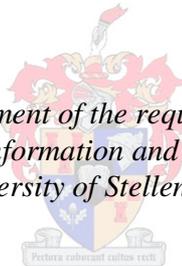


Leveraging enterprise portals for business performance – the implications for the management of knowledge assets

by
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Declaration

By submitting this thesis/dissertation electronically, I declare that the entirety of the work contained therein is my own, original work, and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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Abstract

Knowledge is increasingly being recognised as the key element to an organisation's sustainability and competitiveness. Knowledge assets refer to organisational resources made of or incorporating knowledge. These assets ultimately create the ability for an organisation to carry out a process or an activity aimed to create and/or deliver value. Knowledge assets are identified as firstly, *Human Capital Assets*, which are embodied in the employees of an organisation whose talent and experience create the products and services that can be sold. Secondly, *Structural Capital Assets* refers to knowledge that is captured or institutionalised within the structure, processes and culture of the organisation. Finally, *Customer Capital Assets* which refers to the combined value of the relationships with customers, suppliers, industry associations and markets and their customers perception of value of an organisation.

Information technology is also recognised as an enabling tool to facilitate knowledge transfer and sharing as it enables knowledge and information flows. In particular, the use of enterprise portals as an information technology enabling platform can provide secure, customised, personalised and integrated access for employees, customers and business partners to dynamic knowledge assets from a variety of sources in a variety of formats, with an increasing focus on business performance.

The research focuses on how organisations can effectively manage their knowledge assets using enterprise portals and how managing these assets can complement organisational core capabilities and competences. Theoretical insights from Boisot's I-Space framework are used as the foundation for analysis of the behaviour of information flows and the creation and diffusion of knowledge within organisations. The role of technologies as enabling partners in this process are examined and management of knowledge assets through the processes of codification, abstraction and diffusion is investigated.

Competitive advantage does not flow automatically from the possession of knowledge assets. An organisation has to know how to extract value from them and extracting value from knowledge assets requires an ability to manage them. The Boisot I-Space framework provides constructive and dynamic processes, namely codification, abstraction and diffusion that significantly improve the ability to manage knowledge assets. When these processes are integrated into the way an Enterprise Portal is designed and used by an organisation, the ability to manage human, structural and customer capital assets is improved. Furthermore, the opportunity for enhanced support of an organisation's capabilities and core competences can be achieved and hence the prospect for improved business performance can be realised.

Opsomming

Kennis word toenemend herken as die sleutelement in 'n onderneming se volhoubaarheid en mededingendheid. Kennisbates verwys na organisatoriese bates wat bestaan uit kennis of wat kennis bevat. Hierdie bates verleen uiteindelik aan 'n onderneming die vermoëns om 'n proses of handeling uit te voer wat daarop gerig is om waarde te skep en/of te lewer. Kennisbates word eerstens uitgeken as *Menslike Kapitaalbates*, wat gesetel is in die werknemers van 'n organisasie, wie se talente en ervaring die produkte en dienste skep wat verkoop kan word. Tweedens verwys *Strukturele Kapitaalbates* na die kennis wat in die strukture, prosesse en kultuur van die onderneming vasgevang of geïnstusionaliseer is. Ten slotte verwys *Kliëntekapitaalbates* na die saamgestelde waarde van 'n onderneming se verhoudings met kliënte, leweransiers, bedryfsverenigings en markte, tesame met kliënte se persepsie van die waarde van daardie onderneming.

Inligtingstechnologie word ook beskou as 'n hulpmiddel vir die fasilitering van die oordrag en deling van kennis deurdat dit die vloei van kennis en inligting aanhelp. In die besonder kan die gebruik van ondernemingsportale, as 'n platform vir die bevordering van inligtingstechnologie, aan werknemers, kliënte en sakevennote veilige, persoonlike en integrale toegang bied tot dinamiese kennisbates uit 'n reeks bronne en in 'n verskeidenheid formate, met toenemende ingesteldheid op 'n onderneming se prestasies.

Die navorsing hieronder ondersoek in besonder die manier waarop ondernemings hulle kennisbates doeltreffend kan bestuur deur ondernemingsportale te gebruik en hoe die bestuur van hierdie bates organisatoriese kernvaardighede en vermoëns kan aanvul. Teoretiese insigte uit Boisot se "I-Space"-raamwerk word gebruik as basis vir die ontleding van inligtingvloei en van die skepping en verspreiding van kennis in organisasies. Die rol van tegnologieë as hulpmiddel in hierdie proses en die bestuur van kennisbates deur middel van kodifisering, abstraksie en diffusie word ondersoek en ontleed.

Mededingende voorsprong vloei nie vanself uit die besit van kennisbates nie - 'n onderneming moet leer hoe om waarde daaruit te put en dié proses vereis die vermoë om kennisbates te bestuur. Die Boisot "I-Space"-raamwerk verskaf konstruktiewe en dinamiese prosesse, naamlik kodifisering, abstraksie en diffusie, wat die vermoë om kennisbates te bestuur aansienlik verbeter. Wanneer dié prosesse geïntegreer word in die wyse waarop 'n Ondernemingsportaal deur 'n onderneming ontwerp en aangewend word, word sy vermoë om menslike, strukturele en kliëntekapitaalbates te bestuur verbeter. Daarbenewens kan die moontlikheid van verbeterde steun vir 'n onderneming se

vermoëns en kernvaardighede op geïntegreerde wyse bewerkstellig word en die vooruitsigte op verhoogde besigheidsprestasie sodoende verwerklik word.

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Finally, this Thesis is dedicated with love to my beautiful sister, Louanne Dale King, in celebration of her courageous journey to find her words once again. I love you to the moon and back!

List of Abbreviations

KM	Knowledge Management
KMS	Knowledge Management Systems
EP	Enterprise Portal
IT	Information Technology

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Chapter 1

Introduction

1.1 Introduction

Organisations recognise that their knowledge can make an important contribution to their sustainability, competitiveness and bottom line. In order to boost their efficiency, increase their productivity and capitalise on their core competences, organisations are placing more emphasis on managing their knowledge. In order to encourage participation and increase the pace at which this happens, technology solutions are often implemented with the view that the implementation constitutes 'practising knowledge management'. The impact of the technology implementation fails to produce the intended results because the organisation has failed to firstly identify *what* their knowledge assets are that are trying to manage and secondly *how* they will manage these knowledge assets to support their core competence.

Enterprise portals are technologies that can provide access to and interaction with relevant knowledge assets comprising of structural, human and customer capital, by selecting targeted audiences and delivering information in a highly personalized manner. Organisations pursue portal initiatives to extend business applications and information to employees, to engage and support customers and employees, and to improve innovation and business agility with partners and ultimately improve their own business performance.

Although portal concepts and products are well-established in many organizations, dating back more than a decade in many cases, many organizations are revisiting and reinvigorating their portal strategies. This is due, in no small part, to the failure or stagnation of existing portal efforts. In addition, broader business demands, technology shifts and advancements, social trends, as well as budgetary and business model changes, are forcing companies to revisit and reinvigorate their portal strategies.

1.2 Background of the Study

Organisations seek to use technology to improve their agility and ability to respond to opportunities and to solve problems. Consulting firms are particularly knowledge intensive and consider knowledge management to be a core capability for achieving competitive advantage. The requirements for a knowledge strategy are very diverse in these types of organisations, particularly, because knowledge is the 'product' which they sell to their clients. Since the majority of their engagements are project related, they rely heavily on frameworks, methodologies and best practice that have either been purchased or developed within the organisation. Furthermore, harvesting knowledge from projects, conducting lessons learnt and then disseminating them within the organisation is ingrained in their processes. However, since consulting organisations are very people centric, often with highly experienced resources with scarce expertise, the need to tap into not only their explicit organisational knowledge but increasingly to the tacit knowledge of their people is fundamental. The ability to manage this type of organisation's knowledge is a demanding and tireless exercise.

The enterprise portal, with its multifaceted functionality including its ability to provide an integrated view of the organisation's knowledge twenty four hours a day, seven days a week, regardless of geographic location. The ability for an enterprise portal to manage an organisation such as a consulting firm's knowledge is not a question; the question is what the implications are for the management of knowledge assets, given the wide spectrum that constitutes their knowledge assets. However, competitive advantage does not flow automatically from the possession of knowledge assets. An organisation has to know how to extract value from them. Extracting value from knowledge assets requires an ability to manage them.¹

1.3 Research Problem

Technologies, competences and capabilities each in their own way are manifestations of a firm's knowledge assets operating at different levels in an organisation.² Whereas a technology depicts the socio-physical systems configured to produce certain types of physical effects³, competence depicts organisational and technical skills involved in achieving a

¹ Boisot M. 1998. p 66-71

² Boisot M. 1998. p4

³ Boisot M. 1998. p5

certain level of performance in the production of such effects.⁴ Capability in turn depicts a strategic skill in the application and integration of competences.⁵ An organisation's unique capabilities, can afford them a competitive advantage thus, enabling improved business performance.

Ultimately, the foundation for any business capability can be found within an organisation's knowledge assets, which comprise *structural assets* (processes and culture); *human capital assets* (people, skills and know-how) and *customer capital assets* (relationships with customers, vendors, industry experts).

Often, organisations invest in technologies such as enterprise portals for strategic reasons, believing that the technology will make it productive and competitive. The problem with this approach is that the organisation fails to recognise that it is their *own knowledge assets together with the enterprise portal* that make it a strategic investment.

Whereas we want to know whether leveraging an enterprise portal can indeed enhance an organisation's business performance, the real significance of this study lies in whether we can manage our knowledge assets using enterprise portals?

1.4 Theoretical Framework

Boisot's Information Space (I-Space) framework is the point of reference for this research, the lens through which the subject matter is viewed and interpreted. The I-Space is a conceptual framework within which the behaviour of information flows can be explored and through these, the creation and diffusion of knowledge within selected populations can be understood. The I-Space seeks to advance that the activities of codification and abstraction are mutually reinforcing and that both, acting together, greatly facilitate the diffusion of information.

It is possible to think of the relationship between codification, abstraction and diffusion as setting up a data field, a configuration of forces that conditions data flows over time through the I-Space and hence helps to shape the evolution of knowledge assets.⁶

⁴ Boisot M. 1998. p5

⁵ Boisot M. 1998. p5

⁶ Boisot M. 1998. p55-58

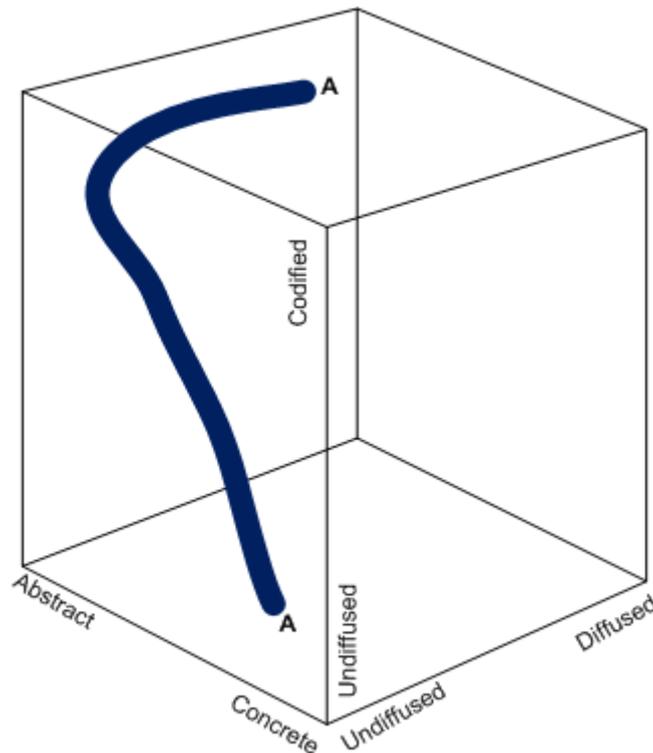


Figure: 1.1: The diffusion curve in the I-Space
(Source: Boisot 1998)

1.5 Research Objective

The purpose of the research is to discover what the implications are for managing knowledge assets in enterprise portals, specifically for knowledge intensive organisations such as consulting firms.

The approach is firstly to examine selected knowledge assets, including structural capital assets, human capital assets and customer capital assets as these not only reflect an organisation's capabilities, but most importantly, it is possible to identify tacit as well as explicit knowledge components within all three categories.

Secondly, to represent the ability of an enterprise portal to sufficiently manage knowledge assets using Boisot's I-Space framework, specifically the three core processes, namely codification, abstraction and diffusion.

The hypothesis put forward in this research is that if organisations use the Boisot I-Space framework, specifically the three core processes, namely codification, abstraction, and diffusion to manage their knowledge assets within enterprise portals, then, organisations will be able to effectively extract value from their knowledge assets, thus supporting their capabilities and core competences.

1.6 Research Methodology

A thorough and extensive theoretical literature study was conducted using relevant written and published literature from sources such as accredited journal articles, research reports, books and theses. The literature study formed the basis from which to firstly understand the conceptual research problem and secondly to use the findings of the research to posit a practical approach to the problem.

The research approach followed was based on a qualitative research method which involved the use of qualitative data such as interviews, documents and participant observation data to understand and study the research phenomena. This proved useful as there has been a general shift in information systems research away from technological to managerial and organisational issues, hence an increasing interest in the application of qualitative research methods. Qualitative research methods are designed to help researchers understand people and the social and cultural contexts in which they live. Often the goal of understanding a phenomenon from the point of view of the participants and its particular social and institutional context is largely lost when textual data is quantified.⁷

The qualitative research method enabled enquiry into processes associated with change or individual's meaning making, seeking knowledge in variation and diverse perspectives. It was useful to explore real organisational goals, processes, failures and links. Qualitative research is valuable in its depth and its ability to uncover and interpret meanings behind behaviours and sense making.⁸

In addition, a participant observation method was employed for an extensive period of time to study and observe the daily experiences of the users of enterprise portals. This included leading and participating in enterprise portal projects in several organisations that were in the process of implementing Microsoft SharePoint Enterprise Portal, as well as moderating an online community of practice for Microsoft SharePoint Super-Users.

The goal of participant observation is to assume a role within the group in order to personally experience what the group members experience, understand their life-world, see things from their perspective and unravel the meaning and significance that they attach to their life world including their behaviour. Although the participant observer must approach the research

⁷ Myers D. 1997. p241 - 242

⁸ Gerhardt. P.L. 2003. p5

situation with a minimum of preconceived ideas, the flexibility of the participant observation process allows room to follow up on a host of clues that the researcher notices.

Using the insight gathered from the initial literature study, the participant observer was able to study the research problem from a scientific frame of reference. This approach together with the participant observer's own experience, expertise and intuition during the process enabled inferences and/ or interpretation to take place revealing themes, repeated patterns of behaviour as well as deviations from these themes or patterns.⁹

The purpose of using multiple methods of gathering data assists in formulating well formed arguments that assist in drawing robust conclusions.

1.7 Research Outline

This sub-section outlines the layout of this research. Chapter 1 introduces the reader to the fundamental subject areas represented in this research as well as the significance of the conceptual research question, whether leveraging an enterprise portal can indeed enhance an organisation's business performance, by effectively managing its knowledge assets?

Chapter two introduces the role that knowledge and knowledge management play in business performance, specifically in the area of organisational capabilities and competence and highlights critical success factors for knowledge management to affect business performance.

Chapter three investigates the role of technology in knowledge management, particularly as an enabler and as a means to manage knowledge assets. A brief overview of archetypal knowledge management systems positions the future discussion, whereafter an in-depth narrative of enterprise portals including features, benefits and critical success factors ensues.

Chapter four investigates the concept of knowledge assets in terms of their ability to enhance the value of organisational competences and identifies the various elements comprising intellectual capital.

Chapter five examines how knowledge assets are managed in enterprise portals by elucidating the three processes identified in the I-Space, namely codification, abstraction and diffusion. A scenario representing an instance of knowledge asset management in an enterprise portal is illustrated.

⁹ Welman JC, Kruger SJ. 2001. p184-187

Chapter six concludes the research with an overall summary of the research, recommendations for organisations implementing enterprise portals and a suggestion for future research in this domain.

Chapter 2

Managing Knowledge for Business Performance

2.1 Introduction

According to Drucker, knowledge management (KM) is a key approach to solving current challenges being faced by organisations, such as competitiveness and the need to innovate. The premise for the need for knowledge management is based on a paradigm shift in the business environment where knowledge is now central to organisational performance.¹⁰

This chapter investigates the contribution that knowledge and knowledge management makes towards business performance including the development of organisational competence and capabilities and an organisation's ability to be both competitive and innovative. Furthermore, a high-level discussion of knowledge management ensues including categories of organisational knowledge, knowledge strategy, and finally drivers, benefits, barriers and critical success factors for knowledge management to have an effect on business performance.

2.2 Background to Business Performance

An organisation's overall economic, strategic, and innovation performance is dependent on the degree to which the organisation can use all of the knowledge it creates and how it turns this knowledge into value-creating activities. These organisations are able to use the tacit knowledge component of KM to create hard-to-duplicate core competence in managing, identifying, capturing, systemizing, and applying tacit knowledge to create customer value as measured by innovation and economic outcomes.¹¹

Organisations need to identify and develop their intellectual resources in order to establish and maintain a competitive advantage to increase their performance. This has led to the knowledge based view¹² of the organisation that considers knowledge as the principal source

¹⁰ Wickramasinghe N. 2003. p295

¹¹ Harlow H. 2008. p151

¹² Sustainable competitive advantage is dependent on building and exploiting core competencies. In order to sustain competitive advantage, resources which are idiosyncratic (and thus scarce) and difficult to transfer or replicate are required. A knowledge-based view of the organisation identifies knowledge as the organisational asset that enables sustainable competitive advantage, especially in hyper competitive

of economic sustainability. Initially, the view of knowledge was driven by information technology and document management. Thereafter, approaches to the management of knowledge moved away from data storing towards capturing and mapping information, which was a more interpretive approach that involved elements of sense making as well as psychological and socio-psychological aspects. Knowledge is now seen as a fluid mix of framed experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates in and is applied in the mind of the knower. In organisations it often becomes embedded not only in documents and similar inorganic forms and repositories, but also in human forms such as organisational routines, processes, practices and norms. Knowledge assets are seen as data combined with meaning that would allow organisations to use it as a ¹³factor for production.¹⁴ The information age that we are entering increasingly substitutes knowledge for both capital and labour. Knowledge is power and increasingly wealth. As futurist Alvin Toffler notes, at every step from today on, it is knowledge not cheap labour, symbols not raw materials, which embody and add value. All economic systems are centered on a knowledge base. All business enterprises depend on the pre-existence of this socially constructed resource. Ideas and knowledge are abundant, they build on each other and they can be reproduced cheaply or at no cost at all.¹⁵

A number of companies recognise that they are on the verge of knowledge-based economic revolution, evidenced by trends such as the movement towards the globalisation of businesses, the shift from a production-based to a knowledge-based economy, growth of information technology, the strive to become learning organisations and the emergence of knowledge workers are some of the reasons why knowledge management practice is being considered for all types and levels of organisations. Hence, it is not surprising at all that the issue of more efficient and effective operations of an organisation's knowledge assets has become more important as numerous organisations have moved from an information to a

environments. This is attributed to the fact that barriers exist regarding the transfer and replication of knowledge thus making knowledge and knowledge management of strategic significance. Wickramasinghe N. 2003

¹³ The advent of free labourers, capitalists and landlords, each selling his or her services on the market for land and capital and labour made it possible to speak of the factor of production. This implied two things: the physical categories of land, labour and capital as distinguishable agents in the production process and the social relationship among labourers, landowners and capitalists as distinct groups or classes entering the marketplace. Heilbroner RL, Milberg W. 2002. p56

¹⁴ Marr B, Spender JC. 2004. p18-21

¹⁵ Wilkins J, Van Wegen B, De Hoog R. 1997. p55

knowledge age. As Drucker rightfully predicted, knowledge has become the key economic resource and a dominant source of competitive advantage¹⁶

Carlucci et al cited in Moustaghfir¹⁷ shows how the management of knowledge assets impacts business performance. It is argued that business performance equates to value generated for the key stakeholders of an organisation. The generated value is the result of an organisation's ability to manage its business processes while the effectiveness and efficiency of performing organisational processes are based on organisational competences. The management of knowledge assets is the entity that enables an organisation to grow and develop the appropriate organisational competences. Therefore, the fact that organisational competences are based on the effective and efficient management of knowledge assets puts it at the heart of business performance and value creation.

The development of new knowledge depends on access to, and availability of, information. Astute managers will shift their attention from systems to information. In a competitive world, where companies have access to the same data, organisations that excel at turning data into information and analysing information quickly and intelligently enough to generate superior knowledge will be successful. The ability for organisations to do a better job in the future depends on how well they utilise information and how well they train and mould this information into something that helps them to be more competitive. These challenges are universal and organisations are striving to find workable ways of deriving knowledge from their vast information resources, with the aim of creating superior performance.¹⁸

2.3 Organisational Capabilities and Competences

Competitive success is governed by an organisation's ability to develop new knowledge assets that create core competences¹⁹ and to realise what knowledge the organisation requires to sustain competitive advantage.²⁰

When an organisation's technologies are configured to deliver distinctive performance that competitors find hard to match, we can speak of a competence or a capability. When such a competence or capability is central to the organisation's operations, we can speak of a core competence or capability. Core competences and capabilities are organisationally integrated

¹⁶ Chong SC. 2006. p232

¹⁷ Moustaghfir K. 2008. p10

¹⁸ Pemberton JD, Stonehouse GH. 2000. p186

¹⁹ Pemberton JD, Stonehouse GH. 2000. p184

²⁰ Lin C, Tseng SM. 2005. p211

networks of technical processes. Knowledge assets are a source of competitive advantage for organisations that possess them. They allow them to bring superior products or services to market faster and in greater volumes than their competitors can match. But how the possession of a knowledge asset translates into competitive advantage remains ill understood. Competitive advantage does not flow automatically from the possession of knowledge assets. An organisation has to know how to extract value from them. Extracting value from knowledge assets requires an ability to manage them.²¹

2.3.1 Defining Capabilities

A capability refers to the skills, assets, and relationships that organisations assemble to build competitive businesses²², the capacity of a team of resources to perform some tasks. Knowledge, in fact, is seen as a “resource” that supports capabilities, activities, and products, and that in turn arises from experience.²³ Capability refers to an organisation’s previous experience, productive capacity, personnel; it depicts the strategic skill in the application and integration of competences for example producing internal combustion engines with price, performance and delivery characteristics that respond to the needs of a wide variety of clients.²⁴ Capabilities integrate/combine to become competences and are underpinned by knowledge. *Therefore, organisations that seek to improve their capabilities need to identify and manage their knowledge assets.* The perspective that knowledge assets represent the foundation of organisational capabilities explains the growing interest in knowledge management as an evolving discipline and approach to improve business performance.²⁵ This means that knowledge assets are fundamental strategic levers required to manage business performance and the continuous innovations of a company. In order to execute a successful strategy, organisations need to know what their competitive advantage is and what capabilities they need to grow and maintain this advantage.²⁶ Knowledge is today’s driver of company life and the wealth-creating capacity of the company is based on the knowledge and capabilities of its people.²⁷ Organisational capabilities are based on

²¹ Boisot M. 1998. p66-71

²² Baghai M, Coley SC, White D. 1999. p101

²³ Moustaghfir K. 2008. p16

²⁴ Boisot M. 1998. p3-11

²⁵ Marr B, Schiuma G, Neely A. 2004. p552

²⁶ Marr B, Schiuma G, Neely A. 2004. p552

²⁷ Marr B, Schiuma G, Neely A. 2004. p552

knowledge. Thus, knowledge is a resource that forms the foundation of the company's capabilities.²⁸

When organisations refer to organizational capabilities, they usually mean the skills embedded in their employees, processes, and institutional knowledge. These are so basic to survival that they are often referred to as core competences. In any competitive environment, a company must be good at what it does and possess skills that make it stand out. Distinctive competences allow growth companies not only to make more money from existing businesses but also to extract greater value from new opportunities. Important as operational skills or competences are to an organisation's success, too narrow a focus on them can stunt growth. A broader definition of capability is one that includes all resources useful in gaining competitive advantage. In addition to operational skill, capability would include three other classes of resources: privileged assets, growth-enabling skills, and special relationships²⁹.

