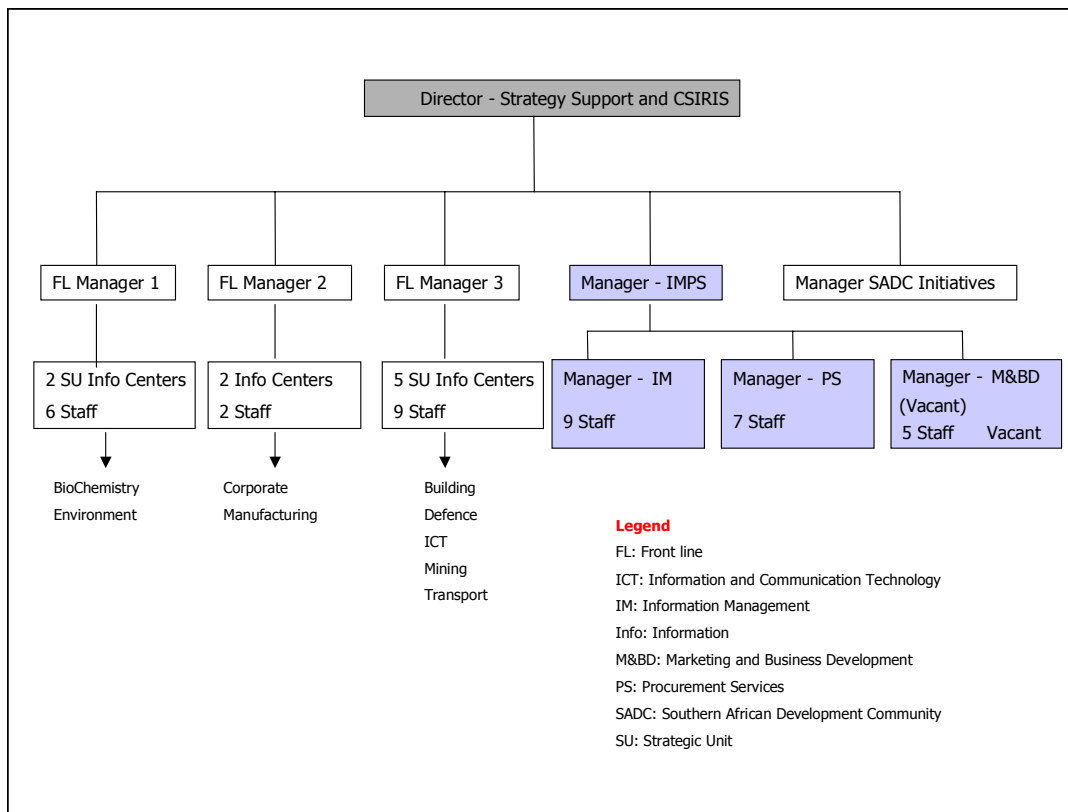
Instead of using the term library, the acronym IMPS (Information Management and Procurement Services) was adopted. Subsequently IMPS was subdivided into three sections and two project managers were appointed: one to manage the information management functions and the other to take care of information procurement. The third group (marketing and business development) was a diverse group, established with the purpose of developing both innovative products and the necessary customer relationship infrastructure. The management of this section was the responsibility of the IMPS manager, but with the proviso that the position would be filled at a later stage when one of the staff members had had sufficient training to add real value to the management team.

Figure 5.2, on the next page, provides more detail on the services model. The model (developed by Page-Shipp, 2001) makes provision for the fact that as many of the back line services as possible should be made available via a web interface. IMPS therefore needed to concentrate, besides carrying out their dedicated back line tasks, on processes that would enable CSIRIS clients to become independent from the presence of a dedicated member of the IMPS staff. It also meant that they were responsible for supply chain selection, especially where the supply chain allowed for Intranet integration or direct access via the Intranet interface. All SU information centres would provide front line services to their clients and would be able to rely on back office services directly from IMPS. The same would be true for on-site independent businesses such as the Innovation Hub (IH).

Fig 5.2: Integrated information services model (Page-Shipp, 2001)
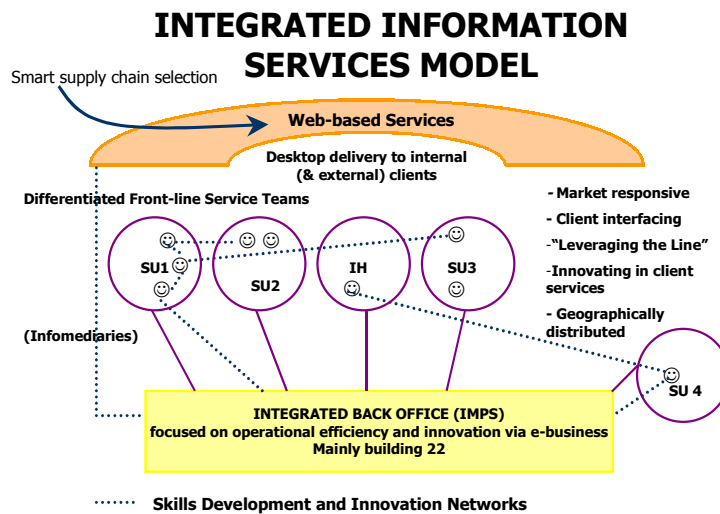
In line with the vision to be market responsive, the knowledge economy trends identified in section 2.2 on page 2.5 were taken into consideration while planning the 'new' service. Additional trends that were seen to be specifically relevant to information services within the CSIR were identified to be the following:

- Institutions are no longer able to afford the luxury of acquiring information sources 'just in case' someone needs to gain access to that source. Within the knowledge economy, it is much more important to facilitate and build networks that enable 'just in time' delivery. The move from just in case to just in time information is continuing to accelerate and is in actual fact migrating to 'just in time - just for me'.
- The fact that the knowledge economy makes increased demands both in terms of speed and scope is applicable to both research staff and information specialists.
- There is an over-supply of information but much of it is not validated. The CSIR, as a reputable research organization which is functioning within a global economy, cannot afford to allow its researchers to make extensive use of invalidated information sources because these sources are more easily accessible than those that are validated.
- Validated information as a rule requires dollar denominated payment.
- A trend where individual strategic units were able to cut budgets for information access indiscriminately could not be tolerated if the interests of the wider CSIR needed to be the focal point.
- There is no value in designing services that are not aligned with the drive towards increasingly more e-business. This trend influences not only service delivery to clients but also the services available from information suppliers.
- E-business implies desktop delivery. Web technology was seen as the most current and appropriate tool for this but it was necessary to form an alliance

with internal computing services to ensure that future developments were monitored.

- The role of the information specialist as info-mediator is diminishing significantly. However, not all researchers (customers) have the time or inclination to do their own information research. The solution is therefore to build a virtual bridge between customer and supplier and to 'walk' across the bridge to meet the needs to the satisfaction of the customer. This trend holds significant training implications.
- Suppliers in general have a 'package' approach to subscriptions. This allows for multidisciplinary research but it also provides much additional under utilization as well as duplication in efforts if products are not scrutinized carefully.
- It is and will become even more difficult to keep track of rapid change both in terms of technology and product development. It is therefore essential to put in place a network of reliable colleagues who will assist in monitoring developments.
- There are cost saving implications to being associated with the rest of Africa or consortia when negotiating supplier contracts. There are however also consequences to being locked into such a grouping. These consequences need to be monitored.

The traditional trend of developing L&IS as a support function was seen to be inappropriate. It was therefore decided to develop CSIRIS as a line function, which was accepted by managers as a more appropriate role within the organization. As a result of the changed role, actions aimed at being able to establish an income-generating line operation were identified for further exploration. The largest obstacle in this process was the perception by information staff members of their own role and importance in the organization. A second challenge was to change perceptions of the services on offer as well as the contribution that CSIRIS was able to make to the organization. These challenges became the goals to concentrate on during the first year of existence.

The service was already contributing directly to both the knowledge acquisition and the knowledge maintenance or corporate memory phases of the information flow cycle (see Figure 2.1 on page 2.16) within the organization. It was also contributing directly to both the tangible and the intangible value chains of the organization (see Figure 4.2 on page 4.24). As such, it was decided to use that responsibility and accountability within the programme area as the basis for interactions with service level agreement managers as well as to build confidence. This is similar to how core business programmes are expected to operate within the CSIR.

To become significantly self-funding was seen as a vehicle to cross boundaries within the organization and assist in developing and/or enhancing the variety of information based services and products already on offer. It was assumed that assistance from the information services group would enable other line programmes to develop new services and products. An ability to provide the necessary link back into the organization with identified enquiries and needs from external clients was also seen to hold possibilities.

Keeping these goals in mind, it became essential to acquire the necessary skills and insights into managing the information service in a 'business' responsible way. It was decided to investigate the modern management literature for suitable management philosophies. Because of its holistic approach, intellectual capital management appeared most attractive. It was seen to be in line with both the developments within the organization as well as the expected needs of the CSIRIS staff members. It was decided, as a start, to implement and measure the methodologies of intellectual capital management at IMPS, as it was a relatively controlled environment where the results and impact of a changed methodology would be most visible. The work environment within IMPS was, towards the beginning of 2001, still very much typically production style with strict hierarchies and by nature very compartmentalized. In addition, the typical jobs identified within IMPS were not, to any degree, what authors such as Stewart (1997, pp 90-91) regard as knowledge worker jobs. That fact was part of the reasoning why it was not feasible to attempt to develop each aspect of intellectual capital as identified in the Skandia model (Figure 2.5 on page 2.42). However. it was expected that the principles and methodologies of intellectual capital development would make a real change in the working lives of the staff members and, in doing so, impact positively on the relationship with customers.

5.1.3 CSIRIS IMPS

As was mentioned in the previous section, IMPS refers to the traditional L&IS functions within the CSIR's information services: the grouping of staff established jointly that they did not wish to be associated with either the 'back office' or 'library' concepts. It was therefore decided to adopt the acronym IMPS (Information Management and Procurement Services).

As could be expected IMPS is responsible for intermediary services performed on behalf of research staff members. IMPS staff members are also responsible for information product contract negotiations and the maintenance of services that may have started out as special projects but which then became part of the routine operations. The activities performed for or on behalf of the front line are depicted in Table 5.1 on page 5.10. Because both finance and human resource development activities relate to the internal functioning and management of IMPS, these items were excluded from the table.

During the second phase of this research, it was decided to revert the responsibility for the archives and the PROATIA[1] infrastructure to corporate administration. This was mainly due to the fact that a decision was taken not to replace the archivist when she left the employ of the company.

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[1] PROATIA: Promotion of Access to Information Act. The Act requires that institutions such as the CSIR create the appropriate infrastructure to deal with requests that come about as a result of the Act. More detail about the Act at http://vpo.ccii.co.za/articles01/hard-won_access.html.

Table 5.1: IMPS services

Complete List of Tasks		
Information Management	**Information Procurement**	**M&BD**
System maintenance •technical and content Stock maintenance •weeding and 'shelving' •issue desk •maintaining the reference collection Cataloguing and indexing •purchased and CSIR reports •journals •paper and electronic Intellectual property •database •collection	ILLs •national and international •internal and external Buying Stock •books •CD-Roms •journals - all formats •document delivery •databases	Marketing Communication, the creation of leaflets/newsletters for: •staff •clients Negotiation of supplier contracts •service level agreements •electronic journals Innovative web-based products General Procurement •IT equipment •L&IS equipment

Excluding the IMPS manager, the total staff complement responsible for the tasks listed above is 21: two managers and 19 members of staff. Although divided by function (Management, Procurement and Business Development), all staff have been constantly made aware of their interdependence and of the joint service provided either directly to CSIR staff or to the front line teams. From the list provided in Table 5.1, it is clear that it is especially the 'Manage the delivery of appropriate information' and to some extent the 'Preserve intellectual property' aspects of the mission which are the focus areas of IMPS.

Table 3.2 on page 3.14 identified the requirements to adhere to; the steps to take; a strategy to follow; and the phases to expect when developing intellectual capital. As a first step, it was decided to take stock of the status quo (as it was in April 2001 when IMPS was established) prior to making any changes. The techniques used to collect the situation analysis information were observation, semi-structured interviews (with selected members of staff), group discussions and available documentation. The result of the situation analysis is reflected below.

5.2   Situation analysis

Besides the IMPS manager, staff members from three of the strategic unit information services (four members from Bio/Chemtek, one from Environmentek, and one from Defencetek) were transferred to the centralized site. Here they joined the 15 staff members who were previously part of a small core L&IS and information service group. As could be expected, almost 30 % of the staff members (six of the 21) felt as if they were joining a new company.

At that time the following, in terms of each of the forms of capital, was established:

5.2.1 Human capital

In the original analysis of the staff complement, it was established that staff members come from a variety of cultural backgrounds. White females staff members were professionally qualified while Black staff (with one exception) did not hold tertiary qualifications. As a result all Black staff performed purely administrative tasks while the White females were responsible for all the professional work. One of the Black males was professionally qualified but was responsible for what could be regarded as non-professional tasks. Two of the White staff members were on the verge of retiring.

Although job descriptions were available, the performance evaluation system was used as a job description activity. There was little evidence that performance reviews were used as a learning activity. The CSIR-wide rewards and recognition system was in use but no objective, transparent criteria were clearly visible. Previously, the department (with only 16 members of staff) was structured around five managers but not all the managers were functioning at the same level of expertise. This had a negative effect on staff morale. Other issues that were evident was that:

- The 'informal' management structure was top heavy. Seven members of staff attended management team meetings – some were formally appointed as managers and some not. Because of varying skill and responsibility levels, it made operational meetings time consuming and inefficient rather than being an effective means of sharing information and making joint decisions.
- Most staff members had been employed by the service in excess of 10 years and many had been doing exactly the same job for that many years.
- There was very little participation in professional society activities other than attending meetings. Service benchmarking was limited.
- A considerable number of professional journals were circulated to staff members. No sharing of knowledge gained from the literature was evident.
- Although there was a joint staff room it was an inhospitable place, only utilized by Black members of staff. Upon further investigation, it was also found that there were clear racial tensions within the group. Although the staff room was used for social interaction, there was definitely no cross-pollination or learning taking place between staff.
- The e-mail system was inundated with personal communications that were shared amongst selected group members.
- There was no visible sharing of learning. Neither were mistakes or lessons learnt being recorded.
- All staff members had access to the latest office software available but few felt themselves competent to use any software other than the standard systems necessary to perform their routine tasks.
- There was no clear evidence of innovative activities or that new or improved products and services would be forthcoming.

5.2.2 Structural capital

The CSIR as a whole has a very stable network infrastructure as well as a well-defined and managed equipment and asset management policy. Fortunately the service as a whole benefited from this practice. In addition it was found that:

- The venue consisted of a series of offices of varying size and in need of maintenance.
- The L&IS system was in the process of being transferred to a new joint catalogue. The usual pressure in terms of exporting and importing data in such large databases was clearly visible but the process was under control.
- Stock was systematically being transferred from the divisional services. It was found that at least two classification systems were in use and that these systems were not utilized similarly. Journal stock was weeded prior to the move and therefore very little overlap in the collection was anticipated. Because of the mammoth task to integrate the collection, these items were unpacked in an available but separate section of the building. (This became one of the first areas in which the cross team dependence became clear. Once the integration of the collection started, it became very difficult for the inter-library loans (ILLs) staff to pinpoint the exact location of documents and temporary staff were employed during phase two to assist in fast tracking the process.)
- An enterprise-wide document management system was just being implemented but staff members were not utilizing it at that time.
- The enterprise-wide e-mail system was implemented and being used but its advanced features, such as the electronic diaries, were not.
- An information services home page and a number of linked pages were available on the CSIR Intranet but they mainly gave access to brochure ware.
- The PC infrastructure was adequate. Most PCs were better than the minimum standard required by the local area network administrators. The latest available office software was available via the desktop.
- Due to the nature of ILLs, reliable photocopying equipment was a prerequisite. Unfortunately the supplier was not rendering the required service and equipment was continually malfunctioning.

5.2.3 Customer capital

There appeared to be very little emphasis on customer activity. The relationship with suppliers was fairly one-sided where the supplier determined the basis and terms of set agreements. Other facts to take note of are:

- Contact with clients was mainly aimed at selling services to clients.
- An address list, mainly used by the document delivery staff, was available.
- Marketing was seen as an 'add-on' task of the manager.
- There was very little evidence of branding or relationship building.
- Although price, quality and turn-around time standards were in place, the customer had no insight into how these standards were set and the staff

members had no proof that the standards were appropriate or acceptable to the customers.

5.2.4 Financial capital

Financial accountability was primarily a management responsibility. Although the strategy was mainly to save costs, most staff members were not aware of the scope of the income generated or where funding came from. There was very little financial control over expenses such as the private use of telephones and access to stationery. All internal customers were charged handling fees, for which a standard pricing list was available. These prices were based on actual costs and therefore very little discussion other than communicating new prices took place between the staff members and the customers. External income was being generated but the rationale or formulae used for determining fees were not documented.

The reason why stakeholders are regarded as 'financial capital' was discussed in section 4.5.5 on page 4.29. In terms of stakeholders, it did not appear that relationships with CSIR Strategic Unit representatives were intact. There was also a definite need to communicate with the labour union, as it appeared to play a key role in the lives of many of the staff members.

With knowledge about the status quo intact, the leadership phase, as identified by Edvinsson (1997, p 370) and reflected in Table 3.2 on page 3.14, could commence. The first step during this phase is to learn from the insights gained during the measurement or situation analysis phase and to set strategy.

5.3   Strategy

A great number of changes were necessary. It was therefore clear that it would be appropriate to use a phased approach in introducing the principles of intellectual capital management. It was thought that three phases would be appropriate. This research report covers only the first two of these phases and refers to the period April 2001 to August 2002. Although phase three, the next development phase, does not form part of this research, recommendations for the phase are provided in section 7.4 on page 7.13.

It was decided that phase one would stretch from April to December 2001. At the end of that period, IMPS staff members were consulted to test their opinion on progress as well as to set strategy for the second phase. The review was conducted informally, in workshop-mode, as part of a staff meeting. The result of the review was incorporated as staff satisfaction in section 2.4 on page A1.20 of Attachment 1.

The second phase started in January 2002 and stretched to August 2002. It was seen as appropriate to end the phase prior to the new business planning cycle that started in September. At that stage a variety of actions were taken to review progress as well as to establish the suitability of rolling out intellectual capital management principles to the front line staff. The result of the review process (reflected as Attachment 1) is to serve as input for the 2002/03-business plan.

Phase three, which will not form part of this report, relies heavily on the strategy that CSIRIS, as a whole, will decide to follow as it is not advisable to continue developing one section independently of the rest.

The adapted balanced scorecard framework (Kaplan and Norton, 2001a, p 100) which was discussed in section 4.5.5 on was utilized to set objectives for each of the first two phases. Given that the wider objective was to lay the foundation for intellectual capital management, it was decided to, concentrate within the first phase, on establishing the necessary structure. During the second phase, the focus would be on the issues associated with populating the structure, measuring contribution and augmenting the existing reward and recognition system with one that encourages knowledge economy behaviour. In accordance with the requirements of the adapted balanced scorecard methodology, the strategy was to use the mission as the guiding principle and to focus all activities so that those that will enable the organization (IMPS) to accomplish the mission would receive priority implementation status. Still following the balanced scorecard lead, the following indicators and targets were identified:

Human Capital

Phase 1:

- Staff members would understand the necessity of contributing by doing more than just narrowly focused tasks.
- All staff members would have the necessary skills to use and contribute to the available infrastructure.

Phase 2:
- Personal growth and skills development would be encouraged, leadership skills would be developed and teamwork would be supported.
- A fair and transparent measuring system would be developed that could be utilized to measure personal progress and that could be implemented as a reward/monitoring system.

Structural Capital

Phase 1:
- Stock would be integrated.
- Available equipment would be effective and adequate for work to be done efficiently.

Phase 2:
- The e-collection would be built while the paper collection would be maintained efficiently.
- The analysis capacity within the existing systems would be developed to provide useful management information.
- The collection of statistics would be automated as far as is possible.

Customer Capital

Phase 1:

- An effective relationship with internal customers would be established.

Phase 2:

- Available market research would be evaluated, to establish the extent and needs of the external market.
- The results from the market survey would be utilized to identify suitable products and services to sell to an appropriate market segment.

Financial Capital

Phase 1:
- A budget that could tolerate investment in intellectual capital activities over and above normal running costs would be negotiated before implementing any activities.
- A budget with realistic income targets would be set within three months of establishing IMPS.

Phase 2:
- A continuation budget to ensure the continued move to the development of e-only information resource infrastructure would be negotiated at the beginning of the financial year.
- The usage of information assets (journals specifically) would be encouraged. This should result in improved utilization by researchers.
- Structures to market and generate external income would be set in place during the 2002/2003 financial year period.
- Growth in external income would be visible at the end of the 2002/2003 financial year.

A variety of actions and initiatives were identified to ensure that the set goals, indicators and targets could be reached. The first action taken was to obtain principal buy-in from senior management for the project. After securing sufficient budget for most of the planned actions, the focus turned to human capital activities. The first step was to ensure that all staff members were treated equally and that they were undergoing the same experiences. As a result, a major revamping exercise was started. All offices were transformed into open plan areas (one of the success factors identified in section 2.4.2.5 on page 2.32 is that staff members who need to share information should ideally be placed in the same space). In the process of planning the new office space, it was ensured that each and every member of staff was moved to a different location. All staff members were required to clean out their working areas (to dispose of 10 years' worth of accumulated but often unnecessarily collected paper). Office allocation was done as a joint effort amongst all managers while space allocation within open office areas was done by the affected staff members. The idea was to allow for the sharing of ideas as well as
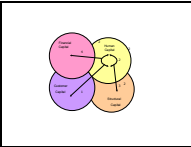
for impromptu learning activities to take place when and where necessary while the revamping was taking place. It was also necessary to make sure that all understood the etiquette associated with open plan offices.

Other actions and initiatives taken were, for the purpose of this study, grouped together and discussed in detail within section 5.4.

5.4 Actions and Initiatives
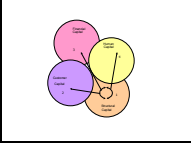
Although the adapted version of Sveiby's Affärsvärlden model (Figure 3.2 on page 3.17) was utilized to identify specific actions and initiatives, care was taken to accomodate both Senge's (1990) disciplines and laws (see section 2.4.1.3 on p 2.12) and Davenport and Prusak's (1997) ecology model (see section 2.4.2.3 on page 2.24) when the initiatives were implemented. The questions identified within the adapted model are repeated for ease of use. All identified initiatives were associated with the guiding questions. Table 5.2 displays the initiatives taken as well as the main phase during which the actions were taken. The rest of this section is utilized to provide further details on the initiatives.
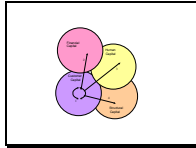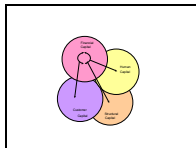
Table 5.2: IMPS Initiatives

Capital	Guiding question	Identified initiatives	Phase
Human Capital	How can IMPS staff members improve the transfer of competencies between people in IMPS?	Create a supporting environment to stimulate knowledge transfer Make effective use of the staff tearoom Appoint appropriate managers Encourage communication by using a variety of communication channels Identify and focus on developing value addition skills Redo job descriptions Evaluate the utilization of staff Set appropriate KRAs for performance evaluation Establish CoPs Support collaborative conversations Capture lessons learnt Develop organizational memory Conduct innovation projects Publish a staff newsletter Encourage active participation at staff meetings	1
		Conduct a skills analysis Benchmark skills Establish a skills development plan Implement a mentoring process Encourage tertiary training Support teamwork	2

Capital	Guiding question	Identified initiatives	Phase
	How can the IMPS employees improve the competence of customers, suppliers, and other stakeholders?	Implement induction training Develop training material and opportunities Provide progress and status feedback to customers Provide regular feedback to suppliers Establish and participate in networks Create a referral database Provide 'advanced' end user training Implement marketing and promotion strategies Develop customer relationship strategy Develop supplier relationship strategy Present papers at conferences and seminars	1
		Participate in consortia Develop information literacy material Identify and design suitable measuring instruments	2
	How can the IMPS staff members learn from suppliers and other stakeholders to improve the competence of the employees?	Identify all stakeholders Identify suppliers	1
		Include suppliers in networking exercises Attend training sessions Attend conferences Implement formal training Test trial products	2
	What/How should the IMPS staff members communicate to assist the stakeholders to make the right decisions with regard to human capital development?	Actively participate in strategy sessions Provide regular progress feedback Analyse results from targeted activities Create reliable sources from which to extract statistics regarding: • staff complement; • training needs; • skills levels; and • customer product use. Communicate: • timesheet information; • policies; • trends analysis; and • product and supplier analyses.	1
		Ensure that e-mail marketing reaches stakeholders Participate in Information Services Forum discussions	2
Structural Capital	How can IMPS improve the conversion of individually held competence to systems, tools and templates?	Establish an appropriate infrastructure Make significant documents available via the DMS Implement a reliable scheduler for the group	1

5.17

Capital	Guiding question	Identified initiatives	Phase
		Implement 'easy-to-use' capture mechanisms Create an environment that is encouraging Identify and develop appropriate measuring systems Develop an appropriate reward and recognition structure Establish personal monitoring system	2
	How can structural capital improve the IMPS staff members' competence by using systems, tools and templates?	Identify and develop suitable systems, tools and templates Do process re-engineering Identify and capture best practices Develop computer based training material Establish corporate memory Carry out competitor and supplier analysis Establish service levels, pricing models and other material that will guide the relationship between the organization and the customer. Introduce new technology where appropriate	1
		Introduce benchmarking	2
	How can structural capital improve the conversations amongst the customers, suppliers and other stakeholders so they improve their competence?	Integrate stock from all SUs Initialise the move to e-products Establish an effective Intranet interface Provide Intranet-based training/supporting material for products	1
		Ensure ease of access to: • analysis of available statistics; • results of implementation of enhancements; and • requests from customers for further enhancements. Market existing products to all customers Introduce trial runs of supplier products Train clients to utilize products effectively	2
	What should be available in terms of structural capital to assist stakeholders in making decisions with regard to continuous development of the infrastructure and finding alternative funding models?	Develop an effective Intranet interface	1
		Develop 'easy to access' usage statistics Provide concise and reliable information pertaining, for example, to: • funding models; • benchmark studies; • competitor analyses; and • market surveys. Utilize communication channels to keep stakeholders up to date with regard to developments of strategic importance	2

5.18

Capital	Guiding question	Identified initiatives	Phase
Customer Capital	How can the competence from the customers, suppliers and other stakeholders improve the IMPS systems, tools, processes and products?	Make available common training material Assist with information literacy training of research staff Provide legal advice for contract negotiation Gain feedback from SLA managers and implement advice Gain feedback from the labour union and implement advice	1
		Integrate feedback from customers into new systems, tools, processes and products	2
	How can customer's, tools, processes and products improve the competence of fellow customers, suppliers and other stakeholders?	Encourage participation at the Information Services Forum	1
		Utilize push technology processes Ensure regular enhancements in line with explicit needs	2
	How can customers effectively integrate the IMPS systems, tools, processes and products?	Design effective Intranet interface Provide effective training Create 'support' documentation	1
		Attend training sessions State requirements for ease of access and personalization	2
	How can the IMPS customer capital assist stakeholders to make the right decisions in terms of their need to gain access to global information?	Provide reliable feedback Identify core resources and make that information available to IMPS	1
		Actively participate in appropriate forums such as the Information Services Forum 'Market' identified core subject area resources to stakeholders	2
Financial Capital	How should stakeholders measure success and invest strategically to ensure that they are able to ensure access to important information?	Evaluate core resource collection Analyse user statistics	1
		Utilize their knowledge about KITOs and scientific excellence and integrate that with feedback received at the Information Services Forum, available usage statistics and interaction with L&IS staff	2
	What is the stake-holder's responsibility with regard to setting standards, participating in workgroups and utilizing infrastructure?	Ensure labour union participation to represent staff members' interests Provide sufficient budget to support required actions and activities	1
		Encourage active Information Services Forum participation Encourage active participation at interactions between labour union representatives and IMPS management.	2
	What can stakeholders do to ensure that IMPS human capital development is possible?	Evaluate available statistics, Provide financial assistance Provide 'mentor' guidance	1
			2

Capital	Guiding question	Identified initiatives	Phase
	What is the stakeholder responsibility with regard to investigating technology alternatives, financial support and technical expertise to ensure the development of effective infrastructure?	Conduct measurement against the mission of the group Development of strategic objectives of the organization Provide infrastructure to enable the implementation of e-business strategies.	1
			2

As could be expected activities did not always proceed strictly according to plan. Sometimes it was possible to switch an initiative from phase two to phase one. In other instances, it was necessary to delay implementation. The introduction of CoPs, scheduled for phase one is an example of the latter. On the other hand, the change in the perception about and contribution by the labour union occured mid way through phase one. The success of the actions taken is reported in the *IMPS Intellectual Capital Report* (see Attachment 1) and the set of initiatives that were identified as priority actions are reported in section 6.4 on page 6.12. The initiatives identified in Table 5.2 are discussed in more detail below.

5.4.1 Phase one initiatives

Although many actions were launched simultaneously, it was decided to focus on and address the issues relating to human capital development as a first priority. This does not mean that other capitals were not addressed. Rather it is that more activities associated with human capital development were initiated than in any of the other capitals. It was especially the knowledge of Senge's disciplines (as discussed briefly in section 2.4.1.3 on page 2.12) and the awareness of the inter-relationships of the various components within the environment, identified in the work of Davenport and Prusak (as discussed in section 2.4.2.3 on page 2.24), that formed the basis for the actions implemented.

5.4.1.1   Human capital

As was mentioned briefly in section 5.2.1 on page 5.11, the informal management structure was top heavy and had to be changed. Only two of the seven staff members who had previously attended management team meetings were appointed in managerial capacity. Both these managers were experienced and were appointed to lead the largest two projects: information management and information procurement. Staff members who no longer had management or management team meeting responsibilities were informed and their tasks were re-defined. The marketing and business development project was managed by the IMPS manager but with the intention to use the position as an area into which new talent could be appointed. Managers decided to make a concerted effort to lead rather than manage but, given the environment, this was initially very challenging.

Because staff at that time felt unmotivated and suspicious of any actions taken, it was decided to communicate as often and as much as was feasible. Besides a daily

newsletter, which is discussed in more detail below, monthly staff meetings were scheduled and an open door policy was followed where staff members were invited to discuss problems and suggest possible solutions to problems whenever necessary. This resulted in a stream of visitations where almost each and every member of staff shared problems mostly of a personal nature. Personal issues relating to work relationships or task distribution were resolved as quickly as was possible. However, the resolution of problems relating to pension funds, medical aid contributions or personal financial management usually required the involvement of either the corporate human resources section or a financial consultant and took longer. As a next step individuals were requested to discuss problems only if they were prepared to include the manager of their project area. This resulted in the nature of the conversations changing as well as a slight increase in the willingness of staff to become involved in the planning of their sections of work.

Monthly staff meetings were very one-sided during the first three months. As a start, agendas were set but as staff started to participate in the meetings an open agenda policy was introduced. Two items are always included in the agenda. The first is a 'gripe and whine' session, relating to work related matters that are causing unhappiness. If problems cannot be resolved immediately, the items are referred to the next management team meeting and reported on as soon as action is taken. The second fixed agenda point refers to team building. After participating in a CSIRIS-wide team building exercise, it was decided to include a team building activity at each of the meetings. Minutes of all meetings, which included the results from the 'gripe and whine' sessions, as well as the team building exercises, are posted on the intranet where they form part of the corporate memory but they also allow staff members, who are not able to attend the meeting, to gain insight into the items discussed.

It was decided to utilize the staff tearoom as the meeting venue for staff meetings - as a first attempt to integrate the tearoom. Racial issues were addressed as part of the team building exercises but it soon became very clear that the issue would not be easily resolved and that ample time and much wisdom and patience were required to resolve the problem. It appeared that ample communication and transparent, fair and good leadership does build the trust relationship necessary to find a long term solution for the problem.

In an attempt to ensure that all staff members were kept informed, a daily 'state-of-affairs' communication newsletter was established and sent to staff, via e-mail, while many changes were taking place. Contributions were mainly from CSIRIS management team members and issues relating to both the front and back line were addressed. The newsletter was later changed to a weekly issue that is published via the Intranet. Management then became responsible for a regular slot but much of the newsletter reflects contributions by staff members. A deliberate attempt was made to encourage learning by including regular contributions relating to personal as well as professional growth. Lastly, a fun section was added to take care of the e-mail traffic amongst staff members. The newsletter contributions as well as its progress from social information sharing to learning tool were evaluated. The result of the evaluation is reported in [section 2.3](#) on page A1.17 of Attachment 1. After

ensuring that communication channels were improved, it was decided to pay dedicated attention to the administration associated with staff development.

The Hay job-grading scheme[2], which is known to be very suited to the knowledge worker environment, is used within the CSIR. As part of the CSIRIS initiative, staff members were required to assist in preparing job descriptions that reflected their responsibilities. In line with what was occuring throughout the rest of CSIRIS each job category was re-evaluated to ensure that jobs were benchmarked. Also in line with the requirements of the organization, six-monthly performance objectives were and are being set. Objectives are set and initiatives are identified within the framework of the mission of the IMPS programme area and the personal (human capital) development targets. As standard practice, reviews are benchmarked during an IMPS management team meeting held specifically for that purpose. The results of the reviews are then analysed for the group, as a whole, to identify weaknesses and strengths as well as for specific training needs. As was mentioned in section 3.4.1.3 on page 3.28, when the obstacles to human capital development activities were discussed, staff members without tertiary qualification found knowledge sharing difficult. Staff members with secondary qualifications were not able to distinguish between knowledge sharing and knowledge giving. Here the assumption is that 'sharing' requires two-directional activities while 'giving' is the traditional one-directional training style of learning. It was and still is difficult to grasp that with 'sharing' the learner has as much responsibility as the master. With giving it is the trainer who has to ensure that the learner acquires certain skills. After the first round of performance reviews, deliberate actions were taken to ensure that all staff members understood their own responsibility for personal growth.

