Knowledge Management
and the Learning Organisation
in the New Economy

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DECLARATION

I, the undersigned, hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Signature: ……………………………………………

Date: ……………………………………………

SUMMARY

In the literature on organisational learning and specifically the concept of a learning organisation, an integrated approach towards the learning organisation appears to be lacking. The thesis is an effort to correct this by integrating the organisational aspects namely strategy, structure and processes into a coherent model of the learning organisation.

For this purpose, the thesis is divided into two parts. The first part is a theoretical evaluation of Peter Senge's concept of the learning organisation, and Nonaka and Takeuchi's model of the Knowledge Creating Company. These models were evaluated to determine the degree to which these models incorporate strategy, structure and processes. In an effort to make sense of the learning organisation concept within the framework of the knowledge era, other influences such as Peter Drucker on the Post-Capitalist Society and Thomas A Stewart on how to manage Intellectual Capital in the new economy, were incorporated. In addition, the basic building blocks of existing theories of the learning organisation were considered in order to develop appreciation for their contribution and influence towards a model of the learning organisation.
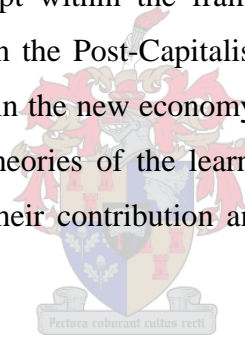
The second part of this thesis endeavoured to build a notional model for the learning organisation. This notional model is considered necessary in order to develop an appreciation for how matters such as structure, strategy and processes can interact and co-operate towards an integrated model of the learning organisation.

In conclusion, a number of factors of organisation were identified as probable principles of organisation in the knowledge economy.

OPSOMMING

In die literatuur rondom organisasie leer, en meer spesifiek die konsep van die lerende organisasie, blyk daar 'n behoefte aan 'n geïntegreerde benadering tot die lerende organisasie te wees. Die tesis is 'n poging om die invloede van strategie, struktuur en prosesse te integreer in 'n geïntegreerde model van die lerende organisasie konsep te verkry.

Vir hierdie doel is die tesis in twee dele verdeel. Die eerste deel sentreer rondom Peter Senge se siening van die lerende organisasie, asook Nonaka & Takeuchi se model van kennis-skepping. Die evaluasie bepaal tot watter mate die implikasies van struktuur, strategie en prosesse in hierdie modelle geïnkorporeer is. In 'n poging om sin te maak van die begrip van die lerende organisasie in die konteks van die kennis era, is Peter Drucker se teorie van die post-kapitalistiese era, asook Thomas Stewart rondom die bestuur van intellektuele kapitaal in die kennis ekonomie, in ag geneem. Vervolgens is die basiese boublokke van die bestaande teorieë van die lerende organisasie besoek om waardering te ontwikkel vir hul bydrae en invloede op 'n model van die lerende organisasie.
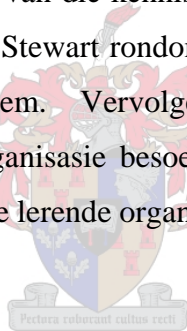
Die tweede helfte van die tesis is gebasseer op kennis en insigte ontwikkel in die eerste helfte en stel 'n spekulatiewe model van die lerende organisasie. Hierdie spekulatiewe model is nodig om waardering te kry vir die verwantskap tussen organisasie struktuur, strategie en prosesse, en wyses waarop hierdie komponente geïntegreer kan word ter wille van 'n geïntegreerde model van die lerende organisasie.

Ter afsluiting word 'n aantal aspekte van organisering geïdentifiseer as waarskynlike beginsels van organisering in die kennis ekonomie.

ACKNOWLEDGEMENTS

I wish to express my appreciation towards friends and family for their endless support, interest and assistance. These efforts did not only add to the quality of this experience, but also motivated the result.

TABLE OF CONTENT

1   INTRODUCTION

The notion of organizational learning has to tackle learning as something more than the sum of the individual learning of the members of that organization (Kim, 1993). In other words, whatever one's notion of organizational learning, it is inevitably built on a model of a learning organization of some kind. The challenge is to approach the learning organization in an integrated way. This implies modelling the learning organization against the organisational aspects of strategy, structure and processes.[1] This thesis is an attempt to build such a coherent model of the learning organisation.

1.1   The New Economy and Knowledge Management

It should be clear that learning only became a central issue in organisations as the result of changes to the meaning and function of knowledge, increasingly relating knowledge to production (Drucker, 1993:17). Knowledge has become a production factor in its own right displacing the traditional factors of production and determining their productivity (Stehr, 1995).   The new economy can thus rightly be called a knowledge economy, in which knowledge resources and knowledge-driven products, services and relationships become organizational assets that should be managed (and measured[2]) the way financial capital has traditionally been.

Over the last two decades a body of theory emerged that specifically addresses the new role of knowledge in organisations. This field is known as Knowledge Management and is devoted to the techniques and principles that should govern the control and manipulation of the knowledge resources of organisations. In a context where knowledge is the central resource of organisations, learning and innovation moves to the foreground and must be seen as fundamental organisational aspects. Learning and innovation are fundamental because they are the knowledge-related aspects that affect the future knowledge stock of an

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[1] Organizational learning has been extensively considered with reference to strategy, but there is a paucity of research with reference to organizational structure and process. For the link between learning and strategy, see any of the following: Argyris, 1990; Grinyer & Spender, 1979; Hedberg & Jönsson, 1989; Miller, 1990; Pennings, et. al., 1994; Senge & Sterman, 1992; Slater & Narver, 1995; Walsh, & Ungson, 1991; Wikström &Normann, 1994.

[2] See for instance Thomas A Stewart's *Intellectual Capital*.

organisation. Against this background, particular attention is warranted to the classic models of the Learning Organisation (Senge, 1999) and that of the Knowledge Creating Company (Nonaka and Takeuchi, 1995).

1.2 What is organisational learning?

1.2.1 Individual learning versus organisational learning

For the developing of any understanding about organisational learning it is necessary to examine the differences between individual learning and organisational learning. Individual learning is important to organisations but organisational learning is not merely the sum of each individual's learning. Much of individual learning theory that deals with repetition of speech and motor skills do not characterise organisational learning, but almost in the same way that individuals develop their personalities, personal habits and beliefs over time, organisations can develop world views and ideologies. Organisations have memories and organisational memories do preserve certain behaviours, mental maps, norms and values over time, even though members come and go and leadership changes (Hedberg, 1981:6).

For organisations, learning enables them to build an understanding of their environment and to begin to assess viable strategies. It results in associations, cognitive systems and memories that are developed and shared by members of the organisation. Organisations, unlike individuals, develop learning systems that not only influence their immediate members, but are then transmitted to new members by way of the organisation's norms, histories and war stories. Consequently organisations do not have brains, but they have cognitive systems and memories (Fiol & Lyles, 1985). As Örtenblad (2001:131) states: "the collective learns."

1.2.2 The study of organisational learning

Fiol & Lyles (1985), in a review of early studies on organisational learning argue that, apart from the need to distinguish between individual and observational learning, there are a number of areas of consensus in observations on organisational learning.

- A key aspect of organisational learning is the **alignment** *of organisational developments with the environment of the organisation* to maintain competitiveness

and survival over the long run (Fiol and Lyles, 1985). Alignment implies that the organisation must have the potential to learn, unlearn, or relearn based on its past behaviours.

- Four **contextual factors** that affect the probability that organisational learning will occur, namely: i) A corporate culture conducive to learning; ii) a strategy that allows for organisational flexibility; iii) an organisational structure that allows both for innovativeness and new insights; and iv) the environment of the organisation. These contextual factors then have a circular relationship with learning in the sense that they create and reinforce learning and are also created by learning.