- Privileged assets

Privileged assets are physical or intangible assets that are hard to replicate and confer competitive advantage on their owner. They include infrastructure, intellectual property, distribution networks, brands and reputations, and customer information.

- Growth-enabling skills

Organizations that master such generic growth-enabling skills as acquisition, deal structuring, financing, risk management, and capital management have a big advantage in creating and sustaining growth. While operational skills tend to be specific to each of an organisation's businesses, these growth-enabling skills are transferable from one market or business unit to another. Because of their broad applicability, they usually reside in the corporate centre, from where they are made available to business units.

- Special relationships

One of the most important yet least-discussed capabilities involves relationships. Ties with existing customers and suppliers can provide growth opportunities and should be nurtured. Those with powerful individuals, businesses, and governments can unlock opportunities that would otherwise be shut off.

How well a company assembles the capabilities that a new business requires determines how successful it is at gaining and keeping positional advantage. Some capabilities are more

²⁸ Marr B, Schiuma G, Neely A. 2004. p551

²⁹ Baghai M, Coley SC, White D. 1999. p101-103

important than others, and combinations are generally harder to imitate than individual capabilities. The business builder's challenge begins with the need to assemble the capabilities most critical to making money in the business. Lasting competitive advantage comes only when companies assemble difficult-to-imitate combinations of capabilities into bundles. Competitive advantage may not call for superior capabilities in every area of a business. But control of the most important capabilities can determine how much of the value of a growing business will flow to its owner. For every opportunity, it is important to distinguish the capabilities that influence competitive success from those that are merely necessary to play the game. Capabilities that are less critical can be outsourced or controlled by others.³⁰

A capability or resource becomes a source of sustainable competitive advantage only if it passes several tests:

- First, it must be competitively superior and valuable in the product market.
- Second, it must be difficult to imitate.
- Third, it must not be easy to replace by an alternative capability
- Fourth, it must be durable
- Fifth, it must be difficult to trade. If the capability can walk out the door with an employee, it is the employee, not the corporation that will appropriate the value.

The key to sustaining competitive advantage as a business grows is to assemble a bundle of distinctive capabilities that together satisfy the criteria. The capabilities in the bundle can be built in-house, borrowed by means of alliances, or acquired outright. As each new capability is added to the bundle, greater competitive advantage accrues because the combination becomes more difficult for competitors to imitate or substitute, and more difficult for employees to appropriate from the company.³¹

- **Dynamic Capabilities**

The effectiveness of knowledge asset management provides organisations with an ability to constantly reconfigure, accumulate, and dispose of knowledge resources to meet the demands of a shifting market. These processes are referred to as dynamic capabilities which are essentially organisational and strategic routines that organisations use to achieve new resource configurations as markets emerge, collide, split, evolve and die. Dynamic capabilities are unique to individual organisations, reflecting their individual idiosyncrasies,

³⁰ Baghai M, Coley SC, White D. 1999. p106

³¹ Baghai M, Coley SC, White D. 1999. p107

their specific path-dependencies, and hence are considered the source of sustainable competitive advantage and long-term superior performance.³² The concept of dynamic capabilities has recently emerged in the strategic management literature to denote the organisation's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. A dynamic capability is a learned and stable pattern of collective activity through which the organisation systematically generates and modifies its operating routines in pursuit of improved effectiveness. Dynamic capabilities allow an organisation to assimilate new knowledge from their business environment, and configure their knowledge sets, operating routines, and organisational competences to meet the new market needs. Some dynamic capabilities integrate resources (e.g., product development routines, strategic decision making), others focus on reconfigurations of resources within organisations (e.g., transfer processes including routines for replication and brokering), and others are related to gain in and release in resources (e.g., knowledge creation routines, alliance and acquisition routines). An organisation's dynamic capabilities are the major source of its competitive advantage as they are usually the source of Schumpeterian benefits, which have the possibility of being sustained indefinitely so long as the dynamic capability is maintained. Also, the long-term competitive advantage lies in using dynamic capabilities sooner, more astutely, or more fortuitously than the competition.³³

2.3.2 Defining Competences

Competences refer to the combination of observable and measurable knowledge, skills, abilities and personal attributes that contribute to enhance employee performance and ultimately result in organizational success. These are known as core competences when they represent a domain in which the organisation excels. It is the result of both individual and organisational activities. In particular at the individual level, it includes personal knowledge and individual skills and talents; while at the organisational level, competence includes infrastructure, networking relationships, technologies, routines, trade secrets, procedures and organisational culture.³⁴ Knowledge creation activities are essential for the generation as well as for the maintenance of competences.³⁵

³² Moustaghfir K. 2008. p11

³³ Moustaghfir K. 2008. p19-20

³⁴ Marr B, Schiuma G, Neely A. 2004. p552

³⁵ Marr B, Schiuma G, Neely A. 2004. p552

Knowledge is inextricably linked to core competence. A core competence must be distinctive, complex, difficult to imitate, durable and adaptable to ensure that it is a source of sustained superior performance. By its very nature, knowledge, specifically tacit or implicit knowledge, is complex and difficult to imitate. Equally, the type of organisational learning apparent in a learning organisation results in knowledge-based competences that are both adaptable and durable. Knowledge plays a unique role in building and conserving core competences. For example, core competences may be based on knowledge of customers and their needs, knowledge of technology and its innovative and distinctive uses, knowledge of products and processes. Furthermore, knowledge of the business environment, of competitors and their behaviour, of countries and their cultures, may also assist in building competences that are both distinctive and superior to those of competitors. The development of knowledge based core competences is a necessary feature for a learning organisation. The resulting adaptability and increased organisational responsiveness ensure that competitors find it difficult to identify, understand and emulate such competences. Converting knowledge into core competences and competitive advantage essentially depends on sharing and coordinating knowledge within the organisation and with collaborating businesses. Learning organisations, because of their superior ability to learn and share, appear more able to anticipate and even create new customer needs, thus generating new sources of competitive advantage. This remains a challenge for all businesses, but knowledge acquisition is an integral feature of the cultural and learning environment that exists within the learning organisation and one which looks set to equip them for the demands of global business in the twenty-first century.³⁶

Competence depicts the organisational and technical skills involved in achieving a certain level of performance.³⁷ Competences are complex knowledge sets, which are acquired through learning, and include technological skills, complementary assets, as well as routines. Organisational competences together with organisation-specific organisational routines are the result of an internal learning process. When organisation-specific assets are assembled in integrated clusters, spanning individuals and groups so that they enable distinctive activities to be performed, these activities constitute organisational routines. Organisational competences are defined as a collection of organisational routines that provide an organisation's management with a set of decision options for producing significant outputs of a particular type. Therefore, these competences represent the organisational activities geared towards the operational functioning of the organisation. Organisational competences also

³⁶ Pemberton JD, Stonehouse GH. 2000. p191-193

³⁷ Boisot M. 1998. p3-11

condition the way activities fit and reinforce one another, which in turn sustain the operational effectiveness. As they are built internally through complex social and learning processes, organisational competences are causally ambiguous and consequently they are difficult to trade or imitate, scarce, valuable, and non-substitutable. These characteristics make them the source of sustainable competitive advantage, and thereby the basis of long-term profitability and above-average performance in the long run. In fact, organisational competences, when leveraged into products and services, generate value and abnormal profitability and impact consequently the overall organisation performance.³⁸

Core competences have been variously described. Teece cited in Griffin for example, refers to *...a set of differentiated skills, complementary assets and routines that provide the basis for a organisation's competitive capabilities and sustainable advantage in a particular business* while Winterschied refers to *...the specific tangible and intangible assets of the organisation assembled into integrated clusters which span individuals and groups to enable distinctive activities to be performed*. Prahalad and Hamel's definition of core competence, cited in Griffin, included the following elements in their working definition:

- a core competence is an integration of skills and technologies. They are unlikely to exist in an individual skill or in an individual team. Typically, they exist at a level of aggregation which would deliver 5-15 core competences for any single large organisation
- they are a product of learning in that they incorporate both tacit and explicit knowledge
- they deliver some kind of customer functionality
- core competences are sustainable because they are hard to imitate
- they enable access to new markets through their incorporation into a number of the organisation's products and/or services.³⁹

Furthermore, a core competence will display the following attributes⁴⁰:

It delivers a clear and valued customer benefit such as lighter, smaller, or more versatile product.

³⁸ Moustaghfir K. 2008. p19-20

³⁹ Griffiths D, Boisot M, Mole V. 1998. p530-531

⁴⁰ Boisot M. 1998. p182

It is largely tacit and hence hard to imitate by competitors. The speed with which a firm can bring innovative products to market for example may depend upon the intangible ability of its product development team to coordinate the actions of its members.

It is organisation wide and can be applied across the organisation's product offering. A competence developed in one area of a firm activity can thus be leveraged and applied elsewhere.

Unlike physical assets, it appreciates with use and is a fruit of an organisational learning process. As it gets used repeatedly, in a variety of circumstances, so does it deepen. Properly managed, a core competence can become more valuable over time.

It cannot be traded and only the organisation incorporating the competence can be traded. It follows that competences have to be grown in-house and cannot be bought in the market.

Prahalad and Hamel (cited in Boisot), indicate that they view core competences as organisation specific integration of technologies that yield a set of core products that form the basis of a product range.

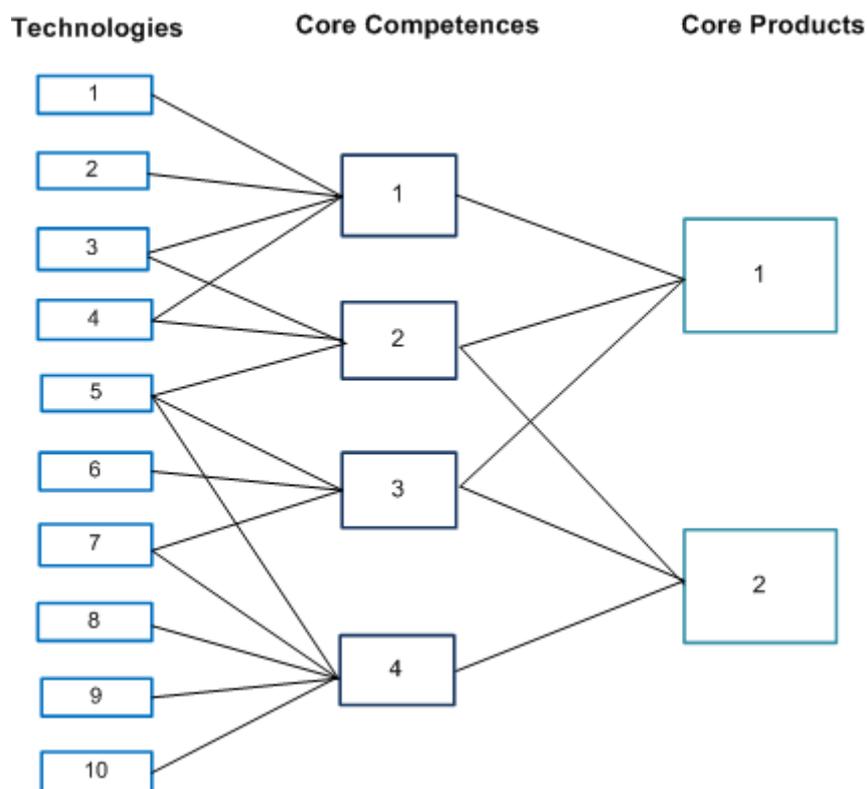


Figure 2.1: Technologies, Skills, Core Competences and Core Products
(Source: Boisot, 1998)

To identify knowledge assets, the first task is to define the core capabilities and competences that will allow an organisation to execute their strategy. Following the identification of core capabilities, a set of critical knowledge assets can be defined that is needed to maintain these capabilities in order to execute the strategy. The set of core capabilities can be derived using a classical top-down approach or the bottom-up approach based on the knowledge-based or resource-based view of the organisation (Figure 2.1). Using the classical top-down approach the strategy and core-capabilities are derived from understanding the external market conditions by taking into account factors such as the bargaining power of suppliers, customers, entry barriers, and potential substitute products and technologies. The role of capabilities is to enable companies to perform the necessary processes to execute their strategy, which in turn fulfils the needs of a clearly defined market. Using this approach, organisations can understand whether they have the capabilities they need to deliver their strategy and see whether they have any development needs. The bottom-up approach, on the other hand, takes a knowledge-based view of the organisation to guide strategy formulation. In this approach organisations match more closely their internal capabilities with the opportunities in the market. The bottom-up concept of corporate strategy definition is more internally focused and allows organisations to first identify what they do⁴¹ *A long-term competitive advantage can only be gained from the management of the knowledge assets underlying organisational capabilities.*⁴²

⁴¹ Marr B, Schiuma G, Neely A. 2004. p563

⁴² Marr B, Schiuma G, Neely A. 2004. p564-566

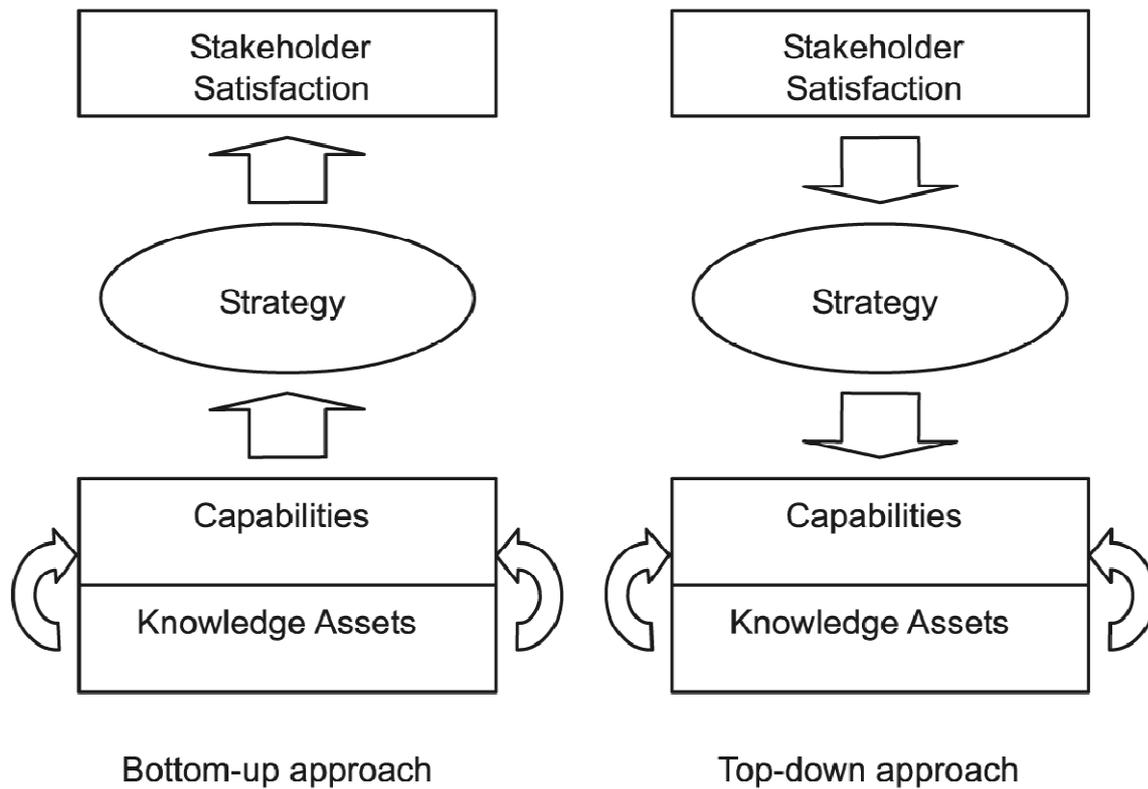


Figure 2.2 Top-down vs Bottom-up

(Source: Marr, 2004)

2.4 Competitive Advantage

The source of long-term competitive advantage for any organisation is derived from access to some form of knowledge that it can exploit. This knowledge can be of any type, from the acquisition of a patent to the knowledge of customer needs, built up over many years. For this knowledge to furnish a sustainable competitive advantage, an organisation must have some form of exclusive, or near exclusive, ability to exploit it. This exclusivity may be due to exclusive possession of the knowledge itself (as in the patent example) or the means of application (such as a factory). If there is no exclusivity, the competitive advantage is not sustainable, because other organisations will easily be able to enter the market and competition will eradicate profits. Often, the source of competitive advantage will change, even if product and markets remain the same, because early entrants will then attempt to exploit their superior market knowledge which they have gained by experience. This knowledge-based view of competitive advantage has led to the discipline of KM, which aims to create conditions under which competitive advantage can be maintained.⁴³

⁴³ Beckett, AJ, Wainwright CER, Bance D. 2000.

Resources which are valuable, rare, inimitable, and non-substitutable, have the potential to provide organisations with a sustainable competitive advantage. A set of resources that seem to match the above criteria are knowledge assets. It is believed that a competitive advantage in today's economy depends upon the way organisations manage their knowledge assets, and how effective and efficient their knowledge management processes are applied to accumulate, articulate, codify, and use knowledge assets to create value and enhance performance over time.⁴⁴

Arguments suggest that companies enjoy a competitive advantage if they know how to create, store, disseminate and exploit organisational knowledge. In the knowledge economy, a key source of sustainable competitive advantage and profitability is how a company creates and shares its knowledge. Organisational knowledge such as operational routines, skills, procedures and know-how are an organisation's most valuable assets and its strategic management capability is the most prevalent source of competitive advantage. If knowledge is to be considered a key resource of the organisation, it has to be exploited for value.⁴⁵

True competitive advantage of companies is often incredibly hard to emulate because it resides in the collective tacit knowledge that employees hold and not in any particular IT solution or business process. The collective tacit knowledge of employees includes a shared set of values, unspoken and uncoded common knowledge, communication patterns and organisational routines that are heavily anchored in that joint experience.⁴⁶

Since the possession of knowledge and information translates into capabilities and profits, the primary goal of management today is to discover relevant information and knowledge in a timely manner and convert it into a competitive advantage.⁴⁷ The competitive value of information depends on the timeliness of its discovery and its contribution to the corporate bottom line. In essence, both the search and use of information are strategic processes through which organisations gain an advantage over competitors.⁴⁸ As Nonaka⁴⁹ acknowledges, in an uncertain economic and business environment, *knowledge is the one source of lasting competitive advantage*. Thus, in an increasingly hypercompetitive environment, focusing on organisational learning and knowledge management is seen as a

⁴⁴ Moustaghfir K. 2008. p10-11

⁴⁵ De Souza, K.C. 2003.

⁴⁶ Terra JC, Gordon C. 2003. p62

⁴⁷ Kotorov R, Hsu E. 2001. p87

⁴⁸ Kotorov R, Hsu E. 2001. p88

⁴⁹ Pemberton JD, Stonehouse GH. 2000. p186

critical route for the rapid development and effective use of knowledge assets that are superior to those of competitors. *Organisations that learn quicker than their competitors, and as a consequence deploy their knowledge assets most effectively, are better placed to create and sustain a competitive edge.*

The potential for an organisation to generate competitive advantage on the basis of its knowledge assets is based on the following reasoning:

- the shift in the relative importance of factors of production away from capital towards labour, particularly intellectual labour
- the ever more rapid pace of change in the business environment
- widespread acceptance of knowledge as a prime source of competitive advantage
- the greater demands being placed on businesses by customers
- increasing dissatisfaction among managers and employees with the traditional, command and control management paradigm
- the intensely competitive nature of global business
- developments in communications and information technology which have transformed the ability of organisations to acquire, store, manipulate, share and disseminate knowledge, resulting in new management styles and shifting cultural and structural management paradigms
- the volatility of the environments in which organisations operate has made the creation and sustainability of competitive advantage an even more demanding task
- the recognition of knowledge as the single most important source of competitive advantage
- new approaches to organisational learning and knowledge management supported by innovative management and technological infrastructure, has developed alternative avenues through which organisations can build and sustain superior performance. It is now possible for organisations to achieve greater flexibility and adaptability through continuous organisational learning and the improved management of their knowledge assets on which their core competences are based.⁵⁰

Sustainable competitive advantage begins with a unique capability that shields a company from competition—usually something measurable, physical, and concrete. This capability must pertain to at least one of the few product features upon which customers base their

⁵⁰ Pemberton JD, Stonehouse GH. 2000. p184

buying decisions and the whole arrangement must be likely to last for a long time.⁵¹ In some industries, the most important strategic advantage comes from day-to-day execution, flexibility, speed, and frontline skills.⁵²

In simple terms, producers who sell their goods or services at a profit enjoy a competitive advantage when customers choose to buy from them instead of from their competitors. But some advantages are worth more than others. In particular, for a competitive advantage to have any strategic meaning, three things must happen:

- Customers must perceive a consistent difference between a company's product or service and those of its competition, and that difference must occur in one or more key buying criteria—that is, in one or more of the few product attributes that actually shape the purchasing decisions of consumers.
- The difference must come from a capability gap between the favoured company and its competitors.
- The product difference and the capability gap must endure over time.⁵³

Differentiation alone is not enough. The advantage must also stem from a fundamental gap in the capabilities of the competing companies—a gap that cannot be bridged, at least not with an economically rational amount of effort. True capability gaps consist of specific, often physical, differences and are likely to be prosaic and measurable. Capability gaps tend to fall into four categories:

- Business-system gaps, which result from the ability to perform individual functions better than competitors do.
- Position gaps, which result from prior decisions, actions, and circumstances. They can include reputation, consumer awareness and trust, order backlogs, and irreversible investment choices, such as better plant locations.
- Regulatory and legal gaps, which result from government action. They can include patents, import quotas, and consumer safety laws.
- Organizational or managerial quality gaps, which result from an organization's ability to innovate and adapt more quickly and effectively than the competition, consistently.^{54 32}

⁵¹ Coyne K, Bhide A.2000.pp 29-30

⁵² Coyne K, Bhide A.2000.pp 30

⁵³ Coyne K, Bhide A.2000.pp 31

⁵⁴ Moustaghfir K. 2008. p11

Only the factors in the first category—business-system gaps—are under the short-term control of producers. Frustrating as it may be to the strategist, competitive advantage or disadvantage often results from factors that cannot be altered quickly.⁵⁵

2.5 Innovation

Innovation is often linked or related to invention or the creation of new products. Innovation is the effect of an organisation creating new knowledge and/or new ways of applying its knowledge. It is the experimental, the learning side of the business. Innovation is the creation of substantial new value for customers and the firm by creatively changing one or more dimensions of the business system. Innovation does not have to be a new product developed by a research and development group. It can be a new delivery approach or a new service. It can be a new customer or market. Innovation can also be internal in the form of new processes, new efficiencies or new ways of organising an organisation's knowledge assets.⁵⁶

Innovation is inextricably linked with intangible capital. To understand an organisation's innovative capacity and processes requires that the organisation understands the nature and breadth of its knowledge assets. Innovation requires that all the elements of an organisation's knowledge assets work together, meaning human capital assets, structural knowledge assets and relationship capital assets. An example of how the elements work together can be gauged from Amidon's Law of Knowledge Dynamics which states that:

- Knowledge multiplies when it is shared
- Innovation and value are created when knowledge moves from its point of origin to the point of need or opportunity
- Collaboration for mutual leverage leads to optimal utilisation of tangible and intangible resources⁵⁷

Effective management of organisational knowledge assets relies on this interactive relationship between knowledge, collaboration and innovation.