In a further attempt to understand the skills levels of staff, it was decided to establish a skills register (database) for IMPS staff. The register provided the necessary information to establish the group's skills level and it formed the base of the skills development plan, which was identified as one of the second phase activities. Most importantly, it provided essential input for the personal monitor, which was also designed during the second phase of the project and which is reflected in Figure 5.4 on page 5.39.

In terms of the requirements for a staff development plan, it was decided to firstly ensure that all staff members have the required skills that will allow them to do their tasks effectively. Secondly, provision had to be made for the creation of opportunities to use current staff more creatively. Instead of retrenching inappropriately skilled staff members, it was decided to re-skill where necessary. Because three of the re-skilling positions were within the information procurement section, it was decided to employ one additional professional member of staff to assist the project leader. In doing so the project leader was able to provide additional assistance and guidance while her own time could also be utilized to assist in re-engineering processes and in investigating improvements to, for example, the

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[2] E. N. Hay and Associates developed the Hay job-grading scheme in the early 1950's. The Hay system allows jobs to be evaluated in terms of its know-how, problem-solving, and accountability requirements. More detail available from http://www.haygroup.com/

financial administration process. The following serve as examples of re-skilling that took place:

- the photocopy clerk was trained and utilized as an ILLs assistant;
- all staff members responsible for ILLs and the delivery of items from the stock in centralized collection were trained to utilize new scanning equipment so that scanned documents, attached to e-mails, rather than photocopies became the norm for journal article delivery;
- after the retirement of the administrative assistant, an ILLs assistant was transferred and taught the tasks;
- as a result of transferring an acquisitions officer to the front line, the opportunity was utilized to allow a member of staff from the information management team to grow into the position, rather than to employ additional staff.

The two positions that became vacant when an ILLs clerk and an information management assistant were transferred to new positions were not filled. It was decided to utilize the opportunity to create client-facing jobs. Both positions were aimed at improving the contact and the relationship with customers. The first position created has already been referred to: that of a professional employee appointed to assist the information procurement project manager. The job focus for that position was to take care of document delivery where there is considerable contact with external customers and to provide the project manager with spare capacity. The second position was utilized to appoint a client liaison officer who could serve as a single point of contact for clients, establish a contact and referral database and co-ordinate marketing activities.

The activities mentioned above could very well also have formed part of a change management drive. They were, however, deliberately focused around building human capital capacity while keeping the organizational mission as well as individual skills and abilities in mind. Obviously activities did not occur in isolation. While the focus was human capital development, much also occurred in terms of structural capital development and these activities are discussed in more detail below.

5.4.1.2   Structural capital

Building structural capital within the IMPS environment has two components. In the first instance the group is responsible for building the CSIR's structural capital. This refers specifically to the L&IS collection (both paper and electronic) and to populating enterprise-wide information systems (for example the workflow and project management systems). In the second instance there is also structural capital that refers specifically to the way things are done within IMPS. In terms of building CSIR structural capital, the following were carried out:

- Given the trends identified in section 5.1.2 on page 5.7, it was suitable to not only centralize but also rationalize the paper collection as far as was feasible. The rationalization was done in conjunction with a selected partner (the Academic Information Service of the University of Pretoria). As an extension

of this, it was decided to concentrate on building the CSIR's virtual collection by negotiating favourable access with a variety of national and international suppliers of reliable electronic information collections.

- A concerted effort was made to shift to an e-business approach for service delivery. This was not only to provide CSIR staff members with access to electronic information on the desktop but also to make internal work processes more efficient.
- The CSIR's Intranet was in the process of being transformed to a second-generation site (database driven). Fortunately the CSIRIS section of the Intranet was already following suit, and it was mainly the internal branding that needed to be finalized. It was therefore identified as one of the 'quick-win' items to complete and introduce. Selected customers were approached and with their assistance the new brand was launched. The content of the site was revised and as a result, besides giving access to a variety of information products, the intranet also became the single repository of the IMPS minutes, agendas, lessons learnt, policies, and procedures. Figure 5.3 is a graphical representation of the interface that was launched in May 2001.

Fig 5.3: CSIRIS on the Intranet

To assist users with the various products that were made available, a quick user's guide as well as tips (and if necessary passwords) were added and labelled 'About'. This ensured that the required information was always available. It was also negotiated with suppliers that the URL to their products was, where possible, always a direct IP authenticated link. Staff members who require access to products from home are therefore required to gain

access by dialling into and registering on the CSIR local area network (LAN) where the LAN software takes care of authentication.

- In an attempt to introduce new services and in conjunction with front line staff members, the structure for subject-specific 'portals' was put in place. The enterprise portal software had to be used for the activity. Due to hiccups in implementing the software, an alternative route had to be followed. This led to the development of html pages with a portal look. The thinking required for the development of true portals was captured so that minimal effort would be required to transfer to the new technology when that became available.
- A concerted effort to make available electronic full text content to research staff resulted in the introduction of three products, ScienceDirect, EbscoHost and SwetsnetNavigator. These products were not selected at whim. Porter's model (see Figure 3.3 on page 3.38) was utilized in the process of identifying possible products and carefully evaluating each of these. A process of deliberating the advantages and disadvantages and running trial periods followed prior to the introduction of the products. Usage statistics for the chosen products are reported in section 5.1 on page 38 of Attachment 1. Having had to negotiate contracts with the selected suppliers as an individual institution during phases one and two of this research (contracts as a rule run for three years), the focus during subsequent phases would be to evaluate the feasibility of joining national and perhaps international consortia. Such consortia are often able to negotiate better value for money deals than can individual institutions. Financial constraints led to a strategy to delay acquiring access to electronic commercially available reference material to a later phase.

Meeting the requirements to assist in building CSIR structural capital was relatively easy. Building structural capital for the IMPS environment held a different challenge. Therefore, in terms of what was required to build IMPS structural capital it was decided to:

- Make all significant documents available only via the enterprise document management system. As part of the skills development programme, staff members were expected to attend the regular training sessions and familiarise themselves with the process to be able to utilize the system effectively.
- Schedule all meetings via the e-mail system. Staff members were expected to keep their electronic diaries up to date. This took a major burden off scheduling meetings and posting reminders. In return it added a training burden, as staff had not previously found it necessary to make use of the advanced features of the e-mail system.
- Introduce alternative technology that could enhance desktop delivery rather than make better photocopies. (Efforts in trying to upgrade the photocopying equipment were seriously hampered due to existing long term contracts with the supplier.)
- Re-engineer processes where necessary. The first process targeted (ILLs and document delivery) was initiated during the consolidation phase and not as a result of this study. The results of the re-engineering process were however

utilized for staff re-allocation and formed the basis of the way in which the services within information procurement were structured. Both operational processes as well as the associated financial processes were targeted during the re-engineering exercise. The project leader, responsible for the area, led the investigation, which was done with the assistance of an external consultant as well as the chosen partner: the University of Pretoria Academic Information Services (UP AIS). The investigation involved a workflow analysis. This meant that the internal process was also benchmarked against that of the UP AIS. The result of this study is reported in Attachment 1, section 3.4 on page A1.27. Investigations associated with the financial systems processes required input from the corporate financial staff. The initial finding was not to change the current financial system but to rather delay further investigation until the enterprise-wide system was upgraded. The process was therefore streamlined but the transfer to a more efficient system was delayed. A third process, cataloguing, was tackled during the second phase of this research and is reported on in section 5.4.3.2 on page 5.43 and in section 3.4 on page A1.27 of Attachment 1. In re-designing the process, a deliberate attempt was made to include the learning loops depicted in Figure 2.2 on page 2.17. However, to what extent learning was taking place was not measured. This aspect will need to be addressed in the future.

From the activities listed above, it can be seen that both efficiency and effectiveness aspects for researchers as well as IMPS staff were initiated. Although the process was slow, the fact that the supporting structural capital was growing gave both staff and researchers the assurance that the service was on track. This in turn led to a perceived improvement in staff morale and customer confidence. The perceptions were not formally tested but were based on informal discussions and interactions with staff as well as customers. The fact that compliments from customers started trickling through more often than complaints was also taken as an indication that client confidence in the service was growing. The actual activities implemented to improve the relationship with clients are discussed in more detail below.

5.4.1.3   Customer capital

Because the IMPS section was attempting to project a new image it was understood right from the beginning that every possible opportunity to interact and obtain feedback from customers would have to be utilized. The most important focus point during phase one was to establish exactly who should be regarded as customers and who as stakeholders. It was also necessary to establish what interaction was taking place between IMPS staff and customers. In terms of marketing strategy and selling, it was decided to focus on the internal or CSIR customers during the first phase. This did not mean that existing external clients were neglected. There was just no concerted effort to approach new external clients.

Within the internal client grouping, the CSIRIS Director and front line managers were identified as the most important of the IMPS stakeholders. Regular contact and communication were already possible through management team meetings. The issue was therefore to attempt to consciously separate the roles of colleagues and

stakeholders. This remained a challenge throughout the initial research period. It was therefore decided to, during the second phase, use an additional feedback mechanism to ensure that all three of the learning loops as identified in Figure 2.2 on page 2.17 were addressed. A further stakeholder, namely the labour union, also was identified. Although this stakeholder had no direct impact on, for example, the set budget, it soon became very clear that the relationship also needed attention. The communication channel was therefore put in place and with the assistance of the Director the relationship grew from confrontational to one of mutual understanding. Obviously senior CSIR and strategic unit managers were also regarded as stakeholders. In this regard it is necessary to mention that front line managers were required, as part of their tasks, to establish service levels agreements (SLAs) with each of the strategic units.

Strategic unit heads appointed SLA managers who were responsible for negotiating the agreement between CSIRIS and the strategic unit. SLA managers were therefore seen as key stakeholders for the CSIRIS front line. In line with the knowledge economy value cluster constellation (as displayed through Figure 4.1 on page 4.19), the IMPS service was specifically structured to service researchers directly. With the assistance of the front line managers, a deliberate attempt was made to make contact and market IMPS services to the SLA managers. SLA managers and front line staff often expressed feedback and needs from 'their' groups of researchers. In addition, it was decided to keep track of customer satisfaction as and when it was expressed and whoever verbalized the feedback. This necessitated the establishment of a single recording mechanism as well as for a contact person for clients. A motivation for the creation of a client liaison position was prepared and, shortly after approval, a client liaison officer was appointed. The client liaison officer was made responsible for analysing the feedback and, besides following-up on complaints, to also regularly report on feedback received.

Besides the feedback in terms of the service received from IMPS staff, researchers also regularly provided feedback on the trial products that were made available. This feedback was either fed back to the suppliers or, where appropriate, utilized to improve the IMPS service. For example, it was established that research staff would rather test trial products towards the middle of a financial year. This is due to the fact that new projects are established at the beginning of the financial year, which causes its own challenges. Similarly, at the end of the financial year, project deadline pressures inhibit proper testing. It was therefore decided to run trials during August and September. This situation needed to be communicated to SLA managers as well as to suppliers so that they understood the dynamics. The front line managers assisted with the communication to strategic units as they were seen to be the appropriate people to do so.

In a further attempt to assist front line managers in their communication with the SLA managers, a number of supporting documents were created. One example of these documents is a guideline to use when evaluating journals for cancellation. Another is a series of presentation slides that could be packaged to suit the needs of specific circumstances. These presentations proved to be a very useful marketing tool and time saver when staff members from other institutions visited CSIRIS.

As an additional step, after the appointment of a client liaison officer, a client contact and referral database was established. The purpose was twofold. The first was to ensure that all enquiries were attended to within an acceptable period of time. The second was to establish frequently asked questions in order to make provision for standard, easy to retrieve answers. An advantage that soon became apparent was that the database could also contribute to the accomplishment of the 'connecting minds' aspect of the CSIRIS mission. It was possible to tell which experts within the organization were willing to and actually did follow-up on the requests forwarded to them. It was also possible to identify 'best practice' in terms of the way in which strategic units dealt with external client contact and learn from that experience.

A drive towards acquiring an increase in the number of external clients was seen to be the focus of CSIRIS as a whole during the second phase of this research project. In preparation for that a market survey, which was carried out just prior to the formal establishment of CSIRIS, was analysed for its applicability. It was found that the survey supplied useful information regarding the type of service IMPS could offer to external clients as well as to the extent to which the CSIR's brand, in terms of information services provision, was established.

From the actions taken during this phase of the project, it is clear that much of what was done served to either establish systems to be utilized during the second phase or to lay the foundations upon which customer capital could be built.

As was discussed in section 3.4 on page 3.17 and in section 4.5.5 on page 4.29 and with specific reference to the work of Kaplan and Norton (2001) and Figure 4.5 on page 4.31, it is not possible to build the components of intellectual capital without also building financial capital. The next section will address the actions taken to develop financial capital.

5.4.1.4   Financial capital

The budget had, to a large extent, been set prior to the initiation of IMPS. The reliable management of the set budget formed part of the normal managerial duties. The challenge was to re-direct funds to more worthy causes without losing sight of non-discretionary expenses. As was mentioned in section 5.3 on page 5.15, prior to initiating any of the 'building intellectual capital' activities it was necessary to negotiate a budget that could tolerate investment in intellectual capital activities over and above normal running costs. This was done with the assistance of the CSIRIS Director who, being also the knowledge management champion within the CSIR, understood the need for the identified activities.

The set budget provided another challenge in terms of the targets for external income. It was also clear that it would be difficult to reach the targets while the focus was on the internal market. It was therefore negotiated that a budget with realistic income targets would be set within three months of establishing IMPS. Subsequently, the income budget was reduced to reflect stability (the same as the previous financial year) rather than growth and fortunately this goal was reached

during phase one. The running budget was reduced to make provision for the loss in income, and this was achieved through stringent saving and cost reduction measures.

The direct involvement of the CSIRIS Director in the process of re-negotiating budget, as well as the communication with front line managers at and outside management team meetings, ensured that stakeholders were aware of and supported changes within the IMPS environment.

5.4.2 Lessons learnt from phase one

A wide variety of lessons were learnt during the first phase of the project. Many of these were at a personal and often unconscious level. The following lessons were documented and reviewed at the onset of the second phase of the process. As most of the activities during phase one were focused on human capital development, most of the lessons learnt also refer to that aspect.

5.4.2.1   Human capital

The lessons listed below are in no particular priority order:

- Human capital development requires leadership rather than supervision when putting in place initiatives to develop individuals. The adaptation from supervision and even management to leadership requires patience and much practice. Staff members stretch accountability and managers find it difficult to let go of responsibilities and empower staff members. In the end, however, it is worth the effort.
- Initial or fledgling attempts from staff to be innovative and to test their responsibilities and build confidence are at times difficult to recognise and therefore easy to destroy. A leader needs to be aware and attentive to recognise and encourage such attempts. There is a fine balance between abdicating responsibility (and allowing staff members to overstep boundaries) and supporting personal development and innovation attempts.
- Without benchmarked standards, it is only possible to access skills properly once the manager or leader really knows the staff members and is able to evaluate their contribution independently. It is also only then that hidden talents and undisclosed skills become available for effective application within the team's responsibility context. In contrast it is also then that a member of staff's success in coping with his workload can be evaluated. Such processes take considerable time and must follow growth cycles to live through. It is therefore essential that skills are surfaced and benchmarked as early as is possible so that the cycle times can be reduced. Although staff members were asked to list their skills at the onset of phase one, the benchmarking was not done. It was therefore seen as a priority item for phase two.
- Building a team is, during the best of times, a difficult process and sufficient time is required. It is useful to identify and implement deliberate actions that can support and fast-track the process. In this regard, it is advisable to make use of experts outside of the immediate environment. Careful selection and

evaluation of the contribution possibilities does however need to be done prior to contracting such experts. Many so-called team builders actually encourage competition, which is not suitable when aiming to enforce sharing and mutual learning.

- Typical change management problems occur, especially during the initial stages of implementation. It was seen as important to identify and manage these as such and not to pull individual incidents out of context. So for example

  - What is said is interpreted as what is meant, to the letter. It was seen as important not to stop communicating as a result of 'less-than-desired' incidents. The answer was found in identifying miscommunication when it occured and in rectifying the matter immediately. More communication rather than less seemed to be more appropriate. It was also useful to make use of an 'open door policy' and 'management by walking about' when changes were implemented.
  - Absenteeism is a known symptom of change in the workplace. It is a major challenge when there are fewer as well as 'new' staff members in a team. This causes conflict and finger pointing within the team. In individual cases it was necessary to formally address the occurrence. From then on it was found best to step back and allow team members to resolve the problem themselves – which they did.
  - In a new situation, new staff members need considerable attention. Managers needed to set aside sufficient time for mentoring and providing assurances. This placed much pressure on managers, as they too needed to cope with the implementation of change.
  - Change is more difficult for some people than for others. There is no value in trying to put all in the same mould. Although difficult to do, it is useful to identify those staff members that are not able to adapt at all and to provide them with guidance regarding alternative options available.
  - Comfort zones are comfortable – for all. When testing new processes, constant monitoring of whether an old process is more comfortable or truly better is required. The only way to do so successfully is for staff members to participate in improving the process and to really listen to the feedback they provide at review meetings.

- Staff members should be given as much assistance as is possible to adapt to new circumstances and requirements. It is therefore essential that skills gaps and training needs are identified and addressed as early as is possible.

As a final remark, it is necessary to mention that, although it may be difficult to measure, the visible growth in individuals should be regarded as the most gratifying of the rewards associated with the implementation of human capital activities. To witness the metamorphosis from an 'own-job-only' focused individual with hidden talents to a confident employee willing to share, participate and lead for the good of the wider group is a unique privilege.

5.4.2.2   Structural Capital

A knowledge era information service needs reliable and dependable infrastructure. Building that infrastructure brings about additional responsibilities that are at times difficult to justify. It remained a challenge to focus on the end goal rather than on financial and time implications.

Stakeholder support is crucial when building structural capital. It is therefore essential that communication channels are efficient as well as effective. In terms of support and commitment, staff members should also be seen as stakeholders.

It is difficult to implement the first improvement to the structural capital. As a result it is best to identify the one item that will have most impact on the widest audience. In the case of CSIRIS that item was the introduction of electronic journal services. In the case of IMPS it was the fact that all staff were required to use the available infrastructure to create and share information.

Developing structural capital is time consuming while it is happening. It is therefore essential that leaders stay focused on the end goal and ensure that the process is kept active. Rewarding the right behaviour publicly is an important component of the process.

5.4.2.3   Customer capital

The very first lesson learnt, as part of customer capital development, is not unique to the knowledge age and it most probably will not be eliminated by the next evolutionary era either. Changed services do not run smoothly immediately and even when clients are in the communication loop they, when under pressure, do not wish to make allowances for delayed service provision. It therefore needs to be ensured that:

- staff members establish and set a realistic delivery date when accepting a task;
- a reliable feedback procedure is followed; and that
- the preventive action 'learning loop' (as displayed in Figure 2.2 on page 2.17) is functioning effectively.

A second lesson is that, given the opportunity and an appropriate mechanism, customers very quickly see the benefit and importance of continuous feedback. The mistake should however not be made of thinking that all customers are willing to provide input. Neither should it be thought that feedback is only given when questionnaires are completed or when feedback interviews are conducted. Some of the most valuable feedback provided by customers came when the purpose of the interaction was something very different: training research staff to effectively use supplier products serves as but one example of an excellent opportunity to gain feedback.

Just as is the case with building structural capital and closely related to the second lesson referred to here, is the fact that building relationships is a time consuming activity. Ample time provision for the activity should therefore be made so that it becomes a priority and not an 'add on' item on the agenda of daily activities. Relationship building also requires a good memory. It is essential to put in place mechanisms to regularly have contact with clients (without causing a nuisance) and to create a memory jogger system as a tool to use in preparation for the intervention (which obviously should not overstep privacy boundaries).

Lastly, it is important to recognise customers as customers and stakeholders as stakeholders. In an environment such as the one under discussion, it was for example easy to underestimate the stakeholder role of the labour union. Similarly, the front line staff were acknowledged as colleagues but not really recognised as customers at the start of the second development phase.

5.4.2.1 Financial capital

Access is needed to sufficient finances to buy in external expertise. Expertise does not come cheaply. On the other hand it is impressive how creative individuals become when they are motivated to see their plans come into being but are confronted with the fact that funds are limited.

5.4.3 Phase two initiatives

Phase two of the project started on schedule in January 2002. The most important feedback received while reviewing phase one was that the pace needed to slow down so that there would be less disruption of the day-to-day tasks. Fortunately, the project was largely at a maintenance stage. Much of the process re-engineering had already taken place and at the time just needed to be continued or 'tweaked'. Only two or three large initiatives were still outstanding. The result was that the pace naturally slowed down. This feedback was, however, taken to heart and it was decided to introduce activities at a more comfortable pace for staff members. The introduction of the personal monitor, which is described in detail as part of structural capital below, is one of the activities, that was done at a pace slower than what was planned.

Reporting on the activities associated with phase two is approached similarly to phase one, starting with developments in terms of human capital.

5.4.3.1 Human capital

During phase two, as was the case during the first phase, attention was given to personal growth and teamwork across boundaries. During this phase, though, it was decided to concentrate on those areas where assistance from outside the IMPS group was necessary. As a result it was negotiated with other CSIR service units to assist in the mentoring and skills development of particularly talented (but perhaps without formal qualifications) individuals. Again the development was targeted to remain within the boundaries of the skills required for the accomplishment of the

mission of the CSIRIS IMPS programme area. The project leader for information procurement also negotiated the 'short term' exchange of staff between the ILLs departments of the CSIRIS and the University of Pretoria's Academic Information Service with the intention to learn from each other.

As a second example, it is worth mentioning that the project leader of the information procurement project decided to enrol for a further university qualification, as did the professional member of staff within the information management project. Lastly, a concerted effort was made to expose a variety of staff members to external courses and professional society activities – when these were in line with their developmental plans. This was done in conjunction with the activities of a training task team.

As a result of the progress review that took place in December 2001, four task teams were established. The task team members cut across the formal project areas. Their activities focused on three of the capitals: human, customer and financial capital. (Due to the efficient development of enterprise wide systems, it was seen as less important to, at that stage, establish a task team that could address infrastructure and largely duplicate efforts taking place within other sections of the organization. One member of staff was delegated to continue to monitor and contribute to organizational activities). Each of the task teams were required to build structural capital in terms of developing mini business plans and budgets for their own activities. Staff members were asked to participate in task team activities on a voluntary basis.

Although the comparison is relatively flimsy, it was decided to manage the task teams as CoPs (see section 3.4.1.1 on page 3.21). No team leaders were appointed. When the teams were established it was explained that each team was responsible for planning activities relating to the task, budgeting for the task activities, and executing the plan. They were made aware of the fact that they needed input from all IMPS staff members and that task team plans would have to be approved at a staff meeting once sufficient budget was provided for by the finance task team. The task teams that were established were the following:

- **Rewards and recognition** – to bring about true transparency and objectivity in the reward and recognition system. Task team members were expected to establish the full extent of the rewards system within the CSIR to ensure that an IMPS system did not contradict the wider requirements.
- **Training** – to address issues relating to the skills that ensure that real value is provided for customers. This task team was also responsible for compiling a list of conferences that could add value and improve the competency of the group. It was their responsibility to ensure that all staff members were given access to information about developmental opportunities. It did however, remain the responsibility of individuals to make use of relevant opportunities.
- **Marketing** – to address issues relating to customer capital. Because of the nature of the marketing required, it did not remain feasible to restrict the task team's activities to marketing IMPS services only.

- **Finance** – to address issues relating to financial capital but to also make staff much more aware of the accountability aspect of running a healthy business. Staff members who joined this task team were provided with training in order for them to have a basic understanding of the CSIR's financial systems as well as the budgeting process.

It is possible to, at this stage, report that, just as is the case with communities of practice, the group members determined the success of the task team. Because of the importance of these task teams, it was perhaps not the appropriate opportunity to experiment with communities of practice.

The skills development of individual staff members fell outside the ambit of the training task team. This remained the responsibility of the IMPS management team. Both the tangible and intangible value chains were taken into consideration when identifying skills that were necessary and that needed to be developed within the group. As a start, the skills identified in Table 4.2 on page 4.24 were evaluated and correlated with the skills identified by Lombard, et al., (1999, pp 6-8) of the CSIR, Marshall, et al., (1996) and Van Deventer, Mbundu and De Bruyn (1999, pp 5-6).

Following this exercise, an audit was done on the available skills to establish the areas in which it was necessary to focus training activities. The result of the audit is reflected in section 1 on page A1.8 of Attachment 1. A complete list of the identified skills is provided as Appendix A on page A1.44 of Attachment 1. The list in Appendix A was not seen as very useful and Appendix B was provided as a first attempt to link the identified skills to the IMPS value chains (refer to Figure 4.2 on page 4.23). In analysing Appendix B, there was a perception that not all of the required skills had been identified. With the assistance of the IM and the IP managers, 24 additional skills were identified. The skills were then classed as core or non-core skills. An indication, as to which capital it would most likely build, as well as the contribution to the tangible or intangible value chains, was indicated. This led to the development of Table 5.3 where the skills required for Financial and Human Resource management are included as M&BD skills.

Table 5.3: Skills required to ensure IMPS sustainability

Cap   - Contributes to the building of this capital (CC=customer; FC=financial; HC=human and SC=structural capital)
A   - Available
NR   - Available but not required
IM   - Information Management
IP   - Information Procurement
M&BD - Marketing and business development
T   - Contributes to the **tangible** value chain
I   - Contributes to the **intangible** value chain
C   - Core skill

Skill	Cap	A	NR	IM	IP	M&BD	T	I	C
Ability to make connections – connecting minds and information	CC					Y		Y	
Client relationship management	CC	Y			Y	Y		Y	Y
Communication and people skills	CC	Y		Y	Y	Y		Y	Y
Identification and tracking of experts	CC	Y			Y	Y		Y	
Interpretation – to tie knowledge of the market with needs of the customers.	CC					Y		Y	Y
Interviewing	CC					Y		Y	
Marketing	CC	Y			Y	Y		Y	Y
Needs identification	CC	Y			Y	Y		Y	Y
Networking	CC	Y		Y	Y	Y		Y	Y
Pro-active identification of potential customers.	CC				Y	Y		Y	Y
Service development	CC	Y		Y	Y	Y		Y	Y
Accounting	FC	Y			Y	Y		Y	
Bargaining	FC					Y		Y	Y
Budget control	FC	Y			Y	Y	Y		Y
Buying	FC				Y		Y		
Evaluation of supply chain	FC	Y			Y	Y		Y	Y
Financial administration	FC	Y			Y	Y	Y		Y
Interpretation of currency fluctuation	FC	Y			Y			Y	Y
Interpretation – reading of legal documentation	FC					Y	Y		Y
Knowledge of pricing models	FC					Y	Y		Y
Knowledge of supplier efficiency	FC	Y			Y			Y	Y
Negotiation and bargaining - suppliers	FC	Y			Y	Y	Y		Y
Ability to use available technology effectively	HC			Y	Y	Y	Y		Y
Ariel	HC	Y			Y		Y		Y
Assertiveness	HC	Y		Y	Y	Y		Y	
Building organizational culture	HC	Y				Y		Y	Y
Coping with change	HC	Y		Y	Y	Y		Y	Y
CSIR DocDel	HC	Y			Y		Y		Y
CSIR project management system	HC	Y				Y	Y		Y
CSIR project management system administration	HC	Y	Y				Y		
Culture consciousness	HC	Y				Y		Y	Y
Database design	HC	Y		Y		Y		Y	
Decision making	HC	Y		Y	Y	Y		Y	Y
ERUDITE	HC	Y	Y					Y	
Facilitation (for communities of practice and cross functional teams)	HC	Y				Y		Y	
Human resource management	HC	Y				Y		Y	

5.35

Skill	Cap	A	NR	IM	IP	M&BD	T	I	C
ICT manipulation	HC	Y				Y		Y	Y
III Millennium	HC	Y		Y	Y		Y		Y
Inmagic	HC	Y	Y					Y	
Innopac	HC	Y		Y			Y		Y
Interpretation of legal and technical documents	HC	Y				Y		Y	Y
Leadership	HC	Y		Y	Y	Y	Y		Y
Management	HC	Y		Y	Y	Y	Y		Y
Mentoring	HC	Y		Y	Y	Y		Y	Y
MS Access	HC	Y	Y					Y	
MS Excel	HC	Y		Y	Y	Y	Y		Y
MS Power Point	HC	Y				Y		Y	Y
MS Word	HC	Y		Y	Y	Y	Y		Y
Negotiation and persuasion	HC	Y			Y	Y		Y	Y
NT	HC	Y	Y					Y	
Overview (balcony vision)	HC	Y				Y		Y	Y
PC technical fault identification and repair	HC	Y	Y					Y	
Persuasion	HC	Y			Y	Y	Y		
Presentations	HC	Y				Y		Y	
Prism	HC	Y			Y		Y		
Request	HC	Y			Y		Y		Y
Sabinet Online	HC	Y		Y	Y		Y		Y
Strategy and vision formulation	HC	Y		Y	Y	Y		Y	Y
Team playing	HC	Y		Y	Y	Y		Y	Y
Telephone etiquette	HC	Y		Y	Y	Y	Y		Y
Time management	HC	Y		Y	Y	Y		Y	Y
To be pro-active	HC	Y		Y	Y	Y		Y	Y
Training - teach users to exploit the full capacity of available products	HC					Y		Y	Y
Understanding of management trends	HC	Y				Y		Y	Y
Understanding of organization's politics	HC	Y		Y	Y	Y		Y	Y
Understanding of technical trends	HC	Y				Y		Y	Y
Web design software	HC	Y				Y	Y		Y
Web page design	HC	Y				Y	Y		Y
Web publishing	HC	Y				Y	Y		Y
Word Perfect	HC	Y	Y					Y	
Writing - manuals, documents, procedures, etc	HC	Y		Y	Y	Y	Y		Y
'Market scanning' and analysis – to identify sources proactively and identify market trends	SC				Y	Y		Y	Y
Ability to analyse	SC					Y		Y	Y
Ability to distinguish between attempting to rectify errors internally and when to call for assistance	SC	Y		Y	Y	Y		Y	Y
Ability to identify errors	SC			Y				Y	Y
Ability to use labelling equipment	SC			Y			Y		Y
Analytical skills - for needs identification and analysis.	SC	Y			Y	Y		Y	Y
Book acquisitions	SC	Y			Y		Y		Y
Building customized portals and extranets	SC	Y				Y	Y		Y
Capturing lessons learnt	SC	Y				Y	Y		Y
Cataloguing	SC	Y		Y			Y		Y

5.36

Skill	Cap	A	NR	IM	IP	M&BD	T	I	C
Collection building - virtual and physical	SC	Y		Y			Y		Y
Collection maintenance	SC	Y		Y			Y		Y
Compilation of policies and guidelines	SC	Y		Y	Y	Y		Y	Y
Converting paper to electronic	SC	Y				Y	Y		
Creativity	SC	Y				Y		Y	Y
Critical evaluation.	SC	Y				Y		Y	Y
Data capturing	SC	Y		Y			Y		Y
Database creation, maintenance and manipulation	SC	Y		Y			Y		
Database development	SC	Y	Y				Y		
Database maintenance	SC	Y		Y			Y		Y
Database searching	SC	Y		Y	Y	Y	Y		
Deliveries	SC	Y		Y			Y		
Development of subject specific databases	SC	Y		Y				Y	
Dialog searching	SC	Y			Y			Y	
Document supply	SC	Y			Y		Y		Y
Driving	SC	Y		Y			Y		
Efficient administration	SC					Y		Y	Y
Filing	SC	Y				Y	Y		Y
Secretarial	SC					Y	Y		Y
Identification and rectification of errors in copied records	SC	Y		Y				Y	
ILL	SC	Y			Y		Y		Y
Indexing	SC	Y		Y			Y		Y
Information collection	SC	Y		Y				Y	
Information management	SC	Y		Y			Y		Y
Information Packaging	SC					Y		Y	Y
Internet searching	SC	Y			Y	Y	Y		Y
Investigation - faults and sources	SC	Y		Y				Y	Y
Issue desk	SC	Y		Y			Y		Y
Journal administration	SC	Y		Y	Y		Y		Y
Judgement – recognise it when you see it	SC				Y	Y		Y	Y
Knowledge management	SC	Y		Y	Y	Y		Y	Y
Knowledge of international cataloguing standards	SC	Y		Y			Y		Y
Knowledge of the CSIR subject areas to include those as subject terms where appropriate	SC	Y		Y				Y	Y
L&IS system maintenance	SC	Y		Y			Y		Y
Maintaining information products	SC	Y		Y		Y	Y		Y
Network administration	SC	Y	Y					Y	
Networking – especially when tracing 'difficult' documents.	SC				Y	Y	Y		Y
Novell network administration	SC	Y	Y					Y	
Packaging of information retrieval from databases and internet	SC	Y				Y		Y	
Policy and procedure formulation	SC			Y	Y	Y	Y		Y
Pro-active identification of future projects	SC	Y		Y	Y	Y		Y	Y
Product development	SC	Y				Y		Y	Y
Record keeping	SC	Y		Y			Y		Y
Report collection maintenance	SC	Y		Y			Y		Y
Scanning (text/images)	SC	Y				Y	Y		Y
Secretarial duties	SC	Y				Y	Y		Y
Selecting L&IS systems	SC	Y		Y		Y	Y		

5.37

Skill	Cap	A	NR	IM	IP	M&BD	T	I	C
Shelf reading	SC	Y		Y			Y		Y
Sifting, sorting, maintaining information collections – virtual and physical.	SC			Y			Y		Y
Stock purchases	SC	Y			Y		Y		Y
Subject area knowledge (CSIR specialization areas)	SC	Y		Y				Y	
Support of hardware items	SC	Y	Y					Y	
Systems administration	SC	Y		Y				Y	
Technical know-how relating to the L&IS system.	SC			Y				Y	Y
To identify errors	SC	Y		Y				Y	Y
To make connections – connecting minds and information	SC	Y				Y		Y	Y
Training	SC	Y				Y	Y		Y
Transferring information from the physical (paper) to the virtual (electronic) domain	SC					Y	Y		Y
Trend identification	SC	Y		Y	Y	Y		Y	Y
Understanding of information trends	SC	Y		Y	Y	Y	Y		Y
Verifying records	SC	Y		Y	Y		Y		Y
Web development and maintenance	SC	Y				Y	Y		Y
Web site administration	SC	Y				Y	Y		Y
Writing and implementation of marketing plan	SC					Y	Y		Y
Writing	SC			Y	Y	Y	Y		Y

This exercise did not take cognisance of skills levels and the list still contains some duplication. It is necessary to also determine if these skills requirements are at the 'beginner, experienced or mentor' level. As a first step, these skills 'levels' need to be benchmarked within IMPS but the intention is that the skills levels will be calibrated with staff members at other institutions. The calibration did not form part of this research. It would be ideal if that could be done as part of further research. It may also be useful to put skills into competency groupings rather than to just list them.