- **Concept of learning** is about the process by which organisations adjust to their environment. Change, adaptation and learning, in the related studies according to Fiol & Lyles (1985), have not been used consistently with the same meaning. So is adaptation equated to organisational learning by some, while others argue that adaptation is not always related to actual learning.

- **Content of learning** may be reflected both in the newly learned patterns of the cognitive associations of members of the organisation, as well as by new behavioural patterns that reflect the new cognitive patterns and/or cognitive associations of the members of the organisation. Despite this useful understanding of the relationship between cognitive patterns and behavioural patterns, it is worth noting that not all behavioural changes reflect organisational learning, and new cognitive patterns do not necessarily result in new behavioural patterns.

- **Levels of learning** (Fiol & Lyles 1985) are referred to by a number of authors that refer to levels of learning: Argyris and Schön (1996) refer to single and double-loop learning and Senge (1990) refers to adaptive learning and generative learning, the latter being the learning that enhances our capacity to create. Yet others refer to lower and higher level learning. Fiol & Lyles separate the two levels of learning to represent cognitive development and behavioural development individually. Later in this thesis, Argyris and Schön's theories of double-loop learning will be looked at in more detail in order to develop an improved understanding of this concept.

1.3   Why an improved model for the learning organisation?

To answer this question that is at the heart of this thesis, we first need to ask ourselves why we need a model of the learning organisation in the first place. It is worth noting that current definitions of the learning organisation are very limited and do not reflect the nature of the learning organisation as it could. In fact, by asking this question we are embarking on a path on which we first need to understand what the need is for having a model of the learning organisation. When challenging the current models of the learning organisation, we will also need to review the definition of what a learning organisation is. This will be done at a later stage and is necessary to lead us to the point of understanding the need for improving on current models of learning organisations. With limited definitions of what a learning organisation is, and with no understanding of why there is a need for a learning organisation, it would hardly be possible to obtain a generic model for the learning organisation.

1.3.1   Why a model for the learning organisation in the first place?

Pedler et al (1991) proclaims a dream in which we can create and design organisations which are capable of adapting, changing, developing and transforming themselves in response to the needs, wishes and aspirations of people inside and outside the organisations. But how do we go about building such a learning organisation, and what would the eventual learning organisation look like? To answer this question in the tradition of Argyris & Schön, an accepted mental model (or common mental map) of the learning organisation should be helpful in creating a common understanding of what a learning organisation should or could look like.

It is clear in all literature on the learning organisation concept that the underlying basis for organisation in Fordism, namely division of labour, does not suffice any longer, at least not on the scale that it used to. If a basis, or some principles, for organisation in this information era exist that will improve the effectiveness of organisations, we must be able to demonstrate these on the basis of a model. Such a model then needs to present a framework for organisations and then incorporate some principles supporting organisational learning. This type of argument is the same approach as Peter Senge's (1990) argument that a number of organisational components has to converge to obtain a model of the learning organisation

that will work in reality, in the same way that a DC3 aeroplane needs certain components to fly (wing flaps, retractable landing gear, radial air cooled engine, tail flaps and a lightweight body). Required is a model that demonstrates the workings of the learning organisation and how the different features of the learning organisation integrate to promote efficient organisational learning. This is required to facilitate a roadmap for an organisation towards becoming a learning organisation.

1.3.1.1 The learning organisation within the framework of organisational learning

Learning (Dodgson 1993) is firstly a dynamic concept, and its use in the theory on organisational learning emphasises the continual changing nature of organisations. In addition it is an integrative concept that can unify various levels of analysis namely individual, groups and corporate. The latter aspect makes organisational learning particularly helpful in reviewing the cooperative and community nature of organisations. In this context Drucker (1993:176) sees the productivity of knowledge, or the qualitative impact (1993:169) of knowledge, as a factor that increasingly determines the competitive position of a country, an industry, or a company[3].

Mark Dodgson (1993) argues that the concept of the learning organisation has been gaining currency amongst large organisations as they attempt to develop structures and systems which are more adaptable and responsive to change. He states that it is increasingly appreciated that the learning capacity of organisations is a key factor towards competitiveness. In the same line of thinking, the learning organisation is summarised by Peter Senge (1990:3) as "organisations where people continually expand their [the organisation's] capacity to achieve the results they [the organisation] truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together."[4]

Two items of literature, in particular, are widely accepted and will be evaluated in this thesis

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[3] For the purpose of this thesis we will see organisational knowledge gains as organisational learning.

[4] Between brackets my own words.

as a basis for a model of the learning organisation concept:

- *The Fifth Discipline: The Art and Practice of the Learning Organisation* by Peter Senge (1990).

- *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation.* Nonaka & Takeuchi (1995).

Why these two models? Apart from the fact that these two endeavours are widely acknowledged, they originated independently in the West and the East. As we will find when we evaluate these texts, Nonaka & Takeuchi's and Senge's texts originated from two very different outlooks to epistemology, based on the different outlooks that the West and the East has towards epistemology according to Nonaka & Takeuchi.

1.3.2   Current models from Senge and Nonaka have limitations

Nonaka & Takeuchi (1995) claim to present a generic model for organisational knowledge creation, and in the process offer quite a complete model for knowledge creation[5]. However, the genericness of the model can be challenged, and a number of limitations to this model will be highlighted within this text. Any discussion on these shortcomings will be addressed later, since a superficial discussion on these shortcomings will add little value at this point.

At the same time there are limitations to the answer supplied in The Fifth Discipline, by Peter Senge. This text, it can be argued, focuses on addressing the behavioural aspects and thought patterns of individuals that will contribute towards the learning organisation. From his experience as Director of Systems Thinking and Organisational Learning at Massachusetts Institute of Technology, Senge (1990:51) identified learning disabilities of organisations and the five disciplines to overcome these shortcomings. However, Senge does not claim, nor succeeds in delivering, a complete model for the learning organisation. Instead he acknowledges that this model compares, in terms of maturity, with a laboratory experiment versus a tried and tested innovation.

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[5] The underlying assumption is that created knowledge is actual learning or at least characterise a form of learning.

1.3.3 Complementary views exist

In this section a number of concepts from within the fields of knowledge management and organisational learning, that contribute substantially towards an improved model of the learning organisation, will be discussed.

1.3.3.1 The Learning Company (Pedler, Burgoyne & Boydell)

A number of attempts from Pedler et al (1991:24-33) at creating a model of the learning organisation may not be as elaborate or as successful as those from Senge and Nonaka & Takeuchi. Nevertheless, these efforts illustrate the nature of the challenge when developing a model for the learning organisation. Another interesting aspect of Pedler et al's text is their view of the life stages of organisations, the learning that occur within organisations and the different stages in the life cycle of an organisation. Instead, this view from Pedler et al adds complexity rather than bringing us any closer to a generic model of the learning organisation. Albeit, the question that does arise is whether the principles for organisational learning supposed in this theses will be generic enough to be independent of the maturity or internal dynamics of the organisation. This question we may want to revisit once the proposed model of the learning organisation is delivered and discussed in more detail.

1.3.3.2 Double-loop learning (Argyris and Schön)

Argyris and Schön claim in their text, Organizational Learning II (1996:xix), that there are two branches of literature on organisational learning. The one branch of literature - being prescriptive, action oriented, value committed and largely uncritical – uses the phrase 'learning organisation' as a catchword for whatever the front running Japanese, or other, organisations are doing and whatever the rest of the world needs to do to catch up with them. The second branch of literature, according to them, treats organisational learning as a research topic for scholars. This group, they claim, tend to be distant from the practice, sceptical of the first branch claims, non-prescriptive and neutral with respect to its definition of learning, in other words open to the view that learning may be good or bad, or linked, or not linked, to effective action or desirable outcomes.