The further we get into the knowledge economy the more that knowledge gets spread across a company's network, both internally (through human and structural capital assets) and externally (through relationship capital assets). That knowledge is spread out in this diverse

⁵⁵ Coyne K, Bhide A.2000.pp 33

⁵⁶ Adams M, Oleksak M. 2010. p80

⁵⁷ Adams M, Oleksak M. 2010. p81

ecosystem has significant implications on some of the most basic ways that we see an organisation. To leverage and build this knowledge, the management structure and approaches need to create capacity for the flow of information and innovation from the bottom up as well as the top down, from the inside out and from the outside in. Many innovation opportunities are created at the intersection between employee and/or organisational competences and the needs of the marketplace.⁵⁸

2.5.1 The Innovation Process

There are many views on the best components of an innovation process, albeit they all essentially address the need to capture ideas and track their progress through a succession of steps to develop and test them and guide the worthy ideas to commercialisation.

The main components of an innovation process include the following:

- Idea generation – stimulating new ideas and getting them into a system where they can be tracked
- Selection – having a process to approve the investment of time or money in an idea
- Development – having resources or coaching available to those working on a project to help develop or test their concept
- Commercialisation – ensuring that the organisation provides the support for all the elements of a business including marketing, sales, operations and finance.⁵⁹

Innovation does not happen in a vacuum – it happens inside existing organisations and ideas that are developed arise out of the competences or experience of employees and existing networks. Ideas are built on existing strengths to perfect something an organisation already knows and/or does or to apply their knowledge in a new direction. Innovation is almost always connected to an organisation's core competences.

An innovation process must be supported by an ecosystem that has the right people, knowledge, culture and external relationships.

2.6 How Knowledge Management impacts Business Performance

Without knowledge, no organisation will survive, it is needed to perform the day to day routines and it is needed to reflect upon these routines and where necessary, to change them. Knowledge application and creation are at the core of any organisation's existence.

⁵⁸ Adams M, Oleksak M. 2010. p83

⁵⁹ Adams M, Oleksak M. 2010. p83

The difference between information management and knowledge management is simply that KM goes beyond the design of information systems. KM takes into account the knower i.e. someone who has valuable knowledge and may be willing to share it with others at a price/cost. KM requires a significant change in behaviour in order to be effective. Secondly the richness and quality of available information sources and the interpretive capacity of employees is far more desirable than simply increasing the information available. Information is meaningless and irrelevant without proper context and validation.⁶⁰

Davenport et al. cited in Reneker⁶¹ define knowledge as information combined with experience, context, interpretation, and reflection. It is a high-value form of information that is ready to apply to decisions and actions. While knowledge and information may be difficult to distinguish at times, both are more valuable and involve more human participation. According to second-generation theory, organisations not only hold collective knowledge, but they actually learn. The proper scope of KM, then, should be to enhance organisational learning i.e. *“feed the processes that spawn the production and integration of new knowledge in human affairs, and innovation and better organisational performance will follow.”*

To the organisation, knowledge is defined as what people know about customers, products, processes, mistakes, and successes. It resides in databases or through sharing of experiences and best practices, or through other sources both internal and external to the organisation. Organisational knowledge accumulates over time, and enables organisations to attain deeper levels of understanding and perception that lead to business astuteness and acumen, all characteristics of wisdom. Knowledge has several additional characteristics that set it apart from other resources, including that it is intangible and difficult to measure, volatile, increases with use, can be used by different processes at the same time, often has long lead times, is usually embodied in agents with wills, and has wide-ranging impacts on the organisation.⁶²

Knowledge management in its most current sense is the effort to improve an organisation's ability to create new knowledge, leverage existing knowledge, protect strategic knowledge and improve human and organisational performance through facilitated meaningful connections. Practically this means:

⁶⁰ Terra JC, Gordon C. 2003. p60

⁶¹ Reneker MH, Buntzen JL. 2000. p393

⁶² Bollinger AS, Smith RD. 2001. p9

- Making sure an organisation's most valuable knowledge (tacit or explicit) is more easily identifiable
- Identifying, organising, integrating and disseminating both internal and external valuable knowledge
- Helping and motivating holders of critical expertise to share their knowledge by making it easy for them to codify part of what they know and collaborate with others
- Fostering higher levels of collaboration internally and with partners, suppliers and customers
- Implementing processes and management practices that improve the retention and protection of valuable knowledge
- Making it easier for employees who share the same interests, learning goals and business problems to find one other
- Ensuring that those within an organisation have access to the knowledge of the organisation when, where and in the form they need it
- Ensuring that an organisation's employees are capable, willing, rewarded and motivated to share their knowledge.⁶³

2.7 Defining Knowledge Management

The attempt by researchers to ultimately define the meaning of knowledge management is a thesis in itself. The following collection of interpretations serves to prove that the field of knowledge management is dynamic, open to interpretation and clearly indicates its multi-faceted behaviour and application.

A number of KM definitions are derived from an organisational *processes perspective*:

- KM is defined as the capacity (or processes) within an organisation to maintain or improve organisational performance based on experience and knowledge. Organisational knowledge is company-wide collective knowledge of its products, services, processes, markets, and customers. It is the sum of individual knowledge within an organisation in a more explicit form that can be codified, stored and disseminated. In summary, KM is managing organisational processes to create, store and reuse organisational knowledge while, on the other hand, developing a knowledge culture to facilitate these processes, with an ultimate aim to create and maximise intellectual capital to make a more intelligent organisation.

⁶³ Terra JC, Gordon C. 2003. p58-59

- We can conceptualize knowledge management as a process whose input is the individual knowledge of a person, which is created, transferred and integrated in work teams within the company, while its output is organisational knowledge, a source of competitive advantage.⁶⁴
- Knowledge management refers to identifying and leveraging the collective knowledge in an organisation to help the organisation compete. . . . “Knowledge management is largely regarded as a process involving various activities . . . At a minimum, one considers the four basic processes of creating, storing/retrieving, transferring, and applying knowledge.
- Knowledge Management is a business process. It is the process through which organisations create and use their institutional or collective knowledge. It includes three sub-processes:
 - Organisational learning—the process through which the organisation acquires information and/or knowledge
 - Knowledge production—the process that transforms and integrates raw information into knowledge which in turn is
 - useful to solve business problems
 - Knowledge distribution—the process that allows members of the organisation to access and use the collective knowledge of the organisation.
- Managing knowledge is a multidimensional process. It requires the effective concurrent management of four domains: content, culture, process, and infrastructure.
- Knowledge management deals with the process of creating value from an organisation’s intangible assets. It not only involves the production of information, but also the capture of data at the source, the transmission and analysis of this data, as well as the communication of information based on, or derived from, the data, to those who can act on it.⁶⁵
- Knowledge is seen as a justified personal belief that increases an individual’s capacity to take effective action. Knowledge management in this view is best understood by considering knowledge management as the systemic and organisationally specified process of acquiring, organizing and communicating knowledge of employees so that other employees may make use.⁶⁶

⁶⁴ Wickramasinghe N. 2003. p296

⁶⁵ Wickramasinghe N. 2003. p296

⁶⁶ Benbya H, Passiante G, Belbaly NA. 2004. p203

- Knowledge management is the panoply of procedures and techniques used to get the most from an organisation's knowledge assets. KM has two main objectives:
 - to make the organisation act as intelligently as possible in order to secure its viability and overall success; and
 - to realize the best value of its knowledge asset⁶⁷
- Knowledge management has been widely considered as consisting of processes that facilitate the application and development of an organisation's knowledge assets. Nonaka et al state that knowledge management includes three primary activities: knowledge generation, which describes the way employees improvise and organisations innovate; knowledge integration, which describes how employees transform their tacit knowledge into explicit knowledge by codifying their ideas into the systems of the organisation; and, knowledge sharing, which describes the socialization process through which employees share knowledge with one another. More broadly, Marr et al (cited in Moustaghfir)⁶⁸ identify seven processes to manage knowledge assets:
 - knowledge generation
 - knowledge codification
 - knowledge application
 - knowledge storing
 - knowledge mapping
 - knowledge sharing and
 - knowledge transfer.

These processes are based on an understanding that knowledge is dynamic in nature, and on this basis they provide guidelines of how to use, transfer, share, develop, and renovate the knowledge assets of an organisation.

- "...any processes or practice of creating, acquiring, capturing, sharing, and using knowledge, wherever it resides, to enhance learning and performance in organisations and "...all methods, instruments, and tools that in a holistic approach contribute to the promotion of core knowledge processes."⁶⁹

⁶⁷ Moustaghfir K. 2008. p17

⁶⁸ Moustaghfir K. 2008. p17

⁶⁹ Perrott BE. 2007. p524

- Knowledge management is recognised as process, rather than an occasional or one-off event. Ongoing and continuous process will be essential in actioning knowledge creation in vital areas of knowledge deficiency.⁷⁰
- The definition of KM is that it is the formal process of determining what internally held information could be used to benefit a company and ensuring that this information is easily made available to those who need it. KM has also been defined as the effective use of systems to collect, use, and reuse knowledge within the organisation. An organisation's overall economic, strategic, and innovation performance is dependent on the degree to which the organisation can use all of the knowledge created by the organisation and turn this knowledge into value-creating activities.⁷¹

A number of KM definitions are derived from an organisational *competitiveness perspective*:

- Knowledge management addresses policies, strategies, and techniques aimed at supporting an organisation's competitiveness by optimizing the conditions needed for efficiency improvement, innovation, and collaboration among employees.
- Knowledge management is defined as the organized and systematic process of generating and disseminating information, and selecting, distilling, and deploying explicit and tacit knowledge to create unique value that can be used to achieve a competitive advantage in the marketplace by an organisation.
- Knowledge management is the identification, storage, protection of knowledge for future operational and strategic benefit of the organisation; this may be implicit or explicit. While operational knowledge is concerned with the day-today running of the business, strategic knowledge is essential to major decisions an organisation must make to capitalize on priority opportunities and successfully overcome major threats.⁷²
- Knowledge management is a process of leveraging knowledge as means of achieving innovation in process and products/services, effective decision-making, and organisational adaptation to the market for creating business value and generating a competitive advantage to organisations.⁷³

A number of KM definitions are derived from an organisational *Performance perspective*:

⁷⁰ Perrott BE. 2007. p524

⁷¹ Harlow H. 2008. p149

⁷² Perrott BE. 2007. p524

⁷³ Chong SC. 2006. p232-233

- Knowledge management may be defined as doing what is needed to get the most out of knowledge resources. Knowledge management focuses on organizing and making available important knowledge, wherever and whenever it is needed.
- Knowledge management is the formal management of knowledge for facilitating creation, access, and reuse of knowledge, typically using advanced technology.
- An individual's knowledge is a part of who he or she is. Organisational knowledge is also intangible. It defines the organisation, and is a reflection of the organisational culture. Knowledge management is usually concerned with capturing an organisation's know-how and know-what through creation, collection, storage, distribution, and application. It means identifying and harnessing the collective knowledge of the organisation gained through experience and competences.⁷⁴

2.8 Categories of Organisational Knowledge

The following discussion highlights some of the core categories of organisational knowledge which typically are included in a knowledge management strategy.

Expertise: Experts and their expertise are the source of a great deal of organisational knowledge and are described as highly tacit/implicit, domain-specific, originating through experience, formal education and collaboration. The organisational strategy must target the retention of expertise and promote its utilization, thereby maintaining and enhancing the core as well as related competences of the organisation. The processes necessary to reach this goal includes: identification of experts in core and related areas, registration of their expertise, facilitation of expert contacts, and the growth of expertise through one-on-one and group collaborations. The technologies that can facilitate these processes include well-developed expertise taxonomies and collaboration systems. The organisational strategy for utilizing this category is one of connection between the expert and the knowledge needs of the organisation. However, maintaining and extending the currency within an organisation can be volatile, as it resides in several aspects of uncertainty (mobility, knowledge depth and reputation) that exists with an organisation's identified experts. Each of these uncertainties can be mitigated by recognizing that experts also have a wealth of tacit/implicit knowledge. As part of the organisation's human capital, a dual responsibility can be placed on these experts to participate in the transfer of their tacit knowledge to other community members

⁷⁴ Bollinger AS, Smith RD. 2001. p10

and where possible explicating their implicit knowledge to ensure its retention within the organisation.⁷⁵

Lessons learned: comprises the knowledge gained while completing task/ situation specific tasks or projects. Also referred to as best known methods, best practices and internal benchmarking, and it is the process of identifying, sharing, and using the knowledge and practices inside an organisation. Enabling technologies must utilize a codification taxonomy such that, once a lesson has been learned, it can be documented, applied and reused. Lessons learned focus on the useful knowledge gained while completing tasks or projects within the organisation and are singular to situations and processes and predominantly represents implicit structured knowledge that has been recently codified or made explicit. The creation of this knowledge, and therefore its source, does not necessarily come from identified experts, and the organisational strategy is to capture this implicit learning from all aspects of the organisation's human capital. This category's volatility highlights the life span of this type of structured knowledge and indicates its relatively brief currency. The strategic hurdle is the correct transfer of knowledge to similar circumstances from prior learnings. This knowledge has potentially high immediate value when correctly applied.⁷⁶

Knowledge documents: represents a form of codified knowledge that is highly explicit, can originate either internally or externally and has been established as having an extended currency. Knowledge documents can be traditional structured knowledge in text-based forms that include: project reports, technical reports, research reports and publications. Alternatively, it can be in unstructured forms, which can include: pictures, drawings, diagrams, presentations, audio and video clips, on-line manuals, tutorials, etc. The strategy for knowledge documents is to achieve easy identification of relevant sources of knowledge that enhance learning and allows the reuse of codified knowledge without the need to contact the individual who originally developed the objects. Since knowledge documents represent highly explicit knowledge, the organisation's human capital should understand, be educated about and recognize standard locations for obtaining this form of knowledge.⁷⁷

Policies and procedures: much of the organisation's knowledge is embedded in its practices in the form of routines and operating procedures. Policies and Procedures has been defined to represent institutional knowledge required for efficient and consistent operation of an organisation. The documents for the policies and procedures are designed to provide the

⁷⁵ Freeze RD, Kulkarni U. 2007. p96-104

⁷⁶ Freeze RD, Kulkarni U. 2007. p96-104

⁷⁷ Freeze RD, Kulkarni U. 2007. p96-104

know-how of a process, are instructive and represent an organisation's endeavour to embed knowledge in the organisation. A knowledge worker following a procedure can still discover the know-why of the process, but it is not a necessity to the continued smooth operation of the organisation. The organisational strategy is one of transfer from other learnings to ensure an extended currency for retention of this knowledge. Once made explicit, the organisation's Policies and Procedures obtain the force of history and become embedded practice.⁷⁸

2.9 Knowledge Strategy

A successful knowledge management strategy identifies an organisation's key leverage points essential to achieve business results. In response to increasingly volatile and competitive environments, organisations are examining how they can better leverage knowledge assets for value creation. Often, these reside in core business processes that may be re-engineered to capitalize on and expand the organisation's knowledge resources and capabilities. The growth of the Internet, Intranets and extranets, and the rapid penetration of information technology into business processes are enabling changes that can significantly enhance productivity and performance and simultaneously enable KM. A KM strategy can help tear down traditional cross-functional boundaries. KM entails helping people share and put knowledge into action by creating access, context, infrastructure, and simultaneously reducing learning cycles.⁷⁹

In order to put a develop a knowledge strategy, firstly, an understanding of the organisation's knowledge assets should be addressed. Assessing knowledge assets leads to shaping of knowledge agenda to achieve sustainable results in alignment with the business strategy. It is essential to create a blueprint of knowledge within the organisation to enable understanding how knowledge can enhance and enable specific processes in the organisation. Secondly, the knowledge management strategy needs to articulate the role that knowledge will play in value creation. The vision also needs to consider resource availability as these conditions the implementation approach. It is critical for a knowledge management program to be based on an organisation's processes and activities to ensure that knowledge is optimized to build the critical capabilities of the organisation. Tying the knowledge management program to an organisation's business processes will ensure that the program is oriented towards achieving efficiency improvements within core and enabling processes through more effective and efficient use of knowledge, thus assisting in achieving the objectives of the business strategy. Business processes are tied to the organisation's business strategy, making them a logical

⁷⁸ Freeze RD, Kulkarni U. 2007. p96-104

⁷⁹ Massey A, Montoya-Weiss MM, Holcom K. 2001. p155-157

starting point for a knowledge management strategy and program and thus ensuring that the knowledge management strategy supports the business strategy and does not exist in isolation.

An organisation's strategic objective not only gives the priority of what intellectual capital elements organisations should develop and maximise, but also provides guidance on the KM strategy formulation. Five strategies for KM that can be pursued are as follows:

- Knowledge strategy as business strategy: focus on knowledge creation, capture, organisation, renewal, sharing, and use in knowledge-related activities.
- Intellectual asset management strategy: focus on organisational level of specific intellectual assets such as patents, technologies, operational and management practices, customer relations, organisational arrangements, and other structural knowledge assets.
- Personal knowledge strategy: focus on personal responsibility for knowledge-related investment, renewal and sharing with others.
- Knowledge creation strategy: focus on organisational learning, research, and development and motivation of employees to obtain new knowledge.
- Knowledge transfer strategy. Focus on systematic approaches for knowledge transfer, i.e. obtain, organise, restructure, warehouse or memorise, repackage for knowledge deployment.⁸⁰

2.10 Drivers for the practice of Knowledge Management

Organisations are interested in managing knowledge for several reasons. Core competences are based on the skills and experience of the people who do the work, and may not exist in physical form. Therefore, it is important that organisations find a way to tap into this knowledge base in order to preserve and expand their core competences. Effective management of knowledge will enable an organisation to provide better customer service. When knowledge within the organisation is shared, it becomes cumulative and embedded within the organisation's processes, products, and services. The goal should not be to capture what everyone knows so that everyone has the same knowledge, but to combine the various levels of expertise present to create new organisational knowledge. This will require networking and communication channels that encourage sharing and collaboration.⁸¹

⁸⁰ Zhou AZ, Fink D. 2003. p43

⁸¹ Bollinger AS, Smith RD. 2001. p9

Furthermore, competition, customer focus, the challenge of a mobile workforce, equity in the work place, and the global imperative are key drivers for knowledge management and since knowledge is critical in obtaining competitive advantage within organisations, knowledge must be regarded as a critical resource and should be leveraged judiciously. Additional pressures include rapidly changing and turbulent operating environments, high stakeholder demands; corporate governance requirements, accountable risk management strategies, and the need to replicate acceptable performance make knowledge management a strategic activity in organisations. The following classification of business knowledge highlights where the risks of knowledge deficiencies may occur:

- What we know we know (knowledge sharing, access, and inventory)
- What we know we don't know (knowledge seeking and creation)
- What we don't know we know (uncovering hidden or tacit knowledge) and
- What we don't know we don't know (discovering key risks, exposures, and opportunities).⁸²

Knowledge management is seen to be a logical extension of three basic business trends:

- An increasing amount of digitized information data that is available 24 hours a day, seven days a week;
- Globalization of business such that production can occur anywhere in the world, as it is knowledge that is the true source of competitive advantage; and
- Growing complexity of business, which requires that new business processes will deliver 'the right information at the right time' so as to ensure accountability and reduce the risk of mistakes. Knowledge has been conceptualized as 'actionable information,' thus more effectively assisting in the decision-making processes within the organization.⁸³

Assuming a corporate or holistic perspective of knowledge also enables senior managers to explore opportunities to leverage knowledge for strategic gain of the whole organisation. A high-level view of the organisation affords executives a perception as to sources and uses of knowledge for operational and strategic benefit, where pockets of knowledge exist, and the benefits of when this tacit knowledge should be made explicit for the good of relevant communities of practice throughout the organisation.⁸⁴

⁸² Perrott BE. 2007. p525

⁸³ Perrott BE. 2007. p524

⁸⁴ Perrott BE. 2007. p525 - 528

2.11 Benefits of knowledge management

KM is a strategic process, the desired goal of which is to harness the value of information by integrating it with processes that govern the manipulation of intellectual assets. The use of KM enables organisations to have more effective decision-making processes and enables organisations both to create new knowledge and to apply this knowledge to generate more innovation in products, strategy, and processes. Greater levels of innovation and improved processes in turn lead to enhanced market and financial performance. KM also enables better strategic moves that enable the organisation to have greater-than-average long-term returns. Knowledge that is shared widely within the organisation and made available in a timely manner enables better strategic decision making.⁸⁵

Benefits to organisations include:

- Employees spending less time looking for information and expertise, enabling highly paid professionals to concentrate on their areas of expertise and generating less stress for employees trying to do more with fewer resources.
- A KM process will help employees to improve their performance and employability, by expanding resources immediately available to them and enabling them to make more intelligent decisions.
- KM will help organisations become more competitive by using new knowledge to reduce costs, increase speed, and meet customer needs⁸⁶

2.12 Barriers to effective knowledge management

Most of the barriers to effective knowledge management involve people, as humans are complex with diverse psychological needs.

- Most knowledge management systems require that data and documents be stored in knowledge bases. From an organisational perspective, the process of building these knowledge repositories can be very time consuming, labour intensive, and costly. People are already busy, and sharing knowledge may mean changing the way they work or adding extra steps to the process to extract the data and enter it into a repository.
- The difficulties surrounding the codification of tacit knowledge notwithstanding the fact that knowledge is constantly changing both at the individual and organisational levels. The gap between what people actually do to perform their jobs and how it is documented

⁸⁵ Harlow H. 2008. p150

⁸⁶ Bollinger AS.2001. p8-18

is difficult to bridge due to the spontaneous actions people take in response to unexpected challenges and problems. Knowledge bases that require a great deal of upkeep may tend to fall into disuse and decay due to obsolete information. Also, information taken out of context can be misleading and misinterpreted.

- Sometimes, too much information is available, and people are unable to assimilate it due to sheer volume and lack of appropriate tools. This results in information overload, frustration and demoralization. If workers do not see the benefits of the application, they will not use it.
- From a team/group perspective, team members may be reluctant to share knowledge if they fear criticism from their peers, or recrimination from management. There may also be subversion of group efforts if there is a lack of respect, trust, and common goals. Reward systems are sometimes based on what a person knows and individual effort, and may be a source of advancement within an organisation.⁸⁷

2.13 Critical Success Factors

The following points have been identified as the most important criteria that organisations should take note of when developing a knowledge management strategy and implementation.

- Positioning knowledge management as a strategic initiative: Knowledge management should have strategic focus in the organisation in order for it to be successful. An executive level sponsor in the organisation is a necessity to ensure that knowledge management has the required drive, buy-in, as well as support to enable successful implementation. It also creates opportunities for communication and marketing of the concept on a strategic level.
- Co-creation of the knowledge management strategy: the core knowledge management teams should ideally work in a community of practice alongside other enabling specialists, such as IT and human resources. Involving these specialists in the design of knowledge management strategic programmes ensures buy-in from all the parties that will play a role in implementation of knowledge management in the business, and creates a shared understanding of the concept and framework. This prevents cycles of rework in the process of establishing knowledge management as a strategic focus area.
- Creating a shared understanding of knowledge management necessitates change management in the organisation to align mental models around the concept of knowledge

⁸⁷ Bollinger AS.2001. p8-18

management. A specific change plan for knowledge management and mental model alignment in the organisation is usually required, on a business unit level, as well as on an organisation-wide level. This ensures that on a practical level, all employees understand what knowledge management is, why it is a necessity for the organisation and what value it adds for the individual, business units and the organisation.