The most important initiative during this phase should be seen as the skills audit that was completed and then gave rise to considerable, subsequent development work. The audit should in future serve as the base from which human capital development within IMPS can be measured. The IMPS personal monitoring tool, which is discussed in the next section, also used the skills audit data as 'base entry level' information. Most of the second-phase structural capital development energy was utilized to develop the personal monitor.

5.4.3.2   Structural capital

A personal monitor was developed in an effort to provide a tool that could be utilized to measure personal contribution and growth. A secondary goal was to serve as a transparent and fair evaluation system that would reward desired behaviour. The reasoning behind the monitor is that it is not possible to measure the growth in intellectual capital at organizational level, if growth cannot be measured at individual contribution level. Because it is so easy to again measure only financial capital related items, an attempt was made to identify what should be measured to establish personal value over the spectrum of capitals. Table 4.7 on page 4.43 reflects the

questions that were formulated to make staff members aware of the fact that knowledge era work is about more than just doing a job. From the questions listed in Table 4.7, a comprehensive monitor was created making use of a Microsoft Excel workbook that was personalized for each staff member. After a first attempt to launch the monitor, it was realized that it was far too complex and cumbersome for the value that would be gained from its implementation. Implementation was stopped and, with the assistance of individual staff members and the two project managers, the monitor was considerably condensed and simplified. Table 5.4 below reflects the portion of Table 4.7 that refers specifically to the 'adapted' personal monitor.

Table 5.4: Monitoring personal value – what contributions to measure

Personal contribution to both the tangible and intangible value chains	Contribution to IMPS/Value added
What skills do I need to do my job? What additional skills do I need to learn? At what skill level am I functioning?	What did I teach to whom?
What am I doing to identify new and better ways to do my work?	What am I contributing to our overall innovation process?
What do I do to ensure good quality work? How often do I need to re-do work?	
What feedback am I getting with regards to the service I am providing?	What do I contribute to the improvement of our service to customers?
	What did I contribute to finding new ways to improve our relationship with our clients?
Are my timesheets completed?	

The second version of the monitor was launched in May 2002. Staff members were only provided with a two-page form to complete (see Attachment 2). The form was in a Word document format that contained the measuring criteria and a 'scoring table'. The form could be printed and completed by hand. They were, however, required to edit the financial capital portion of the form to indicate the bulk of their daily task as one item only with a maximum score of 50 out of a possible 400. Although a few members of staff were trained to assist in the process, that specific item caused real problems for most, as they could not agree with the concept of the 'job' they were doing being only such a small portion of the full contribution. The monitors were checked to establish the nature of problems and these were addressed at an individual level. All staff members agreed to use the system for a period of six months after which the system would be reviewed and adapted to make provision for further concerns. The paper-based monitors were captured by hand at the end of June 2002. Only then were the results transferred to the adapted Excel workbooks from which it was possible to automate calculations. Because the data was seen as untested and therefore unreliable, results were not reflected as part of this research. Figure 5.4 below does, however, reflect the graphs section within the monitor. From the graphic it is possible to see that an individual is able to benchmark his/her own progress against that of the rest of the section.

Fig 5.4: The IMPS personal monitor
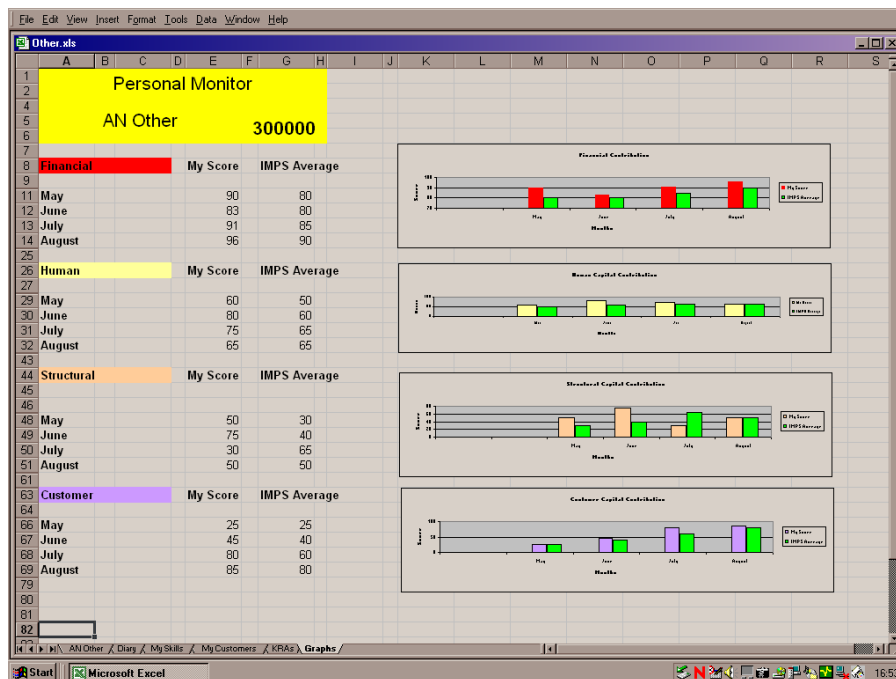
The figure shows that the monitor workbook makes provision for several worksheets. The first of these is for the capturing of scoring data; and the second sheet is a diary where any back-up information is captured. Worksheets three, four and five allows for the individual to, with the guidance of his immediate manager, list his skills (including the skills level), his customers and the key result areas (KRAs) or objectives for a specific review period. KRAs form part of the CSIR's formal evaluation system. The last worksheet provides the graphs that are drawn from the information captured on the first worksheet. The benchmarking figures come from a separate workbook that is generated from the personal workbooks. As indicated in section 2.4 on page A1.20 of Attachment 1, staff members have reserved judgement on the use of the personal monitor. From observing reactions and listening to complaints, it is the perception that most are finding it challenging to make provision for the monitoring of more than just 'financial capital contribution'. Because all appear to be positive about the intention behind the monitor, it has been identified as one of the priority actions, for the next development phase (not covered in this report), to ensure that the tool is formed and shaped until it becomes acceptable to all.

On the graphs (Figure 5.4), the green bar always indicates the IMPS average. The monitor was designed so that each of the intellectual capital categories carries equal weight: a score out of approximately 100. It is necessary to, at a later stage, evaluate if it is not perhaps necessary to build in a weighting system that is more appropriate to a person's specific role within IMPS. The agreement with staff was that the methodology would be reviewed at the end of a six-month implementation period. It is also at that stage that a decision will be made whether the system will be introduced to the rest of CSIRIS.

Currently the usage of the monitor is cumbersome. The intention is not to work in such a way for a prolonged period. Should the monitor prove to be valuable, the process should be migrated to the enterprise-wide workflow system. At present the CSIR's workflow system does not make provision for scorecard evaluation of individuals but, according to the supplier of the software (Peoplesoft, 2002), the balanced scorecard is part of their enterprise performance management product line. This functionality should be investigated during the next development phase.

Other changes and improvements to structural capital were less intensive than the implementation of the personal monitor. For example:

- During the first phase of implementation, it was established that investigations associated with the financial systems processes required input from the corporate financial staff. It was then decided to delay changes to the internal financial system and to do further investigation once the enterprise-wide system was upgraded. During phase two, procedures around petty cash, the payment of invoices and a number of other minor procedures were streamlined. As part of the CSIRIS-wide streamlining of project registration, the IMPS timesheet and financial reporting was also addressed and simplified.

- CSIRIS took on the responsibility to facilitate communities of practice within the CSIR. It was therefore seen as important to also develop those skills within the IMPS environment. Not all IMPS staff members were required to participate but it was especially the web developer and the managers that were tasked with the skills development challenge. Virtual communities were of special interest. Initially the virtual community structure was to be based on portal technology but, due to technical constraints as well as a lack in appropriate skills, the web interfaces, for the communities, were developed as static pages. The planning and thinking was done in conjunction with appropriate front line staff members and the community facilitator. Planning was also done in such a way that it allowed for migration to a more appropriate technology when that became available. Figure 5.5 is an example of one such a virtual community interface.

Fig 5.5: Interface for a virtual community

The interface makes provision for links to the CSIRIS services and also to 'self help' commercially available document delivery services. Direct links to specific e-journals and the most suitable search engines applicable to the subject area are included. The content of the centre panel is determined solely by the community and is changed as often as is necessary.

As a result of feedback received from customers, it was decided to redesign the layout of the CSIRIS Intranet interface (Figure 5.3 on page 5.24). The enhanced version made provision for subject categorization as well as for 'an article of interest' section that could be updated with a brief overview and a link to an article that is of general interest to CSIR staff. In Figure 5.6 on the next page, for example, the link was to an article on performance based pricing, which linked to an article on the *Harvard Business Review* site.

Fig 5.6: Enhanced Intranet Interface

The new interface also made provision for a link to the documented results of an Information Services Forum, which was established by CSIRIS management to facilitate formal feedback from the CSIRIS customers. From the 'hit rate' results analysis, which is run monthly, it was established that more than just the CSIRIS staff were reading the CSIRIS staff newsletter and as a result it was also given more prominence on the new interface.

Another activity that had direct impact on the growth of structural capital is a cataloguing benchmark exercise that was done in conjunction with the preferred partner, UP AIS. A task team was appointed to specifically look at the process being followed at 10 of the institutions identified as leaders in the industry. The conclusions, reached after the completion of the investigation are reported in section 3.4 on page A1.27 of Attachment 1. The report (Van Deventer, et al., 2000) was presented to the management of CSIRIS and UP AIS as well as to colleagues from the participating institutions.

In summary, the most important activities during this phase, that specifically relate to the development of structural capital, are the development of a 'personal growth and contribution' monitor and a cataloguing benchmark study that was completed in collaboration with a reliable partner. The next section addresses activities associated with customer capital.

5.4.3.3   Customer capital

Phase two corresponded with the CSIRIS-wide drive to increase activity in the external market. In relation to Ansoff's marketing strategy model (discussed in section 3.4.3 (c) on page 3.50) and keeping in mind the products and services that IMPS could offer, it was decided to follow a product development strategy and to market only existing products to new markets/customers. The secondary role that IMPS needed to play was in terms of developing and producing supporting documentation such as templates for proposals and marketing brochures. Co-ordination of the activity was delegated to the client liaison officer who had to ensure that contributing individuals, from both the front line and IMPS, kept to set deadlines.

The liaison officer was also responsible for keeping track of the marketing plan and its associated activities. Both the CSIRIS managers and the marketing task team participated in identifying the appropriate activities, but the liaison officer put in place a system that ensured that weekly, monthly and quarterly activities were executed. Some of these activities were specifically planned to include partners (for example book suppliers to host a book fair), some were purely informative, and others, the monthly activities, were targeted at information literacy. Again the liaison officer's role was to ensure that planned activities took place. She also ensured that a review of activities could take place prior to setting the programme for the next period. Every opportunity was utilized to gain feedback from clients that were affected by individual activities. This feedback was documented and made available via the document management system. A synopsis of the results was also published in the weekly newsletter to staff.

The establishment of an Information Services Forum (for the CSIRIS group) was seen as another opportunity to gain formal feedback from the most important clients and stakeholders. An Executive Vice-President, who is also the most important CSIRIS stakeholder, chairs the forum. Active participation in this forum ensured that IMPS had an opportunity to market its services and identify needs that were perhaps not being addressed. Two such items were:

- a need to develop alternative funding models to pay for services that are of a generic nature; and
- the need for a guideline document that research staff members could utilize to identify what information resource is most suitable for a variety of information retrieval needs.

From the above it can be seen that the second phase of customer capital development focused heavily on collecting and interpreting feedback from customers. The feedback was utilized to continuously address and improve activities that were taking place as part of the day-to-day operations.

5.4.3.4 Financial Capital

Besides the normal budgeting and financial control activities, the development of new funding models still provided a challenge at the end of the research period. It was therefore decided to facilitate a workshop and invite the two project managers, the CSIRIS Director, and the front line managers to participate. The purpose was to gain input as to what models to propose to the Information Services Forum.

), the pace slowed down during the second phase and the focus was on maintaining and stabilizing activities that were initiated during the first phase. Even though it could therefore be seen as a maintenance phase, there were a number of lessons that came from the phase two activities.

5.4.4 Lessons learnt from phase two

During the second phase of implementation, the working environment had become much more stable and as a result the lessons from this phase were to a certain extent more lasting than those from the first phase. The lessons are again grouped as emerging from the four capitals.

5.4.4.1 Human capital

Not all teams are able to manage themselves with the same amount of success within an unstructured environment. The situation needs to be monitored and, when necessary, deliberate action has to be taken to ensure that teams learn from each other. If this is not done it is very difficult to keep some task teams functioning effectively.

It is very easy to allow the results of a skills audit to overshadow the development that is taking place. It is therefore recommended that the requirements for a skills level be established prior to an audit. Knowing what the requirements are minimizes the 'surprise factor' for staff members as it makes it easier for individuals to judge their own expertise. Care is also needed to not allow something like a skills audit to turn into competition amongst individuals.

5.4.4.2 Structural capital

Benchmarking is valuable for a variety of reasons. However, ample time provision is needed and it must be ensured that all interviewers approach the exercise from the same angle. Visiting the benchmarking partners one by one allows for additional information to be collected but it would perhaps have been useful to meet with all the participants as a group, either at the onset of the project or as a last review prior to releasing the final report.

5.4.4.3   Customer capital

There are definite advantages to allowing a stakeholder to drive a formal feedback activity such as is the case in the CSIRIS Information Services Forum. Both customers and service providers see the stakeholder as an honest broker and the feedback provided is therefore of value for all.

At the same time though, it is easy to allow positive feedback to overshadow what may appear to be minor indications of problems. When everyone else seems positive, it is a difficult task to ensure that one stays 'honest' to a complaining customer. In this regard the monitor, even though it makes provision for gaining additional 'points' when a problem is resolved, did not in the initial stages have the desired effect. Having identified the problem, additional measures needed to be taken to ensure that these complaints were addressed with the appropriate diligence. It does appear to be an area that needs additional attention.

5.4.4.4   Financial capital

Stakeholder attitude was definitely influenced by positive interactions with CSIRIS customers. It was a mistake not to build more strongly on the same model for IMPS stakeholders. This was rectified late in the research project.

In closing, it is perhaps necessary to mention that maintaining and growing a system holds a different challenge to establishing it. If the implementation of intellectual capital management is to reach its full potential, it is necessary to ensure that all leaders buy into and are able to see the advantages of intellectual capital management early in the process. This means that the responsibility of driving the different stages of implementation could be shared.

It became very clear towards the end of the second phase that it was necessary to do a formal evaluation of progress.

5.4   Evaluating progress

Evaluation of progress occurred continuously, but very informally, during and after the 'phase one' activities were implemented. It was decided to do a formal evaluation at the end of the second phase. It was seen as of little value, within the context of this research, to merely count and reflect items such as years of service in the company or the amount spent on formal training. Neither were items associated with per capita income of real value or relevance. However, items such as customer satisfaction and lessons learnt were relevant. Table 5.4 on the next page, which also builds on Table 4.6 on page 4.37 and Table 5.2 on page 5.16, was created to reflect only those tools that were utilized to gain the results reflected in the *IMPS Intellectual Capital Report* (Attachment 1).

Table 5.4: Measuring growth – indicators and tools utilized

Measurement category	Indicators of growth	Measuring tools
Staff development and satisfaction (Human capital)	Motivated workforce Active participation at staff meetings Participation in networks Active participation in strategy sessions	Staff satisfaction polling through focus group discussions and interviews Analysis of 'gripes and whines' sessions and staff meeting participation.
	Personal development	Skills audit Review of personal scorecards Analysis of staff newsletter content
	Supportive environment to stimulate knowledge transfer	Analysis of staff newsletter content
	Appropriate skills under development Appropriate KRAs for performance evaluation Innovation projects	Evaluation of the human resource development plan Audit of training sessions, Conference attendance and formal training
	Participation in CoPs, task teams and consortia activities	Review of task team activities
Infrastructure development and utilization (Structural capital)	Reliable sources from which to extract statistics regarding: • staff complement; • training needs; • skills levels; and • customer product use.	Structural capital audit and analysis of available statistics
	Improvement in processes including benchmarking	Audit of process re-engineering
	Proof that the identification and development of suitable systems tools and templates is happening Proof that the identification and capturing of best practices, corporate memory and lessons learnt is occurring Proof that service levels, pricing models and other material that will guide the relationship between the organization and the customer has been established	Audit of repositories and systems
	Growth in CSIR structural capital	Review of new products and services
Customer commitment and satisfaction (Customer capital)	Commitment towards IMPS amongst customers	Delphi technique feedback
	Independence of customers	Analysis of new product usage statistics

Stakeholder satisfaction (Financial capital)	Keeping stakeholders up to date with regard to developments of strategic importance	Personal semi-structured interviews
	Proof that the group is achieving its mission	Measurement against the mission of the group
	Proof that the group is acquiring the infrastructure to enable the implementation of e-business strategies.	Analysis of activities
	Proof of responsible supply chain selection • Benchmarked preferred supplier list • Analysis of products • Analysis of usage statistics (from suppliers)	Analysis of available supply chains

The results of the analysis and review process are reported in detail in Attachment 1.

5.5   Summary

Chapter 5 provides a detailed overview of the activities implemented at the CSIRIS IMPS section where an experiment was conducted to see if intellectual capital management was an appropriate management philosophy to follow. The activities were structured over a period of 18 months and were implemented in two phases. Kaplan and Norton's adapted scorecard framework (which was discussed in section 4.5.5 on page 4.30) was utilized to set objectives for each of the two phases.

A situation analysis was done at the start of the experiment. The adapted version of Sveiby's Affärsvärlden model (Figure 3.2 on page 3.17) was utilized to identify specific actions and initiatives to be taken as a consequence of the situation analysis findings. It is clear that most of the activities focused on human capital development as that seemed to be the obvious place that needed most developmental work. However, an overview of all activities was given in Table 5.2 on page 5.16.

The last section within this chapter identified the indicators that need to be evaluated for growth as well as the tools that will be utilized to establish how much growth had taken place. The result of the evaluation is reported in the following chapter.

Chapter 6
Measuring progress

There are two main purposes for measuring intangible assets and two main parties who will be interested in the results.

- In the **external presentation**, the company describes itself as accurately as possible to stakeholders, customers, creditors, and shareholders so they can assess the quality of its management and whether it is likely to be a reliable supplier or a dependable creditor.
- **Internal measurement** is undertaken for management, which needs to know as much as possible about the company so that it can monitor its progress and take corrective action when needed (Sveiby, 1997, p 163).

6.1   Introduction

At an intuitive level it could be assumed that much progress has taken place. This chapter will however be utilized to investigate and provide factual evidence that the intellectual capital management philosophy was beneficial for the CSIRIS IMPS service as a whole. As such, the purpose of this chapter is threefold. Most importantly, the intention is to set a benchmark so that activities to follow will have a set of results against which to measure progress. A secondary aim is to record the growth that has taken place during the study period and, thirdly, the aim is to identify the priority actions that have to be taken forward to the phase of development that should take place after the completion of this research. The process followed to gather evidence and identify priority actions is provided in the section below. Section 6.4 provides insight into the reaction of stakeholders when they were provided with the *IMPS Intellectual Capital Report*.

6.2   Process followed

As was referred to in section 1.3, research stretched over an 18-month period. At the onset of the research a detailed situation analysis was completed. The result of this situation analysis is reflected in section 5.2 on page 5.10. From then progress was monitored informally. A formal review of progress was carried out at the end of the study period. The results of the review were used to create an intellectual capital report for the CSIRIS IMPS section. A self-assessment template, introduced within the CSIR in 2002 and which line programmes are required to use when measuring **their** results, was adapted and utilized for this purpose. The CSIRIS *IMPS Intellectual Capital Report* is provided as Attachment 1.

In terms of the actual measurement, it was decided to make use of a variety of methods to gauge progress. The methods implemented to gather feedback and proof of growth and satisfaction were discussed in more detail in section 1.5 on page 1.7. To measure human capital development specifically, a skills audit was carried out to establish a complete list of skills as well as to create a skills development plan for the section. Secondly, the contributions to the staff newsletter were analysed as an indicator to establish the extent to which staff members were learning from each other. Staff satisfaction was measured through a series of group interviews at the start of the second implementation phase and through focus group discussions at the end of the research period.

In selecting appropriate questions for the focus group discussions, it was decided to reword and make use of the 'new signs of trouble' list that was created by Stewart (1997, p 201). Attachment 3 provides both the questions and the instructions given to the facilitators prior to the discussions. No managers or staff members regarded as managers (union representatives) were included in the focus group discussions. Staff members were divided into two groups. It was deliberately decided to split the groups by race to ensure that groups were as uniform as is possible but also to make provision for the use of indigenous languages during discussions. A deviation from the classic focus group compilation is that both facilitators and group members knew each other. This is in contrast to the advice of the authors consulted but, as

discussed in section 1.5 and because staff satisfaction was the topic of discussion, this was not seen as detrimental to the process. Staff members are familiar with single-hour meetings and discussions and, because there was no need for lengthy introductions, it was decided to limit the focus group discussions to an hour rather than the usual two-hour session. Participants were given the opportunity to send further comments to the facilitator for a period of two working days after the discussion. The two facilitators were briefed a week in advance of the group discussions. Both tested and understood the instructions given in Attachment 3.

Progress in terms of the development of structural capital was mainly measured through an analysis of the available IMPS documentation on the Intranet; evaluations of available usage statistics; and of results gained from benchmarking the cataloguing and ILL processes.

A Delphi exercise was used to gain feedback from information specialists (as first line customers). The e-mail communication initially sent to the information specialists as well as the subsequent iterations of the questionnaire are reflected in Attachment 4. The exercise not only polled satisfaction but was also very useful to gather information on what these customers regard as:

- the most crucial issues to address; and
- which aspects should be seen as achievements to build upon.

As a last step to test results, the *IMPS Intellectual Capital Report* was made available to IMPS stakeholders. (Stakeholders for IMPS, as was discussed in section 5.4.1 on page 5.26, are seen as the CSIRIS director, front line managers and union representatives.) In the case of the stakeholders, it was decided to gain feedback through personal semi-structured interviews. This approach was thought suitable because it would provide the opportunity to gain personal feedback outside the meeting space, which could be confused with the normal work interaction. As discussed in section 1.5 on page 1.9, Westbrook (in Powell, 1997, pp 150-151) and Zemke and Kramlinger's (1982, p 101-103) general advice for preparation and conducting personal semi-structured interviews was followed. Each interviewee was provided with access to the report (see instructions in Attachment 5) prior to the interview. The guiding questions for the personal interviews as well as a list of priority actions that came from the *IMPS Intellectual Capital Report* are provided in Attachment 5. The sessions with the stakeholders were used to share information where it was necessary, to prompt for their opinions when appropriate and to identify those actions that they would support as the most important for the next phase of development. The results of the analysis of the IMPS intellectual capital activities, as well as the feedback gained from the stakeholders, are reflected in the next section.

6.3   Results

As a first step, Table 3.2 on page 3.14 was reviewed. The table indicates the phases to expect when implementing intellectual capital management. As Edvinsson (1997, p 370) warned, the phases did not occur sequentially. It is the researcher's

perception that intellectual capital management, within IMPS, is at this stage reaching Edvinsson's 'measurement' phase but that some actions, such as the Intranet development, are already within the 'technology' phase. With regard to the steps to take and the strategy to follow, which are also reflected in Table 3.2, a similar pattern is visible. All of the authors quoted in Table 3.2 did make provision for an audit or overview of results, which is the purpose of the rest of this section.

In reviewing the progress made, the situation analysis done in April 2001 was used as a point of departure. Table 6.1 provides a quick overview of the progress made in IMPS (from the situation analysis provided in section 5.2 on page 5.11 to the situation towards the end of the study period).

Table 6.1: Situation analysis in brief

April 2001   **September 2002**

Human Capital

April 2001	September 2002
Top-heavy management structure. Little input from staff members.	Reduced number of managers. Staff members have many opportunities to participate and provide input in matters that are of concern to them.
Most staff members have more than ten years experience in exactly the same position.	A number of staff members have been moved to more challenging positions. Areas where change is critical – due to the age profile, have been identified.
Little participation in professional activities.	Increase in activities. The group can vouch for one association chairmanship and two conference papers. Professional society meetings and training sessions are attended regularly by a wide spectrum of staff members.
No visible sharing of knowledge and learning	Still limited but visible sharing is taking place. Staff members are beginning to informally train each other.
Staff room under-utilized.	Utilized to a larger extent but there still are problems that have to be addressed.
E-mail system misused for social activities.	Standard templates for customer communication have been developed. Jokes and fun items are shared via the staff newsletter.
Skills in application software lacking.	Skills are intact and the skill level is growing. Staff members are assisting each other in acquiring new knowledge about applications.
Little innovation and/or new products.	Innovation and creativity visible through both marketing activities and the development of web products.

Structural Capital

Venue lacking maintenance	All areas were re-painted and carpeted. Communal recreation area upgraded.
Library system not fully implemented	Only one module still needs implementing. Library stock should be fully integrated within the calendar year.
Document management system under-utilized	Document management system has become part of the way things are done.
Advanced features in e-mail system not utilized	Managers all are able to use advanced features and do so regularly. All staff members are able to accept appointments and check the status of their own e-mails to clients.
Intranet interface mainly gave access to brochure ware	Intranet interface gives access to a variety of supplier products as well as organizational memory information. The CSIRIS homepage has been on the list of the 10 most visited sites on the CSIR Intranet since January

April 2001	September 2002
	2002.
PC infrastructure adequate	PC infrastructure adequate but now needs upgrading.
Photocopy equipment needed maintenance	New maintenance contract negotiated. Alternative equipment and work procedure has lessened the dependency on photocopying equipment.
Customer capital	
Contact aimed at selling	Contact aimed at marketing.
Address list was available	Address list transferred to a more user-friendly system. Updated and maintained regularly.
Marketing was an 'add-on'	Marketing is the responsibility of a task team. The task team is functioning very efficiently. A marketing plan has been prepared and implemented. Marketing material is used effectively.
Little evidence of branding	Own brand is well established internally. It is used consistently on the Intranet, marketing e-mails and promotional material. The CSIR brand is used for external communication.
Customers had no insight into price structuring	Customers do have insight into why and when handling fees are charged.
Financial capital	
Staff had no insight into financial responsibilities and accountabilities	Staff members are conscious of expenditure and income.
Little control over private use of telephones and stationery	Private use is monitored and controlled.
Rationale behind pricing was not documented	Rationale documented and applied consistently.
Relationship with stakeholders was very limited.	An established and managed relationship with all stakeholders.

From this brief analysis it was clear that progress had taken place. It was therefore seen as appropriate to continue with a more detailed review. Attachment 1 gives access to the detailed analysis while sections 6.2.1 to 6.2.5, provide the outcome of an analysis of the progress made. The first aspect evaluated and discussed is human capital development.

6.3.1 Human capital

From Table 5.4 on page 5.46, the following activities were identified to evaluate growth in human capital development and staff satisfaction:

1. An audit of staff skills and an evaluation of the human resource development plan.
2. Staff satisfaction monitoring through
   a. interviews;
   b. focus group discussions;
   c. an analysis of 'gripes and whines' sessions and staff meeting participation; and
   d. an analysis of the staff newsletter.
3. A review of task group activities.

Sections one and two (pp A1.7-A1.19) in Attachment 1 provide the detail of the evaluation. From the results of the evaluation, it is possible to report the following strengths with regard to human capital development:

- Staff members are willing to develop their own skills.
- The work environment is supportive.
- The skills required to perform the IMPS tasks are available and being used.
- The document delivery section has the strengths and skills level necessary for the continuation of that service.
- Although it still needs cultivation, a relatively strong and reliable professional network does exist.
- The work environment allows for the participation of all staff members in the review of processes.
- All staff members are prepared to contribute in order to improve the work environment.
- At least 62 % of the staff members are younger than 50 years of age.
- A staff newsletter is in place and is being utilized successfully.
- Staff members are contributing to the process of identifying weaknesses within the service. They are also assisting in finding solutions to these problems.

However, the following weaknesses will need to be addressed during the phase following this research:

- In terms of skills development it is necessary to re-evaluate the significance of value chains, as discussed in section 4.5.4 on page 4.22. It appears that the skills associated with the intangible value chain need more attention. Although a skills development plan has been developed, it needs to be re-evaluated specifically keeping the intangible value chain skills in mind. The plan also needs to be implemented and evaluated for success.
- Skills levels have not yet been properly benchmarked and, as a result, some staff members have an unrealistic perception of their own skills level.
- Staff members who do not perform core IMPS functions are not being accommodated in terms of their skills development.
- An obvious weakness in terms of the skills development plan, is that, although a relatively large percentage of staff members (38 %) are older than 50, there is no indication that provision has been made for the acquisition of retirement life skills.
- In terms of the transfer of knowledge, only 'mentoring' is seen as a required skill. Other options need to be further investigated.
- The identified strengths within IMPS have not been prioritised nor tested for true value. It is difficult to develop competitive advantage without that knowledge.
- Information management skills transfer does not receive any priority attention, and yet in terms of cataloguing expertise there is a real threat that expertise could be lost within a very short period.
- The process of research, to develop professional skills, needs to be accelerated. Where research has been conducted, it is essential that the research be reported to the professional fraternity for peer review and feedback.
- A tendency to divert attention by blaming colleagues needs to be closely monitored.

- The imbalance in age distribution within the information management group needs to be addressed.
- Although sufficient resources are available, there is lack of evidence that systems are being optimally utilized.
- Not enough is being done to share experience amongst each other and the staff members of the preferred partner, UP AIS.
- The Black/White perceptions have not been sufficiently addressed.
- Job commitment (in contrast to commitment to the employer or colleagues) is not always at an acceptable level.

From the list of weaknesses it is clear that much work still needs to be done. However, having identified what needs to be addressed, it is anticipated that it should be a relatively easy task to make rapid progress. A number of actions were identified to address the identified weaknesses. Stakeholders were requested to assist in prioritising these actions. The complete list of actions is provided in Attachment 5 (page A5.3) and the first part of section 6.3.5 on page 6.12, gives the detail of those actions that were seen as the most important to address. Structural capital, which is addressed next, showed very definite strengths but a number of weaknesses were also recognizable.

6.3.2   Structural capital

The following activities to evaluate growth in structural capital development were identified in Table 5.4 on page 5.45:

- structural capital audit and analysis of available statistics;
- audit of process re-engineering;
- audit of repositories and systems; and
- review of new products and services.

Section three (pp A1.22-A1.32) in Attachment 1 provides the detail of the evaluation of the IMPS structural capital. From the analysis it was possible to identify the following strengths with regard to structural capital development:

- in cataloguing, there is an ability to adhere to national and international standards;
- a wide variety of available products was made accessible to researchers within the CSIR;
- knowledge about the evaluation of information products has been acquired and implemented;
- the core documentation collection has been established (but not enough effort has been placed on the development of the collection);
- the core IMPS processes are in line with those of its strategic partner and, in the case of cataloguing, in line with that of the best in the country;
- a benchmark process has been established and suitable benchmark partners have been identified;
- the IMPS information management group has been part of the initialisation of the investigation into the state of cataloguing in the country;

- long-standing relationships with reliable suppliers are intact;
- information about e-product suppliers is readily available;
- a strong network, which includes key staff from CSIRIS IMPS and UP AIS, has been put in place;
- a well developed but non-formal network with staff at the science councils is in place; and
- the reliability of the CSIR ICT infrastructure is seen as a competitive advantage.

The following challenges still need to be faced:

- Information technology equipment not functioning at minimum network standards needs to be replaced as a matter of urgency.
- Clients have a need to be more closely involved with the weeding-of-stock process.
- A process to manage expectations, created when electronic products are tested (trial periods), is not in place.
- There is currently no follow-up evaluation to establish if trial users continue to make use of the products after subscription. A method of control should be built into the process.
- A regular review schedule for internal documents needs to be established.
- Use of the available documents/items (on the document management system or via the Intranet) is not being monitored for usefulness.
- The paper filing system has not been integrated with the electronic system.
- Journal administration is still done via a separate system. The administration should be transferred to the central library system.
- 'IMPS'-type departments within benchmark institutions are considerably larger than that of the CSIRIS IMPS section. It is necessary to also benchmark with smaller and non-academic institutions.
- Knowledge about key suppliers is available but is not shareable in its present format.
- The similarity in the demographics of staff members between UP AIS and IMPS does not allow for creativity and 'out-of-the-box' thinking.
- There has been very little activity in allowing staff members to actually share the experience of working within each other's departments during this review period.
- The partnership between CSIRIS and UP AIS is an enigma to colleagues in the professional associations.
- Some staff members are lacking appropriate knowledge to utilize pieces of equipment to their full capacity.