However, Argyris and Schön (1996:xix) claim that the communities of practice, that make up

the two branches, do converge on certain key ideas that coincide with their own theory. Firstly, both branches tend to pick up on the importance of recognising, criticising and restructuring mental models. Secondly, there are different levels of learning, e.g. single- and double-loop learning, or lower- and higher-level learning.

Although they claim to bridge the gap between the two factions with their normative and practice based approach to organisational learning, it will become increasingly clear that the double-loop learning concept forms but a part of the needs of the learning organisation.

1.3.3.3 Knowledge management combined with organisational learning

It is a growing trend to combine the fields of study of organisational learning and knowledge management when looking for a complete solution to organisational decision making challenges. In the same fashion we will include, among others, the implications of the text *Intellectual Capital* from Thomas A. Stewart into this study, and with interesting consequences. Especially Stewart's view of knowledge management, namely that knowledge management is the management of knowledge flows and knowledge stocks, has interesting implications towards an effectual model of the learning organisation.

1.3.3.4 Post-Capitalist Society (Peter F. Drucker)

Peter Drucker claims that the world is currently undergoing a transformation, and that society rearranges itself in creating a post-capitalist society. He states that several of these transformations occurred in history. The first instance mentioned is that of the emergence of the city guilds with the revival of long-distance trade, giving rise to the bourgeoisie as a new social class during the 13th century - with the world almost over-night becoming centred in the "new city". Then in the late 15th century, the Renaissance peaked in Europe, resulting in the inflated divide between the common and aristocratic classes. A further instance was the Industrial revolution and the steam engine in the 18th century, bringing about the entrepreneur and capitalism.

The view of Karl Polanyi (1946) is that, based on the need of a society, new classes may be introduced and superfluous classes may disappear. Is it possible then that the "knowledge

worker[6]" that Drucker identifies is a new social status or class as a result of the new knowledge based economy? Nevertheless, two aspects of Drucker's Capitalist society are of importance in the context of the learning organisation. Drucker (1993:44) claims that, in any developed country today, we have a society of organisations, and that any individual can only contribute to society through an organisation. He also advocates the knowledge worker as a new prominence, and implies that the knowledge worker should be managed in a different way (Drucker 1993:5-7).

Of particular interest to the learning organisation are Drucker's views on how organisations in the knowledge society should be administered.

1.4   A proposed model

1.4.1   Conceptually bringing current models and views together

When one considers an organisation as a group of individuals organised towards a specific task (Drucker, 1993:43), the following research question may arise: On what basis do we then organise a group of individuals to increase the capacity of an organisation towards effective shared learning? One can construe, from the literature at hand, that an organisation may need to respond when the circumstances of the organisation, or the task at hand, changes. This response can be in the interest of the task at hand, or simply for survival in the interest of its stake-holders. So, will we be able to purposefully build an organisation that inherently has the capacity to adapt effectively and efficiently to changes in its environment, or at least learn improved responses to internal and external stimuli?

This question, with consideration of the discussion in sections 1.1 and 1.2 above, can also be rephrased: After studying current models of the learning organisation, will we be able to identify principles for organising in the knowledge economy that will improve, or possibly maximize, the organisations capacity towards shared learning and shared knowledge creation? In the same way that division of labour was a principle for organisation in Fordism

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[6] Although Drucker often uses the term "knowledge worker", he does not give a good definition for the term "knowledge worker". However, some of the authors referred to in this thesis acknowledge the emergence of knowledge workers in the knowledge economy. With their aid an understanding of the term will be established.

we will search the texts at hand for the principles of organisation in the new knowledge based economy.

1.4.2 Combining the strengths of current views and models

Each of the recognised view points, theories and models will be evaluated to extrapolate their strengths and wisdom in order to combine these into an induced model of the learning organisation. In a very logical and systematic manner we will see how a model for the learning organisation enfolds from the particular literature - a model that combines the most important aspects of the related literature into a systematic solution. Towards this purpose the practicable controls available to organisations, namely the organisational strategy, organisational structure and actual processes of the organisation, will receive priority. The underlying assumption is that any useful model of the learning organisation must supply the manager of the learning organisation with the apparatus that he or she needs to be built into the learning organisation, as well as a framework that can be used to steer the manager towards a better understanding of the internal operations of the learning organisation.

1.5 Organisational learning versus a model for the learning organisation

The study field of organisational learning covers a vast array of topics and consequently, in the process of building a practical and complete model of the learning organisation, a natural selection of related topics had to occur.[7] The approach when analysing the models was to focus on the acknowledged controls of organisation such as organisational purpose, strategy, processes and management of the resources of the learning organisation. Some topics were very interesting, but unfortunately, due to the need for a clear focus, they need to be excluded from this discussion. These include subjects such as:

- Research and development (R&D) as a contributor towards organisational learning. Learning in R&D can occur in the focus of the R&D, the innovations or intended

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[7] For an overview of the distinction between organizational learning and the learning organization see: Mumford, 1995; Sun & Scott, 2003; Yeo, 2005; Wang & Ahmed, 2003.

learning, as well as in the process of R&D itself. The latter (Dodgson 1993) may develop the organisation's ability to identify, assimilate and exploit the knowledge from the environment. The final outcome of R&D are then considered to be learning that will enhance the eventual capabilities of the organisation.

− Organisational forms conducive to learning. In this regard (Dodgson 1993), learning is emphasised as a social process that needs to be coordinated within the organisation.

− Different patterns of organisational learning (Dodgson 1993). When compared with individual learning, the way in which knowledge, information and communication flows are distributed in the organisation, can give rise to very different patterns of organisational learning.

− The importance of routines in organisational learning (Dodgson 1993) and the view that routines operationalise organisational memories and knowledge base. Routines are observed to include forms, rules, procedures and conventions around which organisations are constructed and through which they operate. It also includes the structure of beliefs, frameworks, paradigms, cultures and knowledge that buttress, elaborate, and contradict the formal routine.
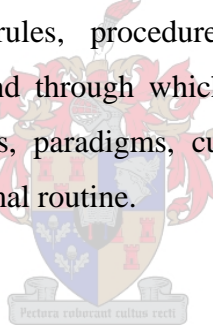
1.6   The research topic

This thesis is thus about the possibility of a practical and useful model for the learning organisation. This effort is despite the vastness of literature in organisational learning and in acknowledgement of the fact that a model of the learning organisation cannot incorporate each and every topic of organisational learning. In appreciation of the efforts put into current models of the learning organisation, or the Knowledge Creating Company as some prefer to relate to this topic, the approach will be to embrace the wisdom of existing models. At the same time the aim is to develop an understanding of the new knowledge driven economy, taking into consideration implications of the field of knowledge management on the model.

For a model to be both practical and useful, it must supply a solution that will give answers to questions from organisational leadership. Firstly, how would I go about creating the optimal structure for my organisation that will promote learning within and around my organisation? Secondly, we know that processes need to be managed, but how do we manage it in order to exploit opportunities for learning? Thirdly, how do I build a learning strategy and create opportunities for learning when creating a strategy?

In an effort to address these needs through one model that integrates the answers to these material questions, this thesis statement applies:

The Thesis Statement

For the effective management of organisational learning and knowledge creation in the new knowledge-based economy, the implications of organisational strategy, structure and process management on knowledge creation within the organisation has to be deliberated in the effort to coherently bind these components of organisational thinking together towards an effectual model for the learning organisation. This of course does not imply that the end-result would be the only model for the learning organization. It is offered as *a* model (not as *the* model) that brings the notions of learning and knowledge creation together with the more traditional organizational aspects of strategy, structure and process.

2 THE CURRENT MODELS OF ORGANISATIONAL LEARNING

2.1 Peter Senge and *The Fifth Discipline*

Very early in his text, *The Fifth Discipline: The Art & Practice of The Learning Organisation*, Senge makes it clear that his theory on the learning organisation still has to mature. He sees his learning organisation as an invention (proven to work in the laboratory) and not yet as an innovation (replicated reliably on a meaningful scale in practice). The crux of this study is that it considers five disciplines to be essential for the success of the learning organisation and he argues that, for their survival, organisations have to be learning organisations.