- **Impact of communication:** communication plays a vital role to entrench knowledge management as a strategic focus area in the organisation. A structured communication plan using a variety of channels ensures adequate communication on knowledge management. Communication has had a significant impact in mobilising demand for knowledge management in the organisation and in creating shared understanding amongst employees.
- **Clearly defined knowledge ownership:** knowledge management has been positioned by a number of organisations to ensure that business units and group support functions own their own knowledge as well as solutions. The core knowledge management team's role is to provide tools, methodologies, processes, guidelines, practices and governance to assist business units in managing their own knowledge. This is especially important, as business units and group support functions in organisations have very unique needs and have a need to control their own working environments. This approach ensures a willingness to participate due to acknowledgement of ownership.
- **Enterprise-wide and business unit specific needs:** a distinct differentiation has been made between enterprise-wide solutions and context specific or business unit specific knowledge management solutions. Group-wide solutions could include, e.g. provision of knowledge on competitive intelligence, market intelligence and people skills within the organisation. Most business units and group support functions would have a need for this kind of knowledge and therefore the design and creation of these solutions are driven centrally to ensure that duplicate solutions are not developed and that the enterprise taxonomy aligns with business unit taxonomies. More specific solutions that apply to only certain areas of the organisation are developed in conjunction with applicable communities of practice and interest.
- **Managing all stages in the knowledge lifecycle:** organisations recognize the importance of managing knowledge through its lifecycle stages of creation, harvesting, sharing and leveraging and not only on sharing.
- **Alignment between business and technology:** knowledge management teams must closely align with the organisation's IT department to ensure that the business

requirements are understood and translated correctly into a technology environment that can support the knowledge management objectives. The process of co-creation of the strategic framework and programme has had a significant impact on creating shared meaning, ensuring business requirements are met through the technology landscape and preventing rework.

- Focus on tacit knowledge and explicit knowledge: although explicit knowledge sharing is seen as important, creating tacit knowledge sharing communities is as important.
- Understanding the role of culture in the organisation is crucial for knowledge management. There will never be a blueprint for implementation of knowledge management due to the fact that each organisation's culture is so unique, and therefore what works in one organisation may not necessarily work in another organisation. It is henceforth of utmost importance to assess culture right at the start of any knowledge management endeavour, as culture can determine how knowledge management can be implemented in the organisation.⁸⁸

2.14 Conclusion

This chapter has highlighted that an organisation's knowledge plays a central role in its ability to perform, albeit long term competitive advantage can only be gained from managing knowledge assets underlying organisational capabilities.

Competence depicts organisational and technical skills while capability depicts a strategic skill in the application and integration of competences. Both are intrinsic to achieving performance and a competitive advantage. Organisations that are able to learn quicker than their competitors and marshal their knowledge assets more effectively are more likely to be able to sustain their competitiveness.

Innovation is the effect of an organisation creating new knowledge and/or new ways of applying its knowledge and requires that an organisation is familiar with and able to identify its knowledge assets.

Finally, knowledge management is the key to maximising an organisation's knowledge related effectiveness by monitoring and facilitating knowledge related activities, establishing and updating knowledge infrastructure, creating, renewing and organising knowledge assets and utilising knowledge assets effectively.

⁸⁸ Du Plessis M. 2007. p98-99

The following chapter investigates the role of technology in knowledge management, both as an enabler and as a means to manage knowledge assets.

Chapter 3

Enabling Technology: KM Systems and Enterprise Portals

3.1 Introduction

This chapter introduces the reader to role of Information Technology in terms of the its role as an enabler in knowledge management practice, as a means to manage knowledge assets as well as the ability to improve business performance. The discussion firstly focuses on typical knowledge management technology highlighting strengths and weaknesses, whereafter an in-depth narrative of enterprise portals follows, emphasising features, benefits and critical success factors for implementation and successful use within organisations.

3.2 The Relationship between IT and Knowledge Management

Information Technology (IT) has been recognised as an enabling tool in facilitating knowledge transfer and sharing in knowledge management processes. IT as a knowledge management enabler mainly refers to that which supports and coordinates knowledge management; for example: databases, knowledge platforms, performance evaluation management systems, and integrated performance support systems. IT available for knowledge management includes data mining, decision support systems, expert systems, groupware, Internet, intranets, extranets, portals and e-mail systems.⁸⁹

IT and knowledge management are closely tied together, because both help the propagation of structured knowledge vertically as well as horizontally within the organization.⁹⁰ Furthermore, it is one of the driving forces for effective knowledge management as it plays a significant role in knowledge representation, knowledge repositories, knowledge transformation, and improves people's ability to acquire and share knowledge. The use of technology ensures fast and efficient accessibility and availability and manipulation of knowledge.

⁸⁹ Zhou AZ, Fink D. 2003. p44

⁹⁰ Yeh YJ, Lai SQ, Ho CT. 2006. p799

Organisations often develop specific knowledge management systems (KMS) to enable knowledge management practices and to complement and enable their core strategies. However, despite these often large investments in the technology, many of the performance outcomes are not clear.⁹¹

Organisations that use technology must ensure that is accessible, easy to leverage knowledge management and create a common controllable environment so that knowledge can be shared within the organization. Hence, IT can enable rapid search, access and retrieval of information, and can support collaboration and communication between organizational members. KM processes are complex, relying on people's previous knowledge, motivation and willingness to create, share and codify their own individual knowledge, therefore depending increasingly on the support of a solid IT infrastructure.

Knowledge items that an organisation needs to manage have different forms and content and include manuals, correspondence with vendors and customers, news, competitor intelligence and knowledge derived from work processes. These explicit artefacts can exist in different formats ranging from text to graphics and audio to video. The amount of information and knowledge in a modern organisation that needs to be captured, stored and shared, the geographic distribution of sources and consumers and the dynamic evolution of information make the use of technology support not an option but a necessity.⁹²

Information technology plays four different roles in knowledge management:

- obtain knowledge;
- define, store, categorize, index, and link knowledge-related digital items;
- seek and identify related content; and
- flexibly express the content based on the various utilization backgrounds.⁹³

However, knowledge management literature is beset with warnings and examples where technology has been perceived as the panacea for all knowledge management issues and where organisations have turned to technology as a quick solution to implementing knowledge management.⁹⁴ Chua⁹⁵ makes an important observation that this is most likely

⁹¹ Harlow H. 2008. p151

⁹² Lindvall M, Rus I, Sinha SS. 2003. p137

⁹³ Yeh YJ, Lai SQ, Ho CT. 2006. p799

⁹⁴ Lindvall M, Rus I, Sinha SS. 2003. p139

⁹⁵ Chua A. 2004. p88

because technology represents a highly visible and tangible solution to an intangible and complex practice for an organisation to embark on.

KM technology has often been blamed for the failure of knowledge management.⁹⁶ The most common misconception that companies must overcome if they are to use KM effectively is that it is all about technology. Too many people make the mistake of confusing knowledge management with a technological fix. Businesses often expect that investment in new computer systems or software will solve their knowledge management problems. Knowledge management is not just about technology, in fact, too much technology can overwhelm employees and actually hinder the process. Furthermore, a technology approach is doomed to failure as KM is essentially a cultural activity that must focus on the human resources of an organisation. Employees are often expected to fit the technology while technological solutions should only be developed to support people, according to their needs and ability to successfully adapt to new working practices.

Researchers agree that the biggest hurdle to instituting knowledge management is not the deployment of a technology solution but in changing people's behaviour and encouraging them to share their know-how.⁹⁷ Although technology is an important part of the KM process as it can facilitate the access to information and transfer of knowledge but the needs of people must remain foremost.⁹⁸ It is important to recognise that the existence of technology will not turn a knowledge hoarding organisation into a sharing one – it requires an appropriate amount of culture change and technology. Indeed, technology can be used as an opportunity to change behaviour.⁹⁹

While some KM literature lowers the value of technology for knowledge sharing, technology can be used successfully to establish the knowledge sharing process across, time, space and virtuality. Furthermore, it can extend the reach and speed of knowledge transfer and assist in the exploration and exploitation of knowledge.¹⁰⁰

While technology cannot provide a perfect substitute for face to face content, it serves as a repository in which knowledge can reliably be stored and efficiently retrieved. The key is to understand how technology is most appropriately deployed and aligned to the knowledge

⁹⁶ De Souza, K. 2003. p 26

⁹⁷ De Souza, K. 2003. p 26

⁹⁸ Call D.2005. p16

⁹⁹ Mohamed M, Stankosky M, Murray A. 2006. p107

¹⁰⁰ Coakes E. 2006. p579

management activities in the organisation.¹⁰¹ More specifically, knowledge management initiatives that undervalue IT and the role that it can play, are equally as unappreciated. Organisations that have a firmer understanding and strategy to manage knowledge, specifically tacit, achieve higher than average returns and are markedly competitive.¹⁰²

Technology must support the business strategy, add value, and be measured. Eight metrics have been identified for KM analysis including motivation, knowledge capture, stored knowledge, personal training, knowledge transfer, creative thinking, knowledge identification, and knowledge access. It is obvious that IT can significantly contribute to all of these metrics.¹⁰³

The uniqueness of each organisation's knowledge management strategy means that the technology that it selects and deploys will necessarily be different and a one size fits all approach is inappropriate. Mohamed et al¹⁰⁴ make a valid point – the key to achieving harmony between the two is to remember that there are certain areas where technology excels and areas where humans excel and the tension between the two results when one paradigm is forced to operate within the realm of another. In reality, much of the failure of knowledge management technology is caused by humans expecting an inanimate object to produce results that should be human led.

Technology is touted as masking the range of knowledge available in an organisation and processes that facilitate the flow of knowledge. Organisations are urged to develop an integrative approach to KM that covers all components of knowledge and leverages specific components strategically aligned to their business objectives.

The use of technology for KM carries an inherent risk in losing control over the flow of knowledge in the organization and it thus important that technical problems are sorted out prior to implementation and that adequate support measures are in place.¹⁰⁵

Many KM initiatives and/or activities are under the leadership of information technology (IT) director or information systems (IS) manager. KM is then pursued as mainly an IT issue by the IT department, rather than engaging the whole organisation, thus lacking a systematic approach. This techno-centric approach seems largely the result of a seduction by IT and the push of the IT industry, which gives a false image that KM-related business issues could be

¹⁰¹ Chua A. 2004. p88

¹⁰² Harlow H. 2008. p151

¹⁰³ Mohamed M, Stankosky M, Murray A. 2006. p111-112

¹⁰⁴ Mohamed M, Stankosky M, Murray A. 2006. p112

¹⁰⁵ Du Plessis M. 2007. p97

easily resolved with IT products in the market. The techno-centricity of knowledge management impedes organisations' ability to achieve their knowledge objectives, jeopardises the potential benefit from knowledge management activities, and hence would lead to failure in KM implementations.¹⁰⁶

3.3 Defining Knowledge Management Systems

Knowledge management in its broadest application refers to how a firm acquires stores and applies its own intellectual capital. From a theoretical standpoint, knowledge management systems refer to the information systems adopted and designed, which efficiently and effectively leverages the collective experience and knowledge of employees to support information processing needs, as well as enabling and facilitating sense-making activities of knowledge workers; i.e. systems that actualize the knowledge architecture.¹⁰⁷

Definitions for knowledge management systems abound and include suggestions such as:

- A knowledge management system (KMS) is a technology that supports knowledge management in organizations, specifically, knowledge generation, codification, and transfer.¹⁰⁸
- A KMS is one that allows both tacit uncodified and explicit codified knowledge to be created, stored and shared using technology or other methods.
- A KMS supports the following eight major knowledge processes:
 - generation of new knowledge
 - accessing valuable knowledge from outside sources
 - using accessible knowledge in decision making
 - embedding knowledge in processes, products and/or services
 - representing knowledge in documents, databases, and software
 - facilitating knowledge growth through culture and incentives
 - transferring existing knowledge into other parts of the organization and
 - measuring the value of knowledge assets and/or impact of knowledge management.¹⁰⁹

¹⁰⁶ Zhou AZ, Fink D. 2003. p41

¹⁰⁷ Wickramasinghe N. 2003. p. 298-312

¹⁰⁸ Benbya H, Passiante G, Belbaly NA. 2004. p202

¹⁰⁹ Harlow H. 2008. p150

- IT in general and knowledge management systems in particular play an important role in the development of knowledge management capabilities and a KMS refers to a broad class of information technologies for knowledge acquisition, creation, integration, transfer and application.
- Typical KMS technologies include databases, intranets, groupware and search engines. In practice these technologies are usually embedded in different business processes, e.g. supply chain management, customer relationship management, competitive intelligence monitoring, and operational management, which results in various KMS applications. These KMS applications are expected to enhance flexibility and adaptability, and subsequently the firm's long-term competitiveness and survival¹¹⁰.
- Knowledge technologies should support the entire knowledge process flow and/ or be able to integrate different components of systems possibly from different vendors. Knowledge management should be supported by a collection of technologies for authoring, indexing, classifying, storing, contextualising and retrieving information and application of knowledge. A user-friendly front end and robust back end are vital and making the knowledge base available to the organisation and delivering the right knowledge at the right time is key.¹¹¹
- Knowledge management systems are specific information systems that focus on organizational knowledge resources and processes. The three primary functions of a KMS, are:
 - to build a knowledge infrastructure
 - to proactively seek and offer knowledge
 - and to make knowledge visible and show the role of knowledge in organizations
- Sources of organizational knowledge are both internal and external. The major internal sources include business processes, databases and employees, while external sources consist of inter-organizational processes, customers, business partners, and market and competitive intelligence. KMS include a variety of applications to capture, manage and leverage the knowledge associated with these diverse sources¹¹²

¹¹⁰ Khalifa M, Yu AY, Shen KN. 2008. p119

¹¹¹ Lindvall M, Rus I, Sinha SS. 2003. p139

¹¹² Khalifa M, Yu AY, Shen KN. 2008. p120

Information systems designed specifically to facilitate the generation, integration, sharing and dissemination of organizational knowledge are referred to as knowledge management systems and fall into four categories:

- Content management tools: tools that offer abilities to integrate, classify, and codify knowledge from various sources
- Knowledge sharing tools: tools that support sharing knowledge between people or other agents
- Knowledge search and retrieval systems: systems that enable search and retrieval and have some knowledge discovery abilities
- General KMS: systems that propose an overall solution for a company's knowledge management needs. Among these general KMS, enterprise portals seem to present the potential of providing organizations with a rich and complex shared information workspace for the creation, exchange, retention and reuse of knowledge¹¹³

The following three tiered KMS Architecture identifies three distinct services supported by KMS technologies:¹¹⁴

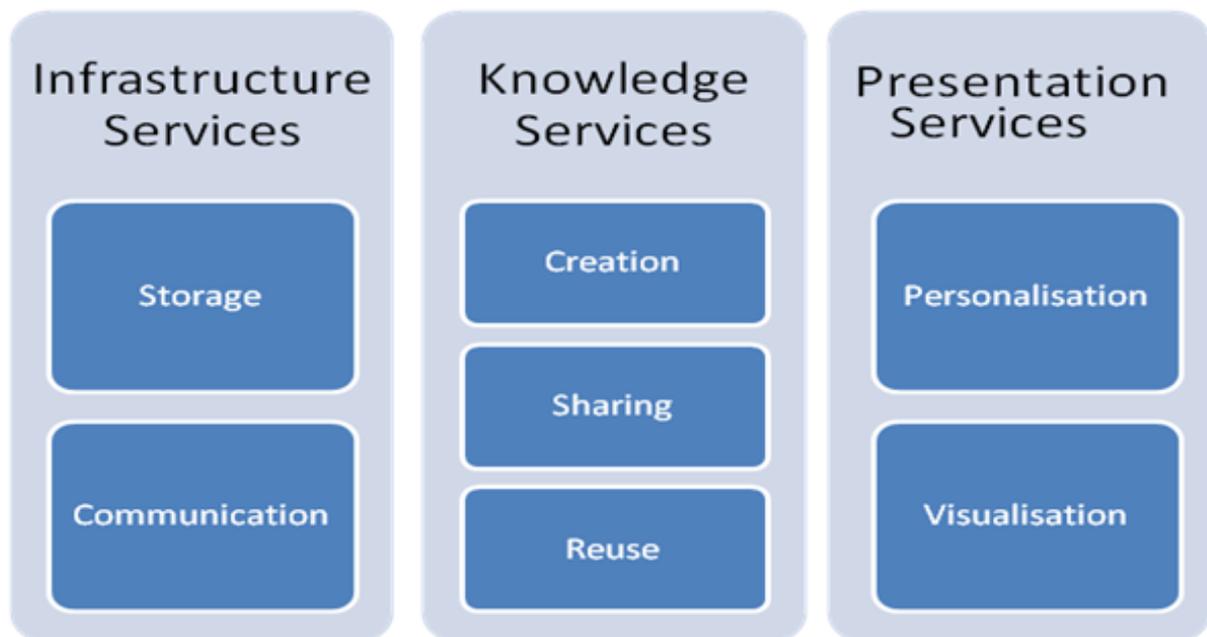


Figure 3.1: KMS Architecture
(Source: compiled by author)

¹¹³ Benbya H, Passiante G, Belbaly NA. 2004. p204

¹¹⁴ Chua A. 2004. p89

Infrastructure services	
Basic technology platform and features needed to implement KM. Two main services provided are storage and communication:	
Storage	Technology enabled store i.e. knowledge repository, typically defined by its content and structure. Content is the actual knowledge stored, Structure refers to how each knowledge unit is specified, the format in which it is represented, the indexing scheme and how each knowledge unit is linked to others. Repositories must be capable of supporting content that is unstructured and of greater richness and form the basis for supporting KM processes, particularly knowledge creation and reuse.
Communication	Includes communication between users i.e. file sharing and email, collaboration among users i.e. synchronous meeting and asynchronous discussion forums and workflow management including managing workflow process by supporting online execution and control of workflow.

Table 3.1 - Infrastructure Services
(Source: compiled by author)

Knowledge services	
Intended to achieve the goals of KM directly. Three primary goals are to promote the process of generating new knowledge, encourage the flow of knowledge among members and ensure the ease of access to knowledge repositories. The underlying processes of these three KM goals are:	
Knowledge creation	<i>Exploitation</i> i.e. refinement of existing knowledge into new knowledge to achieve improvement in efficiency and effectiveness, <i>Exploration</i> i.e. creation of knowledge through discovery and <i>Experimentation</i> or codification i.e. the articulation of tacit knowledge into formats such as formulae, manuals or documentation that are comprehensible and accessible to others.
Knowledge sharing	Flow of knowledge from one part of the organisation to other parts. If the process is not properly managed, valuable sources of knowledge in the organisation will remain local or fragmentary and internal expertise under leveraged. One goal of KM is to foster the flow of knowledge among members of the organisation. Social computing is the development of digital systems that are drawn from social information and context to enhance the activity and performance of people and organisations.

Knowledge reuse	Synonymous with information retrieval. Process includes capturing, packaging, distributing and using. Search capabilities and automatic generation of meta data. The value of meta data is in encapsulating information about the document that can be used to construct selected views of the info based on the user's requirements.
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Table 3.2 - Knowledge Services

(Source: compiled by author)

Presentation services	
Primarily concerned with enhancing the interface between the user and the information/ knowledge sources. Two common features of presentation services are:	
Personalization	Involves gathering user info and delivering the appropriate content and services to meet the specific needs of a user. It is implemented by aligning three components i.e. user profiles, content and business contexts.
Visualisation	Purpose is to help users better understand the information and knowledge available by making subject based browsing and navigation easier

Table 3.3 - Presentation Services

(Source: compiled by author)

3.4 Defining Enterprise Portals

In order to maintain organisational competitiveness, knowledge workers must be able to change their work processes and their supporting information systems to meet the changing needs of their customers. Enabling the ability for employees to select the information they need, as well as the ability to change work processes and systems they work with has a unique set of challenges. Creating a knowledge management system that combines these efforts is an even more difficult management problem. To be successful with this KM initiative, an organisation must manage the different activities together, interface with each other without interfering with each other and be focused on the future. This must be done within the unique context of the organisation where the operational activities and strategic initiatives are considered equally over time. An organisation's ability to balance the activities of its knowledge workers between planning for its future and running the business is important for maintaining and expanding shareholder value.¹¹⁵

¹¹⁵ Collins H. 2003, p 8

Transnational organisations have specific issues relating to space and time and increasing virtuality in their working practices. Technology can assist to alleviate these issues and can provide the organisations with ways to share and distribute knowledge throughout their processes, sites and workforces. Successful knowledge management continues to require a socio-technical approach where the social aspects of knowledge creation, storage and sharing need to be considered alongside the technical. Socio-technical theory advises that we must consider people, task, process and environment (both internal and external) when considering how best to implement technology into our organisations.¹¹⁶

Enter the enterprise portal, an information technology enabling platform used to implement knowledge management initiatives. Portals provide the doorway to resources and services. When an enterprise portal is designed around an organisation's knowledge management strategy, then an enterprise *knowledge* portal has been built.¹¹⁷ Enterprise portals promise to provide secure, customizable, personalized, integrated access for employees as well as customers and business partners to dynamic content from a variety of sources, in a variety of source formats, wherever it is needed, often with an increasing focus on business processes.¹¹⁸

The terms Employees Portals, Enterprise Intranet Portals, Enterprise portals, Business-to-Employees Portals and Business-to-Employees Systems are sometimes used interchangeably as synonyms to refer to the category of portals which aim at providing employees with in-time relevant information they need to perform their duties and make efficient business decisions. Unfortunately, confusion still exists regarding the term "portal." To many organizations, a simple Web site aimed at their employees is a portal.¹¹⁹ The following definitions cited in Benbya¹²⁰ represent an integrated understanding of the term enterprise portal:

- A personalized workspace that integrates the most relevant sources of information and the underlying connections that make this information valuable to organisations in a single point of access.
- A portal is a web site targeted at a specific audience that provides: content aggregation and delivery of information relevant to the audience, collaboration and

¹¹⁶ Coakes E. 2006. p579

¹¹⁷ Collins H. 2003. p8

¹¹⁸ Remus U. 2007. p538

¹¹⁹ Gootzit D. 2007. p1

¹²⁰ Benbya H, Passiante G, Belbaly NA. 2004. p204-205

community services, and application access for the target audience, delivered in a highly personalized manner.

- A portal leads somewhere or to something, it is a doorway. In the enterprise, the doorway leads to content, data and services within and beyond the organization. The value of the enterprise portal lies in its ability to provide a single access point to disparate information.
- Applications that enable companies to unlock internally and externally stored information, and provide users a single gateway to personalized information needed to make informed business decisions.
- A tool that provides business users with a single web interface to corporate information scattered throughout the enterprise.
- Single-point Web browser interfaces used within organizations to promote the gathering, sharing and dissemination of information throughout the enterprise.

Portals can provide the doorway to resources and services. A portal can be defined as an entry point or originating website for combining a fusion of content and information dissemination services. A portal should provide access to tools for collaboration, research and personal productivity and offer functionality such as scalability, legacy system integration and future system compatibility. Portals provide a common and well understood interface that becomes transparent to users so that use of such technology becomes second nature to the users.¹²¹

Enterprise portals direct individuals to digital knowledge objects and information system applications, helping them make sense of the volume of information that is available and showing how organisational knowledge resources are interconnected. It might include access to external source of information, news feeds and research and internal sources of knowledge and capabilities i.e. email, chat, instant messaging, discussion groups and videoconferencing. Capabilities for categorizing, indexing and searching for content and for linking business applications such as enterprise and customer relationship management. An enterprise portal can enhance employee productivity by presenting a seamless single point of access to all information resources employees need to do their jobs. Portals or portions thereof are extended to customers, suppliers and business partners and can help these groups understand a company's business or unique value proposition.¹²²

¹²¹ Coakes E. 2006. p582 - 584

¹²² Laudon KC, Laudon JP. 2004. p324-325

Enterprise portals provide a secure, personalized view of the enterprise for each individual user or class of users, based on job functions, roles or other relevant criteria. An enterprise portal integrates disparate sources of information and business logic, and provides a single point of access to the knowledge and processes of the organisation through a simple and intuitive interface to users of the extended enterprise, including customers, employees, suppliers, and business partners alike, with a single point of access to the knowledge and processes of the organization through a simple, intuitive interface. The technicalities of the back-end applications, documents or databases remain in the background and are invisible to users. Using an enterprise portal, these constituencies (customers, partners, employees) can conduct business via the intranet, extranet or Internet from wherever and whenever convenient for them. In the most simplistic sense, an enterprise portal can be simply a Web page that has been created to collate the hyperlinks to all the web applications which are basically separate applications with differing functions and user interfaces. Sophisticated enterprise portals are expected to accomplish much more than a web page hyperlinked to web applications. The accesses are usually highly personalized, depending on the roles and responsibilities of the users in the organization. Rapid deployment is achieved while high consistency is maintained. Searching within the portal is facilitated and better teamwork and collaboration is enabled.¹²³

Enterprise portals offers a solution for managing large and complex amounts of information as it can be used to gather, manage, share and utilise information that has been stored in disparate databases throughout the company. An enterprise portal can be defined as a single point of access for the pooling, organising, interaction and distributing of organisational knowledge.¹²⁴

Enterprise portals create a customised single gateway to a wide and heterogeneous collection of data, information and knowledge. They provide different kinds of personalization so that content is presented in a manner that suits the individual's role within the organisation and reflects personal preferences. The organisation and the user can control which information is made available and how it is displayed.¹²⁵ Portals pull information from different sources and display it in a coherent way performing an explicit to explicit knowledge conversion. Portals support knowledge distribution and organise information display.¹²⁶

¹²³ Huang GQ, Zhao JB. 2007. p76-77

¹²⁴ Raol JM, Koong KS, Liu LC, Yu CS. 2003. p693-694

¹²⁵ This is an excellent example of diffusion.