A number of priority actions were identified to address these issues. Stakeholders were requested to assist in prioritising the actions. The complete list of actions is provided in Attachment 5 (page A5.3) and section 6.3.5, in this chapter, gives the detail of those actions that were seen as the most important to address. The next section provides more details about the strengths and weaknesses associated with customer capital.

6.3.3   Customer capital

The following activities to evaluate growth in customer capital development were identified in Table 5.4 on page 5.45:

- feedback from first line customers using the Delphi technique;
- analysis of usage statistics for new supplier products – second line customers (researchers).

Before the results are discussed, it is interesting to note that the electronic Delphi exercise was seen as a successful, easy and quick technique to gain reliable feedback. The Delphi exercise should also be regarded as the most important source of feedback for this section of the report. The way in which the classic Delphi technique was adapted to suit the context of the research was discussed in section 1.5 on page 1.10.

In conducting the Delphi exercise, 19 clients were approached for feedback. In round one, there was 79 % (15) participation, which dropped and stabilized to 68 % (13) in round two and three. Only one strategic unit did not participate. Figure 6.1 provides a graphical representation of the participation.

Fig 6.1: Delphi participation
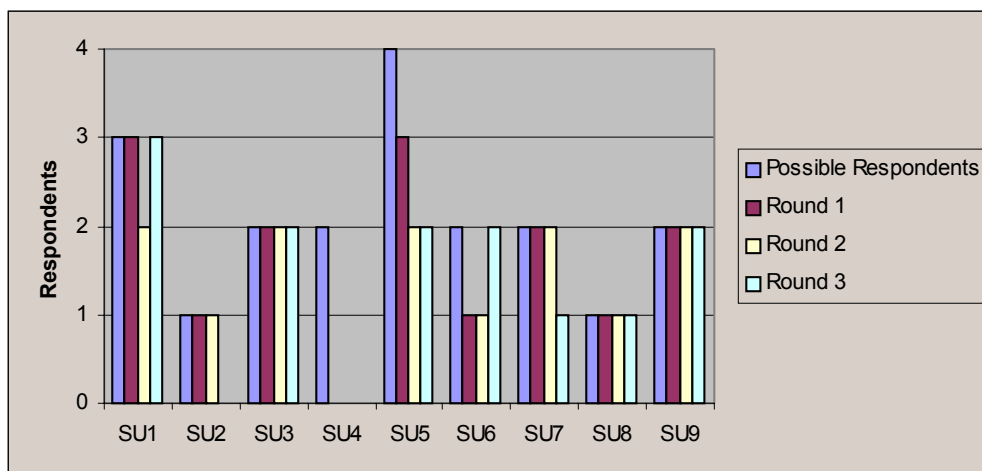
Section four (pp A.1.32-A1.34) in Attachment 1 provides the detail of the feedback received. The following strengths with regard to customer capital development were identified:

- Front line clients appear to be comfortable with the process where staff members other than themselves deliver back office services.
- The new staff induction process provides a good example of constant improving and learning from experience. This process needs to be rolled out to other sections as well.
- Marketing efforts are based on fact rather than on perceived needs.

The identified challenges provide proof that perceptions need to be managed. The areas that need improvement are the following:

- The intellectual property administration process is not functioning optimally.
- Clients need more insight into the information management process.
- Customers have a perception that they were not consulted during the weeding of stock. The perception needs to be addressed.
- There appears to be enough contact in establishing a relationship with the customers' customer but there is too little maintenance of the relationship as very little contact is maintained afterwards. The relationship with the front line is also not receiving the attention it needs.
- There is also a perception that the intellectual property administration process is not functioning optimally.
- Too little progress is being made in terms of external business creation, mainly due to time constraints and a lack of confidence in the 'salesmen'.

A number of priority actions were identified to address the issues raised by first line customers. Stakeholders were requested to assist in prioritising the actions. The complete list of actions is provided in Attachment 5 (page A5.3) and section 6.3.5, in this chapter, gives the detail of those actions that were seen as the most important to address. It is also necessary to mention that, although it may not have been identified as a specific action, there is a definite need to enlarge the base from which to test customer satisfaction amongst research staff. (Research staff members were not approached, as it was not seen as appropriate to do a customer survey for the IMPS section only within the larger CSIR.)

Apart from the Delphi exercise, the usage statistics for new products were also analysed as part of customer capital. The two specific products in question are ScienceDirect and EbscoHost. The detailed usage of these products was recorded in section 5.1 of Attachment 1. In general it is possible to say that, according to usage statistics from the suppliers, the average number of pages viewed within ScienceDirect has been just less than 9 000 per month. Between 150 and 700 search sessions are taking place per month and, as a result, on average 1 000 full text articles are downloaded from the system. From that it is possible to deduce that the system is being utilized. Taking the total number of researchers within the CSIR into consideration (in section 5.1.1 on page 5.3 it is indicated that 1443 members of the full staff complement are registered as users within the library system), it is of concern that the product is not utilized optimally. It is presumed that the trend is due to the fact that researchers at present have access to both paper and electronic journals. This dual subscription practice is set to stop at the start of the next financial year. The next six-month period should therefore be utilized to again market the product extensively.

All 10 databases available via EbscoHost are being accessed. Usage statistics for this product are not as extensive as those provided by ScienceDirect. It is however possible to report that the CSIR's usage of the product compares favourably with

those of the larger South African technikons. It is recommended that the supplier is approached to ensure that more usable statistics are made available. Without such statistics it will remain impossible to make useful deductions about the usage of the product amongst researchers.

Weaknesses associated with the supplier products (such as the lack of reliable statistics in EbscoHost) were addressed as part of stakeholder capital and will again be addressed in the next section, which relates to stakeholder commitment. Because of the explicit aim not to confuse researchers who are not concerned with the fact that IMPS is only one section within CSIRIS it was, within the context of this research, rather difficult to separate stakeholders from customers. The next section does, however, provide detail that relates to the relationship with IMPS' internal stakeholders. It is also necessary to already mention that actual financial figures were not used as part of this research project as it was not seen as appropriate to do so.

6.3.4   Stakeholder commitment as part of financial capital

Table 5.4 on page 5.45 specifies the following activities to evaluate growth in financial capital:

- personal semi-structured interviews;
- measurement against the mission of the group;
- analysis of activities, to provide proof that the IMPS group is building an infrastructure that is aligned with an e-business approach; and an
- analysis of available supply chains.

The reason for including stakeholders within the financial capital review was discussed in section 4.5.5 and Figure 4.5 on page 4.31 illustrates 'stakeholder-financial' capital in relation to the other capitals. Because stakeholders are seen as part of the IMPS financial capital, their opinion on the development of intellectual capital as well as the financial management within IMPS was polled through personal, semi-structured interviews. The result of these interviews is discussed is more detail in section 6.4 of this chapter.

In addition to the semi-structured interviews, a number of performance indicators (improved asset utilization and the availability of effective supply chains) were identified (in lieu of actual financial figures) and discussed in section five of the *IMPS Intellectual Capital Report* (see Attachment 1 section five (pp 34-40). From the evaluation of these indicators, it was possible to identify the following strengths with regard to financial capital development:

- the availability of statistics from suppliers;
- the fact that income targets were met and expenditure was kept within budget; and
- the availability of information about products, suppliers and services.

In terms of weaknesses, the following would need attention:

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- The lack of comparable statistics relating to the use of paper-based products and services makes attempts to provide proof of customer independence to speculation.
- The perception of low information literacy levels of research staff has not yet been tested.
- The methodology followed for time sheet capturing is time-consuming.
- The report functionality within the central record keeping system (PMS) is not being utilized optimally.
- Very little of the experience gained in negotiating with suppliers over the review period has been captured.

Again, as was the case when analysing the other capitals, in an attempt to address the identified weaknesses a number of priority tasks were listed. The list of priority actions is provided in Attachment 5. Section 6.3.5, below, provides insight into those priority actions that need addressing immediately.

6.3.5 Priority Actions

Trying to address each one of these actions would cause a loss in focus and therefore the list was made available to stakeholders prior to the interview with them (see Attachment 5, page A5.3). The intention here was two-fold. In the first instance it was an effort to focus on the future rather than to reflect on past performance for a prolonged period. In the second instance, it was to gain commitment from the stakeholders in terms of those activities that they would support when it is necessary to do so. Stakeholders were prepared to assist with the process. They were asked to indicate importance using a five-point scale, where five is most and one is least important. The result of the importance rating is reflected in Attachment 5, pages A5.10 to A5.12. Only those actions that were rated as five- and four-point 'priorities' were then identified as actions to be implemented during the next growth phase. The actions to be implemented are discussed in more detail below.

All development actions listed below are in a random and not any priority order. As has been the case throughout, human capital development activities are more extensive than activities associated with any of the other capitals. This should not be seen as a major concern at this stage but the trend needs to be monitored to ensure balance in intellectual capital development. The most important identified human capital development activities are the following:

- Develop an objective tool against which staff members can test their own skill levels.
- Establish a reliable benchmark for IMPS skills levels.
- Test the validity of the identified document delivery strengths and build the appropriate skill levels to maintain the expected standard.
- Develop and implement a plan of action to minimize the risk within the information management section.

- Include professional research in the skills development plan for all professional staff.
- Complete the skills development plan and implement.
- Change the distribution of staff in the information management section.
- Develop a strategy to better harness the diversity within the IMPS group.
- Establish a plan to ensure that communication (especially from management) items are placed in the 'CSIRIS on Friday' newsletter - **regularly**.
- Create a strategy to address issues raised during staff satisfaction focus group discussions. The strategy should address:
    - Perceptions based on cultural differences.
    - The use of the staff tearoom.

Of these items it would in all probability be necessary to address staff satisfaction issues first as these will have an impact on the way in which all other activities will progress. Items such as the skills development plan and placing communication articles in *CSIRIS on Friday* have already been initiated and will not be as difficult or time-consuming as a strategy to harness the diversity in the group and addressing staff perceptions about cultural differences. Developing an objective tool against which to measure skill levels and then establishing a benchmark go hand in hand and could therefore be seen as a single project.

In terms of structural capital development, the following could be seen as the most important issues:

- Place greater effort on the development of the CSIRIS documentation collection. A regular review schedule needs to be established, the use of the available items should be monitored and the paper filing system has to be integrated with the electronic system.
- Benchmark the 'evaluation of new e-products' process should be benchmarked with that of the strategic partner.
- A core group of trial product users (early adopters amongst the researchers) should be established.
- Transfer journal administration to the central library system.
- Identify strategic partners, similar in staff size and library budget, without jeopardizing the existing relationships with academic partners
- Benchmark the suppliers with those of the strategic partner.
- Initialise a process to monitor key/core suppliers.
- Develop the relationship with partners in the science council community.
- Build the image of CSIRIS IMPS as a strategic partner within the profession by sharing joint knowledge where possible.
- Evaluate the basic understanding of the use of equipment and augment the understanding with a knowledge/skills development exercise.
- Complete an evaluation of the available equipment for strategic planning purposes.
- Integrate systems to stop the duplication of work

Again, some of these activities have already been initiated and it should therefore only be a question of building upon what is already in place. Transferring the journal

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administration to the library system is a comprehensive and important task and that should definitely receive priority attention. It will also be a first step towards integrating systems so that duplication of work can be eradicated.

Fewer actions were identified in terms of customer and financial capital development. All of these appear to be achievable. In terms of customer capital development, the following are required:

- Fully review the ILLs/document delivery processes and include a proper investigation into a recording system that is accessible to end users/clients.
- Re-engineer the process that relates to research report administration.
- Initiate a process to evaluate client satisfaction for CSIRIS as a whole.
- Develop an action plan to build relationships with the front line staff.
- Formulate a complete business plan for the external income drive. The plan should make provision for appropriate human resources.

Re-engineering the research report administration urgently needs addressing, as a revised process should be in place before the start of the new calendar year. The knowledge gained while negotiating supplier contracts, which is part of the identified financial capital development activities listed below, also needs to be done as soon as possible. Other financial capital activities are to:

- initiate a process to reliably establish information literacy levels;
- develop a strategy, which would ensure an increase in information literacy levels throughout the CSIR;
- create a system to use report functions within the available system (PMS) more effectively;
- investigate alternative methods of recording time spent on projects so that less time needs to be spent on recording the action;
- capture the knowledge gained about the existing supply chains;
- formalize the process to select and ensure the reliability of electronic supply chains; and to
- remove the costing differences between SUs.

As referred to at the beginning of this section, the list of actions is extensive and, should it become necessary, the number of actions should be reduced further in order to ensure that activities that are implemented are accepted by staff and will build customer satisfaction and trust.

The process of identifying strengths, weaknesses and priority actions has been very rewarding as it was possible to also identify those actions that could be regarded as good practice within CSIRIS. Section 6.5 provides recommendations as to which of these actions should be implemented throughout CSIRIS. The section below provides more insight into the general feedback received from stakeholders in response to the *IMPS Intellectual Capital Report*.

6.4 Stakeholder reaction to the *IMPS Intellectual Capital Report*

Stakeholders responded very positively to the idea of an *IMPS Intellectual Capital Report* available. They were impressed with the accomplishments of the group. Stakeholders did not require any additional information prior to the start of the interviews. Attachment 5 provides the full details but, in terms of general perceptions, the following statements were made:

- There has been an improvement within IMPS. What is being done is working! Some of this should be rolled out to the front line.
- The clients' perception about the service/unit has improved tremendously. This is mainly due to resolving identified problems but also due to the introduction of electronic services.
- Communication is a problem throughout CSIRIS and the *IMPS Intellectual Capital Report* is a case in point. Many of the actions implemented in IMPS are not known to the front line.
- As general comment: appointing a client liaison officer was a good decision. It has enhanced the CSIRIS image.
- Apart from what has been written in the report, it is possible to say that the situation within IMPS is calmer than before. However, because there is an ever-present national threat of privatisation, it should be expected that staff members would react negatively towards any attempts to make them independent. Similarly, staff members in general do not like change. As a result, dissatisfaction should be expected when change occurs.
- The list of actions is very comprehensive – it is difficult to identify anything that was not addressed.
- The actions were rather intensive. It may have been better to distribute the actions over a longer period of time.

Stakeholders indicated that the operational issues listed below need attention. It is a concern that many of these items were not identified while completing the intellectual capital review. The items that need attention are:

- There is a perception that IMPS staff members do not know where the library collection is. Perhaps it is just a question of training staff members in dealing directly with clients but at present it reflects as inefficient service.
- The systems are not fully integrated and clients seem to be battling to find answers.
- As far as ILLs are concerned, it is of concern that Sabinet Online records are not totally up to date. This reflects badly on filling rates.
- The security of the stock is a big concern. The fact that the stacks are now being locked is a big improvement. IMPS staff needs to do proper stock control.
- Abbreviations should not be used in the catalogue as staff members find them difficult to interpret.
- The service has improved, but there is more room for improvement.
- There are still some concerns over staff members not providing feedback on progress.

- There are also complaints about the journal circulation slips not looking professional.

Although actual financial figures did not form part of this report, stakeholders are aware of the IMPS financial performance. In general stakeholders were impressed with the way in which the IMPS finances were managed. Nonetheless, there were two specific issues that was felt needed attention. These are to:

- Standardize the way in which SUs have to pay for services such as ILLs and cataloguing. The current arrangement allows for too much discrepancy.
- The journal renewal procedure, which impacts on the entire budgeting process, is still too cumbersome. It should be streamlined.

Stakeholders think that benchmarking against the processes followed at UP AIS is good practice. They indicated that the following also needed to be benchmarked:

- The document delivery process. Especially in terms of delivering items from an institution's own collection to its staff. The purpose would be to establish a realistic turn-around time expectation.
- Web presence, especially the desktop products and services which are available to end users from other library web interfaces, needs to be benchmarked.

In general stakeholders appeared surprised that so many documents were already available centrally. When asked what additional documents should be made available via the CSIRIS web interface, the following was suggested:

- Front line documents, for example guidelines, policies and procedures. The focus should be to create knowledge for staff members who have to do relief-work during holidays.

The following were also mentioned:

- centralizing the filing system would be beneficial, as it would force everyone to sort out his or her own system; and
- there should be a strong focus on business English. All communication documentation should be standardized and made available as part of the Intranet collection.

General advice from the stakeholders was collected and listed. The items of advice include the following:

- IMPS staff members need to consider practicing patience with each other, in response to the issues associated with cultural differences.
- It is recommended that a set of work ethics or acceptable 'office' behaviour guidelines be drawn up for and by staff, also as a response to issues associated with cultural differences.

- Job switching may open new avenues for staff members; the option should be investigated as further skills development.
- The IMPS personal monitor has brought in a measure of objectivity, which is positive, but staff members do not fully comprehend the aim and goal of the monitor. These should be explained in full.
- It is necessary to investigate and integrate the work being done on skills development with the CSIR's four-stage career model [1]. It was seen as a weakness that there is no obvious linkage with the standardized CSIR practice. This matter needs urgent attention.
- Staff members should be allowed to acquire skills that will allow them to understand the nature of the business. They need 'skills' to understand which skills are necessary to make progress in their careers (skills for upward mobility).
- Staff should be given more choices by encouraging multi-skilling.

As a last comment, it is necessary to mention that **CSIRIS** stakeholder attitude was definitely influenced by positive interactions with CSIRIS customers. The fact that stakeholders were surprised that so much had taken place within the IMPS environment can be seen as an indication that it was a mistake not to build more strongly on the same model in terms of the **IMPS** stakeholders.

6.5   Conclusion and recommendations

From the review, it is clear that significant progress has been made in establishing a basis for further intellectual capital development within CSIRIS IMPS. It is recommended that the practice also be introduced to the CSIRIS front line. In doing so, the following good practices should be noted:

- Establishing staff perceptions about their own skills and competencies was a very useful exercise. It identified the need for objective tools to measure skill levels. It also provided a basis point from which to move forward.
- The review of staff satisfaction at regular intervals, using a variety of methodologies, paid dividends and should be continued.
- Using a variety of smaller satisfaction polls at regular intervals is a good way of keeping in constant touch with client satisfaction as well.
- The use of the staff newsletter as a communication and knowledge-sharing tool is recommended.
- The relationship with a single reliable partner has worked well. The experience gained from the interactions will be invaluable in the fostering of relationships with further partners but also with other sections within the UP AIS.
- Being able to focus attention on the evaluation of core processes only has ensured that the evaluations were done in such a way that the evaluation and improvement of subsequent processes would be a relatively easy task. A

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[1] The CSIR makes use of a 4 stage career model. *Career stage 1*: Someone who works under supervision, *Career stage 2*: An independent worker, no longer working under supervision, *Career stage 3*: Someone who works through others, who supervises, *Career stage 4*: A sponsor, an influencer, a renowned expert. All staff are 'classed' according to this model.

similar process could ensure that the core front line activities could also be evaluated and improved.

- A validated market survey focuses attention. It allows for the development of appropriate marketing material and for targeting appropriate customers so that it becomes relatively easy to market products and services.
- A comprehensive analysis of supplier products gives confidence in the selection of a specific product.

Lastly, it may also be of value to ensure that the virtual silo that exists between the front and the back line staff members within CSIRIS is addressed so that the group can function as a single entity. Structuring the service (and therefore the staff members) to address each of the capitals rather than the front and the back line may be very useful.

6.6   Summary

This chapter provided an overview of the results achieved through the introduction of intellectual capital management within the CSIRIS IMPS section. Both strengths and weaknesses were identified after the *IMPS Intellectual Capital Report* (see Attachment 1) was compiled. From the weaknesses, a number of priority actions were identified and listed while the strengths provided a good lead as to what could be considered good practice. Stakeholders were asked to make use of the list of actions and to assist in identifying only those items that should be addressed during the next review period. A condensed list of priority actions is reported in section 6.3.5. The last part of Chapter 6 was used to report on the stakeholder reaction to the intellectual capital report and to provide a number of recommendations as a consequence of what was established during the review process. Chapter 7 provides an overview of the results achieved and some conclusions reached and also recommends areas for further research.

Chapter 7
Summary, conclusions and recommendations

Undoubtedly measuring knowledge assets must be imprecise, but there is a lot of informed guesswork in 'hard numbers' too. If the process of measuring tangibles were foolproof, companies would never have to take write-offs for those assets or argue with tax authorities about whether their useful life (and hence the rate at which they should be depreciated) is five, ten, twenty, or more years. More to the point, enthusiastic experimentation with measures is the best way to improve them (Stewart, 1997, p. 223).

7.1   Introduction

In section 1.3 , the following statement was made: *The perception is that knowledge economy management philosophies are only truly applicable when managing knowledge workers. This perception is challenged because the advantages of these philosophies are such that they should also be deemed applicable within a back office environment – and more specifically within a library and information service (L&IS) back office environment.* An extensive literature survey was conducted to establish what the knowledge economy involves, which knowledge economy management philosophies are being practiced and which of the available philosophies would be most appropriate to use within a library and information support services environment. As a result of the survey, it was decided to investigate intellectual capital management in detail and Chapter 3 was utilized to establish what the principles of intellectual capital management are, what generic tools and techniques could be identified and are available to stimulate growth in the skills, competencies, capabilities and job satisfaction of the workforce, and which of those tools and techniques are appropriate within the information support services environment. An attempt was then made to establish, from the literature, appropriate mechanisms for measuring and reporting on the impact of introducing intellectual capital management and which of the measures are of use and interest within the context of L&IS. With the theoretical knowledge as background, the management philosophy was then implemented within the context of a special L&IS within a large South African research organization. The actions that represent the strategy and the realities of implementing and maintaining a knowledge era management philosophy were discussed in detail in Chapter 5. Chapter 6, and more specifically Attachment 1, presented the impact of having introduced intellectual capital management.

This final chapter will be used to provide an overview of the results achieved, conclusions reached, the impact of preparing a benchmark report, and recommendations for further research.

7.2   Overview of the results achieved

Table 6.1 on page 6.4 provides an overview of the change in the situation, as it was in 2001 and then again towards the end of the research period. The results achieved are presented briefly below:

Human capital has grown from a situation where the management structure was top-heavy, staff were in the same positions for a prolonged period and very little evidence of innovation and sharing of knowledge was evident, to a situation where:

- There is a reduced number of managers.
- Staff members have many opportunities to participate and provide input in matters that are of concern to them.
- A number of staff members have been moved to more challenging positions.
- Areas where change is critical, due to the age profile, have been identified.

- There is an increase in professional activities. For example, the group can vouch for one association chairmanship and two conference papers.
- Professional society meetings and training sessions are attended regularly by a wide spectrum of staff members.
- Although still limited, sharing of information and knowledge is taking place as staff members are, for example, beginning to informally train each other.
- The staff tearoom is utilized to a larger extent but there still are problems that have to be addressed.
- The e-mail system is being used more effectively as a communication medium. Standard templates for customer communication have been developed while jokes and fun items are rather shared via the staff newsletter.
- Necessary skills are intact and the skills level is growing. Staff members are assisting each other in acquiring new knowledge about applications.
- Innovation and creativity are visible through both marketing activities and the development of web products.

Structural capital too has shown growth. At the start of the research period the venue needed redecorating, the library system still needed to be fully implemented, the e-mail and document management systems were under-utilized and photocopying equipment needed maintenance. These issues have been addressed and most of the foundation work for effective structural capital has been completed. It will be possible to continue upon this route after the completion of this research. Some of the achievements worth mentioning are the following:

- All work areas were changed to open plan offices, re-painted and carpeted. The communal recreation areas were also upgraded.
- All but one module of the library system has been implemented. The physical library stock should be fully integrated within the current calendar year.
- The document management system has become an integral part of the modus operandi.
- Managers are all able to use the e-mail system's advanced features and do so regularly. All staff members are able to accept appointments and check the status of their own e-mails to clients.
- The Intranet interface gives access to a variety of supplier products as well as organizational memory information.
- The CSIRIS homepage has been on the list of the 10 most visited sites on the CSIR Intranet since January 2002.
- A new maintenance contract has been negotiated with the photocopy machine supplier. Alternative equipment and a changed work procedure have lessened the dependency on photocopying equipment.

Customer capital has grown from a situation where marketing was not considered seriously, branding was done haphazardly, contact was aimed at selling and customers had no insight into price structures, to a situation where:

- Contact is aimed at marketing.

- The contact address list has been transferred to a user-friendly system where it is updated and maintained regularly.
- Marketing is the responsibility of a task team. The task team is functioning very efficiently. A marketing plan has been prepared and implemented and marketing material is used effectively.
- The awareness of branding is intact. The CSIRIS brand is well established internally. It is used consistently on the Intranet, marketing e-mails and promotional material. The CSIR brand is used for external communication.
- Customers have insight into why and when handling fees are charged.

In the last instance there has also been growth in the area of financial capital. Proof of this is evident because:

- Staff members are conscious of expenditure and income and the impact of these on IMPS.
- In support of cost consciousness, the private use of telephones and stationery is monitored and controlled.
- The rationale behind pricing structures is documented and applied consistently.
- There is an established and managed relationship with all stakeholders.

In the process of implementing intellectual capital management in a back office context, a considerable number of lessons were learnt. These lessons are reflected in section 7.3 below.

7.3 Lessons learnt while introducing intellectual capital management

Numerous lessons were learnt while implementing intellectual capital management within the CSIRIS IMPS section. These lessons were discussed in sections 5.4.2 on page 5.29 and 5.4.4 on page 5.45. The following is a summary of the identified lessons:

- The adaptation from supervision and even management to leadership requires patience and much practice.
- Initial or fledgling attempts from staff to be innovative, to test their responsibilities and to build confidence are at times difficult to recognise and therefore easy to destroy.
- Without benchmarked standards, it is only possible to access skills properly once the manager or leader really knows the staff members and is able to evaluate their contribution independently.
- Building a team is, during the best of times, a difficult process and sufficient time is needed.
- Typical change management problems will occur, especially during the initial stages of implementation. It was seen as important to identify and manage these and not to pull individual incidences out of context. For example, it is important to remember that:

  o What is said is interpreted as what is meant – to the letter.

- o Absenteeism is a known symptom of change in the workplace. It is a major challenge when there are fewer as well as 'new' staff members in a team.
- o In a new situation, new staff members need considerable attention because the existing staff members are not able to provide the same amount of support they would under normal circumstances.
- o Change is more difficult for some people than for others.
- o Comfort zones are comfortable – for all.

- Staff members should be given as much assistance as is possible to adapt to new circumstances and requirements.
- Not all teams are able to manage themselves with the same amount of success within an unstructured environment.
- It is very easy to allow the results of a skills audit to overshadow development that is taking place. It is therefore recommended that the requirements for skills levels are established prior to doing an audit so that the result of the audit does not come as a surprise to those being audited.
- A knowledge era information service needs a reliable and dependable infrastructure. Building that infrastructure brings about additional responsibilities that are at times difficult to justify.
- Stakeholder support is crucial when building structural capital. It is therefore essential that communication channels are efficient as well as effective.
- It is difficult to implement an initial improvement to the structural capital. As a result, it is best to identify the one item that will have most impact on the widest audience and implement that first.
- Developing structural capital is time consuming.
- Benchmarking is valuable for a variety of reasons. However, ample time is required and it must be ensured that all interviewers approach the exercise from the same angle. Visiting the benchmarking partners one by one allows for additional information to be collected but it would be useful to meet with all the participants as a group either at the onset of the project or as a last review prior to releasing a final report.
- Changed services do not run smoothly immediately and even when clients are in the communication loop they, when under pressure, do not wish to make allowances for delayed service provision. Therefore it must be ensured that:

  - o staff members establish and set a realistic delivery date when accepting a task;
  - o a reliable feedback procedure is followed; and that
  - o a preventive action 'learning loop' functions effectively.

- Given the opportunity and an appropriate mechanism, customers very quickly see the benefit and importance of continuous feedback. However, the mistake should not be made of thinking that all customers are willing to provide input. Neither should it be thought that feedback is only given when questionnaires are completed or when feedback interviews are conducted.
- It is essential to put in place mechanisms to regularly have contact with clients. Building relationships is a time consuming activity. It is therefore a

beneficial to make ample provision for the activity so that it becomes a priority action and is not left to chance. Relationship building also requires a good memory. Creating a memory jogger system as a tool to use in preparation for interactions with clients is valuable.

- It is important to recognise customers as customers and stakeholders as stakeholders. In an environment such as the one under discussion, it was, for example, easy to underestimate the stakeholder role of the labour union. Similarly, the front line staff members were acknowledged as colleagues but not readily recognisable as customers.

- As was mentioned in section 5.4.4.3 on page 5.46, with regard to the CSIRIS Information Services Forum, there are definite advantages to allowing a reputable stakeholder drive a formal feedback activity. Both customers and service providers see the stakeholder as an honest broker and the feedback provided is therefore of value for all. At the same time though, it is easy to allow positive feedback to overshadow what may appear to be minor indications of problems. When everyone else seems positive, it is a difficult task to stay 'honest' to a complaining customer.

- Access is needed to sufficient finances to buy-in external expertise. Expertise does not come cheaply. On the other hand, the creativity of individuals when they are motivated to see their plans come into being but are confronted with limited funds, should not be underestimated.

- Stakeholder attitude was definitely influenced by positive interactions with CSIRIS customers. It was a mistake not to build more strongly on the same model for IMPS stakeholders.

Maintaining and growing a management philosophy holds a different challenge to establishing a new one. As a general comment, if the implementation of intellectual capital management is to reach its full potential, it is necessary to ensure that all leaders buy into and are able to see the advantages of intellectual capital management early in the process. This means that the responsibility of driving the different implementation challenges could be shared.

Finally, although it may be difficult to measure, the visible growth in individuals could be regarded as the most gratifying of the rewards associated with the implementation of human capital activities. To witness the metamorphosis from an 'own-job-only' focused individual with hidden talents to a confident employee willing to share, participate and lead for the good of the wider group is a unique privilege.

Based on the results achieved and the lessons learnt, it is possible to make certain recommendations in terms of the management of CSIRIS as a whole, as well as to make recommendations for further research. These recommendations are discussed in more detail in sections 7.4 and 7.5 below.

7.4   Recommendations for CSIRIS

Because of the visible positive effect achieved within the IMPS section, it is recommended that the intellectual capital management philosophy be rolled out to the front line and that the entire CSIRIS be managed using the same practices and principles. This would not only ensure that the 'knowledge worker' portion of CSIRIS be managed using the appropriate tools and approaches, but it should also ensure that gap between the front line and the back office be narrowed.

The perceived virtual silo/gap between the front and the back line staff members within CSIRIS was mentioned in section 6.5 on page 6.18. This needs to be addressed so that the group can function as a single entity. Structuring the service (and therefore the staff members) to address each of the capitals rather than the front and the back line may be very useful. It is recommended that the **management structure** be changed so that there is no clear management divide between the front line and the back office. This does not mean that the front line and the back office activities be intertwined. It rather means that each manager becomes accountable for both front line and back office activities. Figure 7.1 is a suggested structure using intellectual capital management as the point of departure.

Fig 7.1: Suggested new structure
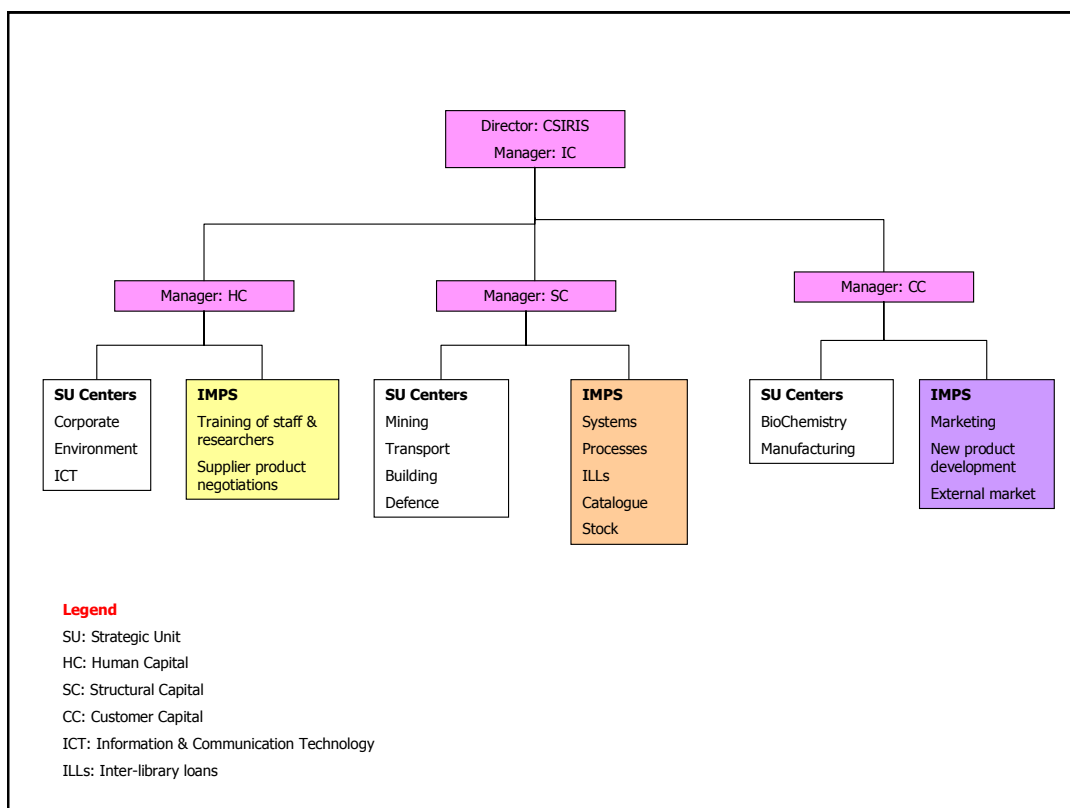
The structure makes provision for a human capital manager who needs to co-ordinate the skills development activities as well as the training of end users. As a result, the negotiations with suppliers for electronic products should also fall within this person's responsibility portfolio as she (her staff) will be able to monitor

customer needs best. The manager responsible for structural capital would also take care of the infrastructure SUs, while the manager responsible for customer capital would manage those SUs where most of the external client activity takes place. Obviously, the CSIRIS Director should share the responsibility for financial capital with the three managers.