Systems Thinking, which is seeing the whole instead of focussing on the parts (Senge, 1990:7), is seen by Senge as the most important of the five disciplines, and a critical component of organisational learning - despite the fact that he considers all five disciplines to be vital for the learning organisation. It is seen as the tool that will assist in developing a deeper understanding of the forces that must be mastered to move towards achieving a vision. The primary purpose of this discipline is to enable individuals to find the real causes of issues so that these causes, rather than the symptoms, can be addressed. This is done by means of a graphical representation of the cause-effect relationships in a given scenario and is discussed at length in *The Fifth Discipline.* As a director at the Sloan School of Management at the Massachusetts Institute of Technology, Senge initially saw Systems Thinking as the solution for organisational learning, but realised that for a more complete solution he had to add the four other identified disciplines.

Personal Mastery refers to individuals gaining a special level of proficiency, in tandem with individual learning. This discipline is considered as the starting point for organisational learning. Learning, through personal mastery, is simply seen as the individual's ability to expand his or her capabilities to achieve those results that he or she truly wants in life. Personal mastery (Senge 1990:7) is distinguished as the individual discipline of continually clarifying and deepening the personal vision, and of focussing energies, developing patience and seeing reality objectively. Finally, it is argued that the learning organisation is not possible unless the organisation has people at every level who practice the skill of personal

mastery.

Building a Shared Vision, is a discipline of primary value for the learning organisation, as compared to the all too common vision statement. The interdependencies of the stated components of the learning organisation are acknowledged by Senge. Personal mastery, widely diffused throughout the organisation, is regarded as the corner stone of building a shared vision (Senge, 1990:148).

Mental Models, as a discipline, is seen by Senge as having two separate sides - firstly the limiting mental models and assumptions of individuals and groups of individuals, and secondly those mental models that empower and drive creative action. In this context he refers to Argyris and Schön and their conceptualisation of espoused theories and theories in use. The theories in use are noted as the individual's mental models.

Team Learning is seen by Senge as the discipline that needs to be developed throughout the organisation in order for it to be a learning organisation. This is due to the fact that he considers teams to be the foremost learning unit in organisations.

2.1.1   Systems Thinking – central to organisational learning?

Senge (1990:23) argues that the core dilemma in organisations is that we learn best from experience but that we never directly experience the consequences of our actions. Systems Thinking is then viewed as the enabling discipline that promotes seeing "wholes" through seeing interrelationships, rather than seeing separate things; and seeing patterns of change rather than snapshots (Senge, 1990:68). It consists of a specific set of tools and techniques that originate in two threads, namely feedback concepts of cybernetics and the servo-mechanism engineering theory, and dates back to the nineteenth century. If applied correctly, it will enable the user to identify (i) systemic leverage points, (ii) internal and external cycles of improvement, (iii) balancing cycles within the system, also called counter balances, and (iv) the impact of systemic delays.

Systems Thinking is thus primarily concerned with cause-effect relationships with a focus on systemic structures, variables and interrelationships that influence behaviour over time. Senge (1990) gives more detail about the annotations and language specific considerations

proposed by this tool-set.

2.1.2 Contributions towards the learning organisation concept

This model takes a definite step towards the fostering of a learning organisation. Case studies, along with Peter Senge's wealth of experience, also show the difference that the improved behaviour and thought processes can have within an organisation.

i. Through real life case studies, of which Shell Petroleum's experience with Systems Thinking in their Planning department is not the least, it is shown how Systems Thinking can make a difference within an organisation when combined with a shared vision and the building of truthful shared mental models. The biggest contribution must be that of making Systems Thinking applicable to the organisation and its interaction with its environment, enabling the organisational member to see the consequences of the organisation's interaction - whether internal interaction or interaction with the environment. This is a strong tool for learning from a process perspective and evaluating the effectiveness of behaviour within processes, since Systems Thinking forces the individual to observe wider than what is obvious - which as a result, fosters learning. At the same time Systems Thinking (Senge 1990:17-24) enables the user to explicitly identify organisational impediments - which Senge refers to as "learning disabilities".

ii. An important aspect of Senge's model is the intention for an organisation to be true to its purpose. Senge (1990:148) sees this as a commitment that is an essential part of a powerful and just organisational vision, and he gives attention to this topic under the heading "Commitment to the whole" (Senge 1990:171), implying that there is a bigger social purpose for the organisation, and an involvement bigger than the individuals involved in the organisation. When individuals in the organisation have a sense of connectedness and compassion towards a vision beyond their self-interest, they find that they have more energy than when pursuing narrower goals, and so, Senge maintains, will organisations that tap into this kind of commitment.

iii. Another very important contribution is the emphasis on the role that shared mental models perform in organisational learning; through challenging and clarifying existing

assumptions and discovering internal contradictions in those assumptions, and thinking through new strategies based on new assumptions. Systems Thinking in particular assists in exposing flaws in mental models and thus in identifying opportunities for learning.

2.2   The Knowledge-Creating Company – Nonaka & Takeuchi

2.2.1   What is the Knowledge Creating Company?

The root of this theory is organisational knowledge creation, meaning the capability of a company as a whole to create new knowledge, disseminate it throughout the organisation, and embody it in products, services and systems (Nonaka & Takeuchi 1995: viii). Nonaka & Takeuchi profess that everyone in a knowledge creating company is a knowledge creator and that the creation of new knowledge requires the participation of front-line employees, middle managers, and top managers. The value of any one person's contributions is determined more by the importance of the information and knowledge contributions that the person provides than the position of that person in the organisation (Nonaka & Takeuchi 1995:51).

Furthermore they argue that the success of Japanese companies is not due to their manufacturing prowess, access to cheap capital, close and cooperative relationship with customers, suppliers and government agencies, or even lifetime employment, seniority system and other human resource management practices – although all of these factors of course are recognised to be important. Instead, they claim that Japanese companies have been successful because of their skills and expertise at *organisational knowledge creation* (Nonaka & Takeuchi 1995:3). They claim that Japanese companies are especially good at continuously and incrementally bringing about innovation in a knowledge creating spiral. This continuous spiral consists of four cyclic phases that are at the core of the knowledge creation process.

Firstly there is the process of transferring tacit knowledge from individual to individual when, for example, an apprentice works with a master and learns through observation, without necessarily the use of language. This is referred to as the Socialisation phase. The externalisation phase refers to the process of articulating tacit knowledge into explicit

16

concepts, e.g. codified knowledge within a text book.

On the other hand, there is the Combination phase, which for Nonaka & Takeuchi is the process of systemising concepts into a knowledge system or solution by combining different bodies of explicit knowledge. Lastly, Internalisation, which is closely related to learning by doing, is in essence about turning explicit knowledge into tacit knowledge.

The aim of this model from Nonaka & Takeuchi (1995:70) is to give the organisation, through understanding the knowledge transfer process, the ability to exploit and leverage both explicit and tacit knowledges.

The sharing of knowledge outside of the organisation is also an important aspect of the knowledge creating company. Nonaka & Takeuchi claim that Japanese companies have continually turned to external parties such as their suppliers, customers, distributors, government agencies, and even competitors, for any new insights or clues they may have to offer. Knowledge collected from outside of the organisation is shared widely within the organisation and stored in the company's knowledge base to be used by those involved in developing new products and technologies. The result is a conversion process for raw knowledge that is brought from the outside into the company, reworked and taken back to the outside in the form of new services, systems and products. The organisation acting on the environment not only performs effective information processing, but also creates information and knowledge by itself. This process involves not merely a strategy of reducing the information-processing burden; it also requires the organisation to evolve itself by amplifying its own diversity, destroying the existing patterns of thought and behaviour, and creating new patterns (Nonaka & Takeuchi 1995:38). Continuous renewal at all levels also appears to be an important aspect of this framework. Nonaka & Takeuchi argue that working in a world of uncertainty worked in favour of Japanese companies, since they were constantly forced to make their existing advances obsolete. In fact, they argue that this trait is found in all successful companies, not only those in Japan. "To these companies change is an everyday event and a positive force."