¹²⁶ Lindvall M, Rus I, Sinha SS. 2003. p144

Many organisations are trying to facilitate end user access to information resources and applications through the implementation of portal technology. A portal is a framework for integrating information and processes across corporate boundaries. It provides a single gateway for users, such as employees, customers and external partners, to log into and retrieve corporate information and other services or resources. The kind of information provided may include structured and unstructured information such as human resource information, company documents and records, company history, financial, sales, product and shipping information as found in databases, e-mails, files, archives and sophisticated applications such as enterprise resource planning and customer resource management applications. The portal may also include access to collaborative tools to enable employees to communicate and to work more efficiently together.¹²⁷

3.4.1 The Advent of Enterprise Portals

Portal technology has evolved through multiple generations since the first portals arrived in 1997. Each generation builds on the previous one:

- Generation 1 was about access to content, providing personalized delivery of content as well as unified search and basic presentation management.
- Generation 2 scaled up the technology foundation with a robust extensible application framework, basic application integration and the beginning of collaborative features.
- Generation 3 added process integration and basic support for Web services and multiple portals.
- Generation 4, the current generation, introduces support for portal federation, composite applications and portlet standards.

These generations show where the majority of portal products are at a given point in time. Not all vendors support all features, and some will lead others by as much as several years. This technology stream is independent of how a portal package is used¹²⁸. Portal technology is also distinct from how portal products are packaged, increasingly as bundled suites

- Generation 5 portal products will push service oriented architecture (SOA) to new levels. They will provide off-the-shelf support for service-oriented business

¹²⁷ Davies, R. 2007. p641-643

¹²⁸ . That is, an end-user organization can undertake a Generation 1 deployment using the latest Generation 4 technology. Gootzit D. 2008.p13

applications (SOBAs), packaged integrating processes (PIPs) and packaged composite applications (PCAs), as well as process orchestration and syndication of services.

Although no vendor offers Generation 6 functionality, the focus of value will be on providing an aggregated experience for users who interface with multiple portals.¹²⁹

A broad variety of different purposes of enterprise portals can be distinguished, ranging from extranet portals providing in-depth content and offering special advantages for business-to-business or e-commerce activities up to intranet portals supporting internal communication and knowledge management¹³⁰ and they are increasingly emerging as home bases for employees. A portal can be viewed as a way to access disseminated information within a company since information chunks can be stored in various systems using different formats. One of the major differences between a traditional web site and a portal resides in the fact that the portal is usually tailored according to the users' need.

The earliest Internet mega-portals such as Yahoo, MSN and Google provided inspiration for the first generation of enterprise portals, and are again providing insight about the directions enterprise portals will take. Social networking, social tagging, wikis, blogs and personal home pages are examples of Web 2.0 functionality found in the consumer Web, which vendors providing enterprise portal products are incorporating.¹³¹

Many, but not all, enterprise portals are built using a portal product or a software suite, including portal functionality. A portal product is a packaged software application that is used to create and maintain enterprise portals. These products can be used to design vertical or horizontal enterprise portals.

- Vertical portals focus on accessing specific applications or business functions.
- Horizontal portals seek to integrate and aggregate information from multiple cross-enterprise applications, as well as specific line-of-business tools and applications.

3.4.2 Drivers for the use of Enterprise Portals

As the basis of value creation and success of organizations increasingly depends on the leverage of knowledge available internally, knowledge management systems are emerging as vital tools for competitive advantage. Among these systems, enterprise portals present the potential of providing organizations with a rich and complex shared information workspace

¹²⁹ Gootzit D. 2008. p13

¹³⁰ Remus U. 2007. p538

¹³¹ Gootzit D. 2008. p2

for the generation, exchange, and use of knowledge. But developing enterprise portals and building the critical mass of users required to make them successful is not an easy task.¹³²

Portals deployed with a strong knowledge management and user's perspective can cause a major shift in the quality and speed of work in knowledge intensive organisations and ultimately in how enterprises function. Successful portals have been adept at creating trust based environments where content is relevant, accurate, timely, communities thrive and users engage in deeper relationship with the portal through personalization. Enterprise portals are being implemented to serve the needs of employees, communities and even extended networks that go beyond the walls of traditional organisations. Enterprise portals start squarely with the needs of a wide base of groups of end users in mind:

- What do users need to perform their job functions?
- What knowledge sources do users already rely on or could rely on in the future?
- How will users access information and knowledge?
- Will the enterprise portals be intuitive for users?
- How will the enterprise portal support user skill development and decision making?

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Enterprise portals can be used to develop and implement knowledge management initiatives and are fundamentally changing how information and collaboration responsibilities are shared in an organisation. Enterprise portals integrate many features closely related to processes that can be important in the deployment of a KM strategy i.e. personalization and search, access to information sources from highly unstructured to structured, internal and external information, communications and collaboration, ease of publishing and access to a vast amount of data, information and knowledge.

Enterprise portals can be designed and deployed to support connections between people and knowledge or information sources (internally and externally). They can spark knowledge creation, the reuse of documented (explicit) knowledge and the rapid mobilization of individuals who can access solutions will have a significant impact on how organisations create, organise, access and reutilize knowledge.¹³⁴

Contrary to previous IT waves, enterprise portals are being developed with a social technical perspective underpinned by KM and Community of Practice (CoP) theories. Enterprise

¹³² Benbya H, Passiante G, Belbaly NA. 2004. p201

¹³³ Terra JC, Gordon C. 2003. pXiii - Xiv

¹³⁴ Terra JC, Gordon C. 2003. pXv

portals are rapidly becoming an essential corporate capability for competitive advantage. Organisations are using enterprise portals to improve and leverage their knowledge assets. Enterprise portals can be used to make it easy to rapidly identify assets and best practices within about outside an organisation and to efficiently share these practices widely to help an organisation achieve its strategic objectives.¹³⁵

Enterprise portals are becoming mandatory from a cost management point. They provide substantial productivity improvements, cost savings in IT and content management and interesting opportunities for centralisation of corporate services. They can significantly help reduce the reinvention of the wheel syndrome and enterprise portals can provide an important strategic tool for rapidly integrating newly merged organisations and an essential helping organisation act as one firm regardless of site location.¹³⁶

The use of enterprise portals are being driven by enormous volumes of information being created, stored and distributed, the speed with which knowledge content changes and the ongoing transformation of the workplace.

To survive, organisations need to be more proactive in their support of knowledge creation and reuse. They need automated systems that can bring the right source of knowledge or information to the user – wherever that person is located, virtually instantaneously.¹³⁷

KM in the networked era means using the power of the Internet to bring the sources of knowledge (codified or tacit) closer to where they are needed. In this respect, KM is about supporting and improving meaningful connections among knowledge sources regardless of their format.¹³⁸ Enterprise portals implemented with a strong intellectual asset management perspective are becoming a tool for competitive advantage.¹³⁹

Current challenges in organisations that will drive adoption of enterprise portals include:

- Incompatible proprietary file formats or platforms
- Information accessed through many different methods including client software, Web browsers, applications and individual hard disks
- Disorganized information
- Inability to easily publish information for enterprise wide viewing
- Searching and accessing information

¹³⁵ Terra JC, Gordon C. 2003. pXvi

¹³⁶ Terra JC, Gordon C. 2003.

¹³⁷ Terra JC, Gordon C. 2003. p22

¹³⁸ Terra JC, Gordon C. 2003.

¹³⁹ Terra JC, Gordon C. 2003. p32

- Non technical users dependent on the IT departments to generate reports or obtain information
- Inability to distribute info widely and beyond the walls of the organisation
- Lack of effective online collaboration tools
- Expensive proprietary architectures that are hard to integrate with different information sources or types
- Overlapping systems often without Browsers
- Outdated desktop centered view of IT applications.
- Enterprise portals provide a format that requires little technological expertise and comparatively little training from end users. They allow non technical people to easily access the wells of information and knowledge existing inside and outside an organisation.¹⁴⁰

With too much information usually available to employees in multiple systems, archives and stored only within the brains of specific individuals, a road map that would help employees determine available information and how exactly to locate it when they need it is required to effectively and efficiently complete complicated and sequential work processes. This road map exists in the form of filters, content categorisation and navigation schemes that allow knowledge workers to select the information that is important to them.¹⁴¹

3.4.3 Enterprise Portal Features and Functionality

Coakes explains that enterprise portals have fairly complex structures and features. However their basic functions and elements are relatively easy to define. From an operational perspective the strength of enterprise portals lies in their ability to provide Web based access to enterprise information, applications and processes. Secondly from a functional perspective, they leverage existing information systems, data stores, networks, workstations, servers and applications as well as other knowledge bases to give each employee in every corporate site immediate access to an invaluable set of corporate data anytime and anywhere. However, at the core of any portal framework, are the applications it purports to support. These can be quite diverse and range from unit specific to organisational wide capabilities, staff to administrative support functions and individual to system wide inquiries. Both internal and external stakeholders can access all of these applications.¹⁴²

¹⁴⁰ Terra JC, Gordon C. 2003. p95

¹⁴¹ Collins H. 2003. p8

¹⁴² Raol JM, Koong KS, Liu LC, Yu CS. 2003. p694

Enterprise portals integrate knowledge from multiple functions or systems, provide access to the knowledge repertoire, and facilitate communication throughout the organization thus enabling/supporting important KM processes within the organization.

Enterprise portal suites should include and provide the following features and functionality:¹⁴³

Core Functionality	
Content management which includes:	<ul style="list-style-type: none"> An enterprise <i>Taxonomy</i> sometimes referred to as “classification schemes” or “categorization schemes” that help organise information for easy retrieval. Each refers to grouping together similar items into broad “buckets” or “topics” which themselves can be grouped together in ever-broader “hierarchies. Corporate taxonomy benefits include search, support, navigation, data control/mining, schema management, and personalization/information delivery.¹⁴⁴
	<ul style="list-style-type: none"> <i>Publishing</i> - a facility that supports content creation, authorization, inclusion and includes the ability to render or publish documents in alternate formats including HTML, PDF, XML, etc. in portal content collections.¹⁴⁵
	<ul style="list-style-type: none"> <i>Document Management</i> – the documents organisations produce represent explicit knowledge. New knowledge can be generated from documents and experts can be identified based on authorship of documents. Enables explicit to explicit knowledge conversion and tacit to explicit conversion when experts are determined based on documents they authored. Document management systems offer features that include storing/ uploading of documents, files, version control, organisation, search and retrieval and advanced searching and access from any Internet connected workstation and search for expertise based on authorship.¹⁴⁶

¹⁴³ Coakes E. 2006. p583

¹⁴⁴ Benbya H, Passiante G, Belbaly NA. 2004. p203

¹⁴⁵ Benbya H, Passiante G, Belbaly NA. 2004. p203

¹⁴⁶ Lindvall M, Rus I, Sinha SS. 2003. p140-144

<p>Collaboration-</p>	<ul style="list-style-type: none"> • Enterprise portals provide the ability to create a shared community and online collaboration by assembling a set of content and services to which members of a group have special accesses. Collaboration tools include e-mail, threaded discussions, chat and bulletin board software that offer a whole range of ways to communicate and share information¹⁴⁷ as well as threaded conversation, project management tools such as task lists, calendars, document sharing or instant messaging.¹⁴⁸
<p>Access and Integration</p>	<ul style="list-style-type: none"> • Enterprise portals enhance access to an enterprise's information assets by providing a gateway to the Web that allows the plethora of information on Internet and Intranet Web sites to be organised and customised through a single entry point¹⁴⁹ • The ability to present a unified view of corporate information that integrates information from different organizational repositories instead of having corporate information spread across many sources within the organization.¹⁵⁰
<p>Expertise location and management</p>	<ul style="list-style-type: none"> • Provides forum for people who need to establish knowledge sharing focused on solving a problem Common features are expertise brokerage and expert identification, also collaboration, capturing questions and answers, track and rate expertise¹⁵¹
<ul style="list-style-type: none"> • <i>Community functionality-</i> Communities require a number of resources and facilities, both physically and virtually. Enterprise portals provide the following functionality. 	<ul style="list-style-type: none"> • A space to meet – online through software that permits discussion groups, e-forums, threaded discussions, online chat rooms for instant communication and virtual meeting rooms. • A place to store ideas – virtual discussions are easily stored in discussion threads and best practice databases that are generated and extracted from these discussions • A memory of activities - databases storing content

¹⁴⁷ Khalifa M, Yu AY, Shen KN. 2008.

¹⁴⁸ Benbya H, Passiante G, Belbaly NA. 2004. p203

¹⁴⁹ Khalifa M, Yu AY, Shen KN. 2008. p592-594

¹⁵⁰ Benbya H, Passiante G, Belbaly NA. 2004. p203

¹⁵¹ Lindvall M, Rus I, Sinha SS. 2003. p140-144

	<p>and documents, virtual presentations, webinars and online courses can provide memory</p> <ul style="list-style-type: none"> • A record of members and their interests – member profiles, searchable expertise and ability to link members with similar interests to enhance social networking within the community. Once expertise is stored in a database, CoPs can enhance their profiles by linking to their own records or reports, articles, web pages, blogs etc • A means of communication i.e. video conferencing, web cam or telephones • Ways to share tacit knowledge¹⁵²
<p>Personalisation and Customisation</p>	<ul style="list-style-type: none"> • Supports the essential building blocks of any portal which has as one of its purposes the dissemination of quality internal and external information. Provides the ability for users to modify their own interfaces and specify their preferences, but also the ability of the system to use such information to dynamically deliver specific content to users in order to propose to them the most relevant information to perform their job. Personalization includes both push and pull technologies. Pushed information. refers to user defined and selected content – such as news, events or specialised memos – which is sent to the particular user.¹⁵³ The ability to adapt to the individual characteristics of its user is the main difference between a portal and a traditional Web home page. Personalised portals are easier to use, less costly to support and more interesting to visit than static Web pages. It automatically offers different information and resources to different users based upon their roles, rights, interests, or past usage.¹⁵⁴ A good portal takes customisation one step further, that is, it enables an

¹⁵² Mohamed M, Stankosky M, Murray A. 2006. p107

¹⁵³ Khalifa. M. Yu AY, Shen KN. 2008.pp 592-594

¹⁵⁴ Khalifa. M. Yu AY, Shen KN. 2008.pp 592-594

	<p>end-user to subscribe and unsubscribe to channels and alerts, set background colours, change the position or layout of the screen, set application parameters, create and edit profiles, and add or remove links depict a true portal as developing personalization to such an extent that it should allow a user to select and store a personal set of appearance and content characteristics, which can be different for every single user.</p>
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Table 3.4 – Core Functionality
(Source: Compiled by the author)

<p style="text-align: center;">Supportive Capabilities</p> <p>These are mainly tools necessary for the well-functioning of the corporate portal and consist of:</p>	
Search	<ul style="list-style-type: none"> • The documents created by employees, partners, customers and competitors are often the most important information available to the organization that remains in general dispersed in numerous places. For these reasons an integrated search capability across multiple information repositories is essential.¹⁵⁵
Security	<ul style="list-style-type: none"> • The ability to secure access to diverse range of resources with incompatible security controls is an enormous challenge for enterprise portals.
Scalability.	<ul style="list-style-type: none"> • The ease with which the system can expand to support an increasing number of users or can be modified to fit the problem¹⁵⁶

Table 3.5 – Supportive Capabilities
(Source: Compiled by the author)

¹⁵⁵ Benbya H, Passiante G, Belbaly NA. 2004. p203

¹⁵⁶ Benbya H, Passiante G, Belbaly NA. 2004. p203

Knowledge Process Management	
<p>The most important functionality of portals is their ability to synchronize and support knowledge development phases. Enterprise portal technology, if built correctly, can be positioned as the central hub of the organization, that enable employees to find relevant vital information and knowledge touch-points (such as experts) required to successfully perform their engagements. The portal tools should be viewed as the mechanisms to augment and interconnect resources so that information can be distributed. Enterprise portals have the ability to support the following KM processes:</p>	
Knowledge generation	<ul style="list-style-type: none"> enabling the acquisition, synthesis, and creation of knowledge.
Storage process	<ul style="list-style-type: none"> enabling the organisation to classify the filtered knowledge and add it to the organizational memory.
Distribution process	<ul style="list-style-type: none"> enabling knowledge to be distributed and shared throughout the organization, before it can be exploited at the organizational level
<ul style="list-style-type: none"> <i>Use and Reuse process</i> 	<ul style="list-style-type: none"> enabling the organization's knowledge workers to use the retrieved knowledge in performing tasks such as: solving problems, making decisions, researching ideas, and learning. The application of knowledge is the most essential task of knowledge management.¹⁵⁷

Table 3.6– Knowledge Process Management
(Source: Compiled by the author)

3.4.4 Benefits of using Enterprise Portals as an enabling tool

Enterprise portals provide a miscellany of benefits including the benefit of cost reduction, organisation and structuring of information and the capability to respond to information requests due to timeous access to relevant knowledge assets. Their competitive advantage is inherent in their abilities to filter, target and categorise information so the users will get only what is needed.¹⁵⁸ In addition, benefits such as global consistency and availability of

¹⁵⁷ Coakes E. 2006. p583

¹⁵⁸ Raol JM, Koong KS, Liu LC, Yu CS. 2003. p693-694

information, business flexibility, collaborative working, integrated end to end business process through workflow and process management tools, knowledge delivered in context and functionality more effective as it is delivered as part of a business process reflecting how someone works, aggregation of content making it simpler to find and manage. The following benefits have been identified as the most important outcomes of implementing enterprise portals

- **Organisational Agility**

Enterprise portals facilitate the creation and management of knowledge repositories and the exchange of information and experiences among employees, helping organizations to achieve internal agility.

An important area of under-exploitation is that of converting an organisation's internal knowledge assets into externally marketed knowledge based products and services. The initial focus for deep knowledge collaboration is often internal. However, enterprise portals are a new and major cornerstone in the move toward pushing information and knowledge to where it is needed within and beyond the walls of the organisation.¹⁵⁹ Since the possession of knowledge and information translates into capabilities and profits, the primary goal of management today is to discover relevant information and knowledge in a timely manner and convert it into a competitive advantage.¹⁶⁰

Enterprise portals offer new opportunities for knowledge workers who are dispersed across geographic regions, providing access, support and assistance, communication, sharing and collaboration through virtual working practices.¹⁶¹

- **Economic Value**

Enterprise portals create opportunities for organisations concerned with customer service and employees to create economic value, customer value, shareholder value, employee value and community value.

The running costs of a portal are relatively low; the biggest cost is user administration and maintenance of personalization repositories, metadata repositories and application integration mechanisms.

¹⁵⁹ Terra JC, Gordon C. 2003. p51

¹⁶⁰ Kotorov R, Hsu E. 2001. p86

¹⁶¹ Coakes E. 2006. p580

- **Supporting Knowledge Workers**

Today's knowledge workers function within corporate structures that are more difficult to control i.e. companies are fluid, supple, with workers assigned to ad hoc interdisciplinary teams. They work on objectives that span multiple parts and levels of the organisation, generating faster responses to changes in the business environment and customer demands, which is conducive to effectiveness but much harder to manage.¹⁶²

The networked era requires a better understanding of the new patterns of sociability. According to Castells cited in Terra & Gordon¹⁶³, the Internet is changing the patterns of social interaction and creating a society characterised by increased network individualism, i.e. the Internet has greatly improved an individual's ability and freedom and capacity to increase their reach and create their own networks. Knowledge workers are a lot less constrained by previous limits imposed by location or organisational boundaries. The network is the enterprise i.e. a lean agency of economic activity where business practice is performed in an ad hoc manner depending on specific projects and ephemeral business demands.

- **Collaboration**

Collaboration has economic benefits, independent of benefits derived from moral principals or personal convictions. Knowledge and wealth springs more often in societies that have higher levels of collaboration and trust. At the firm level, the link between competitive advantage and higher trust levels produce more interaction. Communities refer to the ways in which people naturally work together and associate with others, acknowledging and celebrating the power of peers, their creativity and resourcefulness in solving problems and their ability to invent better, easier ways to meet their commitments. What holds community members together is a common sense of purpose, the needs of individuals to connect with others who share similar experience or learning goals and ultimately each member's real need to know what the other members know. When enterprise portals are designed to help these communities to thrive, employees can tap even more effectively into the pool of knowledge traditionally exchanged only among individuals who have the opportunity to work side by side or in frequent formal and informal personal encounters.¹⁶⁴

¹⁶² Terra JC, Gordon C. 2003. pXxii

¹⁶³ Terra JC, Gordon C. 2003. 21

¹⁶⁴ Terra JC, Gordon C. 2003. p73

- **Integration of Knowledge**

Enterprise portals provide workers with a personalised desktop giving them the information, knowledge and resources they need to execute their jobs. Portals integrate both structured and unstructured data throughout an organisation and beyond. Their design reflects a fundamental transformation of our view of enterprise information management, from a series of isolated tasks to the coordinated integration of knowledge.

Furthermore, enterprise portals provide an essential business platform that allows the integration of information from disparate information sources, both internal and external. As valuable content is created, organised and distributed, parts of it can be transferred from the internal corporate portal environment to external audiences, including customers, suppliers and partners. Employees in a knowledge enterprise require effective tools and a work environment that enables teamwork to effectively focus on customer needs. Organisations that structure enterprise portals improve their knowledge assets.¹⁶⁵

Enterprise portals are an effective approach to seamlessly provide content and connections to data, information, people, partners, clients and knowledge. Enterprise portals may be used to completely change how information, activities and responsibilities are shared in an organisational environment. Enterprise Portals can be designed and deployed with the goal of generating connections between people and information, sparking knowledge creation, innovation and reuse of documented knowledge or locating people who can apply their tacit knowledge in specific business situations. Enterprise portals can be particularly relevant for people working on multiple projects and dealing with complex situations that require multiple sources of information and opinions. They may make it easier for team members to share and see the same applications simultaneously even if not located in the same geographic area.¹⁶⁶

Enterprise portals allow companies to implement their knowledge management initiatives straight into their business strategies. The resulting enterprise portal solution brings people, work processes, content and technology into a single solution.¹⁶⁷

¹⁶⁵ Terra JC, Gordon C. 2003. pXxiv

¹⁶⁶ Terra JC, Gordon C. 2003. p48-49

¹⁶⁷ Collins H. 2003. pXii

3.5 Conclusion

This chapter highlighted the enabling role that IT plays in the form of knowledge management systems and enterprise portals. The research highlighted the misconception that technologies are often misinterpreted as knowledge management solutions and that the human capital factor remains the key determinant as to whether technology implementations are successful.