It would also be useful to complete an intellectual capital report for CSIRIS as a whole. Besides the fact that it would set the CSIRIS benchmark, such an exercise would assist in identifying specific areas where 'gap bridging' needs to take place.

Before attempting to introduce knowledge economy management practice throughout CSIRIS, it would also be of value to review the work done by Davenport and Prusak (1997), see page 2.25, and Wiig (1997, p 402), reported on page 2.23, as these authors provide valuable insight into the issues that need to be faced in managing and building enterprise knowledge. Davenport and Prusak specifically allude to the importance of the environment in which the service is conducted.

In section 2.4.3.3 it was reported that Bontis (1998, p 65) and Jordan and Jones (1997, pp 392-393) stress an encouraging environment as the foundation to learning and the transfer of knowledge amongst staff. To create and maintain such an encouraging environment, it is seen as essential that staff and managers constantly communicate through both formal and informal channels. The review of staff satisfaction at regular intervals, using a variety of methodologies, paid dividends within IMPS and should be utilized throughout CSIRIS. Similarly, the use of the staff newsletter as a communication and knowledge-sharing tool is recommendable. Its value should not be underestimated.

The purpose of the sharing and communication would be to provide an enhanced service to the CSIRIS customers: not in the 'client-is-king' fashion of course but rather as a trusted partner. In this regard, as mentioned in section 2.4.1.1 on page 2.11, it would be wise to follow Senge's (1990, p13) advice and create a unit that has the capacity to shape its own future. This would require that CSIRIS as a whole:

- creates confidence in the skills and abilities of the CSIRIS management and staff;
- becomes more proactive in its understanding of its clients (current and potential) and their needs;
- develops innovative products and services to address the needs of the clients; and
- builds the infrastructure and relationships with reliable suppliers.

In terms of the leadership necessary to ensure that CSIRIS is able to shape its own future, the work of Eisner, et al., (2001) and Kotler (2001) is recommended. Eisner, et al., provides valuable insight into the lessons prominent leaders have learnt. In the case of the Kotler article, the reader is made aware of the interrelationship between management and leadership and the role each has to play in the knowledge economy work environment where proactive service is a prerequisite for success.

To be proactive, CSIRIS would need to move closer to the client and enlarge its capacity to collect and analyse feedback. There is a growing need for CSIRIS to test customer satisfaction. Within IMPS, the electronic Delphi worked well, as did the number of smaller satisfaction polls. These should be considered for use within this larger grouping. Once feedback has been collected, the response speed and the ability to ensure that problems are addressed, and that they do not occur again, will to a large extent determine client trust. In this regard it would be of use to again review the work done on effective organizational learning (Argyris, 1982 and Bontis, 1997), reported on in section 2.4.1.4. A proper market survey should also be done for **internal** customers. A validated market survey focuses the attention. It allows for the development of appropriate marketing material and the targeting of appropriate customers so that it becomes relatively easy to market products and services. Stewart's (1997, pp 155-163) advice in terms of moving close to the client was reported on page 3.49. This advice is worth following.

In terms of specific innovative products and services aimed at the internal clients it may be necessary to concentrate on the development of innovation skills. Authors such as Demarest (1997), Smith (1998), Sveiby (1998a) and Edvinsson (1997), who were consulted for the purpose of this study (see section 3.2.1 page 3.4), recognise the importance of innovation but, if CSIRIS is to take this advice seriously, it will be necessary to investigate the subject in much more detail.

CSIRIS would also need to move closer to its information industry competitors and partners. It may be beneficial to identify potential partners and competitors and to then make use of Porter's (1998, p 73) model (Figure 3.3 on page 3.38) to collect and analyse data about these competing and complementary services. Within IMPS the relationship with a single reliable partner (UP AIS) worked well. The experience gained should form part of such an analysis, as it will be invaluable in the fostering of relationships with further partners and with other sections within UP AIS. One example of a project that should be shared amongst partners is the analysis of supplier products. A comprehensive analysis of a product gives confidence in the selection of that product. The process is, however, time consuming and, because the exercise should be repeated annually (to take the fluidity of the products into consideration), it would be impractical to continue doing such a task as individual organizations. A second example can be found in the use of communities of practice. No truly successful communities of practice were developed within IMPS. That does not mean that communities should not be established. There is a suspicion that the communities within IMPS were too small to be viable. This needs to be investigated further and re-evaluating the advice provided by Brown and Duguid (2000), De Bruijn (2001), and Hackett (2000, pp 25-26), see section 3.4.1.1 on page 3.22, is a useful point of departure. Allowing partners to participate in the communities should be seen as a next step in the process.

The most important operational level advantage gained from the current partnership with UP AIS was the opportunity to benchmark operational activities. Being able to focus attention on the evaluation of core processes ensured that the evaluations were done in such a way that the evaluation and improvement of subsequent

processes would be a relatively easy task. A similar process could, for example, ensure that the core front line activities could also be evaluated and improved.

One of the items identified for further attention within the IMPS environment was the use of the personal monitor. As was mentioned in section 5.4.3 on page 5.47, one of the aims behind the monitor is to create a truly transparent tool that could assist in the 'reward and recognition' process. In the process of re-evaluating the introduction of the monitor, it would be useful to again review the general reward and recognition suggestions put forward by the *American Management Association* (see page 2.63 for more detail) as these could provide valuable insight into actions that could be woven into the monitoring process.

In summary it could be said that intellectual capital management has been an appropriate management philosophy to use within the IMPS environment. A sound foundation from which to leverage a knowledge economy service has been established and it is now appropriate to roll out the principles and practices to the rest of CSIRIS. In this regard, the two most important recommendations to ensure success would be to eliminate the artificial divide between the front line and back office and to continue to build on the intellectual capital management foundation that has been put in place.

As can be deduced from some of the suggestions above, there is a need for research in terms of creating a knowledge economy relevant information service. Other recommendations for further research are reported below.

7.5   Recommendations for further research

The implementation of a relatively new management philosophy such as intellectual capital management allows for numerous additional research projects. Only some of those opportunities are identified here.

In section 3.2.2 on page 3.6, the work of Nonaka and Takeuchi (1995) was mentioned. They remarked that Westerners tend to emphasize explicit knowledge and the Japanese tacit knowledge. It would be interesting to establish how Africans perceive knowledge as no reference to that could be traced for the purpose of this research.

In discussing value chains (see page 3.12), the statement was made that it is presumed that customers perceived value not at the point where a paper document is handed over the counter but rather at the point when he/she finds a reference and is able to link to the full text. This presumption needs to be tested as it could provide the basis for viable business.

As indicated in section 4.3 on page 4.8, more research is necessary to identify the factors that affect the rate of learning and 'forgetting' in organizations. Factors favouring an accelerated rate of learning are a promising area of future research. This comprehension can allow investments in training and innovation to lead to better and quicker results than those achieved at present. Neither knowledge

acceleration nor depreciation formed part of this research and were therefore not taken into consideration. Within the context of information service delivery such research would be applicable to both information workers and end users.

Stewart (1997, p 238) refers to research to effectively measure the true value of back office work. This research was within the context of financial services. It should be worthwhile to investigate the applicability of that technique to subsections within library and information services, more specifically areas such as ILLs where much of the activity could be seen as transactional.

In section 2.6.4 the statement was made that it is debatable if all cultures would be motivated through pay. It may be useful to establish what South Africans, or African information workers, regard as appropriate reward for work well done.

It would be useful to establish which life skills are required for knowledge era employees. Developing a programme to assist managers in recognising the difference between not having an appropriate life skill and not wanting to adapt to change would be useful. It would also reduce stress levels in employees if they realise that they could acquire the necessary skills to cope within the knowledge era.

It was indicated in section 5.1.2 that there are cost saving implications to being associated with the rest of Africa or consortia when negotiating supplier contracts. However, there are also consequences to being locked into such a grouping. These consequences need to be investigated and the results made available to the South African information community.

As part of the skills development activity (discussed in section 5.4.3 on page 5.31) a need to gain access to a cross-industry benchmark in terms of the requirements for beginner, experienced and mentor level skills was identified. Such a benchmark would allow for the development of skills at a national level and would also be of much use to training institutions.

As was mentioned on page 29 of Attachment 1, the cataloguing function needs to be reviewed objectively at national level. Such a review should address the applicability of the function but should also look at the role and the contributions that are made to national and international systems and the implications of these contributions to both the employer and the national system. In addition, because it was not the intent to do so at that stage, no concerted effort was made to consult literature to test if similar benchmark studies had been done internationally. To ensure that the benchmark is a truly valuable input to a national investigation, such research is required.

Innovation in information products and services is an area that needs focused attention. It would be to the advantage of the industry as a whole if research in this area could be done as a matter of urgency.

Similarly, both the 'brand name' and the image of L&IS and L&IS professionals suffer as a result of general perceptions in the private sector. Dedicated research, which could provide answers to the problems, is necessary.

Zickner (1996, pp 79-89) in her research (reported on page 2.40) established that organizations with 100 to 1000 employees are most successful at intellectual capital management. This finding is disputed and should be investigated further.

It should be fairly easy to identify the impact an information worker makes on the tangible value chain within the organization. No reference to such research was traced. The impact on the intangible value chain is even more important. Both these impact levels need to be investigated.

As a final suggestion, it was mentioned on page 3.59 that a relationship with suppliers that could lead to win-win solutions, where both suppliers and customers gain fairly from the negotiated contract, needs further investigation. Such an investigation should perhaps include a section on the international negotiation activities as well as the factors that need to be kept in mind when negotiating with different cultures.

7.6 Concluding remarks

Attempting to implement intellectual capital management within IMPS was the driving force behind much of the development that has taken place within the section. However, should it be necessary to repeat this exercise, it would be better to introduce fewer activities, especially during the initial implementation stage. This observation can be seen as the main reason for attempting to identify only the priority actions for the continuation of the IMPS intellectual capital development after this research has been concluded.

It is, however, not only the number of activities that needs to be controlled. The nature of the activities also needs careful thought. One has to ensure that the task is not larger than the result one wishes to achieve. For example, staff members do not record lessons learnt if beautifully written essays are expected. Neither do they consult those lessons if they have to sift through pages of text to find the essence of what to note. In the case of CSIRIS IMPS, lessons only became really useful once they were recorded in tabular and bullet-point format. 'Lessons learnt' is but one example. The same is also true for other elements of building structural capital.

Creating structural capital is also not the cure for all problems. Due to the consequences of historical practices, the South African work environment is challenging. Developing human capital remains of paramount importance. The perception is that it is essential to supplement human capital development activities with knowledge era life skills. Specific items that come to mind are personal finance, entrepreneurship, work ethics, quality and managing information overload.

The aspect of information overload highlights the importance of the relationship with the information service customers. Not enough is being done to get to know the

customer and the world customers have to survive in. This is in all probability due to the fact that information workers have been playing the role of intermediaries for such a long time. It is sufficient for an intermediary to know where supplies and markets are and to then facilitate the process of moving the stock from the supplier to the buyer. Knowledge era information workers need to do more than that. It is not wise to indiscriminately contribute to the information overload customers are already experiencing.

Similarly the relationship with information suppliers needs more focused attention. The role customers should be playing in the development of supplier products should be built. The best way for that to occur is for the information worker to truly understand the product, the needs of the client and the capabilities of the supplier. The same is true when cultivating the relationship with information service stakeholders, as this requires skills and strategies that do not come naturally when previously the focus has been on the needs of customers. These skills and strategies need to be developed. The capabilities of customers to either assist in the process of building those skills and strategies or to directly contribute to the interaction with stakeholders should not be underestimated.

As a last remark, as with other knowledge era management philosophies, understanding that intellectual capital management is about 'management' and not about 'measurement' is fundamental to implementing intellectual capital management successfully … in any environment. If this is not realised, it defeats the purpose of intellectual capital management as it is very easy to slip back into a paradigm where the focus of attention is on the results achieved rather than on the activities necessary for the next growth phase.

7.7   Summary

This final chapter was used to report and reflect on the results achieved and the lessons learnt in the process of implementing intellectual capital management, to make recommendations for CSIRIS, to provide recommendations for further study and to make a number of concluding remarks. In summary, it could be said that intellectual capital management has been an appropriate management philosophy to use within the IMPS environment. It should therefore also be appropriate to roll out the principles and practices to the rest of CSIRIS. In this regard, the two most important recommendations to ensure success would be to eliminate the artificial divide between the front line and back office and to continue to build on the intellectual capital management foundation that has been put in place.

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The solution to the conundrum of valuing communities of practice is to gather anecdotal evidence systematically. You can't just collect certain stories, perhaps the most compelling ones, because isolated events can be unrepresentative. A systematic effort captures the diversity and range of activities that communities are involved in (Wenger and Snyder, 2000, p 145).

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Attachment 1
IMPS Intellectual Capital Report

> The future is in our eyes and in our hands. As the industrial society gives way to the emergence of a new, digitized knowledge- and service-orientated society, it is imperative that we think ahead and seek new perspectives, concepts and management tools. In today's network-based, knowledge-intensive, global service society, it is not the products that count, but effective, knowledge-rich relationships characterized by innovative, high-quality partnerships (Skandia, 1998, p 3).

IMPS

Intellectual Capital Report

April 2001 – August 2002

MJ van Deventer

September 2002

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Figures

Appendices

Executive summary

CSIRIS IMPS managers are able to rely on willing and supportive staff members (21 of which 62 % are younger than 50) that have the required skills to accomplish the IMPS mission. The work environment allows for participation of all in the review of processes and staff members are willing to contribute to the solution of problems and to improve the work environment. One good example of continuous learning and improvement relates to new staff induction sessions. Here the feedback from both the new staff members and the trainers are consolidated after an induction session, changes are made when, and where necessary and the changes are then introduced at a next induction session. However, as this is the first review of IMPS intellectual capital development, it is obvious that there would be a number of weaknesses to address. Most of identified human capital challenges relate to skills development. There is especially a need to accelerate the rate of skills development within the context of staff diversity. Some staff members are lacking appropriate knowledge to utilize pieces of equipment or application software to their full capacity. This is probably because the transfer of knowledge between staff members is still in its beginning stage and therefore concerted efforts should be made to ensure that transfer happens faster.

A variety of products were made available to research staff in an attempt to build CSIR structural capital (research infrastructure). As many of the products and services provided from or developed by the IMPS group, depend heavily on the availability and reliability of technology, the CSIR's ICT infrastructure is seen as a major advantage. The focus of attention during this review period was on the supply of electronic journals. In this regard, the availability of supplier product data as well as statistics about the usage of products has been of use when identifying appropriate and reliable supply chains. The long-standing relationships with reliable suppliers were serviced and a number of new suppliers were identified to ensure that electronic product delivery remains efficient. In developing the CSIRIS structural capital, organizational memory was established. A combination of web technology and the document management system (DMS) was used for that purpose.

In terms of specifically IMPS structural capital development, the review period was characterized by a number of efforts to benchmark and streamline processes. It was established that the core processes were comparable to those of the IMPS strategic partner UP AIS. In one instance benchmarking was done wider than just against UP AIS. As a result, IMPS has been involved in the initiation of a cataloguing benchmark project that should in the near future be rolled out nationally.

Challenges relating to effective structural capital are important but should be simple to address. Equipment functioning below the minimum network standard needs to be replaced, as a matter of urgency and applications running on the infrastructure should be investigated for full functionality. One example of increased functionality would be if the journal administration were transferred to the central library system and a second is to make full use of reports that one could generate from any of the available systems.

The running of trial access to products is a popular practice to ensure that the correct products are chosen when enhancing the research infrastructure. It is, however, necessary to manage the expectations that are created when products are made available. There is currently no follow-up evaluation to establish if trial users continue to make use of the products after subscription. A method of control should be built into the process. The lack of comparable statistics relating to the use of paper based products and services turns the attempts to provide proof of customer independence into speculation. A perception, that the information literacy level of research staff members needs to be addressed, has to be tested.

Within IMPS, it is also essential to test perceptions about the usefulness of its structural capital. The use of documents/items available to IMPS staff via the DMS or the Intranet should be monitored and

the paper and electronic filing systems should be integrated. It is still possible for staff members to control their own knowledge stocks. Knowledge about key suppliers is but one example. In a further effort to improve processes, it is necessary to review the choice in benchmark partners.

In terms of customer capital, it is possible to report that internal marketing has paid off. Research staff members are using the research infrastructure and subject specialists are more comfortable with the idea of allowing IMPS staff members to do all back office tasks. A comprehensive market survey was utilized to determine the strategy to follow for external marketing. As a result, marketing efforts are based on fact rather than on perceived needs. A challenge is, however, to address the perception that client opinions do not count when it comes to the weeding of stock.

In terms of financial capital, it is possible to report that income targets were met and that expenditure was kept within budget.

The challenges mentioned above will be addressed in the next review period as a number of priority actions have already been identified to do so. Notwithstanding the challenges, it was possible to also identify a number of good practices. The following were seen to be recommendable:

- Establishing staff perceptions about their own skills and competencies was a very useful exercise. It identified the need for objective tools to measure skill levels. It also provided a basis point from which to move forward.
- The review of staff satisfaction at regular intervals, using a variety of methodologies, paid dividends and should be continued.
- Using a variety of smaller satisfaction polls at regular intervals is a good way of ensuring that one is in constant touch with client satisfaction as well.
- The use of the staff newsletter as a communication and knowledge-sharing tool is recommendable.
- The relationship with a single reliable partner has worked well. The experience gained from the interactions will be invaluable in the fostering of relationships with further partners but also with other sections within UP AIS.
- Being able to focus attention on the evaluation of core processes only has ensured that the evaluations were done in such a way that the evaluation and improvement of subsequent processes would be a relatively easy task. A similar process could ensure that the core front line activities could also be evaluated and improved.
- Doing a validated market survey, focuses the attention. It allows for the development of appropriate marketing material and for targeting appropriate customers so that it becomes relatively easy to do the marketing of products and services.
- A comprehensive analysis of supplier products gives confidence in the selection of a specific product.

These practices will be carried forward to ensure success in the next review period.

Introduction

The Information Management and Procurement Services (IMPS) group was established within the larger CSIRIS in April 2001. This report is an attempt to reflect on the state of the intellectual capital within the group at present. It also provides an evaluation of perceived strengths, areas for improvement and priority actions for what is believed to be the next phase of development.

Mission

The CSIRIS mission statement is as follows:

- Manage the delivery of appropriate information
- Facilitate tacit knowledge connectivity by for example:
    - Leveraging the efforts of knowledge workers
    - Finding the best minds
    - Connecting to the networks of minds
- Preserve intellectual property

The first and the last points within this mission statement are seen as the core responsibility and the main purpose for maintaining the IMPS service.

IMPS Tasks

IMPS staff members are measured according to their ability to provide back office/support services (the back bone of library and information services). A brief reminder of all the activities IMPS is responsible for:

Complete List of Tasks

Information Management	**Information Procurement**	**M&BD**
System maintenance •technical and content Stock maintenance •weeding and 'shelving' •issue desk •maintaining the reference collection Cataloguing and indexing •purchased and CSIR reports •journals •paper and electronic Intellectual property •database •collection	ILLs •national and international •internal and external Buying Stock •books •CD-Roms •journals - all formats •document delivery •databases	Marketing Communication, the creation of leaflets/newsletters for: •staff •clients Negotiation of supplier contracts •service level agreements •electronic journals Innovative web-based products General Procurement •IT equipment •L&IS equipment

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The IMPS section provides more than just the transactional activities associated with traditional back office services. Tasks that could not be regarded as transactional are, for example, the tracing of documents with incomplete bibliographic references, marketing activities and the creative development of interfaces for web products. Suitably qualified and motivated staff members are seen as the prerequisite for effective as well as efficient service delivery. The identification and development of appropriate skills, to enable the quality of service expected from the group, has therefore taken priority during this reporting period.

1. **Development of appropriate skills and core competencies**

In total 127 task-related skills were identified within the IMPS group. These skills fall within three broad categories, namely information skills, information technology skills and a combination of soft skills. On the left of the graph in Figure 1 it is possible to see that 66 of the identified skills relate to the tangible value chain while 61 have reference to the intangible value chain. Appendix A provides a full list of all skills. From the analysis it was possible to establish that 59 or just less than 50 % of the required skills could be regarded as soft skills. Twenty seven percent (34) of the required skills relate to the ability to use information technology while a further 27 % (34) are pure information service skills.

Fig 1: Skills
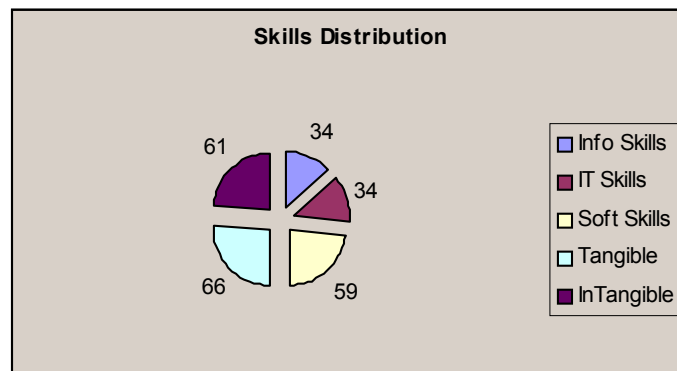
The skills are currently classified by an internal classification code. Four types of skills are identifiable:

- Ability skills are largely determined by the individual and reflect on the quality of the work performed.
- Process skills relate to the core of the job in hand and therefore each of these skills actually consists of a variety of other skills. Each individual would be required to have at least one process skill within his portfolio of skills.
- Technical skills, which requires that step-by-step instructions be followed.
- Software skills, which refer to the ability of an individual to use the software applications that are necessary to perform tasks.

Figure 2 below provides a breakdown of identified skills as classified above. Appendix B provides the detail of an initial attempt to re-group these skills so that it is possible to identify the core skills required for the sustainability of IMPS.

Fig 2: Skills by type
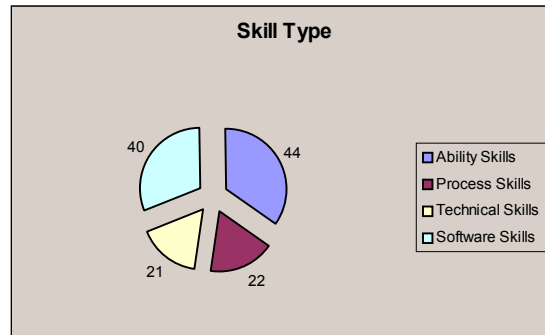
Skills levels do vary and, as a result, three categories of skills were identified, namely beginner, experienced and mentor. As a benchmark exercise, staff members were asked to identify their skills and to classify the level at which the skill is being practised. In evaluating the result of the activity, it was established that staff members need an objective means to test perceptions of ability and reality. That aspect should be addressed in the next phase of development. It will also be necessary to benchmark skills levels with at least one partner organization.

A number of activities were implemented in an attempt to develop skills further. As indicated in Figure 3, six members of staff (29 %) are at present pursuing formal training. Five of these are enrolled for technikon training while the sixth is doing a university short course.

Fig 3: Formal training activities

Because of the nature of the work performed, it appears that informal training is perhaps of more value, especially in terms of building skills levels.

The graph in Figure 4 indicates that more than 60 % of the staff members received professional training. Professional training refers here to training that enhances the quality of the job in hand and includes items such as training to efficiently utilize the library and the Sabinet Online systems. Training from external societies includes secretarial and marketing training.

Fig 4: Informal training received
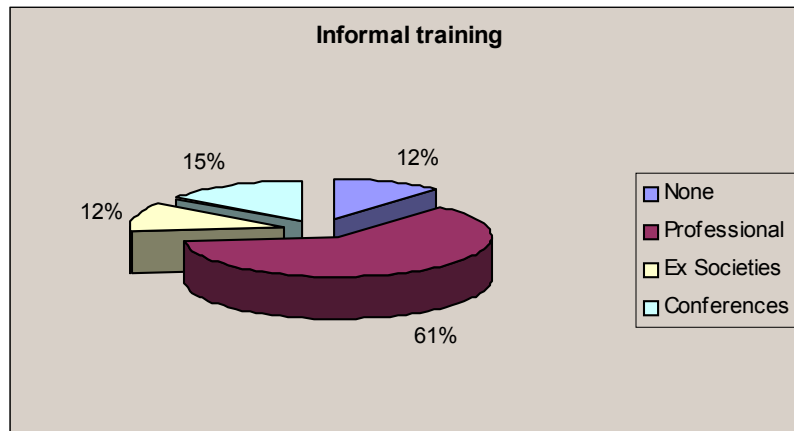
Four members of staff (15 %) attended conferences while three (12 %) did not receive any further training. All three these staff members do not perform tasks that relate to the IMPS core business. However, this is a weakness and relevant options should be investigated for them.

Evaluation

An approach to try to identify all required skills was perhaps painful but necessary. It is essential to now develop these skills. The skills development plan needs to be implemented as soon as is possible.

Strengths

Willing staff members and a supportive environment.
Availability of the skills required to perform IMPS tasks.

Areas for improvement

Staff members who do not perform core IMPS functions should also be accommodated in terms of their skill development.

Perhaps an obvious weakness, also in terms of the skills development plan, is that, although a large percentage of staff members are older than 50, there is no indication that provision has been made in terms of retirement life skills.

Another weakness is that, in terms of transfer of knowledge, only 'mentoring' is seen as a required skill. These last two aspects will need more attention in the next phase of implementation.

Priority actions

Develop an objective tool against which staff members can test their own skills levels.

Establish a reliable benchmark for IMPS skills levels.

1.1. Creation of competitive advantage

If the vision of being able to be a sustainable business with an ability to generate income is to be accomplished, it will be necessary to ensure that skills are competitive with those in the market. For the development of competitive advantage, these skills need to be benchmarked not only with those of similar functions in similar institutions but also with those of commercial suppliers. The skills also have to be measured against customer needs.

From the feedback received from clients, it was possible to identify that customers perceive IMPS to have a number of strengths to build on. These were for example:

- the relationship with customers;
- DocDel[1] & ILL expertise – especially in terms of international requests;
- experienced staff whom are dedicated to good service;
- the existing expertise and infrastructure to handle routine work and obtain information often under difficult circumstances, mostly totally undervalued and unappreciated for its worth; and
- network contact with library consortia.

The skills required to maintain and grow these strengths need to be prioritised for further development.

Evaluation

The approach to identify strengths as perceived by customers is a good one for the short term. It is however also necessary to set longer term goals and to develop the skills necessary to reach those goals.

Strengths

The document delivery section appears to already have the strengths necessary for the continuation of that service.

Areas for improvement

The identified strengths have not yet been prioritised neither tested for true value.
Information management skills do not receive any priority attention and yet in terms of cataloguing expertise there is a real threat that expertise could be lost at any moment.

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[1] DocDel: the CSIRIS document delivery service which is generating the bulk of the section's external income.

Priority actions

Test the validity of the identified document delivery strengths and develop skill levels.
Develop and implement a plan of action to minimise the risk within the information management section.

1.2. Development of professional learning, reputation and credibility

In terms of professional credibility and learning it is possible to report as follows:

- An IMPS staff member represents the CSIR on the science council library consortium management body.
- The chairperson of the South African Interest Group for Para-Professionals is employed within this group.
- One conference paper was accepted for presentation while a second has been submitted. No journal articles were submitted for publication.
- Information management staff members interact with colleagues at UP AIS as and when necessary.
- Staff members regularly participate in professional society meetings. Representatives attend the meetings of the South African Online Users Group, the Library and Information Association of South Africa, Special Library and Information Services group, the Inter-Library Loans User Group and a variety of meetings and discussion forums presented by the academic fraternity.
- The document procurement group is also in the process of establishing an objectively evaluated approved suppliers list, which could be of use to the library community.

Professional networks are well established for the inter-library loans and document delivery sections.

Evaluation

Although activities have taken place, too little has been done in terms of creating a competitive edge.

Strengths

A relatively strong and reliable professional network does exist.

Areas for improvement

The process of research, to develop professional skills, needs to be accelerated. Where research has been conducted, it is essential that the research be reported to the professional fraternity.

Priority actions

Include professional research in the skills development plan for all professional staff.

1.3. Good practice

Establishing staff perceptions about their own skills and competencies was a very useful exercise. It identified the need for objective tools to measure skill levels. It also provided a basis point from which to move forward.

2. **Management of human capital**

At the onset of the review period, the following objectives, for human capital development, were set:

- Staff members would understand the necessity of contributing more than just doing narrowly focused tasks.
- All staff members would have the necessary skills to use and contribute to the available infrastructure.
- Leadership skills would be developed.
- A fair and transparent measuring system, that could be utilized to measure personal progress and that could be implemented as a reward monitoring system, would be developed.

A number of actions were taken to reach the objectives. The most important of these were to:

- create an encouraging/pleasant work environment;
- capture lessons learnt;
- develop organizational memory;
- identify innovation projects;
- encourage recorded knowledge sharing and social interaction by means of a staff newsletter;
- get active participation at staff meetings;
- establish a human resources development plan;
- endeavour to benchmark skills; and
- establish a mentorship programme for potential managers.

The results gained from these actions will be discussed in more detail in section 2.1.

2.1. Pleasant work environment

The first action taken to improve the work environment was to decorate and re-organise the available office space. In reviewing the process, it was established that staff found the adaptation to open planned space difficult and in the case of the information management group, the space should have been sub-divided or utilized differently. The mix of staff members currently working together in that space

(professional cataloguers and para-professionals) causes unnecessary friction. Staff members felt that it was a positive factor that they were all required to move but thought that implementing such a large change needed more planning and dedicated staff to ensure that all logistics were taken care of. The team responsible for the move and renovations did however receive an overwhelming vote of confidence.

As a further attempt to ensure that the environment was constantly improved, a 'gripe and whine' session was included at monthly staff meetings. Staff members were then given the opportunity to express their dissatisfaction with any issue that is of concern to them. The rules for brainstorming were followed (for example that anything is discussable, no defending and no slandering behaviour is allowed). Issues that could be resolved immediately were dealt with. Managers took responsibility for issues that needed more attention. An analysis of these 'gripes and whines' resulted in the following conclusions:

- Initially issues needed management attention and had to be resolved outside the meeting. Currently most can be resolved and dealt with there and then.
- There is a considerable reduction in the number of items reported.
- The process has resulted in a number of improvement actions. The following serve only as examples: a guideline for issuing bound journal issues was created; assistants were appointed to ensure that the integration of stock was fast tracked; a Groupwise tips and tricks session was developed and presented to staff members; and the signage within the building was upgraded.
- However, an element of 'finger pointing' is starting to sneak into these sessions. This tendency will need to be monitored and managed or it will defeat the purpose of the sessions.

Opportunities to grow and to use one's skills and competencies effectively have a major impact on the perception of the work environment. In an attempt to distribute and develop appropriate human capacity, the demography of the workforce was evaluated and re-allocations were done in the following ways:

- Two Black males were moved from clerical to assistant positions. The previous incumbents were required to train them to an acceptable level of expertise. Both the staff members and the 'trainers' were required to indicate satisfaction with progress and the ability to work independently. Both made satisfactory progress and are able to work independently.
- A qualified librarian was appointed to make provision for professional skills in document procurement.
- A client liaison officer was appointed to provide a single point of entry for clients and a source of 'control' within IMPS.
- One of the senior managers was tasked with skills development and mentoring of junior staff. Through the re-allocation of her tasks, provision was made for the necessary time to do so.

In a further effort to ensure that available skills are utilized and that new skills are developed appropriately, a skills development plan has been established. This plan should form the basis for the next reporting phase. It is currently being reviewed so

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that the skills levels can be benchmarked and required skills can be grouped for specific jobs.

Evaluation

It appears to have been the right approach to place all staff members in an equally disrupted environment for a short period during the formation stage of IMPS. It would however in future be better if such an action is logistically planned so that staff do not need to experience such disruption again.

Strengths

The work environment allows for the participation of all staff members in review processes.
All staff members are prepared to contribute in order to improve the work environment.

Areas for improvement

A tendency to divert attention by blaming colleagues needs to be closely monitored.

Priority actions

Complete the skills development plan and put it into action.
Change the distribution of staff in the information management section.

2.2. Harnessing Social Diversity

There are currently 21 members of staff. In terms of the current age distribution, only six staff members are younger than 40 years of age. Of these six, only one is a Black professionally qualified person. In addition the two web developers – one a Black male the other a While female fall into the younger than 40 group as does the client liaison officer. Only one of the Information Procurement staff members is younger than 40. On the other hand, all cataloguers and all but one of the staff within Information Management fall into the 'older-than-51-years-of-age' category. From these statistics, it is clear that IMPS urgently needs to capture the knowledge this group of people have accumulated or an alternative option needs to be investigated. The Information Procurement group is slightly more balanced in terms of the age distribution. Figure 5 provides the current staff age distribution.