2.2.1.1   Tacit knowledge and knowledge creation

A key aspect to understanding the Japanese approach to knowledge is that knowledge within the organisation is primarily viewed as being either tacit or explicit knowledge, and that

explicit knowledge, or "knowledge expressed in words", is considered to be only the tip of the iceberg. Tacit knowledge can then be segmented into two dimensions. The first would be the technical dimension which encompasses, but is not limited to, the "know-how" of craftsmen. The second dimension is an important cognitive dimension that consists of schemata, mental models, beliefs and perceptions, so ingrained that it is taken for granted. Contained here are reflections of reality (what is) and of the future (what ought to be).

The authors argue that a full understanding of tacit knowledge[8] has direct implications on organisational thinking, and as a consequence the organisation will be viewed as a *living organism* instead of being looked at as a machine. From this perspective, sharing what the company stands for, where it is going, what kind of a world it wants to live in, and how to make that world a reality, becomes much more crucial than processing objective information. It is argued that highly subjective insights, intuitions and hunches are an integral part of tacit knowledge and that tacit knowledge also incorporates and embraces ideals, values and emotions, as well as images and symbols. Understanding the implications of these soft and qualitative elements is crucial to the understanding of the Japanese view (Nonaka & Takeuchi 1995:9) of knowledge creation. Knowledge, that implicitly includes tacit knowledge, is considered to be as much about ideals as it is about ideas, and it is accepted that innovation are driven by ideals. In this context, for Nonaka & Takeuchi, organisational intent[9] drives the knowledge spiral.

2.2.1.2   Middle management and the Middle-Up-Down Management Model

Middle management has been identified, in this model, to play an important part in knowledge sharing, knowledge creation and innovation. The model of middle-up-down management is presented in contrast with the typical western top-down and bottom-up

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[8] Tacit knowledge will be discussed in more detail in section 2.4.5 Understanding tacit knowledge in order to gain an appreciation of the implications of an understanding of tacit knowledge.

[9] Nonaka & Takeuchi often refers to organisational intent and, worded into the organisational vision, as the driving force for all knowledge creating activity within the organisation. In this context, vision creation is not seen as a top down process but rather an iterative process whereby all parties within the organisation are involved.

management styles. The main role of middle managers in the middle-up-down management model is to orient the chaotic situation, that is often intentionally created by senior management towards purposeful knowledge creation. Middle managers achieve this by providing their subordinates with a conceptual framework, that helps them make sense of their own experience, based on the direction supplied by top management (Nonaka & Takeuchi 1995:128). At the same time they facilitate the knowledge flows from top management to front-line workers and solve contradictions that may exist between these parties. An important aspect of this model is that organisational staff is seen as a knowledge creating crew; front-line workers are equated with knowledge practitioners, middle management with knowledge engineers, and top management with knowledge officers:

Knowledge practitioners are responsible for accumulating and generating both tacit and explicit knowledge, and consist of knowledge operators, knowledge specialists, knowledge engineers and knowledge officers. Knowledge operators constantly interface with the realities of the various organisational fields and accumulate and generate rich tacit knowledge in the form of experienced-based embodied skills. They are mostly involved in the operational side of business, e.g. sales staff, production line workers and supervisors. Front-line sales people can, through meaningful dialogue with customers, mobilise the customer's tacit knowledge base. Knowledge specialists mobilise well structured explicit knowledge in the form of technical, scientific, and other quantifiable data, the kind of knowledge that could be transmitted and stored on computers.

Knowledge engineers in the middle-up-down management model must be equipped with excellent project coordination and management capabilities; be skilled at coming up with hypotheses in order to create new concepts; be equipped with the ability to integrate various methodologies for knowledge creation; have the communication skills to encourage dialogue[10] amongst team members; be proficient at employing metaphors in order to stimulate imagination; engender trust among team members; and must or should have the

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[10] Dialogue, in this model, is considered as a very important aspect of knowledge creation. Dialogue goes wider than mere discussions, can (and should?) contain conflict and the sole purpose is sharing views and ideas towards knowledge creation and innovation. Dialogue sessions are often held over weekends in some hotel or resort, can be unstructured and every one with an interest may join.

ability to envision the future course of action based on an understanding of the past.nowledge officers, on the other hand, give a company's knowledge activities a sense of direction through the articulation of grand concepts on what the company ought to be, and by creating a knowledge vision in the form of a corporate vision or policy statement. They also set the standards and guidelines for justifying the value of the knowledge that is being created.

In addition to these responsibilities, it is considered critical that the knowledge officers need to foster a high degree of personal commitment from other members of the knowledge creating crew. To do so, it is argued (Nonaka & Takeuchi 1995:157) that an open and equivocal vision, which is susceptible to a variety of interpretations, is preferred. It is argued that an equivocal vision gives members of the self-organising team the freedom and autonomy to set their own goals, making them more committed to figuring out what the ideals of top management really mean to them.

2.2.2   Enabling conditions for organisational knowledge creation

To support and promote the knowledge creating spiral throughout the organisation, five conditions have been identified, namely intent, autonomy, fluctuation and creative chaos, redundancy and requisite variety.
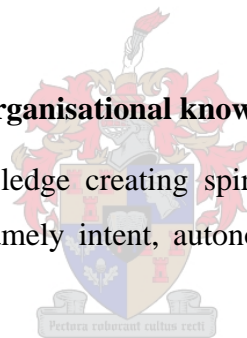
Organisational intent provides the most important criterion for judging the truthfulness of a given piece of knowledge. If not for intention, it would be impossible to judge the value of information, or knowledge perceived or created. At the organisational level, intention is often expressed by organisational standards or visions that can be used to evaluate and justify the created knowledge, and it is necessarily value-laden[11].

Autonomy is generated when all individuals are allowed to act autonomously, as far as circumstances permit, and within the principles of self-organisation[12]. The result would be an increase in the chance of introducing unexpected opportunities, that individuals will motivate themselves, and a higher probability for creation of original ideas. Autonomous

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[11]Nonaka & Takeuchi (1995:74-75) on value laden visions.

[12] Nonaka & Takeuchi refers (in an endnote) to Images of Organisation (1986) by G Morgan.

groups and task forces, often forming cross-functional and multi-functional backgrounds according to Nonaka & Takeuchi, must also be allowed to define their own task boundaries. The purpose of these teams and groups (Nonaka & Takeuchi 1995: 76) will then be to foster creativity and innovation, for instance in product development projects.

Chaos can be generated either naturally, or intentionally when top management introduces a "sense of crisis" by means of setting challenging goals. When organisational members have the ability to reflect on their actions in this "crisis", the benefits of creative chaos may be achieved. In this regard, middle management has an important role to fulfil in guiding members through the fluctuation and chaos.

Sharing redundant information promotes the sharing of tacit knowledge, because individuals can sense what others are trying to articulate, and therefore can speed up the knowledge creation process. It is recognised that there are several ways to build redundancy into the organisation. One is to adopt an overlapping approach, such as product development teams consisting of representatives from various departments. Another is the strategic rotation of personnel in order to increase understanding of the rest of the business through direct exposure.

Having a requisite variety is the condition where an organisation's internal diversity must match the variety and complexity of the environment in order to deal with challenges posed by the environment. Ways of introducing the requisite variety include sharing redundant information and knowledge; having flat and flexible organisational structures with a strong information network interlinking business areas; changing organisational structures frequently in order to maintain internal diversity; and frequent rotation of personnel, thereby improving multifunctional knowledge in individuals.