The discussion focused on the advent of the enterprise portal and its usefulness in providing a holistic solution to the modern day organisational requirements including collaboration, content management, access and integration, expertise location and management and community functionality.

The versatility of the enterprise portals was demonstrated in their accessibility to be used both internally in an organisation as well as being accessible to customers and partners.

The research however indicates that many companies are just starting their corporate portal efforts. However, while many organizations have the necessary technological infrastructure in place to support knowledge management, they are not exploiting the full potential of their investment.¹⁶⁸

The following chapter investigates the concept of knowledge assets in terms of their ability to enhance the value of organisational competences and identifies the various elements comprising intellectual capital.

¹⁶⁸ Benbya H, Passiante G, Belbaly NA. 2004. p203

Chapter 4

Knowledge Assets

4.1 Introduction

Knowledge assets and their management currently constitute both a major source of competitive advantage for organisations as well as a major problem. In the global environment it is increasingly recognised that the way in which organisations mobilise and utilise their knowledge assets may constitute the significant difference between them. Yet, at the same time, the ways in which organisations can access and manage their knowledge assets is also acknowledged to be a major difficulty, so organisations find themselves in the position where their most critical resource is, at the same time, their most difficult challenge to manage. One of the reasons why organisations have experienced difficulties in identifying knowledge based competences is the tacit nature of these competences.¹⁶⁹

Knowledge assets interact with each other to create capabilities and competences, and it is often this interaction which delivers a competitive advantage because it makes these assets difficult for competitors to imitate.¹⁷⁰

Knowledge assets represent the core competences of organisations and their strategic role to create value and improve business performance has incited organizations to invest heavily in methodologies, processes, and technologies to enrich, nurture, and renew them over time. Teece cited in Moustaghfir¹⁷¹ argues *that the competitive advantage of companies in today's economy stems not from market position, but from difficult to replicate knowledge assets and the manner in which they are deployed*. Hence, knowledge management practices have emerged as the processes to accumulate, articulate, codify, and effectively use knowledge assets and enhance their value continually.

Management teams are unable to convert their solid thinking into solid action by their entire workforce, it has become tougher for companies to make things happen because key corporate assets are no longer physical plant and financial capital, and the most meaningful assets are knowledge assets.¹⁷²

¹⁶⁹ Griffiths D, Boisot M, Mole V. 1998. p529

¹⁷⁰ Marr B, Schiuma G, Neely A. 2004. p563

¹⁷¹ Moustaghfir K. 2008. p17

¹⁷² Terra JC, Gordon C. 2003. pxxii

This chapter explores the concept of knowledge assets, how they enhance the value of organisational competences, which in turn support organizational processes, products and services. The discussion will focus on defining and exploring characteristics of knowledge assets and their value; discussing the distinction between tacit and explicit knowledge and finally investigating the various components of intellectual capital.

4.2 Defining Knowledge Assets

Boisot,¹⁷³ asks the question: “What is an asset?” An accountant would define an asset as a stock from which a number of services are expected to flow. In the case of current assets they are expected to flow for less than a year, in the case of fixed assets, they are expected to flow for more than a year. Knowledge assets are stocks of knowledge from which *services* are expected to flow for a period of time that may be hard to specify in advance. A knowledge asset can prolong its existence indefinitely. The economic life of an asset is a function of how fast the knowledge base that sustains it is changing. While the economic life of a physical asset is basically a function of the economic life of its knowledge content.

In the management literature many terms have been used to refer to the concept of knowledge assets. In the strategic management literature the concept of “resources” has been used to define all the firm’s assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by the firm to conceive of and implement strategies that improve its efficiency and effectiveness.¹⁷⁴

Knowledge based assets are defined as non-physical features that contribute to, or are used in producing products, or rendering services, that are expected to generate future productive benefits for individuals or companies that control the use of those features.¹⁷⁵

The literature identifies a number of definitions including:

- knowledge that exists in an organization that can be used to create differential advantage
- the experience and wisdom employees have (mostly in their heads) about such varied things as making decisions when faced with incomplete information, forming judgments based on learning and experience, policies and procedures, complex

¹⁷³ Boisot M. 1998. p3

¹⁷⁴ Moustaghfir K. 2008. p15

¹⁷⁵ Rodgers W. 2003. p181

organizational relationships, rules of thumb used in different situations, theories and reasoning about past or present business success

- the sum of everything everybody in your company knows that gives you a competitive edge in the marketplace
- a knowledge asset consists of facts (statements whose validity is accepted), assumptions, and heuristics which provide economic value to its possessor
- a knowledge asset is a company's resource which has a cognitive nature. It can either be made of knowledge, e.g. brand, patent, drawings, logos, designs manuals, routines, reputation, identity, and so on, or incorporate knowledge, e.g. software for decision making, equipment or a machine for performing a specific activity and so on. A knowledge asset is a resource providing an ability to carry out an activity, which becomes a competence when the ability is a specialized one.¹⁷⁶
- a knowledge asset is any organisation resource made of or incorporating knowledge which provides an ability to carry out a process or an activity aimed to create and/or deliver value.
- knowledge assets can be tangible or intangible in nature. While it is quite intuitive to realise an intangible knowledge asset, it might be less intuitive to realise a tangible knowledge asset. Some examples of tangible knowledge assets are the layout of work spaces, which strongly affect relationships and knowledge sharing mechanisms among workers as well as the technological features of equipment, which can affect the development of some specific competences or skills required to equipment's users. A tangible knowledge asset can be considered as an organisation's tangible resource relevant for the development, acquisition, management and diffusion of knowledge, or as organisational structural component, embedding specific knowledge.¹⁷⁷

4.3 Characteristics of Knowledge Assets

Knowledge assets are essentially regenerative. This means that new relevant knowledge may emerge from a knowledge-intensive business process as additional output, besides products and services. Knowledge assets may not exhibit decreasing returns to use, but will often increase in value the more they are used. Most assets are subject to diminishing returns, but not knowledge. The bulk of the fixed cost in knowledge products usually lies in creation rather than in manufacturing or distribution. Once knowledge has been created, the initial

¹⁷⁶ Linzalone R. 2008. p40-41

¹⁷⁷ Linzalone R. 2008. p40-41

development cost can be spread across rising volumes. Network effects can emerge as knowledge assets are used by more and more people. These knowledge users can simultaneously benefit from knowledge and increase its value as they add to, adapt, and enrich the knowledge base. In traditional industrial economics, assets decline in value as more people use them. By contrast, knowledge assets can grow in value, as they become a standard on which others can build.¹⁷⁸

As knowledge assets grow, they tend to branch and fragment. While knowledge assets that become standards can grow more and more valuable, others, like expiring patents or former trade secrets, can become less valuable as they are widely shared. A successful company must therefore continually refresh its knowledge base. The rapid and effective re-creation of knowledge can represent a substantial source of competitive advantage.¹⁷⁹

Boisot¹⁸⁰ states that the potential for discontinuity is an inherent feature of all knowledge assets. Differences between neoclassical and evolutionary productive function resides in their respective economic properties. Data resources have quite different economic properties i.e. they are not naturally scarce. What is locked in a single person's head at one moment can in time become common knowledge the next. Data resources can proliferate uncontrollably and are therefore more difficult to appropriate and more subject to economic exchange than physical ones, The more agents come to rely on knowledge assets as substitutes for physical resources, the more difficult they will find it to appropriate fully whatever value these create and to secure a maximum return on such assets.

In the evolutionary production function, knowledge creation and application show up in two distinct phases:

- Creating knowledge – the generation of insights through a process of extracting information from data (downward movement)
- Applying knowledge – testing the insights created in a variety of situations that allow for the gradual accumulation of experiential data (upward movement)

Knowledge assets emerge as the fruits of these two separate processes. They are the product of two quite different types of learning working in tandem. The first is discontinuous and unpredictable, i.e. they might be trivial or revolutionise whole industries. The second is more incremental and manageable. Thus corresponding with “experience curves”. Each type of

¹⁷⁸ Apostolou D, Mentzas G. 2003. p357

¹⁷⁹ Apostolou D, Mentzas G. 2003. p357

¹⁸⁰ Boisot M. 1998. p30-35

learning prepares the ground for another. Without a steady accumulation of experiential data, the act of insight has nothing to feed on. Without some fundamental insight, experiential learning has nothing to build on.

Scholars have argued that knowledge assets contribute to create value not only by themselves, but by their dynamic interactions, highlighting that the interaction amongst elements is complementary in that the value of one element is increased by the presence of other elements.¹⁸¹

A knowledge asset creates, stores and/or disseminates knowledge objects. If we define knowledge objects as the means of representing knowledge, then the following statement outlines the relation between knowledge assets and knowledge objects:

For example:

- A person is a knowledge asset that can create new ideas, learnings, proposals, white papers (knowledge objects).
- A community of interest is a knowledge asset that can create new ideas, best practices (knowledge objects).
- A process is a knowledge asset that can create and/or store and disseminate best practices, company standards, R&D material (knowledge objects).
- A vision is a knowledge asset that can create a new mission statement, strategic plan, goals (knowledge objects).¹⁸²

4.4 Value of Knowledge Assets

The market values of many companies are higher than their accounting values, indicating that the real value of a company not only depends on the accounting value of its shareholders' equities, but also includes the increased contribution of intangible assets. It was argued that the creation of business value mainly comes from intangible assets, such as knowledge and with the revolution of information technology and the advancement of the Internet, the value of knowledge assets has been greatly enhanced.¹⁸³

The value of knowledge assets is principally determined by the value of the knowledge in a base case problem and the scope of its deployment. However, knowledge assets may also have value outside the scope of their current application. Thus, knowledge assets may possess

¹⁸¹ Linzalone R. 2008. p40-41

¹⁸² Apostolou D, Mentzas G. 2003.

¹⁸³ Lin C, Tseng SM. 2005. p208

a value that is only somewhat implementation dependent. The value of intellectual property is determined by the effect it has on competitors.¹⁸⁴ The open ended value of knowledge assets means there is no one to one correspondence between the effort required to create them and the value of the services they yield. Knowledge assets are non linear in respect to the effects they produce. When they are embedded in physical assets, i.e. manufacturing process, they can become a major source of discontinuity.¹⁸⁵

The value of knowledge to an organisation depends on the ability of the organisation to exploit its knowledge. This in turn depends on two factors: its exclusivity of access to the knowledge and its access to the technology required for exploitation.¹⁸⁶

Rodgers¹⁸⁷ suggests that the value of knowledge can be understood better by framing it in four major ways:

- Extraordinary leverage and increasing returns: unlike most assets, knowledge is not subject to diminishing returns. The chunk of knowledge fixed cost lies in creation rather than in manufacturing or distribution. Knowledge assets can grow in value (e.g. the effects of networks) as they become a standard on which others can build. After knowledge is created, the initial development cost can be spread across rising revenue volumes.
- Fragmentation, leakage, and the need for refreshment: competition, expiring patents or former trade secrets can make knowledge less valuable as it becomes widely shared in society. An efficient and effective re-creation of knowledge can represent a substantial source of competitive advantage.
- Uncertain value: knowledge investment value is often difficult to estimate in terms of future discounted cash flows. Systematic advances in knowledge building blocks may come to a dead end in terms of contributing to a company's wealth.
- Uncertain value sharing: a company may not benefit from knowledge investments for the following three reasons. First, since most knowledge is embedded in people's minds, it cannot be owned or controlled. Second, knowledge may be a difficult asset to trade due to reports or software programs being copied without detection. Also, determining who owns the knowledge may be quite challenging (even for law courts)

¹⁸⁴ Wilkins J, Van Wegen B, De Hoog R. 1997. p57-63

¹⁸⁵ Boisot M. 1998. p3

¹⁸⁶ Beckett, AJ, Wainwright CER, Bance D. 2000. p602

¹⁸⁷ Rodgers W. 2003. p182

if jointly developed by several parties. Third, unpredictability of knowledge assets results may make it difficult for exact valuation to be agreed on.

4.5 Tacit and Explicit Knowledge

A holistic view of organizational knowledge assets must encompass a view of both the tacit and explicit nature of knowledge. The connection between tacit and explicit knowledge has been recognized in which tacit knowledge is the means by which explicit knowledge is captured, assimilated, created and disseminated and where tacit knowledge forms the background necessary for assigning the structure to develop and interpret explicit knowledge.¹⁸⁸

Organizations' knowledge resources have pertinently been described as an iceberg. The structured, explicit knowledge is the visible top of the iceberg. This part of the knowledge resource is easy to find and recognize and therefore also easier to share. This is also done in organizations through different forms of technological and pedagogical methods. Beneath the surface, invisible and hard to express, is a momentous part of the iceberg. This hidden part applies to tacit knowledge resources in organizations.¹⁸⁹

According to Polyani cited in Hendriks & Vriens,¹⁹⁰ explicit knowledge is public knowledge since it covers those aspects of knowledge that can be articulated in formal language and transmitted among individuals. Knowledge acquisition builds and evolves the knowledge base of an organisation. Knowledge organisation and storage takes place through activities by which knowledge is organised, classified and stored in repositories. Explicit knowledge needs to be organised and indexed for easy browsing and retrieving and must be stored efficiently to minimize storage space.¹⁹¹

Tacit knowledge has intrigued researchers for many years and has been described in a multitude of ways: practical know-how, difficult to articulate, transferred only via observation and practice, subconsciously understood and applied and rooted in action, experience and involvement in a specific context.¹⁹²

Similarly, explicit knowledge has a wealth of research to depict the essence of this knowledge type as being: embodied in a code or language, knowledge already documented

¹⁸⁸ Freeze RD, Kulkarni U. 2007. p96-104

¹⁸⁹ Haldin-Herrgard T. 2000. p358-363

¹⁹⁰ Hendriks PHJ, Vriens DJ. 1999. P114

¹⁹¹ Lindvall M, Rus I, Sinha SS. 2003. p139

¹⁹² Freeze RD, Kulkarni U. 2007. p105-107

precisely or formally articulated and articulated, codified and communicated in symbolic form and/or natural language.¹⁹³

Tacit knowledge is internal in nature and is relatively hard to code and extract. Not only does tacit knowledge need to be discovered, extracted, and captured; it has to be creatively disseminated so that this shared knowledge can be efficiently used to extend the KM base. Tacit knowledge is that work-related practical knowledge learned informally on the job. This definition defines only one part of tacit knowledge, that is, the part that encompasses know-how. The other part of tacit knowledge is the cognitive dimension which consists of beliefs, values, attitudes, ideals, mental maps, and schemata which are related to the cultural shaping of the individual and the group. This cognitive dimension of tacit knowledge is a most important, yet most difficult, part of enabling knowledge creation and dissemination.¹⁹⁴

Within these two dimensions of tacit knowledge there are four categories: hard-to-pin-down skills; mental models; ways of approaching problems; and organizational routines. Another way to understand tacit knowledge is that it is used in three ways: to find problems; to solve problems; and to predict and anticipate problems. In problem finding, the ability to develop a mental model and map of the problem is highly related to the internal store of tacit knowledge. These techniques of problem finding and problem solving are similar to the craftsman's model in that tacit knowledge of how things go together and which way the system acts leads to the identification and solution of problems.¹⁹⁵

Perhaps tacit knowledge is the more important component of KM, to the extent that the collaboration that it encourages leads to quantum shifts in knowledge rather than the incremental linear enhancements that are typically associated with explicit KM. However, tacit knowledge extraction, dissemination, and collaboration are difficult to effect. Tacit knowledge may be best understood by the assertion that we know more than we can tell. While tacit knowledge and explicit knowledge coexist in a continuum (or as a knowledge spiral) complementing each other, the explicit knowledge forms are more easily extracted and measured. The measurement of tacit knowledge is less clear. Tacit knowledge can be part of the group collective knowledge. This socio-cultural knowledge drives the organization, but it is difficult to measure.

¹⁹³ Freeze RD, Kulkarni U. 2007. p105-107

¹⁹⁴ Freeze RD, Kulkarni U. 2007. p105-107

¹⁹⁵ Freeze RD, Kulkarni U. 2007. p105-107

Boisot¹⁹⁶ suggests that productive organisations have shown a strong preference for complexity reduction over complexity absorption, for practical reasons. While complexity absorption leads to a steady accumulation of tacit, experiential knowledge within an organisation, this knowledge can only be articulated and communicated with difficulty and thus remains in the heads of the owners. Both its availability and its existence are precarious. It is for this reason that productive organisations find it a better strategy to invest in the articulation of knowledge and complexity reduction than in the accumulation of tacit knowledge and hence in complexity absorption. Articulate knowledge can be shared and can thus be used to facilitate the coordination of productive activity. Tacit knowledge cannot be so easily shared.

The characteristic of tacit knowledge is the difficulty in coding it so as to be shared. There can be found two different schools regarding externalization and codification of tacit knowledge. One that believes that tacit knowledge must be made explicit for sharing and another that regards tacit knowledge as always being tacit. One example of the first is Nonaka and Konno who have created a model of knowledge creation in the SECI-model. This model also concerns transfer of tacit knowledge. They assert that the process include four modes socialization, externalization, combination, and internalization in an ongoing circular movement.¹⁹⁷ For example:

- From tacit knowledge to tacit knowledge: the process of ‘socialization’ through shared experience and interaction
- From explicit knowledge to explicit knowledge: the process of ‘combination’ through reconfiguring existing knowledge (such as sorting, adding, recategorizing, and reconceptualising explicit knowledge) can lead to new knowledge
- From tacit knowledge to explicit knowledge: the process of ‘externalization’ using metaphors and figurative language
- From explicit knowledge to tacit knowledge: the process of internalization through the learning process.¹⁹⁸

The other school regarding the sharing of tacit knowledge claims that tacit is always going to be tacit. According to this view there is no need to express explicitly tacit knowledge. To make all knowledge explicit and eliminate the tacit personal elements in it could even be

¹⁹⁶ Boisot M. 1998. p38-39

¹⁹⁷ Haldin-Herrgard T. 2000. p358-363

¹⁹⁸ Perrott BE. 2007. p525

destructive to all knowledge. Tacit knowledge includes the ability to percept particulars that constitute entities. In externalizing tacitness, the focus is moved from the entity to the particulars. If this focus is changed to the particulars the sight of the entity is lost and with that also the tacit knowledge. Accordingly, to diffuse tacit knowledge the exertion should not be in externalizing it but in understanding entities by their particulars. We share explicit as well as tacit knowledge in interaction with other people and through experience and exercise. Whether the distributor of the tacit knowledge is conscious of the knowledge and the sharing or not is not of importance.¹⁹⁹

Boisot,²⁰⁰ however, argues that what appears to have been underplayed in this formulation is that tacit knowledge comes in three distinct variants :

- Things that are not said because everybody understands them and takes them for granted i.e. knowledge of them has been consciously or unconsciously internalised over the years. Such knowledge could in principle (although not always) be articulated, but is not.
- Things that are not said because nobody fully understands them They remain elusive and inarticulate.
- Things that are not said because while some people can understand them, they cannot costlessly articulate them.

The passage from tacit to codified and abstract knowledge incurs a cost. Codification and abstraction are devices for shedding data. Consequently, structuring data for the purpose of sharing it, creates a fundamental asymmetry between senders and receivers, between those who have to carry out the initial codifying and abstracting of information on the one hand and those who receive it already structured on the other.

Irrespective of the need of externalization in sharing tacit knowledge there is an agreement that tacit knowledge diffusion is more difficult than the sharing of explicit knowledge.²⁰¹

4.6 Intellectual Capital

Research defines knowledge assets as a major part of an organisation's value and a major contributor is the concept of intellectual capital (IC), which helps managers to identify and

¹⁹⁹ Haldin-Herrgard T. 2000. p358-363

²⁰⁰ Boisot M. 1998. p57

²⁰¹ Haldin-Herrgard T. 2000. p358-363

classify the knowledge assets of an organisation.²⁰² *Intellectual capital, as a bundle of knowledge assets*, represents an essential factor for best enhancing and supporting organizational performance improvement.²⁰³

Increasingly, intellectual capital (i.e. knowledge, customer relationship and expertise) is becoming the critical resource for a firm's viability and success as it has a significant and substantive impact on business performance. That is why Roos et al (cited in Zhou & Fink)²⁰⁴ urge: *in the modern business world, the business imperative is to manage intellectual capital or die.*

It is widely recognized that the value creation dynamics are the result of a continuous improvement of organizational performance. In fact, through a performance improvement, an organization is able to better satisfy the wants, needs and expectations of its stakeholders. In order to improve performance, an organization needs to continuously improve its effectiveness as well as efficiency. It requires the ability to design, implement, manage and develop the organizational processes at the basis of the production of the organization's output and outcomes. This is possible only through a continuous development of organizational competences. *The competences are rooted in the organizational knowledge assets which build the intellectual capital of the organization.* Consequently the assessment and management of intellectual capital play a fundamental role to support the improvement of organizational performance and value creation dynamics.²⁰⁵

Hence, knowledge management is managing organisational processes to create, store and reuse organisational knowledge, while, on the other hand, developing a knowledge culture to facilitate these processes, with an ultimate aim to create and maximise intellectual capital to make a more intelligent organisation.²⁰⁶

4.6.1 Defining Intellectual Capital

Schiuma et al²⁰⁷ view that the definition of intellectual capital should be broad enough to enable organisations to embrace the full range of their intangible resource, and specific enough to provide guidance for management to take actions. The definitions of intellectual

²⁰² Marr B, Schiuma G, Neely A. 2004. p553

²⁰³ Schiuma G, Lerro A. 2008. p3-7

²⁰⁴ Zhou AZ, Fink D. 2003. p34

²⁰⁵ Schiuma G, Lerro A. 2008. p3-7

²⁰⁶ Schiuma G, Lerro A. 2008. p3-7

²⁰⁷ Schiuma G, Lerro A. 2008. p3-7

capital are, like knowledge management, varied and vast. A snapshot of definitions include the following:

- May be classified as assets (e.g. brand, trademark, contracts, databases) or skills (e.g. know-how of employees, organizational culture)
- Knowledge that can be converted into value
- Consists of four main components: market assets, human-centred assets, intellectual property assets and infrastructure assets
- Consists of three categories of intangible assets: internal structure, external structure and human competence
- It is composed of a thinking part, i.e. the human capital, and a non-thinking part, i.e. the structural capital
- Intellectual material that has been formalised, captured, and leveraged to produce a higher-valued asset; packaged useful knowledge
- It is the sum of human capital and structural capital. It involves applied experience, organizational technology, customer relationships and professional skills that provide an organisation with a competitive advantage
- Assets created through intellectual activities ranging from acquiring new knowledge (learning) and inventions to creating valuable relationships²⁰⁸
- It is about knowledge and knowing capability of a social collectivity.²⁰⁹
- Intellectual capital $\frac{1}{4}$ competence $\frac{3}{4}$ commitment.²¹⁰
- It is a concept that classifies all intangible resources as well as their interconnections
- Sources of future benefits (value), which are generated by innovation, unique organizational designs, or human resource practices
- It is composed of all knowledge-based assets, distinguished between organizational actors (relationships, HR) and infrastructure (virtual and physical)²¹¹

Intellectual capital takes two forms. First there is the semi-permanent body of knowledge, the expertise that grows up around a task, a person or an organisation and may include communication and leadership skills, the organisation's value proposition, familiarity with an organisation's processes, values and culture i.e. the way we do things around here. The second kind of knowledge assets are tools that augment the body of knowledge, either by

²⁰⁸ Schiuma G, Lerro A. 2008. p3-7

²⁰⁹ Harlow H. 2008. p149

²¹⁰ Harlow H. 2008. p149

²¹¹ Marr B, Schiuma G, Neely A. 2004. p554

bringing in facts, data, information or by delivering expertise and augmentation to others who need them when they need them i.e. leveraging them. Phone numbers are not intellectual capital, phone books are.²¹²

Intellectual capital is located in places that are strategically important and where management can make a difference. According to the Skandia/ CIBC model of intellectual capital developed by Hubert Saint-Onge of the Canadian Imperial Bank of Commerce and Leif Edvinsson of Skandia, intellectual capital is divided into three parts: Human Capital, Structural Capital and Customer Capital. These three categories reflect the knowledge assets of a company, identifying tacit as well as explicit knowledge.²¹³ However, intellectual capital is not created from discrete amounts of human, structural and customer capital but from the interplay among them.²¹⁴

The following diagram represents the relationship between intellectual capital and knowledge assets and the subsequent effect that these have on the elements of business performance.