Fig 5: Age distribution

Staff - Distribution by Age 2002
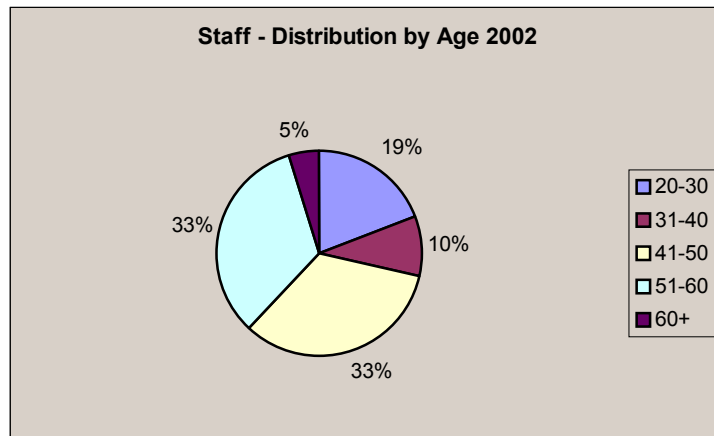
Figure 6 provides the staff distribution by race, gender and formal qualifications. From the graph, it can be determined that the group is predominantly Black but that the gender distribution is almost equal. What is of concern is that more than half of the staff members do not have tertiary training – which has become a pre-requisite for working within the knowledge economy. Those that do have further training mainly fall into the White female grouping.

Fig 6: Staff compilation by race, gender and formal qualifications

Staff - Race, Gender & Qualification 2002
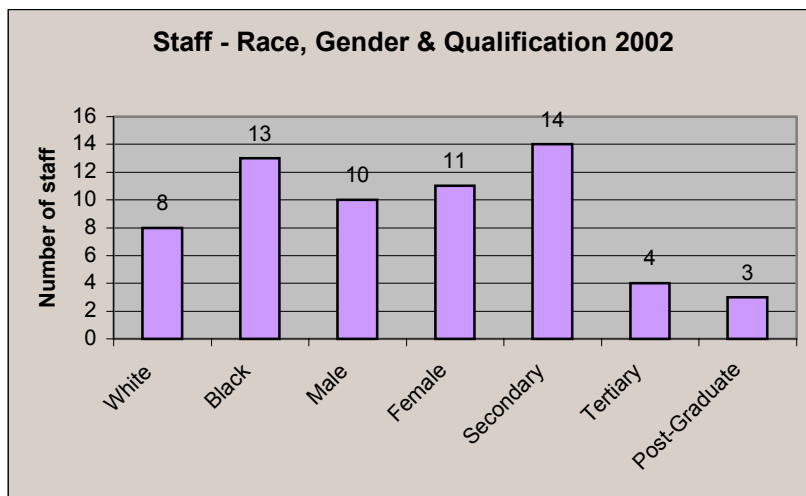
Evaluation

Although it is possible to identify diversity within the group there is very little proof that the diversity is being harnessed.

Strengths

At least 62 % of the staff members are younger than 50 years of age.

Areas for improvement

The imbalance in age distribution within the information management group needs to be addressed.

Priority actions

Develop a strategy to better harness the diversity within the group.

2.3.   Appropriate resources and knowledge sharing

In terms of resources, it is possible to report that access to both the core systems (Sabinet Online and Millennium) is operated at optimum level. Training is available on tap should it be necessary. Personal computers currently all adhere to the minimum standard set by the CSIR Network Administrators. In terms of the equipment dedicated to specific tasks (for example for sending and receiving full text documents between libraries), it is necessary to report that one of the core computers does not adhere to the minimum standard and needs to be replaced. A second, although it currently adheres to the minimum set standard, is not sufficient for the job requirement. All other equipment adheres at least to the set minimum standard.

All staff members have access to the CSIR suite of software products. Not all of these are of use within the work environment. Efforts are made to encourage use for personal development. An example of 'encouraged use' is that core documents (such as a personal monitor in Excel) are deliberately placed only on the document management system and that it is mandatory for staff to access the documents there. Where necessary, training is provided to the group (a session on the basic features of Groupwise is one example) and staff members are 'rewarded' for training each other through a point allocation within the personal monitor.

The staff newsletter was evaluated to establish its usefulness as a communication tool. It was also evaluated in terms of its progress from social information to knowledge sharing tool. Only the contributions from IMPS staff are relevant to this report but, since all CSIRIS staff members use the newsletter, their contributions were measured in relation to those of the IMPS staff. The period reviewed is 23 April 2001 to 26 April 2002.

In total there were 496 items contributed to the newsletter over that period. IMPS staff contributed 198 or 40 % of these items. Figure 7 below provides the breakdown of contributors.

Fig 7: Contributors
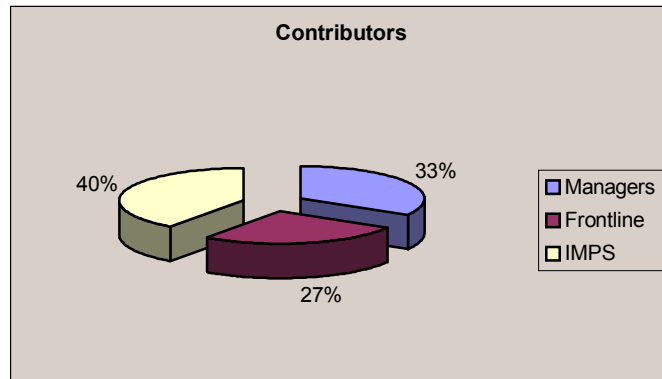
Of concern is that there is, within the IMPS group, only a core group of contributors. Black staff members do not contribute to the newsletter as a rule. When they do contribute, these articles are of a fun or of a limited information sharing nature. They do not use the newsletter for either communication or knowledge sharing. Only eight items could be classified as knowledge sharing items. IMPS staff members contributed seven of the eight items. The first of these items gave a procedure to follow to save on international phone calls. The next week two more articles followed – one on how to save on national phone calls, the other on a process to ensure that copyright was not breached when doing press cuttings. Two weeks later, a further item on saving telephone costs followed - this time using the Internet to send messages to cell phones. Although it was interesting to see this 'nesting pattern', it was probably because staff members were expected to start paying for personal calls during that period. Three of the eight items described various software short cuts and the last item described the acceptable way to reference Internet sources. Figure 8 depicts the contributions graphically.

Fig 8: Contributions
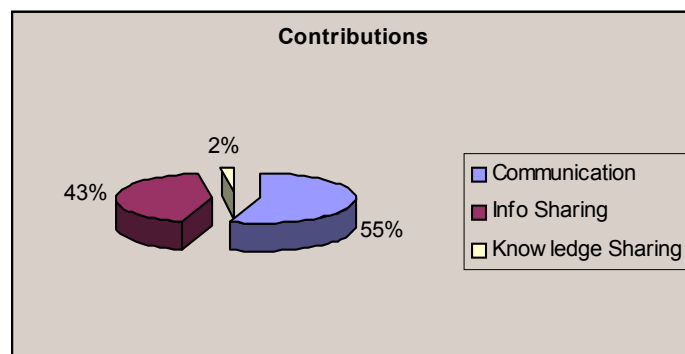
The maximum number of items per issue was 18 while the least was four. What is of concern is that communication articles have dropped considerably since September 2001. The impact of the reduction in communication articles needs to be tested.

Evaluation

An approach to utilize a staff newsletter to encourage formal knowledge sharing is a good start but it is not sufficient. More needs to be done in terms of, for example, the establishment of communities of practice.

Strengths

A staff newsletter is in place and is being utilized.

Areas for improvement

Although sufficient resources are available, there is lack of evidence that systems are being optimally utilized.

Not enough is being done to share experience amongst each other and the staff members of the preferred partner – UP AIS.

Equipment not functioning at minimum network standard needs to be replaced as a matter of urgency.

Priority actions

Identify equipment that does not meet network specifications and develop a strategy to replace essential equipment.

If the newsletter is to serve its purpose as a communication and knowledge-sharing tool, steps need to be taken to increase knowledge sharing articles. It is also necessary to create an index for the newsletter, as it is currently very difficult to retrieve useful information. The balance between front line and IMPS contributions also need to be addressed.

Ensure that communication (especially from management) items are placed in CSIRIS on Friday - regularly.

It is recommended that the reasons why Black staff members are not contributing to the staff newsletter be investigated and that the labour union be approached for regular contributions. Such contributions may assist in transforming the newsletter into a useful tool for Black staff as well. If this is not feasible, an alternative method should be found.

2.4. <u>Motivated and prepared workforce</u>

Staff satisfaction was seen as providing the basis on which to evaluate the motivation and preparedness of the workforce. A first staff satisfaction survey was done informally, in November 2001, as part of a general staff meeting. At that time the following concerns were identified:

- The review period (April to November 2001) was perceived as being very unsettling as too many events took place simultaneously. A systematic rollout of events would have been preferable.
- There was a need for further training in the use of systems necessary to do the daily tasks.
- The journals circulated to researchers were causing delays in document delivery.
- The photocopy equipment needed to be maintained properly as it was causing a negative perception of the service as a whole.
- Staff members were against paying for personal phone calls.
- Full transparency was requested in terms of bonuses and awards.
- A system was needed that would ensure that staff members who returned from leave would be able to tap into happenings and changes.
- The issue desk was not functioning smoothly.
- The IMPS section is not marketing itself sufficiently.

Each one of these issues was addressed in the six-month period after the review.

At the same review session, the following positive aspects were listed:

- the staff newsletter was regarded as a big success;
- the use of the document management system was seen in a very positive light;
- management was seen to be fair and transparent in what they were doing;
- the back up for each other within the information management section was working well;
- the opportunity to attend professional conferences was appreciated;
- the 'new' offices were a vast improvement on what was used previously;
- the team spirit had grown tremendously; and
- 'new staff members' appreciated the attempts to make them feel welcome.

Early in 2002, the group review was followed by a series of smaller 'peer group' interviews. The results from the interviews confirmed the findings of the group review. All staff members indicated that they felt better about being at work than in previous years but the fact that too many things had changed in one year was stressed continuously. They were prepared to share the following suggestions for improvement:

- Steps need to be taken to ensure that researchers return inter-library loan items in time. It was suggested that the front line staff members assist in ensuring that the CSIR does not get black listed by suppliers.

- The early 'on site' delivery should be scheduled so that it is possible to add urgent items requested after 16:00 the previous afternoon.
- Researchers leaving the employ of the CSIR often leave without returning inter-library loans. The process needs to be addressed so that the inter-library loans department knows about the disengagement prior to the staff member leaving.
- It is necessary to create a system where both the positive and negative encounters with clients can be recorded.
- IMPS staff members need to educate researchers in terms of copyright. This is to ensure that researchers understand why it is not possible to supply them with all articles from a single journal number.
- There is a need for a collection of basic business letters and e-mail templates. These should be made available via the Intranet.
- It is necessary to hold skills development sessions on tips and tricks for all the standard applications in use.

Again – each one of these items was addressed. The front line group is assisting in addressing items such as the disengagement of research staff, skills development and copyright.

As a last measure of staff satisfaction, two focus group discussions were held in August 2002. Facilitators were chosen so that group members were given the opportunity to hold the conversation in the mother tongue of the majority of the group members. This resulted in a Black/White split. From the results of the focus group discussions, it was possible to deduce that motivation is not as high as it was during the previous six-month period. A number of perceptions surfaced that need to be addressed. The first group of perceptions relate to cultural differences. A second group of perceptions could be related to changes that are taking place within the CSIRIS management structure. These perceptions were seen to be of less importance, as they would be addressed when the management structure was finalised. Closely related to this is the perception that CSIRIS as a whole has changed direction and that staff members are not sure of the vision for the group anymore. These perceptions need to be tested again after management changes have been implemented.

From the results of the focus group discussions, it is clear that the use of the staff tearoom as a back-up meeting venue needs to be revised. There is, for example, a perception amongst Black staff that those members of staff not using the tearoom are monitoring them. Such an issue needs to be addressed.

In general, staff members felt that they should reserve judgement on the personal monitor. It was seen as a worthy cause but the items listed in the monitor need revision. Black staff members felt strongly that they are being disadvantaged by elements of the monitor.

In terms of the perceived value placed on the employee, Whites felt that they were valued but that there is disparity in salaries. They also felt that they needed to do too much in terms of standing in for absent staff members. In contrast Black staff

members felt that their skills were not being valued or optimally utilized. They also expressed a feeling that there is too little opportunity to practice newly acquired skills. The threat of retrenchment seems less troublesome than before. There is a definite need for recognition both as individuals as well as for the IMPS group.

With regard to commitment, it was established that staff members could not be regarded as passionate about what they were doing. It appears that many see what they were doing as a 'comfort zone' means to provide for themselves and their families.

Lastly, a request, to investigate the implementation of flexitime employment was put forward.

<u>Evaluation</u>

The variety and frequency of measuring staff satisfaction provided for feedback but it also allowed for constant contribution to the improvement of service. This approach should be continued.

<u>Strengths</u>

Staff members are contributing to the process of identifying weaknesses within the service. They are also assisting in finding solutions to these problems.

<u>Areas for improvement</u>

The Black/White perceptions have not been addressed to the extent that is required within a positive work environment.

Job commitment is not at an acceptable level.

<u>Priority actions</u>

Create a strategy to address issues raised during focus group discussions. The strategy should address:
- perceptions based on cultural differences; and
- the use of the staff tearoom.

Set in place an activity that will involve staff in the review of the personal monitor.

Investigate the ramifications of allowing flexitime employment.

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2.5. Good Practice

Firstly, the review of staff satisfaction using a variety of methodologies appears to be paying dividends. Secondly, the use of the staff newsletter as a communication and knowledge-sharing tool is recommendable.

3. **Strategic management of structural capital**

The objectives set for the review period were the following:

- Integrated stock.
- Available equipment is effective and sufficient so that work could be done efficiently.
- The e-collection is built while the paper collection is maintained efficiently.
- The analysis capacity within the existing systems is developed to provide useful management information.
- The collection of statistics is automated as far as is possible.

3.1 Integrated stock

The physical integration of book stock is taking place and system records are being updated. In terms of general statistics, it is possible to report that for the period July 2001 to August 2002 the stock statistics are as follows:

CSIR Catalogue size:
Bibliographic records: 67 500
Item records: 85 500

Catalogue transactions:
New bibliographic records: 1 200
New item records: 1 465
Changed records: about 15 000 (Primarily due to collection integration)
Updated records: about 1 500 (Primarily journal holdings changes; also updated in SACat and WorldCat)
Deleted records: about 7 500 (Weeded and lost items. Items were also deleted in SACat and WorldCat)

The complete integration of journal stock will probably be completed early in 2003.

Journals:
Journal check-in records: 700
Journal circulation: 240 routing lists and 1800 routing entries
Swets alerts: 110 titles (maintenance and distribution)

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From the available statistics, it is clear that stock was not just being integrated but that the CSIR's holding records, in both the national and the international databases, were being updated.

Evaluation

The process of integrating stock has been a slow and tedious one. This was mostly because remote sites were not cataloguing to national standard. The process has ensured that national holdings are updated as integration takes place.

Strengths

Ability to adhere to national and international standards.

Areas for improvement

Clients have a need to be more closely involved with the weeding process.

Priority actions

Create a collection development policy that should include weeding principles.

3.2   Increase in customer value

The value received by the CSIRIS client is of vital importance. A number of activities to ensure value for money were undertaken. For example, an investigation to access the most appropriate e-journal platforms and databases to subscribe to, was completed. From the investigation, it was possible to establish the following:

- Only 26 % of the CSIR's journal subscriptions were available electronically.
- Between the products ScienceDirect and EbscoHost, 90 % of the CSIR's journal subscriptions, that were available electronically, would be covered. These two products would in addition also provide access to journals previously cancelled or never bought.
- By subscribing to e-products, it would also be possible to tap into functionality never previously available. Functionality here refers to being alerted when new publications became available and for selected dissemination of information – making use of push technology.
- Suppliers were willing to provide the CSIR with trial access to their products.

It was decided to schedule trial access to a number of products. During the review period, access was gained to the following e-products:

Product	Subscribed
ScienceDirect	Yes
EbscoHost	Yes
Web of Science	No
Ei Village	No
SA Legal	Yes
Factiva	No
Kompass	To be decided
SA E-Journals	To be decided
EezyDex	No

New products are also identified in collaboration with clients. For example, the *IEEE Journal platform* is currently under investigation.

Prior to making a decision on subscribing to an e-product, clients are polled for feedback on the usefulness and value of the product. In addition, products such as ScienceDirect and EbscoHost were evaluated against 16 selected criteria and correlated with a product such as SwetsnetNavigator, the contents page service provided by SwetsBlackwells, which gives access to full text journals. Once a decision has been made to acquire a product, contracts are reviewed by legal services to establish the risks and to evaluate the terms and conditions that the CSIR will need to adhere to. Both the identification and evaluation procedures and the process followed to reduce risk are regarded as value added services.

Evaluation

The process to identify and evaluate products is comprehensive. Taking the sums of money involved and the implications of signing multi-year contracts when subscribing to the products, the process should be continued.

Strengths

A wide variety of available products.
Knowledge about the evaluation of information products.

Areas for improvement

Managing expectations created when products are tested during the trial period.
There is currently no follow-up evaluation to establish if trial users continue to make use of the products after subscription. A method of control should be built into the process.

Priority actions

Benchmark the evaluation process with that of the strategic partner.
Establish a core group of trial product users.

3.3   Building the service

With regard to sharing and building upon the available knowledge within IMPS, it is possible to report that in addition to the standard CSIR documentation, the CSIRIS Intranet currently provides access to the following IMPS documents:

Type of document
Minutes & agendas
Policies
Procedures
Lessons learnt
FAQ for e-journals

An index to DMS documents – such as:
    Documentation templates
    Project proposals
    Project reports
    Pricing/tariff lists and handling fees,
    Guidelines (e.g. cancelling journals and
    borrowing bound journals)
    Skills development plan,
    Client feedback reports,
    Marketing pamphlets
    Marketing activity plan
    Statistics (marketing and web usage)

Most of these documents have not yet been reviewed and during the next reporting phase that will be an important issue to address.

Evaluation

The decision to make core documents only available via the document management system was a wise one. Staff have accepted and adopted the policy.

Strengths

The core documentation collection has been established but not enough effort has been placed on the development of the collection.

Areas for improvement

A regular review schedule needs to be established.
Use of the available items is not being monitored.
The paper filing system has not been integrated with the electronic system.

Priority actions

Review the available shared documentation.
Develop the collection of sharable documents by escalating the process down to the individual departments.
Create an electronic filing system/index that includes both paper and electronic documentation.
Make the index available via the web interface.

3.4   Operational excellence

Three core processes were targeted for improvement during this review period. The first of these was the requesting of inter-library loans. Because it was identified as a process that could become part of the workflow system, much of the preparatory work had been done prior to the establishment of the IMPS section. That means that the internal process was benchmarked against that of UP AIS. The result of this study indicated that because the workflow system would have had to link into a supplier system, which was not possible at the time, the technological solution to the problem was not feasible. A second technology issue that became an obstacle was that the IMPS section needed a link into the CSIR's financial system. Because of the initial finding: not to try and change the current financial system but to rather delay further investigation until the enterprise-wide system was upgraded, the whole ILL process was just streamlined in accordance with the outcome of the workflow investigation – using current technology. Although the process was improved re-engineering will only take place when it is feasible to migrate to a different system.

A second process that was reviewed and improved during this period was journal subscription administration. Because of the improved process, it was considerably easier for the front line staff to establish information (such as exchange rate influence and the availability of electronic versions) about the subscriptions they manage. A weakness in the current process is that all administration takes place outside the central library system. Problems occurred when the journal administration module was implemented. This needs to be addressed as soon as subscription renewals have been completed.

The third process is cataloguing. A cataloguing benchmark project came about because of the alignment of activities between the L&IS support functions of CSIRIS and UP AIS. Based on the experience gained by the UP AIS, eight institutions were identified as appropriate benchmark candidates.

From the study, it was possible to conclude that the actual cataloguing process is very similar at all institutions. The generic cataloguing process is displayed in Figure 9.

The most prominent dissimilarity between the CSIR's process and the generic model was that the CSIR uses only professional members of staff to complete the whole process. This is because the activity is mainly the responsibility of a single cataloguer.

Fig 9: Generic cataloguing process
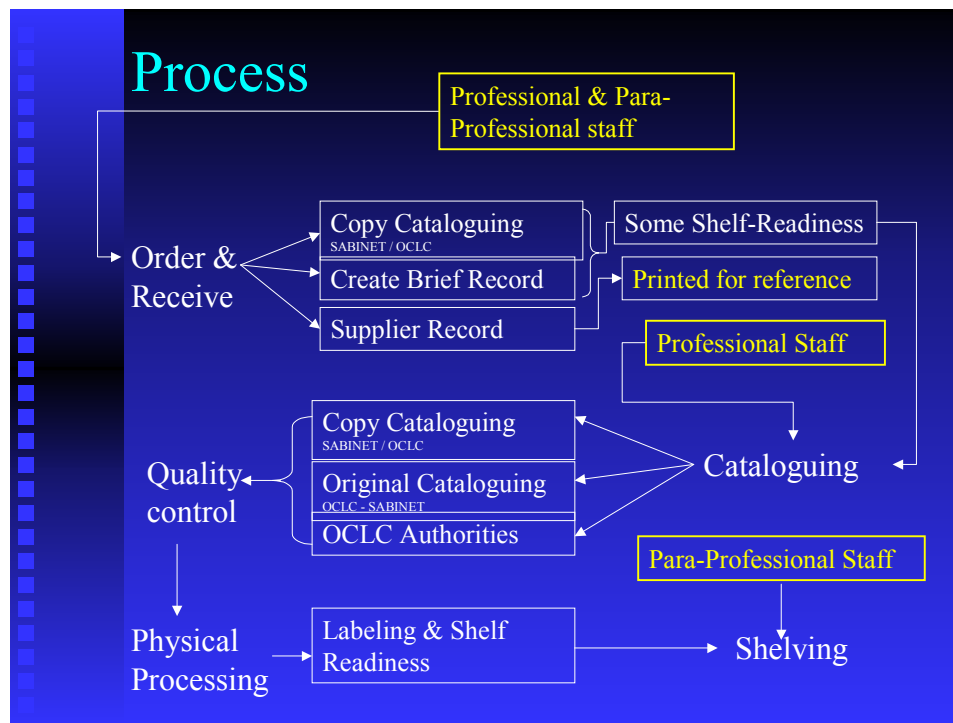
A number of conclusions and recommendations came from the study. Only those that have relevance to this report are reflected below.

- With one exception, all institutions visited use the same process, system and tools. Minor deviations in process are noticeable but everyone follows all the crucial steps. At one of the institutions the cataloguing, acquisitions and journal administration functions are totally integrated.
- The acquisitions, cataloguing and journal administration functions at nine of the institutions depend upon each other to such an extent that the process cannot be changed in one section without affecting the others.
- The role that the national Sabinet Online system and the international OCLC/Pica system play in the cataloguing process needs to be re-evaluated. No process re-engineering is possible without Sabinet Online's participation because it plays a central role and largely determines the process followed. This process is not necessarily to the benefit of the stakeholders - who pay the cataloguer's salary.
- Sabinet Online should be asked to negotiate with OCLC/Pica and insist that supplier records are added to the OCLC database. These records become a wasted resource if this does not happen.
- It was not possible to statistically correlate cataloguer with cataloguer or even cataloguing department with cataloguing department. There were too many variables to be taken into consideration.

- None of the institutions was able to report that that the financial record keeping facility within the library system (Millennium) was integrated with that of the larger institution. All felt that such a step would be a vast improvement.
- Unless an alternative process is followed, the South African information services sector as a whole is bound to be in serious trouble in a very short period of time due to the age distribution of cataloguers. The CSIR has the same problem and therefore needs to keep in touch with developments in this arena.
- The role and position of an 'original cataloguer' should perhaps be elevated to that of an expert in the field. Copy cataloguing should be done by para-professionals.
- The structure and size of a cataloguing department should be determined by the percentage of original cataloguing that is required. In this regard the CSIR needs to consider the implications for the longer term.
- The potential for shared, original cataloguing facilities should be explored.
- Far too much time is spent on quality control. Perhaps only fixed fields and access points should be checked. It is also ludicrous that a record downloaded from the national or the international supplier needs to be edited. Pressure should be placed on suppliers to solve quality problems.
- It appears that system administrators have varying skill levels. Establishing a user group for administrators who fall outside of the Gaelic consortium could only ensure better utilization of the system throughout the country.

From the benchmarking exercise, it is clear that the cataloguing function, as a whole, needs to be reviewed objectively, preferably at national level. Because this study was only conducted at a core group of institutions, it may be useful to use either an online focus group discussion or even a Delphi exercise to test the situation at other institutions. Such a review should not only address the applicability of the function but should also look at the role and the contributions that are made to national and international systems. In addition, because it was not the intent to do so at that stage, no concerted effort was made to consult literature to test if similar benchmark studies had been done internationally. To ensure that the benchmark serves as truly valuable input to a national investigation, such research should be done. Obviously IMPS should stay aware of the developments.

Evaluation

The strategy to target only core processes for evaluation and improvement, was correct. All have benefited from the lessons learnt. These lessons will assist in ensuring that the re-engineering of subsequent processes will be easier.

Strengths

The core IMPS processes are in line with those of its strategic partner.
The benchmark process has been established and suitable benchmark partners have been identified.
The IMPS section has been part of the initialisation of the investigation into the state of cataloguing in the country.

Areas for improvement

Journal administration has not yet been transferred to the library system.
Similar departments at benchmark partners are considerably larger than that of the IMPS section. It is perhaps necessary to also benchmark with smaller and non-academic institutions.

Priority actions

Transfer journal administration to the central library system.
Identify strategic partners, similar in staff size and library budget, without jeopardizing the existing relationships with academic partners.

3.4 Increase in supplier reliability

Long-term relationships with suppliers of paper-based products have been developed over a considerable period. The document procurement group maintains records of contact persons. The reliability of the supplier is recorded. These records have not yet been placed in a central system. Suppliers of electronic products obviously do not yet have an established record of accomplishment but they are being monitored.

At least one of the suppliers was monitored using competitor intelligence techniques. This was done to establish the effort and return in doing such monitoring. The experiment was successful but time consuming. It will, however, be rolled out for core suppliers and UP AIS will be approached to assist in the gathering and analysis of intelligence.

Evaluation

This is an example of where an established paper-based process could be augmented with technology to create a valuable resource. The existing system is reliable and available but it needs to be transferred to a central system.

Strengths

Long-standing relationships with reliable suppliers are intact.
Information about e-product suppliers is readily available.

Areas for improvement

Knowledge about key suppliers is not available to share.

Priority actions

Transfer information about suppliers to an electronic format.
Benchmark the suppliers with those of the strategic partner.
Initialise a process to monitor key/core suppliers.

3.5   Strategic alliances and partnerships

The relationship between UP AIS and CSIRIS IMPS has a longer history than just this review period. The relationship is built on a shared desire to:
- improve processes;
- efficiently manage core processes; and to
- maintain cost effectiveness.

The relationship is now at a stage where it will be possible to do more than just compare processes and procedures.

A relationship with the other South African Science Councils will be cultivated during the next review period. An informal arrangement has been in place for a number of years but, due to the environment that all face, it could only be to the advantage of all institutions if the relationship was place on a more formal footing.

Evaluation

An approach to initially choose only one strategic partner has been the correct one to follow. It has become necessary to investigate a strategic alliance with partners in the science council fraternity.

Strengths

A strong network, which includes key staff from both institutions.
A well developed but non-formal network with staff at the science councils.

Areas for improvement

The similarity in the demographics of staff members between UP AIS and IMPS does not allow for creativity and 'out-of-the-box' thinking.
There has been very little activity in allowing staff members to actually share the experience of working within each other's departments during this review period.
The partnership is an enigma to colleagues in the professional associations.

Priority actions

Develop the relationship with partners in the science council community.
Build the image of CSIRIS IMPS as a strategic partner within the profession by sharing joint knowledge where possible.
Identify further areas of collaboration between IMPS and any of its partners.
Actively exchange staff members between institutions for brief periods.

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3.6   Harnessing ICT

The wider CSIR network is stable, reliable and secure. This has minimized the need for expert skills within IMPS. An asset register is available and maintained electronically. There is, however, a risk that equipment bought prior to the establishment of IMPS may cause problems within the next financial year. The risk has not yet been reviewed independently and needs to be done as a matter of urgency.

Capital investment was made in a digital sender, which has largely reduced the dependency on the photocopy equipment as well as increased the ability to supply documents electronically.

Evaluation

It would have been better if a full-scale investigation into the state of equipment had been done much earlier during the review period. It is now necessary to fast track the process and ensure that strategic investment is done at the correct level. It would also have been appropriate to evaluate the skill level of staff members utilizing the equipment.

Strengths

The CSIR infrastructure.

Areas for improvement

Lacking skills to utilize pieces of equipment to their full capacity.

Priority actions

Evaluate the basic understanding of the use of equipment and augment the understanding with a skills development exercise.
Complete an evaluation of the available equipment for strategic planning purposes.

3.7   Good practice

The relationship with a single reliable partner has worked well. The experience gained from the interactions will be invaluable in the fostering of relationships with further partners.

Being able to focus attention on the evaluation of core processes only has ensured that the evaluations were carried out in such a way that the evaluation and improvement of subsequent processes would be a relatively easy task.

4. **Management of customer capital**

Objectives set for customer capital development were the following:

- Establish an effective relationship with internal customers.
- Evaluate market research, to establish the extent and needs of the external market.
- Examine the needs of the external market.
- Utilize the results from the market survey to identify suitable products and services to sell to an appropriate market segment.

4.1   Customer satisfaction with products and quality

In general, client satisfaction appears to be improving. From the review of the staff newsletter, it was established that front line staff, in six instances, felt it appropriate to report their satisfaction with the service from IMPS staff. During the early part of the same period, however, four complaints about aspects of the service were also recorded. Three of the complaints related to the inter-library loans and document procurement section. The responsible staff members were involved in the corrective action. The inter-library loans group as a whole was tasked with establishing a preventive process. Since then, only one further complaint was received.

From a workshop for front line staff where, amongst other issues, the service level of the back office (IMPS) was discussed, it was possible to extract the following four items that need attention:

1. Clients were dissatisfied with the time delay between requesting copies of articles and receiving the copies. No factual evidence was provided.
2. The administration around capturing data relating to research reports is too cumbersome.
3. The disengagement process is too cumbersome and needs attention.
4. Books kept at the remote site in Modderfontein are not reflected in the catalogue.

The first and third issues were addressed directly after the workshop. The process of disengagement was streamlined so that only filtered information would reach the front line. In terms of time delays, it was not possible for the front line to provide evidence of delays and they agreed to monitor and report on the facts of the situation before any action would be taken. The capturing of research report data is complex and has not yet been resolved. It was agreed that a project to address the whole process would be established as soon as possible. The cataloguing of books on the remote site was initiated in the week after the meeting and is in process.

As a further exercise to test customer satisfaction, a Delphi investigation was completed where all 19 of the front line customers were polled for feedback. Seventy nine percent of these customers participated in the process. It was established that

the items customers felt most comfortable to leave in the hands of the IMPS staff members were the following:

- negotiating contracts for supplier products;
- the maintenance of the library system;
- the delivery of documents;
- marketing and communication; and
- the renewal of journal and other subscriptions.

The services and products that need to be expanded were identified to be:

- efficient service levels;
- the expertise in handling routine library work;
- innovative web-based products;
- document delivery; and
- contact with library consortia.

When asked to identify all the problems and weaknesses in the services, only 16 problem areas were identified. Upon rationalizing the list (putting items that were similar together), the list was reduced to nine items. During the last round, one further item was added to the list but this item has relevance to one strategic unit only and it was therefore not added to the list of priorities to address. The items that do need addressing, in priority order, are the following:

- the library system – both the slow speed and the interfaces;
- implementing a monitoring system for document orders;
- turn-around time on document orders;
- weeding of stock without consultation with clients;
- deleting the records to 'missing books' from the catalogue;
- communication between the front and back lines;
- updating the reference collection;
- gaining access to more journal material; and
- providing back up in the IMPS offices during lunch and tea breaks.

From the feedback received from clients, it was possible to identify a number of strengths, weaknesses and priority actions. The detail id provided below.

Evaluation

Within such a small group using a variety of methods to poll satisfaction is more satisfying than relying on a single method. It would in future be necessary to also include a methodology where individual feedback was directly polled.

Strengths

Front line clients appear to be comfortable with the process where staff members other than themselves, deliver back office services.

Areas for improvement

The intellectual property administration process is not functioning optimally.
Clients need more insight into the information management process.

Priority actions

The inter-library loans/document delivery processes needs a full review, which is also to include a proper investigation into a recording system that is accessible to end users/clients.

Re-engineer the process that relates to research report administration.

Initialise a process to evaluate client satisfaction for CSIRIS as a whole.

4.2   Customer relationship management

A portion of the work done within IMPS is done on behalf of the CSIRIS clients. One example is a weekly CSIRIS marketing e-mail sent to registered e-mail recipients throughout the CSIR. Although IMPS staff members are not always responsible for creating the content of the marketing e-mails, they are responsible for enforcing the planned schedule, the artistic content and the associated web publishing. From the statistics available, it was possible to establish that 21 messages were posted during the review period. On average 1 521 members of the CSIR staff (researchers) were targeted with each of the e-mail shots. Subjects covered ranged from the promotion of supplier products such as ScienceDirect to giving directions to use the library catalogue. In total 31 941 e-mails were linked to the 21 messages that were sent out and 23 519 of those e-mail messages were opened by the recipients. Figure 10 provides the detail graphically.