2.2.3   The five phase model of the organisational knowledge creation process

This model from Nonaka & Takeuchi presents an integrated organisational model using the concepts identified in their study, and incorporating a time dimension into the theory. The five phases are:

   i. Sharing tacit knowledge. Starting with the sharing of tacit knowledge of individuals for

a set purpose or given advantage of the organisation, e.g. creating a common understanding of future products of the organisation.

ii. Creating concepts based on the shared mental models created in step 1. Through induction, deduction and abduction the shared tacit mental models are verbalised. Abductive reasoning or non-analytical methods, that include metaphors and analogies, are often viewed as non-logical as opposed to induction and deduction.

iii. Justifying concepts based on organisational intent and the needs of society at large. Are these concepts worthwhile for organisation and society; and is the organisational intent still intact?

iv. Building an archetype by combining the newly generated explicit knowledge, as created by this five-phased process, with the existing explicit knowledge.

v. Cross-levelling of knowledge, both intra-organisationally and inter-organisationally. Intra-organisationally to ensure that the organisation benefits maximally from new innovations, e.g. where an innovation can spawn a series of related innovations within the organisation; and inter-organisationally to ensure that the organisational value chain or its industry maximally benefits from, and contributes to, the value of the innovation, e.g. Matsushita making VHS technologies available in the industry in order to gain a competitive advantage over Sony's Betamax technology.

2.2.4 A new organisational structure?

Nonaka & Takeuchi state that knowledge creation has as much implications for the organisational structure as it has for the management process. They call for some limitations of traditional structures and claim that, for middle-up-down management to work effectively, the organisation needs a structure that they called the Hypertext Organisation. However, despite their claims, when analysed closely and looking past the graphical presentations of this structure, the proposed Hypertext Organisational structure appears to be a hybrid of a matrix organisation. Like the matrix or project organisation, autonomous project teams are formed from the business as usual dimension, and their efforts to distinguish their organisational structure from the matrix structure is not very successful. In fact, some of the

claims they make towards the Hypertext Organisational structure, in an effort to distinguish it from the matrix structure, are equally attributable to matrix structured organisations[13], also called project organisations (Morgan 1992:58). The only material difference in the Hypertext Organisational structure is the addition of a third dimension, namely the knowledge base layer. In the Hypertext Structure, the knowledge base layer does not exist as an actual organisational entity, but it is embedded and gives prominence to organisational vision, organisational culture and technology.

Nonaka & Takeuchi (1995:167) explains that "Corporate vision provides the direction in which the company should develop its technology or products, and clarifies the field in which it wants to play. Organisational culture orients the mindset and action of every employee. While corporate vision and organisational culture provide the knowledge base to tap tacit knowledge, technology taps the explicit knowledge generated in the other two layers [projects layer and business system layer]."[14]

2.2.5   Contributions towards the learning organisation concept

i. The first and foremost contribution of this model lies in the emphasis on tacit knowledge and incorporating tacit knowledge into a realistic and workable model of knowledge sharing and knowledge creation[15], namely the knowledge creation spiral.

ii. Nonaka & Takeuchi's (1995:ix) study is the first realistic effort towards formalising a generic model of organisational knowledge creation. This model combines the knowledge creation spiral into the five phase model of the organisational knowledge

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[13] Nonaka & Takeuchi (1995:170-171) compared the Matrix and the Hypertext organisational structures: (1) The matrix organisation also relieves project members from operational responsibilities when assigned to projects; (4) Deadlines are as applicable to projects in the matrix organisation; (5) Projects in the matrix are especially placed under direct control of top management – all claims that Nonaka & Takeuchi say is only valid for the Hypertext structure.

[14]In square brackets my own words.

[15] In 1996 Michael Polanyi was the first to describe tacit knowledge. His views are explained in more detail in section 2.4.5 Understanding tacit knowledge.

creation process and sets a standard which other models can be measured against or could use as a starting point, despite limitations that will be explained in the next section.

iii. Nonaka & Takeuchi (1995:59) shows how organisational knowledge creation (or organisational learning as the preferred term of reference in this thesis) touches on many aspects of organisational behaviour, including organisational structure, organisational culture, organisational vision and intent, management roles and management practices.

iv. The study shows that both information and knowledge are context specific in that they depend on the situation, and relational in the sense that knowledge is created dynamically in social interaction among people. People, interacting in a certain historical and social context, share information from which they construct social knowledge as a reality, which in turn influences their judgement, behaviour, and attitude. Similarly corporate vision, presented as an equivocal strategy by leadership, is organisationally constructed into knowledge through interaction with the environment by the organisation's members, which in turn affects the business behaviour.

v. The relationship between individual and organisational knowledge creation is clearly defined and illustrated through many case studies. The organisation is required to support "creative individuals or provide contexts for them to create knowledge. Organisational knowledge creation, therefore, should be understood as a process that 'organisationally' amplifies the knowledge created by individuals and crystallises it as part of the knowledge network of the organisation. This process (Nonaka & Takeuchi 1995:59).takes place within an expanding 'community of interaction' which crosses intra- and inter-organisational levels and boundaries."

vi. Through promoting the knowledge base layer of the organisational structure, Nonaka & Takeuchi highlight the need to have knowledge accessible in different contexts through the organisation for the purpose of organisational learning. They see that much of this is done with the aid of technology.

2.3 Pertinent shortcomings of these efforts

2.3.1 *The Fifth Discipline* from Peter Senge

Without doing this excellent contribution any harm, a few areas of concern regarding the learning organisation will also be addressed:

i. It is doubtful whether applying Systems Thinking, in itself, will constitute the learning organisation - even when applied along with widely disseminated team learning, personal mastery and a strong corporate vision. When systemic structures influence behaviour, and Systems Thinking allows the observer to identify the inherent impediments within the system, one may ask whether Systems Thinking is the solution that Senge promotes it to be, or whether it is merely a means towards an end. One can argue that Systems Thinking will assist in identifying impediments towards the organisation's effectiveness. From this learning, organisational behaviour can be altered to eliminate identified impediments. Systems Thinking then becomes a tool that will assist in identifying structural impediments, and that may be a learning experience. However, Systems Thinking has its limitations, and Eric Brown from Ohio University, argues that a major problem is that leaders may find it extremely difficult to determine where a system begins and ends. To illustrate this, he emphasises that any given system is most often a subsystem of a yet larger system, and a problem thus arises when determining the boundaries of the system one needs to analyse. Consequently, if a leader chooses to focus his or her analysis narrowly, he or she may pass over dynamics that are relevant to the success of the organisation. At the same time, interpreting the system's boundaries too broadly may result in the system's interrelationships becoming too complex to analyse.

ii. The implications of organisational structure and process management are only addressed by Senge as far as Systems Thinking will assist in identifying structural and process related impediments. The dynamic role of the correct or appropriate structure and process design and management practices are not addressed at all. Although aspects such as personal character and integrity within the organisations will most definitely add value within, and to, the organisation, an organisational model could not exist solely of personal skill and traits. After exploring this text there is still a need for

a model or framework for organisational learning that will allow the structure and processes of the organisation to be more adaptive, flexible and agile. Also, in the e-business environment created by the Information Era, an organisational model that is less reliant on the personal skills of the different levels of management, but that also gives guidance towards an approach and practices for structure building and process management, is needed.

iii. Michael Fielding argues in his article, *Learning Organisation or Learning Community? A Critique of Senge* that Senge's work seems to lack an adequate understanding of the pervasiveness of power in organisational life, or any realistic strategy for incorporating this into the theory and practice of the learning organisation. For example, Senge notes that although organisational vision will most certainly be influenced by individuals with personal vision throughout the organisation, the role of top management in vision creation is underplayed, almost to the point where it appears that creating an organisational vision is a "bottom up" exercise and can only be done if there are enough individuals in the organisation with strong personal visions and high levels of personal mastery.

iv. Senge emphasises an organisation's ability towards team learning as a building block for organisational learning. Teams are regarded by Senge as the primary learning unit of the learning organisation, but are they? The learning organisation has to, by default, provide for interactive learning, and other learning entities, such as communities of practice[16] that often originate at own accord in and across organisations, also do exist; and these are not necessarily team oriented. Dunge et al (1997) argues that Senge attributes organisational learning primarily to the attributes of organisational members and, as a result, equates organisational learning with individual learning with the related assumption, according to Dunge et al, that if enough organisational members develop the ability to understand how the organisation operates as a system, the organisation will become more effective. They argue that, unless individual or team learning is relevant to the organisation's business strategy and needs, it will be relatively useless.