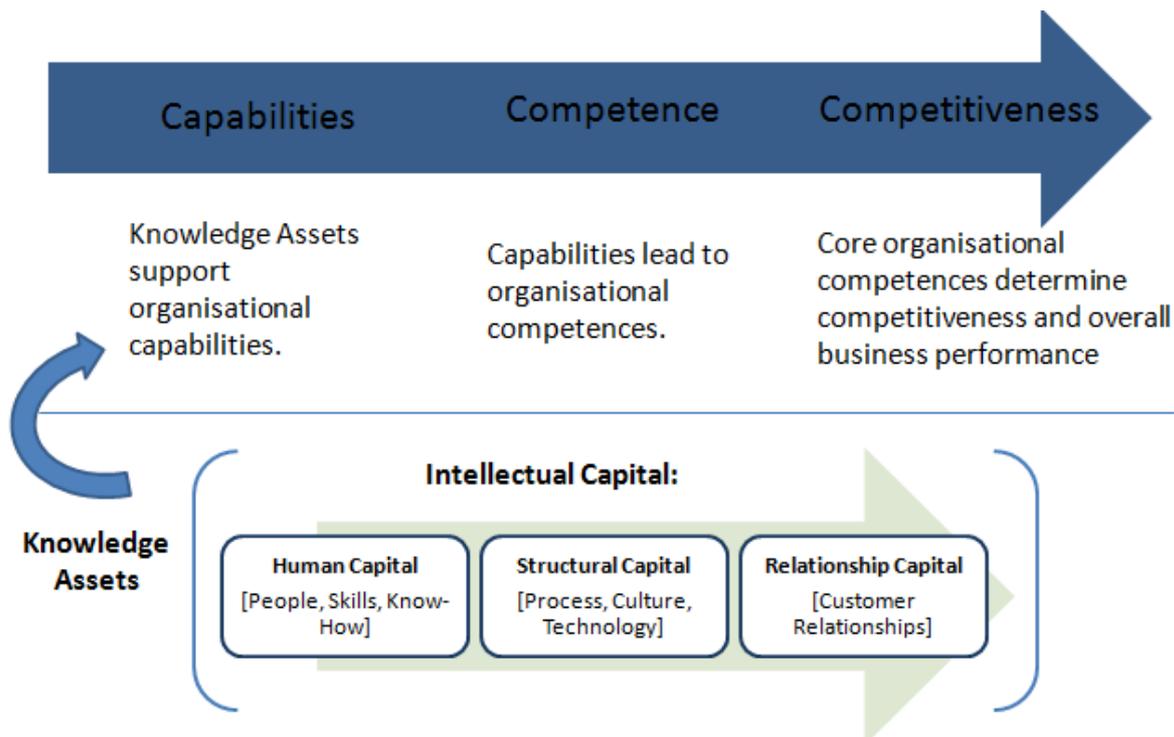


Figure: 4.1: The relationship between Intellectual Capital and Knowledge Assets with Capabilities, Competence and Competitiveness
(Source: Compiled by the Author)

²¹² Stewart TA. 1999. p71

²¹³ Stewart TA. 1999. p75

²¹⁴ Stewart TA. 1999. p78

4.6.2 Human Capital

Human capital is essential in that it is the source of innovation and renewal and incorporates attitudes, perceptions, and abilities of employees and their motivation commitment and adaptability to the company. It includes the knowledge that each individual has and which they generate.²¹⁵

Employees create value by applying their skills, exerting their knowledge and by initiating new ideas. But the knowledge and skills from employees can only be utilised by the organisation if employees are willing to make this contribution. So human capital management concerns itself not only with how to maintain the knowledge base of workers, but also with how to encourage and motivate them to contribute both tacit knowledge and explicit knowledge.²¹⁶

Areas that are key to managing human capital are:

- building an inventory of employee competences;
- developing a system to transfer the needed knowledge, skill, or intellectual addition when required; and
- acquiring an evaluation and reward system anchored to the acquisition and application of competency that aligns with the company's strategic objectives.²¹⁷

Human capital is embodied in the people whose talent and experience create the products and services that are the reason customers come to it and not a competitor, which equates to human assets. The greater the human capital intensity of a business, the greater its percentage of high value added work performed by hard to replace people, the more it can charge for its services and the less vulnerable it is to competitors because it will be even more difficult for rivals to match those skills than it is for the first company to replace them.²¹⁸ For example if a software package sells for \$1 million before employee modifications and \$3 million after employee modifications, then the human capital used to modify the software is \$2 million.²¹⁹

Linzalone²²⁰ refers to 'wetware capital' which includes all the knowledge assets related to human resources.

²¹⁵ Rodgers W. 2003. p182

²¹⁶ Zhou AZ, Fink D. 2003. p37-39

²¹⁷ Rodgers W. 2003. p182

²¹⁸ Stewart TA. 1999. p91

²¹⁹ Kannan G, Aulbur WG. 2004. p389

²²⁰ Linzalone R. 2008. p40-41

4.6.3 Structural Capital

This component is also referred to in the literature as Organisational Capital and includes knowledge that has been captured/institutionalized within the structure, processes, and culture of an organization. It provides the mechanism for sharing and transporting knowledge needs such as structural intellectual assets for example distribution channels, communication systems, laboratories, competitive and market channels, which turn individual know-how into the property of the organization.²²¹

Structural capital is the supportive infrastructure that enables human capital to function and includes the organization's philosophy and systems for leveraging the organization's capability. Structural capital represents an organisation's capabilities to meet its external and internal challenges. This is further classified into process (including the techniques, procedures, and programs that implement and enhance the delivery of goods and services. e.g. databases, information systems) and innovation capital (includes intellectual property i.e. resources, whose ownership is granted to the company by law, including patents, copyrights, trademarks and brands²²² and intangible assets like knowledge culture).^{223 + 224 + 225}

Structural capital packages human capital and permits it to be used again and again to create value.²²⁶ According to Drucker, *only the organisation can provide the basic continuity that knowledge workers need in order to be effective. Only the organisation can convert the specialised knowledge of the knowledge worker into performance.*²²⁷ Among the elements of structural capital are strategy and culture, structures and systems, organisational routines and procedures.

The explicit management of structural capital can increase productivity. Albeit knowledge work rarely moves steadily forward, it is an open ended series of to and fro collaborations and commitments, but even though it is less structured, structural capital can improve the flow of knowledge.²²⁸

Structural capital should serve two purposes – one is to codify bodies of knowledge that can be transferred to preserve the recipes that otherwise may be lost. For example the plug and

²²¹ Rodgers W. 2003. p182-183

²²² Linzalone R. 2008. p40-41

²²³ Kannan G, Aulbur WG. 2004. p389

²²⁴ Zhou AZ, Fink D. 2003. p37-39

²²⁵ Kannan G, Aulbur WG. 2004. p389

²²⁶ Stewart TA. 1999. p76

²²⁷ Stewart TA. 1999. p108-9

²²⁸ Stewart TA. 1999. p121

play business processes that an organisation used to open new offices in one twelfth the time previously required or best practices that can be adapted, transferred and reused. The second purpose is to connect people to data, experts and expertise including bodies of knowledge on a just in time basis.²²⁹

4.6.4 Customer Capital

Customer capital is defined as the combined value of the relationships with customers, suppliers, industry associations and markets. Customer capital refers to issues like trust and understanding and the strength and loyalty of customer relations. Customer satisfaction, repeat business, financial well-being, and price sensitivity may be used as indicators of customer capital.²³⁰

It is the value of an organisation's relationship with the people with whom it does business i.e. the depth (penetration), width (coverage) and attachment (loyalty) of the organisation. It refers to the likelihood that customers will continue to do business with the organisation and can be broadened to include the value of relationships with suppliers, also referred to as customer capital.²³¹

Rodgers²³² et al refers to customer capital as relational capital and defines it as the knowledge of and acquaintance with communities, competitors, customers, governments, and suppliers in which the company operates. It also provides the perception of value obtained by a customer from conducting business with a supplier of goods and/or services.

Linzalone²³³ refers to customer capital as Netware Capital which involves knowledge assets related to a company's relationships with its stakeholders. Including commercial power, distribution channels and the perceptions that stakeholders hold about the company.

Of the three broad categories of intellectual assets, customer capital is the most obviously valuable and since customers pay bills, they are reflected on the organisations financial statements and thus easier to track than those made by people and systems or capabilities. Despite this, customer capital is probably the worst managed of all intangible assets, with many organisations not even knowing who their customers are.²³⁴

²²⁹ Stewart TA. 1999. p132

²³⁰ Kannan G, Aulbur WG. 2004. p389

²³¹ Stewart TA. 1999. p77

²³² Rodgers W. 2003.

²³³ Linzalone R. 2008. p40-41

²³⁴ Stewart TA. 1999. p144

Customer capital can create wealth building opportunities for both buyer and seller by considering the intangible value chain.²³⁵ Organisations should be looking for information everywhere in the value chain and put it wherever it has the biggest return. Three key questions should be asked:

- What information drives the business?
- Who has it?
- To whom is it worth most?²³⁶

Customer capital is a lot like human capital and although organisations cannot own customers any more than they can own people, they can invest in employees to increase their value to individuals and to create knowledge assets for the company as a whole and together with their customers can grow intellectual capital that is their joint and several property.²³⁷

4.7 Conclusion

This chapter highlighted the importance of knowledge assets for an organisation to create value and improve business performance. It also highlighted the nuances of managing knowledge assets which emerge in both tacit and explicit forms.

Intellectual capital was highlighted as being the sum of human capital and structural capital which involves applied experience, organisational technology, customer relationships and professional skills that provide an organisation with a competitive advantage.

Human Capital, Structural Capital and Customer capital were presented as categories that represent the knowledge assets of a company and which include both tacit and explicit components. It was further highlighted that intellectual property is the sum of the interplay of these three categories.

The following chapter examines how knowledge assets are managed in enterprise portals by elucidating the three processes identified in the I-Space, namely codification, abstraction and diffusion.

²³⁵ A value chain shows how a product or service moves from first seller to end user, from raw material to goods on the shelf. The idea is to add as much value as possible at as little cost as possible and to capture this value in the organisation's markup. Stewart TA 1999. p153

²³⁶ Stewart TA. 1999. p153

²³⁷ Stewart TA. 1999. p155

Chapter 5

Managing Knowledge Assets in Enterprise Portals

5.1 Introduction

The preceding chapters have attempted to illustrate how organisational capabilities and competences give rise to superior business performance. These competences, comprising the organisation's capabilities are typically supported by an organisation's knowledge assets, which have been identified as structural assets comprising of processes, culture and innovation; human capital assets which includes people, skills and know-how and finally customer capital assets which incorporates all relationships that an organisation maintains with its customers, partners, suppliers and vendors and competitors.

The significance of adopting an enterprise portal to assist in managing (i.e. codifying, abstracting and disseminating) these knowledge assets has been expounded on, the benefits of which will not only assist organisations to identify their most valuable knowledge assets but will furthermore create an environment that seamlessly connects people, processes and content.

However, as previously discussed, the benefits of a technology such as an enterprise portal cannot be realised merely through its implementation. Successful organisations ensure that their own knowledge management strategies and processes are complemented by the technology. In order to do that, organisations must design and implement certain governance and management processes. This chapter seeks to elucidate on three core processes of knowledge asset management, namely codification, abstraction and diffusion and the implications for these areas in the case where enterprise portals are employed to manage knowledge assets.

A scenario representing an actual instance of knowledge asset management by means of an Enterprise Portal will be presented to illustrate the processes in action.

5.2 Background to Knowledge Asset Management

Determining what organisational knowledge should be managed at the outset of a knowledge management implementation is vital. Organizations need to set guidelines to determine the

type of knowledge to manage in order to minimise overload and ensure the collection and availability of high quality, relevant content for users. An integrated view of knowledge assets should be maintained, not one that is fragmented by geography or lines of business and should be tied to the contexts that they are used in as well as the individuals using them. Organizations must also be able to identify the gaps between what they have and what they need. The focus should be on knowledge that is critical to the business and specify that it is important to include knowledge not only pertinent to the organization itself, but also to its environment, e.g. industry knowledge.²³⁸

Organisations pursue knowledge management because it can provide a sustainable advantage as it generates increasing returns and continual advantages. Knowledge asset management constitutes several processes that are vital to the organisation's future performance, namely:

- *Knowledge acquisition processes* - a strategy to guide the acquisition of new knowledge. In order to have a viable future, an organisation must have a strategy and processes to obtain new knowledge for the organisation to apply. New knowledge can be acquired external to the organisation i.e. by purchasing it, hiring experts, or licensing patents or it can be created from within the organisation by formal research activities, through expertise and experience and generated during knowledge harvesting exercises.
- *Knowledge retention processes* – the aim being to maintain the knowledge base of the organisation and to sustain the present performance of the organisation. Processes include the documentation and dissemination of explicit knowledge such as procedures, reports as well as training and learning through coaching and shared learning through communities of practice.
- *Knowledge reuse processes* – the aim being to exploit the current knowledge of the organisation either internally or externally to create a sustainable advantage. Often, reuse of knowledge improves and increases the existing knowledge base of an organisation and can be pre-emptive of innovation processes.²³⁹

Three processes are central to the management of knowledge assets and they are codification, abstraction and diffusion.

²³⁸ Du Plessis M. 2007. p96

²³⁹ Beckett AJ, Wainwright CER, Bance D. 2000. p602

Boisot²⁴⁰ explains that knowledge assets have emerged from attempts at economizing on data processing and data is the factor of production in the new information economy as it substitutes for physical resources through a learning process that blends the gradual accumulation of experience with discontinuous insights. The first part of the process namely *experience*, *increases* the consumption and processing of data and the second, *insights economises* on data resources. Therefore, codification and abstraction hold the key to economizing on data which are crucial prerequisites of effective communication and by implication of effective organisational processes.

While codification can be thought of as a process of giving form to phenomena or to experience (albeit potentially useful, the act of codification can be fraught with problems and ambiguities), abstraction is the process of discerning the structure that underlie the forms. Codification and abstraction work in tandem and both reduce the data processing load imposed on an agent whether organisation or individual. They also facilitate communication processes and hence the diffusion of information whether inside or across boundaries.

As previously illustrated, Boisot's I-Space framework demonstrates the flow properties/streams/patterns of information within different agent groupings as a function of its degree of codification and abstraction. Certain specific flow patterns give rise to the kind of learning from which knowledge assets emerge.²⁴¹

5.3 Defining Codification

The act of assigning phenomena to categories once these have been created is known as coding. The faster and the less problematically that coding can be performed the more effective the codification process and the more extensively it will be used. Clearly, given how strongly the data processing load is affected by the number of categories we have to deal with, it pays to choose the categories with care. The degree of refinement of the classification schemes results partly from training and experience.²⁴²

Codification constitutes a selection from competing perceptual and conceptual alternatives. The more of these there are to choose from, the more time such a selection will require and the more problematic it will become. Choice, in effect links codification to the idea of complexity. The more complex a task, the greater the amount of data processing required to

²⁴⁰ Boisot M. 1998. p41

²⁴¹ Boisot M. 1998. p42

²⁴² Boisot M. 1998. p43

complete. The same is true of codification, the less codified a task, the greater the time required to assign events to categories and hence the larger the number of bits of data that have to be processed in order to complete it. The art of selection or codification is often conflict laden.

Codification can be thought of as a procedure for shedding surplus data and hence for economizing on data processing. This shedding of data makes commitment to a codification strategy inherently risky. If the strategy is faulty, the wrong data may be selected and valuable data discarded. Boisot²⁴³ compares codification to exercising an option, which can often be an irreversible act, however keeping an option open on the other hand buys time and can be far more valuable than exercising it. Absorbing uncertainty therefore, like absorbing complexity is a way of keeping one's cognitive options open. Given that it can lead to positive as well as negative outcomes uncertainty is not all bad and is not always to be avoided.

The codification dimension is scaled according to one particular definition of complexity, the number of bits of information required to carry out a given data processing task. At the uncoded end of the codification scale we encounter a non-deterministic and almost chaotic regime which resists all attempts at task codification, where the task data is random. At the coded end, we encounter a highly ordered regime which reduces to a choice between two states. Clearly economizing on data resources entails moving away from the uncoded end and toward the coded end of the scale, from the inarticulate towards the articulate, from the complex towards the simple. Data processing economies are by no means an unmixed blessing. A price is paid in terms of lost flexibility of options foregone. The more completely one codifies a task, the more one effectively fossilizes it. For better or for worse it becomes an inert process. Complete codification then allows a task to be performed entirely by machine without human intervention.²⁴⁴

Different levels of knowledge, regarding the possibility to codify, can be recognized in organizations' knowledge resources. The easiest to code is structured knowledge, for example databases and instruction books. Unstructured knowledge found in, for example, reports or discussions is possible to code but this is not always done. The hardest to code is tacit knowledge, which is the most transparent and subjective form of knowledge.²⁴⁵

²⁴³ Boisot M. 1998. p45

²⁴⁴ Boisot M. 1998. p46-47

²⁴⁵ Haldin-Herrgard T. 2000. p357

5.4 Defining Abstraction

Codification and abstraction often run closely together albeit they are quite different. Codification gives form to a phenomena, abstraction gives them structure. If codification allows us to save on data processing resources by allowing us to group the data of experience into categories, abstraction allows us to realize further savings in data processing by minimising the number of categories that we need to draw on for a given task. Abstraction then works by teasing out the underlying structure of phenomena relevant to our purpose. It requires an appreciation of cause and effect relationships to an extent that simple acts of codification do not.²⁴⁶

While codification can be understood as a form of differentiation, abstraction can be understood as a form of integration and reductionism – it works by letting the few stand for many. Data processing requirements can be reduced by a mixture of codification i.e. by reducing the number of points to choose from on a coding scale and abstraction i.e. by reducing the number of attributes that need to be codified for the purpose of categorisation.

Boisot²⁴⁷ illustrates a data processing exercise by using an example of the process of grading tomatoes in order to price them for a sale in the market. The attributes of the tomatoes would include weight, size colour, texture, shape, hardness and taste as these are deemed important to a consumer. If these attributes were firstly coded along a three-point scale i.e. good, average and unacceptable and secondly classified accordingly, then there would be 2187 possible assignments for the tomatoes, which is still a significant amount of data processing for a consumer to deal with. Producers may then decide to group together attributes that correlate with one another for example weight and size or hardness; colour and taste, thus reducing the task to four attributes – albeit this still indicates a possible 81 assignments. Producers may further decide to lower the number of decisions to only acceptable and unacceptable, across four product attributes, i.e. 16 possible assignments. Effectively, this type of codification exercise reduces the number of points to choose from on a coding scale from three to two and reduces the number of attributes that need to be codified for the purposes of categorisation from seven to four. Abstraction is achieved by noticing and exploiting the way that different attributes correlate with one another.

When properly carried out, abstraction allows one to focus on the structures, casual or descriptive that underlies the data. It generates concepts rather than precepts. Like precepts,

²⁴⁶ Boisot M. 1998. p48-9

²⁴⁷ Boisot M. 1998. P49

concepts are devices that economise on data processing. While precepts achieve their economies by maintaining a certain clarity and distinction between categories, concepts do so by revealing which categories are likely to be relevant to the data processing task.

Abstraction like codification is a device for shedding data i.e. for economizing on data processing resources. Codification facilitates abstraction by giving categories an edge and making them more visible and manipulable. Abstraction in turn stimulates codification by reducing the number of categories whose boundaries need defining. Both working together have the effect of making knowledge more articulate and hence shareable.²⁴⁸

Researchers believe that some tacit knowledge can be codified, but most of it cannot be articulated and cannot be captured at all through technology or documentation. Recent collaborative software in the market improved the effectiveness and the efficiency of collaborative-commerce but, it is a long way before technology that completely fulfils the totality of KM requirements is reached.²⁴⁹

5.5 Codifying and Abstracting using a Taxonomy

Intranets and enterprise portals have become popular, offering all employees the possibility of using the explicit knowledge enshrined in electronic documents.

Taxonomy is a classification schema with which to organize information in a hierarchical manner and complexity reduction and navigation facilitation are the main reasons for using taxonomies. In the area of knowledge management, taxonomies are often used to structure content in an enterprise portal. Human intervention is still necessary, for example to decide on taxonomy node names or labels. It is also true that in many enterprises no single set of categories will satisfy all the users. Some terms, even if they are common across the enterprise, may not be uniform.²⁵⁰ The use of taxonomy enables adequate classification of information, thereby providing improved search results that are not only based on the appearance of key words.²⁵¹

Efficiency in dealing with information and in searching for the right content is inadequate and information management must begin by thinking about how people use information otherwise practical usage is impossible. Even though employees today have access to an

²⁴⁸ Boisot M. 1998. p51

²⁴⁹ Mohamed M, Stankosky M, Murray A. 2006. p106

²⁵⁰ Boh WF. 2008. p1-9

²⁵¹ Boh WF. 2008. p1-9

astonishing number of different information sources, there are major deficits in handling information, which often result in:

- Disappointing search results
- Fuzzy naming²⁵² due to inconsistency in the classification schema and the vague use of terms
- Misleading use of terms

The above problems identify that the control of semantics (the meaning of terms) and the orderly classification of terms used in a business environment are the key to success in order to minimize the deficits associated with inefficiency. These solutions would also help to avoid the repeated development of existing components (e.g. in software development) due to an imprecise use of language that makes it impossible to recognize that components are indeed similar.

Taxonomies serve as the foundation for search, navigation, storage and communication services between persons and/or systems. Yet, even though the benefits of a taxonomy and glossary seem to be obvious, the question remains why only a few information-centric companies have implemented these two instruments to minimize their terminological deficits. A lack of implementation persists despite the fact that surveys have proved that the demand for improved search and indexing capabilities within portals (which can be enhanced through these tools) still heads the user wish list.²⁵³

5.6 Defining Diffusion

Harrison et al²⁵⁴ define diffusion as the process by which an innovation is communicated through certain channels over time among members of a social system.

Diffusion is the third of the 3 dimensions that make up the I-Space. It can be scaled to refer to the proportion of a given population of data processing agents that can be reached with information operating at different degrees of codification and abstraction. Such a population

²⁵² Fuzzy naming is one of the most common errors that knowledge workers make when contributing to a knowledge base. The erroneous naming conventions adopted by consultants on an Enterprise Portal implementation was interesting and ranged between inventing complex abbreviations that no one but themselves would understand to the other side of the scale where users would merely call a highly valuable asset as 'Max's IP'. A mantra of "Call it what it is" was instituted to prevent this problem.

²⁵³ This point confirms Boisot's opinion that each way of processing data offers advantages and drawback. And that abstract conceptual knowledge may find general application but come across as 'pallid and bloodless' Boisot M. 1998. p51

²⁵⁴ Harrison T, White K. 2005. p188

need not consist of individual human beings. It could be made up of firms, industries or even countries. All that we require is that each member of the population exhibits a similar general capacity for receiving, processing and transmitting data.²⁵⁵

Information diffusion in social processes is the most complex of all, since behaviour patterns are more plastic and hence wide ranging and they are subject to the conscious exercise of free choice by data processing agents.