Fig 10: E-mail marketing

Averages: Marketing e-mails to CSIR staff

1521

1120

401

- E-mails Opened
- Not Opened / Assumed Deleted
- Total
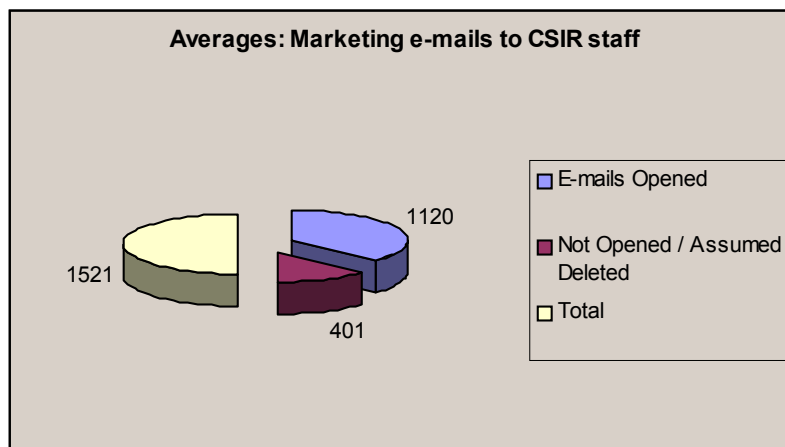
Because the average reach for the e-mail marketing campaign appears to be in the region of 74 %, which is much greater than was expected, this drive will be continued.

New staff induction sessions were started in January 2002. On average six members of research staff attend these sessions monthly. One of the remote sites was visited for a similar presentation. Satisfaction is monitored and feedback recorded after the sessions. Each session is followed by a short 'lessons learnt' event. Ideas to improve the session are implemented for the following session. Both the feedback and the lessons learnt actions are recorded and published to the Intranet site. New staff members are contacted on an ad hoc basis to enquire about their 'information' progress. Their names are also forwarded to the appropriate front line staff member for follow-up visits.

<div style="border:1px solid black; padding:10px;">

Evaluation

Customer relationship management has been initiated but lacks depth. The approach therefore needs to be expanded.

Strengths

The 'new staff induction' process is a good example of constant improving and learning from experience. This process needs to be implemented at other sections and for other processes as well.

Areas for improvement

There appears to be enough contact in establishing a relationship with the customers' customer but there is too little maintenance of the relationship as very little contact is maintained afterwards. The relationship with the front line is also not receiving the attention it needs.

Priority actions

Establish a procedure to ensure follow-up contact with new staff members.
Develop an action plan to build relationships with the front line staff.
Initiate actions in document procurement to maintain contact and build relationships with clients.

</div>

4.3   Customer retention and acquisition

The internal market is largely a captured one. The potential for generating income from an external market was investigated as an additional stream of income. From the results of the investigation, it appears that there is sufficient potential for business, to continue with the drive. The specific aspects to be included in such a potential service were established, as were the pricing limitations. It was determined that
- the CSIR's brand for information services is relatively well established;
- potential clients would prefer electronic delivery; and that
- potential clients do not see a supplying service for Gauteng situated in Pretoria, rather than Johannesburg, as a problem.

The target market was identified, all supporting documentation was developed and client visits have started. It is too early to evaluate customer acquisition. The process

will be monitored closely for successes and for lessons to be learnt from the actions taken.

<u>Evaluation</u>

Making use of external consultants to do a proper market survey was right. It has allowed for the identification of core products and services that should be marketed.

<u>Strengths</u>

Marketing efforts are based on fact rather than on perceived needs.

<u>Areas for improvement</u>

Too little progress is being made – mainly due to time constraints and a lack of confidence in the 'salesmen'.

<u>Priority actions</u>

Formulate a complete business plan for the external income drive. The plan should make provision for appropriate human resources.

4.4   <u>Good practice</u>

Using a variety of smaller satisfaction polls at regular intervals is a good way of ensuring that one is in constant touch with client satisfaction.

Doing a validated market survey, even for information services, focuses the attention. It allows for the development of appropriate marketing material and for targeting appropriate customers so that it becomes relatively easy to do the marketing of products and services.

5.   **Management of financial capital - performance indicators**

Objectives set to ensure stakeholder satisfaction were the following:

- Improved asset utilization.
- Practice efficient financial management by:
  - o setting a budget that could tolerate investment in intellectual capital activities over and above normal running costs would be negotiated before implementing any activities;
  - o setting realistic income targets;
  - o negotiating a continuation budget to ensure the continued move to the development of an e-only information resource infrastructure;
  - o establishing the infrastructure to market and generate external income; and
  - o showing growth in external income at the end of the 2002/2003 financial years.

- Ensure reliable supply chain selection.

5.1   Decreased dependency and improved asset utilization

According to usage statistics from the suppliers, it is possible to report that the average number of pages viewed within ScienceDirect has been just less than 9 000 per month. Between 150 and 700 search sessions are taking place per month and as a result on average 1 000 full text articles are downloaded from the system. From that it is possible to deduce that the system is being utilized. The downward trend reflected in Figure 11 appears to have stopped and an upward trend is starting to emerge. However, the relative conservative usage of the product is of concern and the next six-month period should be utilized to again market the product extensively – especially because it is the intention to stop dual format subscriptions in the new financial year. The reasons for usage trends also need to be investigated.

Fig: 11 Usage of ScienceDirect
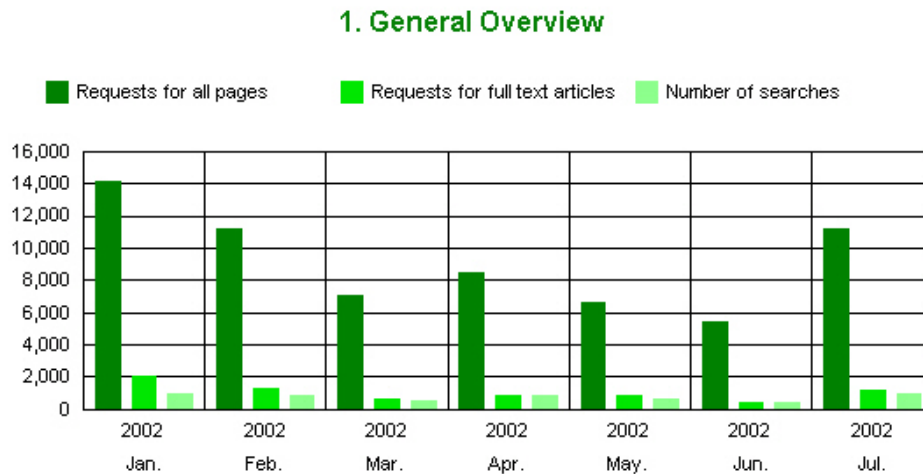
EbscoHost:

All 10 databases available via EbscoHost are being accessed. For interest's sake, it was decided to use the same 10 institutions that were visited for the cataloguing benchmark exercise and to correlate their 'search' usage with that of the CSIR. Only one of the other Science Councils subscribe to the product and their information was also added. From the results, it appears that the CSIR's usage is comparable to that of the larger South African technikons (see institutions D, E and J on the graph in Figure 12 on the next page).

Fig 12: Correlation between searches done at benchmark institutions
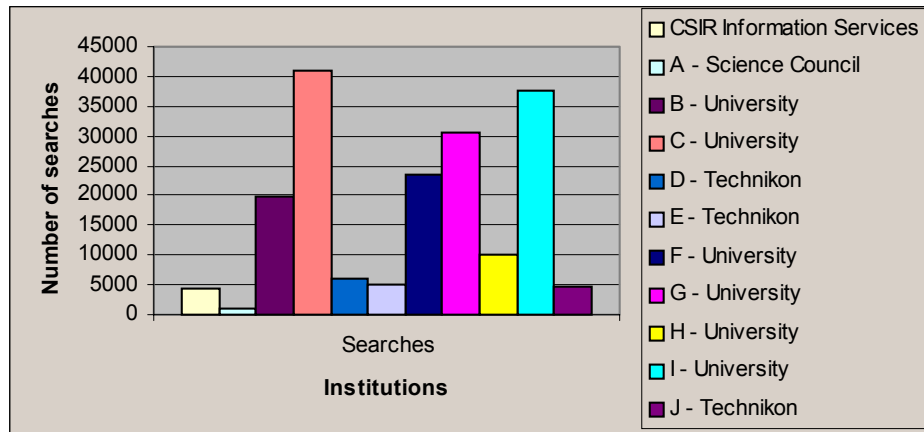
Taking the total number of potential users into consideration, the search information could be regarded as very satisfactory.

Because a search does not necessarily indicate that the product was of use, the number of full text articles downloaded was seen as a more reliable indicator. Again using the same 10 institutions, a correlation on the number of downloaded items was done. The result of the correlation is depicted in Figure 13. From the graph one can deduce that the CSIR's return on investment is better than that of the technikons and the other Science Council.

Fig 13: Downloading full text articles
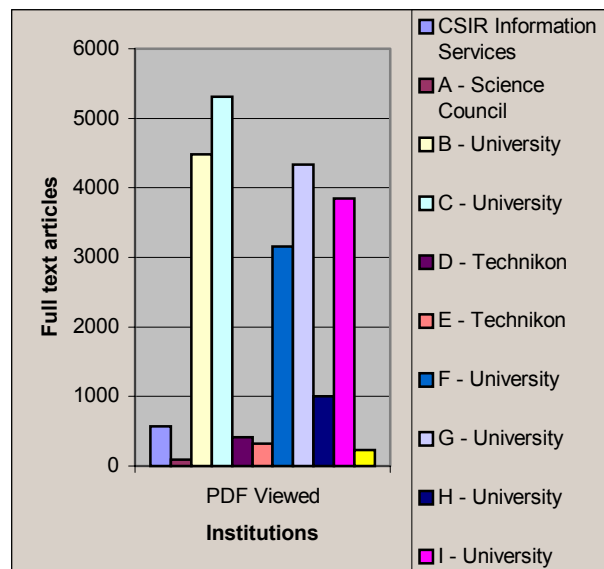
Just as is the case with ScienceDirect, this product still needs to be monitored for both its real return on investment as well as for the alignment with the organization's drive for e-business.

Evaluation

The approach followed is in line with the e-business strategy of the wider CSIR. User acceptance and actual usage still needs to be tested.

Strengths

The availability of statistics from suppliers.

Areas for improvement

The lack of comparable statistics relating to the use of paper based products and services.
The perception of low information literacy levels of research staff has not yet been tested.

Priority actions

Initiate a process to reliably establish information literacy levels.
Develop a strategy that would ensure an increase in information literacy levels throughout the CSIR.

5.2   Improved cost effectiveness and efficient financial management

The IMPS section is largely responsible for the CSIRIS running budget. Financial performance is measured in terms of the ability to stay within the set budget. There is a drive to earn external income. That income is part of the set budget. An analysis of the balance sheet indicates that IMPS was run on a sound financial base. External income was marginally better than what was expected and internal income targets were met. Only 50 % of the budget negotiated for the improvements to the offices was necessary as it was established that the building rental contract could be renegotiated to include improvements to the site. The income generated from the payment of private phone calls was not substantial but the saving was. On average, the monthly phone bill reduced by more than R 2 000 after the introduction of that measure.

Internal income is earned by a monthly contribution from the various SUs. IMPS staff members complete timesheets to use as proof for time spent on work being done for these internal clients. An analysis of timesheet completion shows that with one exception all staff members are completing timesheets. It has also shown that, by comparing the current financial year to the previous one there is a considerable improvement in the number of timesheets completed as well as in the quality of the information captured. There are, however, serious doubts whether these timesheets serve the purpose they were intended to do. It is difficult to extract productivity data and there is little evidence that anyone, but the IMPS managers, is using the

information. One also needs a more objective measure of value added than measuring time.

Evaluation

The approach followed was the one prescribed for all support departments. The process of establishing timesheet categories is cumbersome and completing the timesheets is time consuming.

Strengths

Income targets were met and expenditure was kept within budget.

Areas for improvement

The methodology followed for timesheet capturing is time consuming.
The report functionality within the central system is not being utilized optimally.

Priority actions

Create a system to use report functions within the available system (PMS) more effectively. Investigate alternative methods of recording time spent on projects so that less time needs to be spent on recording the action.

5.3   Reliable and effective supply chain selection

Currently journal subscriptions are as follows:

Item	Total	%
Paper only	392	69
Paper and electronic	153	27
Electronic only	3	1
Membership publications	16	3
Unique Titles	**564**	**100**

The majority of paper subscriptions are done via a single preferred supplier. The relationship with the subscription agent (supplier) has been stable and reliable for more than three years. Much of the effort during this review period was therefore spent on identifying suitable electronic full text suppliers. The suppliers reviewed are provided in Figure 14 on the next page. The process followed was to list all the titles supplied for each of the suppliers and to then correlate that with the journals the CSIR subscribed to. From that it was possible to establish that EbscoHost (which includes Business Source Premier, Expanded Academic ASAP International, Master File Premier and General Business File International) could supply electronic access to 68 % of the titles that the CSIR subscribed to and that were available electronically. The next supplier that provided access to CSIR subscriptions was ABI Inform but only seven

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titles were unique - that is, not already in EbscoHost package. It was therefore decided that it would be a waste of valuable financial resources to also subscribe to the ABI product.

Because Elsevier's ScienceDirect provided both balance in the electronic collection (EbscoHost concentrates on management and computing science information) and because it was regarded as an excellent product in terms of functionality, it was selected as the second supplier. This was a good choice because, when given access to the ScienceDirect collection, 383 titles were accessed during the first month. The CSIR subscribed to only 32 of the titles accessed.

Both these products proved to be stable and reliable with virtually no downtime being recorded. Full text articles are of a very high quality and there appears to be continuous but incremental development in the products. There is no doubt that the scope of access has broadened at very little additional cost.

Fig 14: Electronic access to the CSIR's journal collections
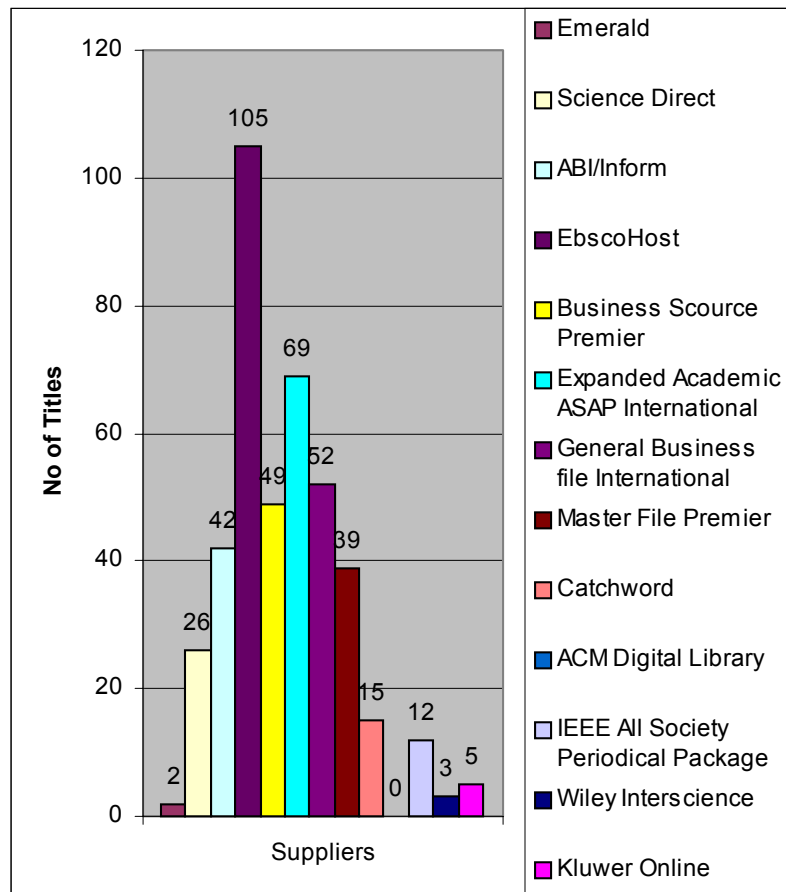
Evaluation

Suppliers of traditional products and services have a traceable record of accomplishment and the approach has been to ensure that the record is up to date. The approach for the selection of e-suppliers was comprehensive. Currently, additional products are tested making use of trial sessions. During such a period, the functionality of the products and the support provided by the supplier are investigated.

Strengths

Availability of information about products and services.

Areas for improvement

Very little of the experience gained over the review period has been captured.

Priority actions

Capture the knowledge gained about the existing supply chains.
Formalize the process to select and ensure the reliability of electronic supply chains.

5.4   Good practice

A comprehensive analysis of supplier products gives confidence in the selection.

Appendix A

Complete list of skills and competencies identified within IMPS

Skill

Ability - Analytical skills
Ability - Assertiveness
Ability - Building organizational culture
Ability - Communication & people skills
Ability - Coping with change
Ability - Creativity
Ability - Critical evaluation.
Ability - Culture consciousness
Ability - Decision making
Ability - Distinguish between attempting to rectify errors internally and when to call for assistance
Ability - Evaluation skills
Ability - Facilitation skills
Ability - Interpretation skills
Ability - Interviewing
Ability - Investigation skills
Ability - Judgement – recognise needs in terms of space weeding repairs etc
Ability - Knowledge of supplier efficiency
Ability - Leadership
Ability - Management
Ability - Mentoring skills
Ability - Needs identification
Ability - Negotiation & bargaining skills
Ability - Negotiation and persuasion skills
Ability - Networking skills
Ability - Overview (balcony vision)
Ability - Persuasion
Ability - Presentations skills
Ability - Pro-active identification of future projects
Ability - Product development
Ability - Service development
Ability - Strategy and vision formulation
Ability - Team playing
Ability - Technology efficiency
Ability - Telephone etiquette
Ability - Time management
Ability - To be pro-active
Ability - To do IT training
Ability - To identify errors
Ability - To make connections (connecting minds and information)
Ability - Trend identification skills
Ability - Understanding of information trends
Ability - Understanding of management trends
Ability - Understanding of organization's politics
Ability - Understanding of technical trends
Ability - Writing

Process - Accounting skills
Process - Book acquisitions
Process - Budget control skills
Process - Capturing lessons learnt
Process - Cataloguing
Process - Client relationship management
Process - Collection building
Process - Collection maintenance
Process - Compilation of policies and guidelines
Process - Deliveries
Process - Development of subject specific databases
Process - Document supply
Process – Human/Staff management
Process - ILL
Process - Indexing skills
Process - Information collection
Process - Information management
Process - Journal administration
Process - Knowledge management
Process - Marketing
Process - Secretarial duties
Process - Training skills
Software - Ariel
Software - CSIR DocDel
Software - CSIR PMS
Software - CSIR PMS administration
Software - ERUDITE
Software - III Millennium
Software - Inmagic
Software - Innopac
Software - MS Access
Software - MS Excel
Software - MS Power Point
Software - MS Word
Software - NT
Software - Prism
Software - Request
Software – Sabinet Online
Software - Web design software
Software - Web publishing
Software - Word Perfect
Technical - Ability to use labelling equipment
Technical - Building customized portals and extranets
Technical - Converting paper to electronic
Technical - Data capturing skills
Technical - Database creation maintenance and manipulation skills
Technical - Database design
Technical - Database development skills
Technical - Database maintenance
Technical - Database searching

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Technical - Dialog searching
Technical - Driving
Technical - Filing
Technical - Financial administration
Technical - ICT manipulation
Technical - Identification and rectification of errors in copied records
Technical - Identification and tracking of experts
Technical - Internet searching
Technical - Interpretation of currency fluctuation skills
Technical - Issue desk
Technical - Knowledge of international cataloguing standards
Technical - Knowledge of pricing models
Technical - Knowledge of the CSIR subject areas to include those as subject terms where
            appropriate
Technical - Library system maintenance
Technical - Maintaining information products
Technical - Network administration
Technical - Novell network administration
Technical - Packaging of information retrieval from databases and internet
Technical - PC technical fault identification & repair
Technical - Record keeping
Technical - Scanning (text/images)
Technical - Selecting library systems
Technical - Shelf reading skills
Technical - Skills associated with maintaining a report collection
Technical - Stock purchases
Technical - Subject area knowledge
Technical - Support of hardware items
Technical - Systems administration
Technical - Verifying records
Technical - Web development & maintenance
Technical - Web page design
Technical - Web site administration

Appendix B

Taking skills and competencies one step further

The current internal classification of skills into ability, process, technical and software skills is not sufficient in terms of being forward looking. It was necessary to re-classify these skills in terms of their ability to develop human, structural, customer and financial capital. The list in Appendix A has therefore been restructured. In the section below 'Y' is an indication of the following:

T = Contributes to the IMPS **tangible** value chain
I = Contributes to the IMPS **intangible** value chain
C = Core Competency – it is necessary to keep on developing the skill level

Category	Skill	T	I	C
Human Capital Development				
Efficient Utilization of IT	Software – Ariel	Y		Y
	Software - CSIR DocDel	Y		Y
	Software - CSIR PMS	Y		Y
	Software - CSIR PMS administration		Y	
	Software - III Millennium	Y		Y
	Software – Inmagic		Y	
	Software – Innopac	Y		Y
	Software - MS Access		Y	
	Software - MS Excel		Y	Y
	Software - MS Power Point		Y	
	Software - MS Word		Y	Y
	Software – NT		Y	
	Software – Prism	Y		
	Software – Request	Y		Y
	Software – Sabinet Online	Y		Y
	Software - Web design software	Y		Y
	Software - Web publishing	Y		Y
	Technical - ICT manipulation		Y	Y
	Technical - Network administration		Y	
	Technical - Novell network administration		Y	
	Technical - PC technical fault identification & repair		Y	
	Technical - Support of hardware items		Y	
	Technical - Systems administration		Y	
Training	Process - Training skills		Y	Y
Human resource development	Process – Human/Staff management	Y		Y

Structural Capital Development

Category	Skill	T	I	C
System Maintenance	Process – Cataloguing	Y		Y
	Technical - Ability to use labelling equipment	Y		Y
	Technical - Data capturing skills	Y		Y
	Technical - Database creation maintenance and manipulation skills		Y	
	Technical - Database design		Y	
	Technical - Database development skills	Y		Y
	Technical - Database maintenance		Y	Y

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Category	Skill	T	I	C
	Technical - Database searching		Y	
	Technical - Identification and rectification of errors in copied records	Y		Y
	Technical - Knowledge of international cataloguing standards	Y		Y
	Technical - Library system maintenance		Y	Y
	Technical - Selecting library systems		Y	Y
	Technical - Subject area knowledge		Y	Y
Stock Maintenance	Process - Collection building		Y	Y
	Process - Collection maintenance	Y		Y
	Process - Information collection		Y	Y
	Process - Information management	Y		Y
	Process - Journal administration	Y		Y
	Technical - Issue desk	Y		Y
	Technical - Record keeping		Y	Y
	Technical - Shelf reading skills	Y		Y
Maintaining Intellectual Property Output	Process - Indexing skills	Y		Y
	Technical - Knowledge of the CSIR subject areas to include those as subject terms where appropriate		Y	Y
	Technical - Skills associated with maintaining a report collection	Y		Y
Ills	Process - Document supply	Y		Y
	Process – ILL	Y		Y
	Technical - Verifying records		Y	Y
Buying stock	Process - Book acquisitions	Y		Y
	Technical - Stock purchases	Y		Y
Managing knowledge	Process - Capturing lessons learnt	Y		Y
	Process - Compilation of policies and guidelines	Y		Y
	Process - Knowledge management		Y	Y
Administration	Process - Secretarial duties	Y		Y
	Technical - Filing		Y	Y
Innovative / Packaged Products & Services	Process - Development of subject specific databases		Y	Y
	Technical - Building customized portals and extranets	Y		Y
	Technical - Converting paper to electronic	Y		Y
	Technical - Dialog searching		Y	
	Technical - Identification and tracking of experts		Y	Y
	Technical - Internet searching		Y	Y
	Technical - Maintaining information products		Y	Y
	Technical - Packaging of information retrieval from databases and internet		Y	Y
	Technical - Scanning (text/images)	Y		Y
	Technical - Web development & maintenance	Y		Y

A1.48

Category	Skill	T	I	C
	Technical - Web page design		Y	Y
	Technical - Web site administration		Y	Y

Customer Capital Development

Marketing & Communication	Process - Marketing		Y	Y
Customer skills	Process - Client relationship management		Y	Y

Financial Capital Development

Financial Management	Process - Accounting skills	Y		Y
	Process - Budget control skills		Y	Y
	Technical - Financial administration	Y		Y
	Technical - Interpretation of currency fluctuation skills		Y	Y
	Technical - Knowledge of pricing models		Y	Y

A1.49

Attachment 2
Simplified personal monitor

The runner who wins the marathon is one of many top athletes who have the stamina to overcome the ups-and-downs of the race. The entrepreneur holds up under pressure and actually likes pressure (usually self imposed). It's called persevering. Furthermore, the entrepreneur is not afraid to fail. Failure is a learning tool (Toftoy, 2002, p 44).

Personal Score Card[2]: May 2002

Contribution	Suggested Score	My Score
Human Contribution (For Myself)		
Attend a conference / seminar	+2	
Present a paper at conference	+10	
Practice / Share paper with staff members	+15	
Learn a new skill	+10	
Improve in skill category	+25	
Teach a colleague something work related	+10	
Apply what was taught to me	+10	
Not apply what was taught to me	- 10	
Share something you have learnt in 'CSIRIS on Friday'	+5	
Sub-Total HC		
Structural Contribution/Innovation (For IMPS)		
Share an idea to improve a process	+2	
Try out the idea	+5	
Prove that the process works better	+20	
Assist to make a process work better	+15	
Lead a task team	+2	
Participate in task team activities	+10	
Think of a new process / service / product	+2	
Talk to colleagues about the idea	+5	
Try out the idea / participate in an experiment	+10	
Know about & not use an improved process	- 20	
Write an article for 'CSIRIS on Friday'	+5	
Sub-Total SC		
Customer Contribution (For my customers)		
Receive a compliment	+5	
Receive negative feedback	-2	
Report the problem	2	
Do corrective action (Fix the mistake)	+5	
Ensure that mistake does not happen again	+15	
Identify a potential new customer	2	
Build your relationship with an existing customer	5	
Hand the personal monitor in on time	+5	

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[2] **Note:** this score card came about as a result of a trial and error process to establish a personal monitoring system. It needs further development as both the items measured as well as the allocated scoring has not been finalized. This version, which has been transferred to an Excel spreadsheet, will be utilized for a period of six months after which staff members will adapt it to suite both their needs and those of management.

Contribution	Suggested Score	My Score
Sub-Total CC		
Financial Contribution (For CSIRIS)		
Each timesheet completed	+10	
Each timesheet not completed	-5	
Number of items completed (per 'x' number)	Max = 50	
Each personal phone call >10 min or > R5.00 not paid from pocket	-2	
Improvement in number of items done	+5	
Sub-Total FC		
Total		
Cheating	**-400**	

A1.52

Attachment 3
Focus group discussions: outline, instructions to facilitators and results

> **Good conversations are the cradle of social knowledge in any organization. Through extended discussions, which can encompass personal flights of fancy as well as careful expositions of ideas, individual knowledge is turned into themes available for others. Each participant can explore new ideas and reflect on other people's viewpoints. And the mutual exchange of ideas, viewpoints, and beliefs that conversations entail allows for the first and most essential step of knowledge creation: sharing tacit knowledge within a microcommunity (Von Krogh, Ichijo and Nonaka, 2000, p 125).**

Outline for use during staff satisfaction focus group discussion

The purpose of the discussion is not only to allow staff to express their own satisfaction with their jobs and the environment in which these jobs are performed but also to discuss that satisfaction while their peers are present. The following questions could be used to stimulate conversation:

1. Identify **general** issues that indicate **staff satisfaction**. Ask questions such as:
    a. Are you having fun at work?
    b. What does it feel like to come to work in the morning?
    c. How are your skills, capabilities and talents utilized while you are working?
    d. Are you learning?
    e. How do you feel about the personal monitor?
    f. What do you think about the way in which the tearoom is utilized?
    g. Do you agree with the changes that have taken place within IMPS over the past year and a bit?
2. Test perceptions on the **value** placed on the **employee**. Possible questions:
    a. What are you worth to IMPS?
    b. Can IMPS go on without you?
    c. Are you being milked?
    d. Are managers and colleagues taking advantage of you?
3. Talk about **job security**. Possible questions to ask:
    a. If you were an IMPS manager and you had to fill your current job on Monday - would you appoint someone just like you?
    b. How much is IMPS worth to you?
    c. What would you do if your job disappeared tomorrow?
    d. Are you worried about your job?

Instructions to facilitators

1. The discussions are only scheduled for 60 minutes. You are welcome to allow the group to continue the discussion if you feel group members still have burning issues but keep your own time constraints in mind.
2. Please assign someone within the group to make notes of the points that the group feel need to be conveyed to management.
3. The guideline above is not cast in stone. It is also not necessary to cover all questions during the discussions. Remember the purpose is to discuss staff satisfaction and if they feel the need to discuss another relevant issue – let them do so.
4. Allow staff two working days to put forward additional comments to be added to the list and then please forward all comments to me by e-mail (no later than Tuesday (3 September 2002) morning at 10:00).
5. About the group discussion specifically:

    a. Please conduct the discussions in the language preferred by the participants.
    b. Spend two or three minutes explaining the purpose of the discussion.
    c. If someone seems to have a novel or interesting point, spend a minute or two to establish if others agree.
    d. Do not indicate your disapproval or support of what is said and encourage all to speak their minds.
    e. It is possible to build on discussion by asking for clarification. However, do not contribute to the discussion – let the participants do the talking.
    f. Some may try and dominate the discussions. Please take measures to ensure that the issue is addressed so that all can provide contributions.
    g. Remember you are not interviewing the group. They need to discuss the issues and explore differences and similarities in opinion.

Please remember to stress the anonymity of all contributions – also those received by e-mail after the discussion.

A1.54

IMPS Staff Satisfaction Focus Group Discussions: 30 August 2002
[Original format - document not edited]

Present: 6 Members of staff
Score rating: Value: 1 –10, where 10 implies very strong feelings
Facilitator: Madelein van Heerden

1. **General issues indicative of staff satisfaction:**

- Moeg, gedemotifeerd, menswaardigheid is aangetas omdat waarde van werk nie raakgesien word nie. (1 persoon, 10) Nie heeltemal so sterk nie (ditto, maar wel gedemotifeerd soms as "goal posts" so baie geskuif word)
- I like coming to work. I like the friends I have at work and would miss them if I stayed at home. (2 persone, 7)
- Apart from finding something to wear and arriving on time, it feels good to come to work! (2 persone, 7)
- Bestuur kommunikeer nie genoegsame redes terug vir weiering van bv. bywoning van konferensies nie. Terselftertyd word van personeel verwag om te groei in pos met vaardighede wat aangeleer moet word, maar hoe? (Groep stem saam, 6)
- Kommunikasie is goed in die groep maar individueel word dit afgeskeep. (4 persone, 6)
- 'n Ma het altyd verdeelde lojaliteit tussen werk en huis (Groep, 6)
- Werk nie gefokus, te veel areas om aan aandag te gee (Scattered focus in your job) (3 persone, 7)
- "Job jars" moet geherevalueer word t.o.v. beide kwaliteit en kwantiteit van take. (Groep, 7)
- The daily delivery of newspapers is not good for CSIRIS's image as we are dependent on the suppliers and they are unreliable. The customers see it as our fault. It is also a pain to run! (1 persoon, 8) Do not agree. The suppliers are much more reliable than the staff responsible for the handling and delivering.
- Wit/swart kultuur verskille veroorsaak probleme:
    - Moeilik om werk toe te kom, voel nie deel van groep, voel die ander mense in haar groep skep 'n negatiewe beeld. Om kulture te meng met vorige oefening het haar skade laat lei. Die ander groep mense het geen respek vir wit vroulike bestuurder. (1 persoon, 8)
    - Meeste van die swart personeel in IM is kans vatters – hulle kom weg met moord. Is daar nie 'n kursus in professionaliteit nie? Boekie "Procedures for the new worker" – dalk vir almal gee. (3-4 persone, 7)
    - Hulle werk nooit tyd in of sit verlof in nie en het nie lojaliteit nie. Daar is 2 stelle waardes. (3 persone, 7)
    - Onrealistiese geleenthede word gegee vir swart personeel – gee vir hulle die pinkie en hulle is besig om die hand te gryp. (3 persone, 7)

A1.55

- o Would suggest the following: Definite procedures for reporting by a certain time to a certain person if not coming to work. Strictness concerning this: our black colleagues are very laid back about not pitching and sending a second hand message half way through the day. (2 persone, 8)
- Bestuur het onrealistiese verwagtinge t.o.v. personeel:
    - o Bestuur moet eers personeel toerus met die nodige vaardighede vir take wat van hulle verwag word. (3 persone, 5) Maar personeel moet bereid wees om toegerus te word
    - o Bestuur verwag te veel van personeel in te kort tyd. (2 persone, 8) Dalk is dit weereens kommunikasie kanale wat nie oopgenoeg is nie – die personeellid dink een ding word van haar verwag, terwyl bestuur eintlik 'n ander ding bedoel het. Die misverstand is te laat om op te klaar wanneer die deadline bereik moes gewees het. (1 persoon, 8)
- Onsekerheid waar CSIRIS hulle nou bevind:
    - o Waar gaan ons heen? (Groep, 6)
    - o Gaan ons geleenthede kry noudat UP van baan is? Hoekom is UP ding daarmee heen? (Groep, 5)
    - o Vereiste van eksterne inkomste van Rm 1,2 is 'n bron tot kommer. Waarom nou ewe skielik die druk op ons? Wat gaan gebeur as ons nie die doelwit bereik nie? (Groep, 8)
    - o CSIRIS is nie regtig deel van Korporaat nie. Bv. ons het geen erkenning gekry by die jaarlikse "awards" seremonie nie. Hulle behandel ons ook nie soos kliënte nie en lewer nie goeie diens aan ons nie. (3 persone, 6)
- My job is quite challenging intellectually, except when the computer systems (Innopac, Sabicat, OCLC, Millennium, Telnet sessions) are not working properly (which seems to be about half the time these days). Then the frustration factor is very great. (1 persoon, 6)
- Yes, I feel that I am learning. Things are done differently every year and one has to learn how to do them well (1 persoon, 5)
- "Personal Monitor":
    - o Personeel moet aan vereistes voldoen sonder dat die geleenthede (bv. tyd, opleiding) daar is. (3 persone, 5)
    - o Gee jou geleentheid om objektief na jou eie "performance" te kyk. (2 persone, 5)
    - o Moet ingestel wees om dit daagliks te doen. Die waarde raak verlore as jy dit nie elke dag invul nie (as nie elke dag tyd het nie) omdat jy vergeet van alles wat jy die vorige dag gedoen het. (2 persone, 5)
    - o Voel hulle is nie kinders nie. (3 persone, 6)
    - o Is hier om te werk – is tyd mors. (2 persone, 6)
    - o Is teen verandering wanneer jy oor 50 is en voel "score card" is 'n "nuwe ding" en forseer nuwe manier van werk. Is gewoond aan jare se manier van dinge op selfde manier doen – gewoond aan comfort

zone en opstandig teen verandering. (2 persone, 5) Dit klink te negatief, en dit was nie die bedoeling nie. **Voorstel:** Persone oor 50 aanvaar veranderinge moeiliker as jonger kollegas. Meeste van die tyd is dit maar 'n verborge vrees dat hulle nie die mas sal opkom nie. Die scorecard is maar net nog 'n verandering, maar sodra die idée bemeester is, is dit tog nie so erg nie.