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[16] Communities of practice will be discussed in more detail in section 2.4.4 Communities of practice

2.3.2 *The Knowledge Creating Company* – **Nonaka & Takeuchi**

The goal of *The Knowledge Creating Company* was to formalise a generic model of organisational knowledge creation (Nonaka & Takeuchi 1995:ix), and it appears that they were very successful at establishing a framework for knowledge creation. The generic nature of this solution can, however, be challenged in a number of areas:

i. A limitation of this theory is the admitted focus towards new product development. This focus introduces a few restrictions.

For a generic model of organisational knowledge creation, the knowledge needs of business services also need to be incorporated. In fact, none to very little reference is made to services or to the fact that product delivery most probably has a complementary service component. The reader of their text may be hesitant to apply the practices, illustrated through case studies on products, on services in the understanding that the knowledge creation process for business services may vary from the knowledge creation for product development.

General business processes are ignored altogether and no reference is made to organisational learning within business processes. Their argument, in order to justify this omission, is that the most important organisational learning occurs at product development stage, and with this statement they ignore various industries. Examples of such industries are the mining and retail industries where competitive advantage is less about defining their product, and more about finding the product and delivering it to the customer. In both these industries the optimisation of actual business processes will produce competitive advantage much more than innovative product development skills will.

ii. The suggested Hypertext organisational structure is a hybrid of the matrix structure and adds little value to organisational learning, except for framing the context of projects in terms of organisational learning, and highlighting the importance of organisational vision, organisational culture and technology in terms of organisational learning.

iii. It is unclear to what extent this model is influenced by the Japanese culture, and it

27

should be emphasised that each culture is an iceberg of tacit knowledge in itself[17]. The fact that the model is presented in terms of western epistemology is certainly helpful for relaying the power of the model, but at the same time it leaves the amount of influences from the Japanese culture into this model unclear, if not concealed. The emphasis that Nonaka & Takeuchi puts on an equivocal organisational intent and vision, as opposed to a clear and well communicated vision promoted by Western organisations, and the fact that they admit that these concepts need to be value laden, drive this argument home. Furthermore, a comparison between Western-style and Japanese-style knowledge creation highlights possible cultural differences between Japanese and Western organisational role-players. In fact, two specific case studies on "global knowledge creation"[18] highlight the type of challenges that Japanese companies face when "going West".

iv. Their argument is that the Japanese model for knowledge creation is the main reason for the success of Japanese companies during recent years. However, in presenting this model, Nonaka & Takeuchi acknowledges that there are other factors contributing to the success of Japanese companies. These include access to cheap capital, lifelong employment, cooperative relationships with customers, suppliers and government agencies, seniority systems, and other human resource practices. Important factors, such as the familiar statistically based quality management practices of Japanese companies, have been omitted altogether. However, it may be that this assumption in their argument has not been tested and, in all fairness, it will be very difficult to test.

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[17] Polanyi (1967:61) argues that the transmission of knowledge from one generation to the other must be predominantly tacit.

[18] Nonaka & Takeuchi Chapter 7 is titled "Global Knowledge Creation" and deals with the challenges of Japanese companies that had to incorporate Western task forces into projects and business ventures. No clear solution towards the challenge of bridging cultural differences is given in either of the case studies in this chapter.

2.4 Complementary influences

In addition to the two models, some complementary views and influences that have direct implications towards a proper understanding of organisational learning, do exist. As a matter of fact, at some point or another, every text on organisational learning makes reference to some of the influences detailed in this section, if not to all of them. The only exception is Thomas Stewart's text, *Intellectual Capital*. The reason behind including Stewart's text is the specific value that he brings in terms of depicting the organisational challenges in the knowledge economy. But, before we look at Stewart, let us first develop an understanding of the relationship of the organisation of today with its people and the knowledge economy, as well as with the other influences.

2.4.1 The knowledge economy – Peter F. Drucker

2.4.1.1   The evolution of knowledge

Peter Drucker argues in his book, *Post-capitalist Society* (1993:17), that knowledge has traditionally been applied to *being*. Since ancient times, and as a result of the Industrial Revolution, the application of knowledge has changed to that of *doing*. Drucker argues that we have moved from general knowledge to specific knowledges, and he insinuates that when we traditionally referred to someone as being educated and knowledgeable, it could only be in the general sense of the word and would by default have a noble meaning. The same statement would, however, be of little value today, unless the subject area of education and knowledge area was added.

Consequently, for Druker, knowledge itself became a resource and a utility. He argues that the revolutionary changes since 1750 were driven by this change in the meaning of knowledge, and that the application of knowledge since 1750 went through a cycle of changes. Before 1880, knowledge was applied to tools, processes and products, which led to the Industrial Revolution. After 1880, and culminating around World War II, knowledge in its new meaning came to be applied to work – resulting in what Drucker refers to as the Productivity Revolution. Since roughly the time of World War II, knowledge has been

applied to knowledge itself, and Drucker refers to this change as the Management Revolution.

Furthermore Drucker argues that we currenlty find ourselves in an economic environment where knowledge is the only meaningful resource. The traditional factors of production of land, labour and capital have not disappeared, but they have become secondary and can be obtained, and easily so, provided that there is knowledge. As a result, knowledge is an utility and the means to obtain social and economic results. Nevertheless, there is little peace in knowing this, as it is in the nature of knowledge that it changes fast, and today's certainties therefore easily become tomorrow's inconsequences.

2.4.1.2 Knowledge and the organisation

Peter Drucker states that an organisation is a group of human specialists working together on a common task, and that it is intended to endure, not for ever, but for a considerable period. In contrast to other social structures such as societies, communities and families that simply *are,* organisations are about *doing.* He emphasises the outlook that the organisation is always specialised, and that it is determined by its purpose. Concentrating on its purpose is what makes an organisation effective. Drucker argues that diversification of purpose, on the other hand, is splintering, and that it destroys the performance capacity of an organisation, whether this is a business, union, school, hospital, community service or a church. The more specialised the organisation, the greater its performance capacity towards its given task becomes.

He further argues that, because the organisation is composed of specialists, each with his or her own narrow knowledge area, its mission must be crystal clear. The organisation must be single minded, otherwise its members become confused. A clearly defined common task is necessary to reduce the possibility of individuals following their speciality, rather than applying their efforts to the common task. Furthermore it will prevent individuals from each defining results in terms of their own specialty. Without this clearly defined common task, individuals will each impose their own values on the organisation.

Only a clear, focussed and common mission (Drucker, 1993:48) can hold the organisation

together and enable it to produce results. The economic value of organisations in the knowledge economy, according to Peter Drucker, is to make knowledges productive. The function of the organisation for Drucker (1993:51) is to put knowledge to work – on tools, processes, products, work, and on knowledge itself - and it needs to be organised to accommodate constant change.