Albeit diffusability establishes the availability of data and information for those who want to use it, it does not measure adoption. Information may be widely diffused but remain unused.²⁵⁶

Furthermore, a population located on the diffusion scale of the I-Space has to constitute a potential audience for a message or set of messages being transmitted. It does not follow that any given sender actually wants his or her message to reach every data processing agent for which it has potential relevance. Nor does it follow that all members of a potential audience have an identical capacity to decipher all messages that might have relevance to them.²⁵⁷

A particular act of diffusion might have many potential audiences i.e. customers, professional colleagues, suppliers etc. In practical applications of the I-Space, target audiences must be specified with great care before they are located along the diffusion dimension, since a faulty specification can seriously undermine the analysis. Collins²⁵⁸ affirms this opinion and explains that in the instance of best practices, these may contain proprietary information and need to be effectively distributed and available to knowledge workers. Documents containing proprietary information may require controlled levels of access for different individuals and purposes and include patents and patent applications, qualifications of professional and technical workers, market research results, customer information, project documentation and market opportunities and many more.

Meaningful messages include sender and receiver sharing the same codes, compatible orientations i.e. values, attitudes, motivations. Several considerations can affect the diffusion trajectory of a message within a population:

²⁵⁵ Boisot M. 1998. p52

²⁵⁶ This point is the vagary that exists when organisations implement technology – the mere availability of the technology does not guarantee usage.

²⁵⁷ Boisot M. 1998. p52-53

²⁵⁸ Collins H. 2003. p14

- The available means of communication will establish the nature and extent of the technical problem. Newspapers, television, the telephone, conferences, internet and face to face meetings all have different diffusion properties and will favour the transmission of particular types of message.
- The sharing of codes between sender and receiver will reduce the semantic problem but will require a joint investment in the communication nexus prior to any specific communication act.
- The prior sharing of contexts between sender and receiver will ease the pragmatic problem between sender and receiver ensuring a better alignment of mutual expectations. They will in turn require a prior investment in shared experience.
- The speed with which a message diffuses in a population will partly be a function of the rate and intensity with which agents interact with each other.
- Traditionally, it could be assumed that information would diffuse faster within urban rather than rural populations.
- Cultural dispositions will select which messages are likely to diffuse rapidly and which are likely to be ignored.
- Legal considerations can affect the diffusion of information. Patent and copyright law severely restrict the uses to which it can be put without the approval of the sender.
- In summary, lower level technical considerations will affect the diffusability hence the availability of information within a given population. Higher level social and cultural considerations will influence the absorption of information within that population and hence the rate at which it is taken up and used.²⁵⁹

5.6.1 Diffusion through Reuse

As previously stated reuse is central to the knowledge management offering as it saves time, improves profit margins and affords an organisation a competitive advantage. However, reuse of information retrieved from an electronic knowledge repository and how this complements person-to-person interactions are poorly understood.²⁶⁰

²⁵⁹ Boisot M. 1998. p54 -55

²⁶⁰ In this discussion, the premise is taken that reuse of information may not only refer to explicit documentation but to discussion points and questions posed in online forums and posts to blogs and wikis and contributions made by experts in enterprise portals. When the knowledge asset is complex or users are unfamiliar with the domain, there are significant challenges in reusing the asset.

A research project identified which factors influence how individuals benefit from reuse of knowledge assets and made the following observations:

- When individuals reuse complex knowledge assets in domains with which they are unfamiliar, they gain more benefit by contacting the author; sharing a common perspective with the author also facilitates asset reuse. Thus both electronic repositories and person-to-person interaction mechanisms complement one another in facilitating knowledge sharing.
- Complexity can play a significant deterrent role; people need to understand the knowledge before they can reuse it. The more a knowledge asset draws on ideas and information in different domain areas, the more difficult it is to reuse. People need to understand how the different areas relate when information crosses domain boundaries. It is also more difficult to create a complex document so that all the information is complete and understandable. Gaps appear between information needed and available. To overcome the difficulties, users can contact authors of the knowledge assets directly for clarification and discussion. Hence, it is important to complement the use of knowledge repositories with person-to-person interaction.
- Source credibility refers to the extent to which a knowledge provider has the relevant expertise and whether she or he is in a position to provide knowledge in the domain. This has a significant influence on the opinions and behaviour of users and has been found to increase user acceptance of recommendations from expert systems and improve knowledge transfer. When source credibility is high, knowledge recipients are likely to be more open and receptive to information from the knowledge provider; ideas in the asset are perceived to be worthy of consideration. The knowledge conveyed is thus more likely to be seen as useful, and to influence the behaviour of the recipient. On the other hand, when source credibility is low, the advice or knowledge is more likely to be challenged and resisted and therefore recipients are likely to discount it.²⁶¹

5.7 Knowledge Asset Management Scenario:

By nature, the functionality offered by an enterprise portal provides the mechanism or medium to codify, abstract and disseminate information and knowledge in organisations. The

²⁶¹ Boh WF. 2008. p1-9

challenge for knowledge practitioners is firstly that often organisations are not clear on what constitutes their knowledge assets and secondly how they can productively start to use an enterprise portal to manage their knowledge assets. A further hindrance is that many organisations have not invested in a knowledge management strategy or worse, that their organisation is so siloed, that, while parts of the organisation are practising KM, others do not even know what KM is, hence the overall value of their organisational know-how is diluted.

The following scenario endeavours to represent the ability of an enterprise portal to sufficiently manage a consulting organisation's knowledge assets using the three core processes, namely codification, abstraction and diffusion. The categories selected for management include Structural Capital, Human Capital and Customer Capital as each reflects the knowledge assets of a company, and most importantly, it is possible to ask questions that identify tacit as well as explicit knowledge.²⁶²

5.7.1 Background

A consulting organisation, specialising in projects in the realm of process engineering with support from business analysis and project management and primarily focusing on the financial services industry, seeks to manage their various organisational knowledge assets.

The organisation's key competitive advantage is their resource pool which comprises a diversity of qualifications, skills, experience and expertise. In addition, the organisation has enjoyed a multiplicity of projects within the financial services sector, over an extended period of time, during which the organisation has built up a substantial cache of processes, frameworks and methodologies; they have built strategic and long lasting relationships within the industry and they have leveraged their consultants' tacit knowledge through the use of communities of practice. The competitive environment in which the organisation competes requires it to rely more heavily on its knowledge assets, hence the subsequent plan to implement an enterprise portal.

Albeit the organisation can see the benefit of using an enterprise portal to manage their explicit knowledge, they are primarily concerned with how to manage confidentiality of their projects, managing their resources' tacit knowledge and continually communicating with the various stakeholders in the organisation. The organisation would like to see proof of why an enterprise portal would be an acceptable tool for them to use to manage their knowledge assets.

²⁶² Stewart TA 1999. p75

A series of questions have been crafted to elicit the information required.

Structural Capital

Processes/ Methodologies/ Programmes	Codification	Abstraction	Diffusion
1. What are the requirements?	<ul style="list-style-type: none"> • Organisational taxonomy that reflects the nature of explicit assets • Supporting Glossary to explain the meaning of taxonomic documents • User training on how the organisational taxonomy works enabling them to categorise and search productively • Ownership of the explicit knowledge assets by the relevant individuals/ groups/ teams 	<ul style="list-style-type: none"> • Taxonomy must reflect the various categories of industries, business units, clients, solutions etc • The categories must be stable enough to support the organisation as it stands and flexible enough to grow with the organisation 	<ul style="list-style-type: none"> • Taxonomy is applied across the organisation, thereby creating a standard for categorisation across the organisation to enable searching and reuse • Governance with regards to access and permissions to copy, modify, delete assets • Access 24/7 to knowledge assets • Updates and alerts sent to applicable persons when assets are added, modified and/or deleted
2. What are the potential benefits?	<ul style="list-style-type: none"> • Less effort to search and find applicable explicit assets as there will be a categorisation system to assist in this task 	<ul style="list-style-type: none"> • The categories will assist the organisation to cluster knowledge assets together, that may have been previously 	<ul style="list-style-type: none"> • Consultants will have access to a collection of the organisation's artefacts including best practices that can assist them to execute their

		<p>disparate</p> <ul style="list-style-type: none"> • The organisation can identify gaps in their knowledge asset collection 	<p>project tasks.</p> <ul style="list-style-type: none"> • Reuse of artefacts can save time, money and lead to innovation • Consultant's can select to be alerted to new submissions or updates to existing artefacts
<p>3. What are the potential risks?</p>	<ul style="list-style-type: none"> • Taxonomy does not reflect the organisation accurately, or it is too voluminous and unwieldy or it is too limited to be of use • The organisation does not support or engage in the initiative and hence does not learn how to use the tool 	<ul style="list-style-type: none"> • Agreement on the requisite categories is protracted, siloed and unduly influenced 	<ul style="list-style-type: none"> • If governance is not applied, there may be security and access issues with assets being accessed by unauthorised persons • Giving employees the power to disseminate artefacts that may be sensitive or of high competitive value
<p>4. What are the critical success factors?</p>	<ul style="list-style-type: none"> • Representatives from the whole organisation must participate in the taxonomy development to ensure overall applicability • Buy-in and agreement on the taxonomy from stakeholders and drive from Senior Management to adopt the method of working 	<ul style="list-style-type: none"> • There must be a balanced approach to including enough information to make the categories inclusive but lean enough to make them productive 	<ul style="list-style-type: none"> • Design a governance model to guide the process of dissemination • Understand what knowledge assets the organisation has • Understand the status of the knowledge assets i.e. sensitive, company-wide or public • Understand the audience requirements in terms of access

	<ul style="list-style-type: none"> • Training of users 		<p>to the knowledge assets.</p> <ul style="list-style-type: none"> • Manage the exceptions i.e. Joe Bloggs is not on the sales team but assists in writing proposals and therefore requires access to the sales document library
<p>5. Position on Boisot’s Scaling Guide ²⁶³</p>	<ul style="list-style-type: none"> • High 	<ul style="list-style-type: none"> • High 	<ul style="list-style-type: none"> • High

Table 5.1 – Structural Capital
(Source: Compiled by the author)

²⁶³ Boisot’s scaling guide assists in articulating, refining and sharing the perceptions of what an organisation’s knowledge assets consist of. See Appendix A.

Human Capital

People, Skills & Know- How	Codification	Abstraction	Diffusion
<p>1 What are the requirements?</p>	<ul style="list-style-type: none"> • An expert locator with fields for resource's information for example: photograph of person, business unit, job title, qualifications, core skills, previous projects, current projects, experience/ companies previously worked at; awards, Community of Practice Membership, Societal membership, hobbies and interests, birthday, contact details, blog address, links to social networking sites external to the company portal, free text field to write a biography • Skills database with specific skills codes/ qualifications that are applicable to the nature of the organisation's work 	<ul style="list-style-type: none"> • An organisational hierarchy that clusters the resources in the applicable groups such as office location, business units, job level, teams and even communities of practice • Skill matrices that identify the levels required for each job grade and job type 	<ul style="list-style-type: none"> • The expert locator should be public within the organisation so that employees can find one another for example if someone wanted to contact an author of an explicit knowledge asset or an expert who may have previously worked on a similar project or even a community of practice facilitator or member. • It is unlikely that an organisation would want to publish an expert locator externally, simply due to knowledge retention and employee retention. • Potentially the skills database will be accessible to everybody to update their own profile but there will be restrictions on

			who can view everyone's skills
2 What are the potential benefits?	<ul style="list-style-type: none"> • One of the easiest and most practical ways of getting people to participate and engage in an enterprise portal • Creating a means to give context to documents and other knowledge assets that require face to face contact • Creating a list of human capital knowledge assets and a means to identify gaps in skills and skill levels • Create a means to reward and recognise human capital contribution to the organisation • Creating a mechanism to build networks within the organisation 	<ul style="list-style-type: none"> • By abstracting this information becomes easier to visualise and to understand • Assists in managing the resources • Assists in managing expectations of resources for example to be promoted to another level, you will need these skills or qualifications. 	<ul style="list-style-type: none"> • Resources can source their own internal expertise when required • By limiting the rights to view the information, sensitive information is correctly managed
3 What are the potential risks?	<ul style="list-style-type: none"> • Resources do not keep the information updated and hence the practice becomes worthless • Relying on the individuals to volunteer information about themselves, some may choose not to do so 	<ul style="list-style-type: none"> • The quality of the data is outdated or 	<ul style="list-style-type: none"> • Even though the information is available, it does not mean that the resources will use it • The information can be abused by member within the organisation for example sales teams who 'bodyshop' or sell

			single deployments as opposed to selling solutions that would require teams and skill sets that the organisation has
4 What are the critical success factors?	<ul style="list-style-type: none"> • Culture of participation in order to get people to complete the information and keep it updated • Knowledge of the skills and qualifications required for each job and level of job in the organisation 	<ul style="list-style-type: none"> • To maintain the quality of the data • Consistency in applying the data 	<ul style="list-style-type: none"> • Expert locator must be communicated widely in the organisation and adopted by everyone i.e. new employees are encouraged to fill it out on their induction and an announcement is placed on the front page of the portal to welcome them and alert the organisation about their presence • The requisite amount of governance is applied to protect sensitive information in the skills database
5 Position on scale²⁶⁴	<ul style="list-style-type: none"> • Medium 	<ul style="list-style-type: none"> • Medium 	<ul style="list-style-type: none"> • Medium

Table 5.2 – Human Capital
(Source: Compiled by the author)

²⁶⁴ Boisot's scaling guide assists in articulating, refining and sharing the perceptions of what an organisation's knowledge assets consist of. See Appendix A.

Customer Capital

Relationships	Codification	Abstraction	Diffusion
<p>1. What are the requirements?</p>	<ul style="list-style-type: none"> • Documented information about who the clients, suppliers, vendors, associates are with details about the relationship, previous sales or engagements, contact persons, contact details. Possibly a CRM system • Links to artefacts that would give additional information for example proposals, presentations, research, industry trends etc possibly to internal project sites • Map of people who ‘own’ or who are involved in the relationship – perhaps a social network analysis chart that maps relationships 	<ul style="list-style-type: none"> • Knowledge of industry groups with relevant companies • Links to industry associations or memberships to external industry portals • Links to external business social networking sites such as LinkedIn • Subscriptions to external industry specific research portals for example Gartner or Forrester • Links to internal communities of practice for industry groups for example Loans Innovation CoP²⁶⁵ 	<ul style="list-style-type: none"> • There must be governance about who in the organisation can access this information because of its proprietary nature and potentially profitability • Access to project sites should be open to members of the organisation – project site governance should be applied where applicable for example proprietary information about the client should be locked down for access by applicable persons only • There must be an opportunity to invite customers and vendors to participate in communities of practice and

²⁶⁵ This is an actual example of an industry CoP that existed within a consulting client organisation. The CoP was instrumental in creating an innovative framework that was adopted by one of South Africa’s leading financial institutions

	<ul style="list-style-type: none"> • Competitor analysis information that indicate market share, customers, products etc 		<p>innovation forums via extranets but once again governance prevails as to who is given access, the type of information they are given access to and when they are given access to this information</p> <ul style="list-style-type: none"> • Access to external information portals will depend on the requirements of the individual and the organisation's subscription terms and conditions
<p>2. What are the potential benefits?</p>	<ul style="list-style-type: none"> • Information about your relationships can be shared and potentially retained even if the key relationship holder leaves the organisation • By linking relationship, sales and project artefacts together, there is one view the relationship with the client 	<ul style="list-style-type: none"> • Information on the various industries are easily accessible and can support the relationship activities for example keeping track of industry trends and potentially innovating ahead of competitors, keeping a close watch on competitor actions, remedying problems, being known as experts in field 	<ul style="list-style-type: none"> • The requisite information is delivered to the right individuals at the right time • Client confidentiality is assured • Opportunity for clients, vendors, suppliers etc to participate in activities in the organisation which potentially can lead to innovation projects, trusted advisor relationships and networks of experts

<p>3. What are the potential risks?</p>	<ul style="list-style-type: none"> • Information is not standardised, regularly updated and the resources do not use the tool • Relationships are about people and hence difficult to document and sometimes codify and may not be effective even if documented 	<ul style="list-style-type: none"> • Information is irrelevant or there is too much information to absorb 	<ul style="list-style-type: none"> • Security and access to information is given to the wrong individuals and proprietary information is leaked • Information is not disseminated appropriately – for example, an organisation’s subscriptions terms and conditions may prevent the diffusion of information to a wider audience thereby reducing the ability to benefit a larger group of people
<p>4. What are the critical success factors?</p>	<ul style="list-style-type: none"> • The information is standardised across the organisation • The processes for accessing, updating information, deleting information etc is documented and there is overall responsibility for the quality of the data 	<ul style="list-style-type: none"> • Focus on the key industry groups • Access to quality information resources 	<ul style="list-style-type: none"> • There is governance around audience and access rights • Opportunities to collaborate are made available • Information is seamlessly disseminated to applicable groups
<p>5. Position on scale²⁶⁶</p>	<ul style="list-style-type: none"> • Low 	<ul style="list-style-type: none"> • Low 	<ul style="list-style-type: none"> • Low

Table 5.3 - Customer Capital
(Source: Compiled by the author)

²⁶⁶ Boisot’s scaling guide assists in articulating, refining and sharing the perceptions of what an organisation’s knowledge assets consist of. See Appendix A

5.8 Conclusion

This chapter outlined what the implications were for managing knowledge assets using the three dimensions from the I-Space framework, namely codification, abstraction and diffusion.

A scenario of a knowledge intensive consulting company was presented to illustrate how an enterprise portal would manage their knowledge assets using the three processes. Boisot's scaling guide was used as to articulate the organisation's knowledge assets and how they are distributed in the I-Space.

The following chapter summarises the main points of the research and reiterates the hypotheses posed in Chapter 1.

Chapter 6

Conclusion

6.1 Summary

This research has investigated whether enterprise portals could be leveraged to improve organisational business performance. A fundamental area of this investigation concentrated on what this would mean for the management of knowledge assets, which are key support structures for organisational competences.

The following main points summarise the discussion:

Business performance equates to value that the organisation offers to its stakeholders. The value is a result of an organisation's ability to manage its business processes while effectiveness and efficiency of performing organisational processes are based on organisational competences. The management of knowledge assets is an entity that enables an organisation to grow and develop the appropriate organisational competences. Therefore the fact that organisational competences are based on the effective and efficient management of knowledge assets puts it at the heart of business performance and value creation.

Competitive advantage does not flow automatically from the possession of knowledge assets. An organisation has to know how to extract value from them. Extracting value from knowledge assets requires an ability to manage them.

The value of knowledge to an organisation depends on the ability of the organisation to exploit its knowledge. This in turn depends on two factors: its exclusivity of access to the knowledge and its access to the technology required for exploitation. Enterprise portals can facilitate both factors.

Increasing the capability of knowledge workers for agile, effective decision making in fast changing environments requires robust connectivity and infrastructure and organisational culture and processes. These aspects nurture and facilitate intensive

levels of information sharing resulting in a larger common knowledge base and evolution of new knowledge.²⁶⁷

Enterprise portals should be implemented within a comprehensive knowledge management strategy. Companies should not confuse the tactical advantages offered by portals with the fundamental changes required for effective knowledge management. The portal is the interface, the place where information exchange and knowledge transfer takes place but it is only one component of successful knowledge management.²⁶⁸

Enterprise portals provide an essential business platform that allows the integration of information from disparate information sources, both internal and external. As valuable content is created, organised and distributed, parts of it can be transferred from the internal corporate portal environment to external audiences, including customers, suppliers and partners.

Intellectual capital characterised by Human Capital, Structural Capital and Customer capital represent the knowledge assets of an organisation and include both tacit and explicit components. Intellectual property is the sum of the interplay of these three categories and helps an organisation to identify and classify the knowledge components of the organisation.

Technology increases an organisation's capacity to capture, process, transmit and store data, thus facilitating moves toward codification, abstraction and hence towards diffusion.²⁶⁹

While codification can be thought of as a process of giving form to phenomena or to experience, abstraction is the process of discerning the structure that underlies the forms. Codification and abstraction work in tandem and both reduce the data processing load imposed on an agent whether organisation or individual. They also facilitate communication processes and hence the diffusion of information whether inside or across boundaries.

²⁶⁷ Kotorov R, Hsu E. 2001. p91

²⁶⁸ Cloete M, Snyman R.2003. pp237

²⁶⁹ Boisot M. 1998. p213

The relationship between codification, abstraction and diffusion is akin to setting up a data field. There is a configuration of forces that condition data flows over time through the I-Space and hence help to shape the evolution of knowledge assets.

The potential of an enterprise portal can be enhanced if it seen as an enabler of intellectual capital management which is directly linked to the ultimate profitability or increased effectiveness of an organisation. The enterprise portal links the different silos of knowledge capital assets with each other as well as with the value proposition and organisational culture of the organisation. Value is created by personalising, aggregating and integrating the human, structural and customer capital.

The enterprise portal facilitates *human capital* creation by consolidating, integrating, enhancing and connecting to the knowledge people have within an organisation. It enables *structural capital* to be shared, used, reused, acquired, retained, identified, received, transmitted, applied and networked within an organisation. The enterprise portal facilitates, collaborates, updates, explores, interacts and promotes the image and brand to customers, partners and interested parties (*customer capital*).²⁷⁰

The hypothesis put forward in Chapter 1 was that if organisations use the Boisot I-Space framework, specifically the three core processes, namely codification, abstraction and diffusion to manage their knowledge assets within enterprise portals, then organisations would be in a position to effectively extract value from their knowledge assets thus supporting their capabilities and core competences.

The evidence presented in this research together with the summation of main points of argument, the deductions presented in the scenario and the alignment with the I-Space framework, affirms the hypotheses. The I-Space framework, specifically the three core processes, namely codification, abstraction and diffusion can support the ability to manage knowledge assets within an enterprise portal. Moreover, by managing their knowledge assets using this particular approach, organisations will be in a position to effectively extract value to support their capabilities and competences.

²⁷⁰ Cloete M, Snyman R.2003. pp238

6.2 Recommendations

Organisations that are considering the implementation of an enterprise portal would be at a considerable advantage if they used the dimensions of codification, abstraction and diffusion to guide their portal design strategy.

In-depth analysis should be conducted to identify the following:

- Organisational core competences that require knowledge assets (both tacit and explicit) to support them
- The corresponding knowledge assets according to human capital assets, structural capital assets and customer capital assets.

The organisation must decide on how each of these knowledge assets should be managed within the enterprise portal. This exercise will identify how each asset will be treated in terms of codification, abstraction and diffusion. This exercise will provide significant guidance to the ultimate portal design strategy and the manner in which these knowledge assets will be managed.

6.3 Future Research

This research provides insight into how organisations can leverage enterprise portals for business performance. The research was not intended to quantify or measure business performance or the ability for organisations to manage knowledge assets. However, based on this research and framework proposed, this may be an interesting area to investigate in the future.

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Appendix A

The scaling exercise is helpful in that it helps to articulate, refine and share perceptions of what exactly an organisation's knowledge assets consist of and of how they are distributed in the I-Space – it provides a view of itself. The result is often consciousness raising even if by its very nature it cannot be fully objective since participants may hold quite distorted views of their organisations knowledge assets.

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Position on scale	Codification	Abstraction	Diffusion
	Is the knowledge	Is the knowledge	Is the knowledge
High	Easily captured in figures or formulae, does it lend itself to standardization and automation	Generally applicable to all agents whatever the sector they operate in, it is heavily science based	Readily available to all agents who wish to make use of it
Medium	Describable in words and diagrams, can it be readily understood by others from documents and written instructions alone	Applicable of agents within a few sectors only, does it need to be adapted to the context in which it is applied	Available to only a few agents or to only a few sectors.
Low	Hard to articulate, it is easier to show someone than to tell them about it	Limited to a single sector and application within that sector, does it need extensive adaptation to the context in which it is applied?	Available to only one or two agents within a single sector

Scaling Guide

(Source: Boisot, 1998)

²⁷¹ Boisot M. 1998. p65