- o Nie 'n 100% refleksie van wat jy doen nie. (1 persoon, 5)
- o Is ons net proefkonyne vir Martie se studie of gaan iets positiefs hieruit kom? (4 persone, 6)
- o I take it seriously, but also with a little bit of a pinch of salt. I am not against it. I feel we can learn something from it. What it is that we will learn, it will be interesting to see. Time will tell. (A type of personal benchmarking) (1 persoon, 6)
- Teekamer:
  - o Teekamer en binnehof lyk mooi. (Groep, 5)
  - o Daar duik hiccups op wanneer teekamer gebruik word vir aanbiedinge en personeel kan nie by ketel/tee & koffie uitkom nie en Minah word ook nie daarvan gesê nie. Stuur asb. 'n email vooraf uit. (Groep, 5)
  - o Sit nie in teekamer en tee drink nie, want het nie tyd nie. Maak tee & drink dit voor rekenaar terwyl werk. (1 persoon, 5)
  - o I don't like the fact that so many meetings are held in the tearoom at 10 o'clock. After all, it is our recreational space! (1 persoon, 6)
  - o Sit nie in teekamer nie omdat dit oorheers word deur swart personeel. (1 persoon, 6)
- Verandering in IMPS oor die afgelope jaar: Baie groot verbetering. (Groep, 8)

2. <u>Perceived value placed on the employee:</u>

- Kan IMPS sonder jou klaarkom?
  - o Niemand is onmisbaar nie – WNNR het jou dit geleer. (1 persoon, 7)
  - o Hulle gaan sukkel sonder ons, ons voeg baie waarde by. (3 persone, 8)
  - o IMPS gaan sukkel om personeel wat aftree te vervang want "al kan enige iemand katalogiseer kan nie almal dieselfde waarde toevoeg as bv. Fia nie" (Groep, 7)
  - o Ontvangs is nou puik – komplimente van kollegas
  - o Groot verbetering noudat net Lana en Annette by ontvangs is. (5 persone, 7) Wat van Kgaugello? Hy doen alternatiewe weke diens. Lana is konstant Dinsdae en Donderdae
  - o I feel that I have a niche to fill for IMPS, which at the present nobody else (other than Fia) can fill because they are not trained to do so. Fia can do my work, at a push, but it would be a strain. (1 persoon, 7)
- Are you being milked?
  - o Nee, maar verskille in salarisse a.g.v. die divisie-geskiedenis veroorsaak probleme. (3 persone, 6)

- o "Absenteeism" veroorsaak dat jy dikwels meer as jou deel moet doen. (3 persone, 6)
- o Ja, soms. Dit het al gebeur dat my direkte bestuurders my vra om insette te lewer en dat hulle dan glad nie my naam noem in die verslag nie! (1 persoon, 6)

3. **Job security:**
- If you were an IMPS manager, would you appoint yourself?
  - o Ja, maar sal ek weer die werk wil hê? "You might have job security but not job satisfaction". (2 mense, 6)
  - o 2 people would be needed for my job, because I know all the shortcuts & I work fast. (4 persone, 7)
  - o Yes. It has been said that if I were replaced it would have to be with a full-day person! (1 persoon, 7)
- How much is IMPS worth to you?
  - o Feeling of "Back Office" is the less intelligent lot and Front Line are the clever lot. We never get recognition. (Groep, 7)
  - o There is a certain "status" in working for the CSIR Information Services. We want to work here. (Groep, 6)
  - o It is my comfort zone. (1 persoon, 6)
  - o Neutral & frustrated – entire working life spend at CSIR & don't know what it feels like to work anywhere else. (1 persoon, 6) Dit is die persoon se eie skuld! Mens kan tog self veranderinge aan jou situasie doen!
  - o **If management stays the same**, will not want to work anywhere else. (Groep, 6)
- Onsekerheid oor "retrenchments" het afgeneem. (Groep, 7)
- Onsekerheid rondom Roy se aftrede en hoe die bestuursspan gaan lyk veroorsaak spanning (Groep, 6)
- Dit sal vir my 'n groot probleem wees indien ek my werk sal verloor aangesien ek, op hierdie stadium, werklik die geld nodig het. (1 persoon, 7)

4. **General:**
- Voorstel vir flexi tyd. Reëling moet met bestuur getref word. Mense wat vroeg begin kan dan vroeër loop sonder om skeef aangekyk te word. Dalk kan personeel dan 'n middag af neem in 'n maand om persoonlike dinge te doen. *It will be difficult to implement because of the lack of integrity that some of our colleagues have! If some people always start at 7.00 and leave at 3.30, that is O.K. because people get to know that. The trouble starts when people chop and change.*

Dankie vir die geleentheid wat ons gegun is om ons menings te lug.

<u>Report on the focus group on job satisfaction</u>

[Original format - document not edited]

Present: 10 Members of staff
Facilitator: Busi Mahlangu
Date: 30 August 2002

<u>GENERAL ISSUES INDICATING JOB SATISFACTION</u>

1. *Are you having fun at work?*

Six employees are having fun, three are not and one was neutral**.**

2. *How does it feel to come to work in the morning?*

Again six feels good, three feel very bad and one was neutral

3. *How are your skills, capabilities and talents utilized while you are working?*

Most feel that they are not given a chance to prove their capabilities and skills. They are being shift around, from one job to another without prior notice. They attend courses but they are not given a chance to utilise what they have acquired from the course. One agreed that her skills are utilized.

4. *Are you learning?*

All of them are learning except three who feel there's nothing to learn because the job they are doing is not what they want.

5. *How do you feel about the personal monitor?*

According to them, the personal monitor does not accommodate them. People who do not get a chance to attend conferences do not get points. Most of them get points in the first section only. The personal monitor should be restructured according to their job description or CANCELLED.

6. *What do you think about the way the tearoom is utilised?*

Most feel that booking the tearoom during teatime without notifying staff could be because the black employees are the one's using the tearoom and this is done intentionally to deprive them of the place to sit and socialise. They feel that the people who sit in their offices during tea breaks actually do that intentionally to check what time other staff return from the break.

7. Do you agree with the changes that have taken place over the past year within IMPS?

They are not satisfied. They said they are being "moved around like furnishers" without being notified in advance. However, there is an individual who feels that the changes within IMPS have opened doors of success. That person feels that it's a great blessing to have a boss like you.

VALUE PLACED ON THE EMPLOYEE

1. What are you worth to IMPS?

They feel they are worthless because of what they get (salary). Most people complain about the workload but still get the same salary. They feel that when they do something, it is wrong and when their other colleagues do the same thing, nothing is said e.g like when they speak to one another, someone will say they are making noise but when that person is talking to his/her friend, it's a job related-discussion.

2. Can IMPS go on without you?

Their answer was YES, some feel they are not of value because the management could just grab anyone within IMPS to do their job should they decide to go.

3. Are you being milked?

The salary they get, to some of them doesn't compare at all to what they do. They work more than they are paid.

4. Are managers and colleagues taking advantage of you?

Yes, their managers are taking advantage of them; some feel they do not get the respect they deserve as adults. Some appreciates being here.

JOB SECURITY

1. If you were an IMPS manager and had to fill your current job on Monday, would you appoint someone like you?

Their answer was YES and NO. YES - because they feel they have skills that they are not given a chance to utilise. NO - because having someone always watching over what they are doing makes them feel they cannot be trusted and this makes them not to have confidence on themselves.

2. *How much is IMPS worth to you?*

To some of them IMPS is worthless. (Some are busy applying for better jobs). Some appreciates working here and feel IMPS is very important to them.

3. *What would you do if your job disappeared tomorrow?*

There will be nothing to do because the decision will already been taken. Although most of them will be miserable, some will be happy that they are finally out of this place.

4. *Are you worried about your job?*

What worries some of them about their jobs is that they do not have a stable job. They are being moved around without prior notice. Some do not worry about their job and enjoy it.

OTHER BURNING ISSUES

1.They are working under a lot of pressure because should they come late because they had to see a doctor in the morning or because of transport problems, hours are taken from them.

2. They feel that when someone approach a manager because that person have a problem with them, the manager should please call a meeting between the complainant and the "guilty party" and hear both sides of the story before taking a decision.

3. When evaluations are done, managers should consult with the people working close to the person being evaluated because in most cases, managers are not aware of the extra jobs the people are doing and their willingness to go that extra mile.

4. The employees request that these issues be taken seriously because otherwise there will be no need for them to attend the staff meetings anymore since it will mean a waste of their time.

Attachment 4
Delphi survey: instructions and results

> The customer today can call the tune because he knows the score. In a knowledge economy, information is more valuable than ever, and generally speaking customers have more than they ever did (Stewart, 1997, p 151).

Delphi Exercise
Round One

Customer Satisfaction Survey: IMPS services to internal clients

We need your assistance so that we can improve our services. For the purpose of the survey we'll be making use of the Delphi technique. The Delphi technique is an approach used to gain consensus amongst a panel of experts. This is normally achieved through a series of rounds where information is fed back to panel members using questionnaires. It has been used extensively within social science research. If you need to know more about the technique, an article available from http://cru.cahe.wsu.edu/CEPublications/wrep0131/wrep0131.html is quite useful.

The idea here is for you to answer five questions as individuals (to be completed by **26 August**). The answer sets will then be consolidated and a single document will be created on the DMS. At that stage you will be asked to vote for the items in order of priority. The process will continue until you all feel comfortable that your satisfaction with our service is conveyed accurately.

If you prefer that we, during the consolidation phase, reflect your name next to a suggestion, it will be done. Please provide us with an indication that it needs to be done.

A reminder: the things that IMPS staff members do:

Complete List of Tasks		
Information Management	**Information Procurement**	**M&BD**
System maintenance •technical and content Stock maintenance •weeding and 'shelving' •issue desk •maintaining the reference collection *Cataloguing and indexing* •purchased and CSIR reports •journals •paper and electronic Intellectual property •database •collection	ILLs •national and international •internal and external Buying Stock •books •CD-Roms •journals - all formats •document delivery •databases	Marketing Communication, the creation of leaflets/newsletters for: •staff •clients Negotiation of supplier contracts •service level agreements •electronic journals Innovative web-based products General Procurement •IT equipment •L&IS equipment

Delphi Questionnaire Round[3] 1

What are the **three** things that you **like** most about having the IMPS service available?	
What are the **three** things that you **dislike** most about having the IMPS service available?	
What do you see as the most important **issues that need to be resolved** in terms of the IMPS services?	
What do you see as the **strengths** that IMPS need to build on?	
What **should have been asked** to test your satisfaction with the IMPS services, but was not?	

Would you like your name reflected against suggestions in the consolidated document? _____

Your Name (Optional) _____

Your assistance and collaboration is much appreciated!

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[3] The intention, in the first round, was to focus attention on the issues that were the most important in the minds of the participants and not to just gather as much information as was possible.

Results Delphi 1: Customer satisfaction – IMPS Services

[**No editing has been done to this list. These are the actual statements cut and pasted from the respondents' feedback documents.**]

What are the three things that you like most about having the IMPS service available?
Hasslefree document procurement
Journal orders
Journal circulation
Cataloguing service
Negotiations with suppliers from one central point
Web-based products (journals and databases) now more readily available
Time consuming "admin" work done from one point
Someone else is doing ILLs, Cataloguing, Buying Stock
Efficient and cost-effective sourcing of articles, conference proceedings, books, etc.
Availability of "journal platforms" such as ScienceDirect, Ebsco and SwetsNet Navigator, which are end-user friendly.
Creating vortals (I think this is what is meant by "innovative web-based products")
Reduces workload of frontline staff.
Faster service to line staff envisaged – direct contact
Negotiation with suppliers
Getting requested articles easily
Getting articles via email
Friendly service
Document procurement handled by DocDel
Renewal of annual journal subs and ordering of new books
IMPS managers have closer contact with SU managers
Ordering Expertise
Online access to products, i.e. Science Dir
Collaboration-gives us as the whole CSIR more power to negotiate deals, like Science Direct
Docdel-an excellent service that supplies information in a sufficient way.
Keeping stock updated.
It saves us time
They could locate items that I could have problems to locate
Experienced staff taking responsibility of time-consuming work involving orders.
Taking responsibility for the maintenance of the systems.
Their willingness to help whenever asked and doing a good job of it
Intellectual Property
Negotiation of supplier contracts
Innovative web-based products
Marketing Communication
ILL
Buying stock
Negotiation of supplier contracts
Cataloguing & Indexing
ILLL: National & International
ILLL: Internal & External
Document delivery
I am not a specialist in everything!! and this way, someone well qualified for the task does the job – eg. Cataloguing.
Tasks that I am not familiar with take longer to complete, so this saves time.
There is always a specialist to consult when you need advice
Book & journal orders
Document procurement via Docdel
Science Direct, Ebsco

What are the three things that you dislike most about having the IMPS service available?
No automatic control over follow-up (journal claims, book orders, etc)
Too much weeding done in the last year
Ref. Collection not maintained (hardly exists)
Too many meetings
Frontline management should be actively involved with the selection, purchase and negotiation of supplier contracts, I.T. equipment, library and journal stocks (ES).
I honestly can't think of any!!
Staff that need more training to satisfy line staff needs.
Inability to find requested documents at the correct source.
Missing documents
It's geographically too far away
ToC article requests by clients. Pls send directly to clients – do not put all the articles in one envelope for SU librarian to sort and send to clients
Slow speed and user unfriendliness of Millennium
Requests for issued books – DocDel to pls contact person directly to whom the book is issued – do not refer request to SU librarian
Not knowing how my order is proceeding
Being a remote SU it means that some of the things they are suppose to do, I still have to do anyway.-Not their problem of course.
Information doesn't get supplied fast enough.
Can't always keep the user up to date, because you don't know what is going on.
There is still a perception of "us and them" often resulting in a breakdown in communication - everybody is protecting their jobs and are afraid of perceived competition.
There is an aura that you are trespassing on their "turf" and you are not welcome, shouldn't interfere and must keep your distance as a client.
Existing systems, although functional, are cumbersome nor user friendly and must be improved as soon as possible.
Under "Buying Stock":-Databases
Millenium is very slow to work with and still deliver good service to clients.
perhaps the weeding of stock without consulting the clients
Following up is more time consuming because more people are involved.
There is less opportunity to develop your own skills!
No control over journal claims
No reference collection to speak of
Journals take too long to reach SU
Weeding

What do you see as the most important issues that need to be resolved in terms of the IMPS services?
There should be no backlog anywhere
Regular follow-up of outstanding orders
Journal claims
IT equipment - esp. computer at issue desk
Slow "millennium"
As journal circ. etc. does not concern me, I have no problems (other people have!)
The work-flow and tracking system of orders
The tracking of the status of Docdel orders.
The problem of IS acting as middlemen with doc orders.
Competence to find required documents faster
Courteous interaction with clients (I do not mean the reception desk)
Why the envisaged close co-operation between UP and CSIRIS did not work out
Turn-around time
Diminishing journal collections
Turnover time- when an item is ordered vs when it is supplied (this applies esp to ILL's and requests from stacks)
Giving feedback to the client of the progress of the process- eg. Where did they request a specific reference so that the client have an idea of how long it is going to take
Open and honest communication between IMPS and Frontline to discuss problems and find solutions, without

aggressive or defensive behaviour on either side. There remains a tension between frontline and IMPS and this needs to be addressed as a matter of urgency. It is essential that the two groups understand one another, existing problems, frustrations and stumbling blocks.

Some of the personnel need to urgently attend a telephone manners course.

Tea & lunchtime are there for all but staff must realize that it is the length of it is the same for all of us.

There must be back-up people in the office to answer telephones during tea & lunch times.

Millennium! - extremely unsatisfactory

Telephone enquiries from Docdel - e-mail or fax please

Missing books deleted from catalogue

Maintaining a Reference Collection

Being remote I am not aware of anything that affects me particularly, except that communication can sometimes be a problem and at times I am left out of the loop – I perform some of the IMPS functions here.

Slow Millenium

Turnover time – stack requests

Update cataloque

No back-up system in place

Communication to discuss clients needs

Feedback on ILL requests

Telephone etiquette

Better understanding between groups – IS staff often left in the dark

What do you see as the strengths that IMPS need to build on?

DocDel & ILL– esp. International requests

Contacts will other library consortia

Efficient and friendly service.

Experienced staff whom are dedicated to good service

A good collection of documents – even if the greater part is old

Ownership ; partnership

More searchable desktop databases available to all (eg ScienceDirect)

Electronic full text access to all journals the CSIR subscribes to

Docdel, although it is already a good service!

Their ability to satisfy their customers

The existing expertise, infrastructure in handing routine work and obtaining information often within difficult situations, mostly totally undervalued and unappreciated for its worth

Marketing of "Buying Stock" for external & internal clients. But: Have dedicated personnel that market & serve only internal clients – CSIR Personnel - and personnel that work only with external clients

Service Level Agreements with SUs- do not overload Information Centre Staff with other issues/responsibilities

Marketing

ILLs

Intellectual property

Innovative web-based products

Customer relationships

Perhaps to keep up with developments in specialist areas and to communicate this to those who need to know about these developments.

Fast service

CSIRIS web-page

What should have been asked to test your satisfaction with the IMPS services, but was not?

Friendliness of staff. (Client contact)

To test a work-flow/ process study using business analysis methodology. I think that this should not only be conducted for IMPS

Can't think of anything!

Pls also test satisfaction of IMPS services with SU clients (eg article requests, ILLs, self help databases, etc)

These books/journals/materials are in the process of being discarded, what are your inputs?

Nothing

How can communication and understanding between IMPS and Frontline be improved?

Client care

Number of participants: 15

Delphi - Round Two	Please indicate your reaction to the statement listed on the left			
	Agree	Disagree	Important	Not Important
What are the things that you like most about having the IMPS service available?				
Experienced staff taking responsibility of time-consuming work involving orders, cataloguing, ILLs, etc				
It saves us time				
Efficient and cost-effective sourcing of articles, conference proceedings, books, etc.				
Ordering Expertise				
They could locate items that I could have problems to locate (sourcing expertise)				
Getting requested articles easily				
Getting articles via email				
Renewal of annual journal subscriptions done centrally				
Negotiations with suppliers from one central point				
Collaboration-gives us as the whole CSIR more power to negotiate deals, like Science Direct				
Access to web-based products (journals and databases) now more readily available				
Keeping stock updated.				
Innovative web based products - (eg vortals)				
Faster service to research staff – direct contact				
IMPS managers have close contact with SU managers				
The willingness of staff members to help whenever asked and their doing a good job of it				
The responsibility for the safekeeping of intellectual property is managed centrally				
The responsibility for the maintenance of the systems is managed centrally				
Marketing and communication is done centrally				
Friendly service				
What are the things that you dislike most about having the IMPS service available?				
Too much weeding done in the last year				
The weeding of stock without consulting our clients				
The Refernce Collection which is not being maintained (hardly exists)				
Too many meetings				
Frontline management are not actively involved with the selection, purchase and negotiation of supplier contracts, I.T. equipment, library and journal stocks				

A1.68

	Agree	Disagree	Important	Not Important
(ES).				
Staff do not have sufficient training in satisfying line staff needs.				
Inability to find requested documents at the correct source				
Missing documents				
It's geographically too far away				
ToC article requests from clients are not dealt with properly				
The slow speed and user unfriendliness of Millennium				
Requests for issued books from researchers are not routed to the researcher directly				
Not being able to monitor the progress with my orders				
Being a remote SU it means that some of the things they are suppose to do, I still have to do anyway.-Not their fault of course.				
Information doesn't get supplied fast enough.				
I can't always keep the user up to date, because I don't know what is going on.				
There is still a perception of "us and them" often resulting in a breakdown in communication				
There is an aura that you are trespassing on their "turf" and you are not welcome, shouldn't interfere and must keep your distance as a client.				
Existing systems, although functional, are cumbersome nor user friendly and must be improved as soon as possible				
Databases should not be bought centrally				

What do you see as the most important issues that need to be resolved in terms of the IMPS services?

IT equipment - especially the computer at issue desk				
Slow "Millennium" - extremely unsatisfactory				
The work-flow and tracking system of orders (progress and status of requests)				
The problem of Information Specialists acting as middlemen with document orders				
Competence to find required documents faster				
Courteous interaction with clients				
Why the envisaged close co-operation between UP and CSIRIS did not work out				
Diminishing journal collections				
Turnover time- when an item is ordered vs when it is supplied (this applies esp to ILL's and requests from stacks)				
Open and honest communication between IMPS and				

A1.69

	Agree	Disagree	Important	Not Important
Frontline to discuss problems and find solutions, without aggressive or defensive behaviour on either side. There remains a tension between frontline and IMPS and this needs to be addressed as a matter of urgency. It is essential that the two groups understand one another, existing problems, frustrations and stumbling blocks.				
Some of the personnel need to urgently attend a telephone manners course				
Tea & lunchtimes are there for all but IMPS staff must realize that the duration of these is the same for all of us as well				
There must be back-up people in the office to answer telephones during tea & lunch times				
Telephone enquiries from Docdel should not be done (e-mail or fax requests please)				
Missing books to be deleted from the catalogue				
Maintaining a Reference Collection				

What do you see as the strengths that IMPS need to build on?

	Agree	Disagree	Important	Not Important
DocDel & ILL– especially the international requests (it is already a good service!)				
Contacts will library consortia				
Efficient and friendly service				
Experienced staff whom are dedicated to good service				
A good collection of documents – even if the greater part is old				
Ownership of their processes				
Partnership with their clients				
Ability to provide us with more searchable desktop databases (eg ScienceDirect)				
Electronic full text access to all the journals that the CSIR subscribes to				
Their ability to satisfy the needs of their customers				
The existing expertise, infrastructure in handing routine work and obtaining information often within difficult situations, mostly totally undervalued and unappreciated for its worth				
Ability to market to the external & internal clients .				
Have dedicated personnel that market & serve only internal clients				
Personnel that work only with external clients				
Service Level Agreements with SUs - do not overload Information Centre Staff with other issues/responsibilities				
Marketing expertise				
ILLs expertise				
Maintenance of intellectual property				

A1.70

	Agree	Disagree	Important	Not Important
Innovative web-based products				
Customer relationships				

New issues

The staff members are friendly				
It is **not necessary** to do a similar survey for the frontline				
A client satisfaction survey, relating to IMPS services, should be done amongst the researchers				
The books/journals/material that is being discarded is of **no concern** to me				
There are **no** communication issues between IMPS and the Frontline				

A1.71

Delphi Round 2 – Results

The output of round two – where participants were asked to indicate whether they agree/disagree with a statement and whether the issue was important/not important - allowed for the calculation of a 'score' for each of the statements. The statements were then ranked according to that score. The higher the score the more important is the issue. There were two exceptions. Both aspects were mentioned within the *additional issues* section. Here the statements were negative and as a result, the low score needed to be converted to indicate the importance of these issues.

Delphi - Round Two					
	Agree	Disagree	Important	Not Important	Score[4]
What are the things that you **like** most about having the IMPS service available?					
Collaboration-gives us as the whole CSIR more power to negotiate deals, like Science Direct	12	0	13	0	25
Renewal of annual journal subscriptions done centrally	11	0	12	0	23
Experienced staff taking responsibility of time-consuming work involving orders, cataloguing, ILLs, etc	11	0	12	0	23
Access to web-based products (journals and databases) now more readily available	11	0	12	0	23
Negotiations with suppliers from one central point	11	0	11	0	22
Efficient and cost-effective sourcing of articles, conference proceedings, books, etc.	12	1	11	0	22
It saves us time	12	0	9	0	21
They could locate items that I could have problems to locate (sourcing expertise)	11	1	10	1	19
The willingness of staff members to help whenever asked and their doing a good job of it	10	2	11	0	19
The responsibility for the maintenance of the systems is managed centrally	10	0	9	0	19
Ordering Expertise	9	0	10	2	17
Marketing and communication is done centrally	10	1	10	2	17
Getting requested articles easily	10	2	9	0	17
Friendly service	11	0	7	2	16
Getting articles via email	10	1	8	2	15
Keeping stock updated.	6	2	9	0	13
Innovative web based products - (eg vortals)	8	0	7	3	12
IMPS managers have close contact with SU managers	7	2	6	2	9
Faster service to research staff – direct contact	5	3	8	1	9
The responsibility for the safekeeping of intellectual property is managed centrally	4	5	6	2	3

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[4] The score was calculated as follows: positive indication = 1 point and negative = 0. Each item was scored. The negative score was subtracted from the positive to arrive at the total score. For example, 12 of the respondents indicated that the first statement was true and none indicated that it was not true. Thirteen indicated that the issue was important and none indicated that it was not. Therefore (12+13)-(0+0)=25.

What are the things that you dislike most about having the IMPS service available?					
The slow speed and user unfriendliness of Millennium	8	2	10	0	16
The Reference Collection which is not being maintained (hardly exists)	9	2	8	0	15
Not being able to monitor the progress with my orders	9	1	8	1	15
I can't always keep the user up to date, because I don't know what is going on.	9	1	8	1	15
Existing systems, although functional, are cumbersome nor user friendly and must be improved as soon as possible	8	1	8	0	15
Missing documents	9	1	7	1	14
Too much weeding done in the last year	7	2	7	0	12
The weeding of stock without consulting our clients	8	2	7	1	12
Information doesn't get supplied fast enough.	7	2	8	1	12
Staff do not have sufficient training in satisfying line staff needs.	5	4	7	0	8
Too many meetings	4	4	8	1	7
There is an aura that you are trespassing on their "turf" and you are not welcome, shouldn't interfere and must keep your distance as a client.	5	2	4	0	7
Requests for issued books from researchers are not routed to the researcher directly	6	4	5	2	5
Being a remote SU it means that some of the things they are suppose to do, I still have to do anyway.-Not their fault of course.	7	3	2	2	4
There is still a perception of "us and them" often resulting in a breakdown in communication	3	4	4	0	3
ToC article requests from clients are not dealt with properly	4	4	3	1	2
Inability to find requested documents at the correct source	3	6	4	0	1
Frontline management are not actively involved with the selection, purchase and negotiation of supplier contracts, I.T. equipment, library and journal stocks (ES).	5	4	2	3	0
Databases should not be bought centrally	2	8	6	1	-1
It's geographically too far away	4	6	2	4	-4
What do you see as the most important issues that need to be resolved in terms of the IMPS services?					
Missing books to be deleted from the catalogue	11	0	10	0	21
Slow "Millennium" - extremely unsatisfactory	11	1	9	0	19
Courteous interaction with clients	10	1	9	1	17
Maintaining a Reference Collection	9	2	9	0	16
Open and honest communication between IMPS and Frontline to discuss problems and find solutions, without aggressive or defensive behaviour on either side. There remains a tension between frontline and IMPS and this needs to be addressed as a matter of urgency. It is essential that the two groups understand one another, existing problems, frustrations and stumbling blocks	8	1	9	1	15
Diminishing journal collections	9	2	7	0	14
The work-flow and tracking system of orders (progress and status of requests)	8	2	8	1	13
Turnover time- when an item is ordered vs when it is supplied (this applies esp to ILL's and requests from stacks)	7	2	8	1	12
IT equipment - especially the computer at issue desk	6	3	7	0	10
There must be back-up people in the office to answer telephones during tea & lunch times	8	2	6	2	10
Tea & lunchtimes are there for all but IMPS staff must realize	6	1	4	0	9

A1.73

that the duration of these is the same for all of us as well					
Telephone enquiries from Docdel should not be done (e-mail or fax requests please)	7	4	6	1	8
Competence to find required documents faster	6	4	7	2	7
Some of the personnel need to urgently attend a telephone manners course	6	3	6	2	7
Why the envisaged close co-operation between UP and CSIRIS did not work out	4	3	4	0	5
The problem of Information Specialists acting as middlemen with document orders	3	7	3	2	-3
What do you see as the **strengths** that IMPS need to build on?					
Customer relationships	12	0	11	0	23
DocDel & ILL– especially the international requests (it is already a good service!)	11	0	11	0	22
Efficient and friendly service	11	0	10	0	21
Ability to market to the external & internal clients .	11	0	10	0	21
Experienced staff whom are dedicated to good service	10	0	10	0	20
Ability to provide us with more searchable desktop databases (eg ScienceDirect)	10	0	10	0	20
Innovative web-based products	11	0	9	0	20
A good collection of documents – even if the greater part is old	11	0	8	0	19
Ownership of their processes	10	0	9	0	19
Their ability to satisfy the needs of their customers	11	0	8	0	19
The existing expertise, infrastructure in handing routine work and obtaining information often within difficult situations, mostly totally undervalued and unappreciated for its worth	11	0	8	0	19
ILLs expertise	10	0	9	0	19
Contacts will library consortia	11	0	7	0	18
Partnership with their clients	10	0	7	0	17
Maintenance of intellectual property	10	0	8	1	17
Electronic full text access to all the journals that the CSIR subscribes to	8	1	8	0	15
Marketing expertise	9	2	8	1	14
Have dedicated personnel that market & serve only internal clients	7	2	7	0	12
Service Level Agreements with SUs - do not overload Information Centre Staff with other issues/responsibilities	8	2	6	1	11
Personnel that work only with external clients	6	3	7	0	10
New issues					
A client satisfaction survey, relating to IMPS services, should be done amongst the researchers	7	2	6	0	11
The staff members are friendly	7	3	6	0	10
There are **no** communication issues between IMPS and the Frontline	5	5	6	1	5
It is **not necessary** to do a similar survey for the frontline	5	4	5	2	4
The books/journals/material that is being discarded is of **no concern** to me	2	9	8	0	1

Participants: 14

A1.74

Delphi questionnaire - Round Three

Please indicate your reaction to the statement listed on the left. In the first instance – is the statement true? In the second instance provide the priority level – where 1 indicates low priority and 5 a very high priority.

	True/False	Priority: 1-5
The tasks that IMPS should definitely continue to do are the following:		
Negotiate contracts on behalf of CSIRIS - especially for electronic products		
Efficient and effective sourcing and delivery of documents		
Renewal of journals and other subscriptions		
Maintenance of the library system		
Marketing and communication		
Weaknesses that need to be addressed / Issues to be resolved		
Millennium - slow speed and the interfaces		
The reference collection		
The lack of a progress monitoring system - especially for document orders		
Weeding of stock without consultation with clients		
Turn-around time		
Catalogue maintenance - delete missing books		
Journal subscriptions - more journals are necessary		
Back-up in the offices - especially during lunch and tea times		
Communication between the front and back line		
Services/Products that need to be expanded		
DocDel		
Innovative web-based products		
The expertise in handling routine library work		
Contacts with library consortia		
Efficient service levels		
If you have any additional comments – add them here:		

A1.75

Delphi Round 3: Results

Note: Only the 'True' statements were recorded. That is for example 13 out of 14 respondents indicated that the statement that IMPS should negotiate contracts on their behalf, is true. On average these respondents gave that same statement a very high (5) priority.

	True/False	Priority: 1-5 (Where 5 = high priority)
The tasks that IMPS should definitely continue to do are the following:		
Negotiate contracts on behalf of CSIRIS - especially for electronic products	13	5
Maintenance of the library system	13	5
Efficient and effective sourcing and delivery of documents	12	5
Marketing and communication	13	4
Renewal of journals and other subscriptions	11	4
Weaknesses that need to be addressed/Issues to be resolved		
Millennium - slow speed and the interfaces	13	4
The lack of a progress monitoring system - especially for document orders	11	4
Turn-around time	11	4
Weeding of stock without consultation with clients	13	4
Catalogue maintenance - delete missing books	12	4
Communication between the front and back line	12	4
The reference collection	12	4
Journal subscriptions - more journals are necessary	9	3
Back-up in the offices - especially during lunch and tea times	11	3
Services/Products that need to be expanded		
Efficient service levels	13	5
The expertise in handling routine library work	13	4
Innovative web-based products	11	4
DocDel	11	4
Contacts with library consortia	12	4
Additional comments:		

A1.76

I remember only now that I originally mentioned the fast service as something that should be built on. I actually meant the 'sneldiens' and this was misinterpreted as meaning fast turnaround time. BOTH are important. (ER) Efficient & speedy handling of electronic payments to CSIRIS/SUs (SR)

Participants: 14