Supplying knowledge to find out how existing knowledge can best be applied to produce results, according to Drucker (1993:17), is in effect what is meant by *management*. In this context a manager becomes responsible for the application and performance of knowledge. Knowledge is now also being applied systematically and purposefully to define what new knowledge is needed, whether it is feasible, and what has to be done to make knowledge effective. It is being applied, in other words, to Systematic Innovation.[19] Although Drucker (1993:39-41) avoids declaring that we have a knowledge society, he argues that knowledge has become *the* resource rather than *a* resource and that this is what changes our society, and fundamentally so. This creates new social dynamics, new economic dynamics and even new politics.

2.4.1.3 The knowledge organisation and its people

To understand the relationship between the knowledge organisation and its people, we need to look at this relationship from a number of different perspectives that Drucker (1993) identified:

2.4.1.3.1 Joining an organisation is always a decision

In reality, sometimes there may be little choice, and even then the fiction of a decision to join is carefully maintained. Drucker (1993) contributes that the more an organisation becomes an organisation of knowledge workers, the easier it is to leave the organisation and move elsewhere. Unlike society, community and family, an organisation is therefore always in competition for its most essential resource, i.e. qualified, knowledgeable and dedicated

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[19] Drucker (1993:38) refers among others to systematic research and development efforts from organisations.

people. Since the modern organisation is an organisation of knowledge specialists, it has to be more of an organisation of equals, 'colleagues' and 'associates'. The position of each is determined by its contribution to the common task (Drucker, 1993:50), rather than by any inherent superiority or inferiority.

2.4.1.3.2   Results in an organisation are always on the outside

According to Drucker (1993:49-50) society, community and families are self-sufficient and self-contained. However, all organisations exist to produce results on the outside, and the results of an organisation are always removed from what each member in the organisation contributes. The individual's contribution, in most instances, is totally absorbed in the task and disappears within. This emphasises that, as an absolute prerequisite of an organisation's performance, the common task and mission need to be crystal clear - and again, expected organisational results need to be defined clearly and unambiguously.

2.4.1.3.3   How organisational decision-making is managed

Societies, communities and families may have leaders - and so do organisations, Drucker argues (1993: 50-51) - but organisations need people who make decisions, or else not much will get done. There have to be people who are accountable for the organisation, including its mission, spirit, performance and results. This management must have considerable authority, and its job in the knowledge organisation is not to command but to direct. The individual knowledge employee decides in large measure what he or she contributes, and how great the yield from his or her knowledge should be. From management's perspective (Drucker, 1993:83) in knowledge and service work, a partnership with the responsible worker is the only way to improve productivity.

2.4.1.4   The Organisation and the knowledge economy

For organisations whose wealth depends on knowledge and intellectual assets, networks rather than hierarchies should be the basis of their organisational design. What is new in the knowledge economy is the deliberately networked organisation, because it has become affordable enough to put a computer on every desk. Technology networks supercharge social

networks, and no longer being adjuncts of the hierarchy, they replace it (Stewart, 1998:182). Networks have become the means by which organisations perform their work.

In 1993 already, Peter Drucker (1993:52) argued that: "In the post-capitalist society it is safe to assume that anyone with any knowledge will have to acquire new knowledge every four or five years or else become obsolete." However, it is ironic that the changes that most profoundly affect a knowledge area do not, as a rule, come out of its own area. The pharmaceutical industry, for example, is being profoundly changed today by knowledge that comes out of genetics and biology, disciplines of which few people in a pharmaceutical laboratory had even heard of a few decades ago. In the same way the greatest challenge to the railways came not from changes within railways but from the car, truck and aircraft. The implication is that every organisation today has to build into its very structure the *management of change*. However, *creating the new* also has to be built into the organisation. For Peter Drucker (1993:53) this includes three systematic practices that he claims has to be part of the very fabric of any organisation:

1. Continuous improvements of everything it does.
2. Exploitation of its own successes, i.e. the ability to develop new applications from its own successes.
3. Innovation that can, and should, be organised as a systematic process.

Drucker (1993:84) is also of the opinion that improving the productivity of knowledge and service workers will demand fundamental changes in the structure of organisations. It will even require *totally new organisations with flatter structures,* re-engineered to let work flow properly, and with less 'command' positions and less layers of management. The word 'rank' will have no or little meaning in these organisations.

2.4.2   Intellectual Capital – Thomas A. Stewart

For Stewart it is not about knowledge creation, and he argues that a very low percentage of the knowledge in knowledge intensive companies is actually put to good use. As a result, it becomes more an issue of leveraging knowledge assets, as he sometimes refers to intellectual

capital.[20] Stewart identifies Intellectual Capital to be i) The most valuable asset of the organisation; ii) The sum of everything everybody in a company knows that gives it a competitive edge; iii) Intellectual material – knowledge, information, intellectual property, experience – that can be put to use in order to create wealth; and iv) Packaged useful knowledge.

Stewart's knowledge company does not care about owning assets, and in fact he argues that the fewer assets, the better. As long as it has intellectual capital, the company can obtain revenues without the burden and expenses of managing and maintaining financial assets. The cost components in a company today are largely R&D, intellectual assets and the services. To the support of this line of argument, Stewart (1998:34) emphasises that when the stock market values companies at three, four or ten times the book value of their assets, it is telling a simple but profound truth - namely that the hard assets of a knowledge company contribute much less to the value of its ultimate product or service than the intangible assets, namely the talents of its people, the efficacy of its management systems, and the character of its relationships to its customers – which together make up its intellectual capital.

Within this framework, much in the same line of thought as Peter Drucker, he identifies the knowledge economy, knowledge company and knowledge worker. Also, if values, vision, empowerment, teamwork, facilitating and coaching are abused in organisational language, he argues that it is a reflection of the fact that managers are groping towards a language and a means for managing knowledge, knowledge workers and knowledge intensive companies.

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[20]At this point, an area of ambiguity in the source material need to be addressed, namely the matter whether learning implies or involves knowledge creation. The opposing view from Stewart, that it is not about knowledge creation, since a very low percentage of the knowledge in knowledge intensive companies is actually put to good use, highlights this matter. At the same time it takes an argument of very simple logic to justify the creation of knowledge. New knowledge and insights can be generated or created by combining existing pieces of knowledge, information and ideas. A good example is Senge's approach to Systems Thinking, which is a result of combining knowledge of the discipline of Systems Thinking with his knowledge of business organisations. This result is a field of knowledge and know-how that can now be passed on by means of his text, The Fifth Discipline. However, both these views, namely the need to create knowledge as well as the need to manage knowledge flows, are of interest since they allow us to isolate different aspects of managing knowledge in order to improve our understanding thereof.

Stewart (1998:50), in *Intellectual Capital*[21], strives to produce not just a definition of intellectual capital, but a description that executives can use to plan how to invest in, and manage, knowledge assets. Intellectual capital is subdivided into human capital, structural capital and customer capital - and crucially, intellectual capital is not created from discrete chunks of human, structural and customer capital, but from the interplay among them. Stewart argues that human, structural and customer capital can be measured and targeted for investment, although each is intangible. Each reflects the knowledge assets of a company - and yet each describes things that managers can conceptualise and manage. Once you are thinking in terms of intellectual, structural and human capital, he argues, it becomes possible to ask the questions that allow identification and management of tacit, as well as explicit knowledge.

2.4.2.1   Human capital

Human capital is the capabilities of individuals required within the organisation in order to provide solutions to customers. From an organisational point of view, human capital is formed and deployed when more of the time and talent of the people working in a company is devoted to activities that result in directed innovation. Human capital grows in two ways, namely when the organisation uses more of what people know; and when more people know more of that which is useful to the organisation.

Human capital is easily dissipated, and it needs to be massed and concentrated. Stewart considers a company's human capital to be those people that are difficult to replace, and who give high value contributions. Human capital is embodied in the people whose talent and experience create the products and services that are the reason customers come to the company, and do not go to a competitor.

2.4.2.1.1   How to build human capital - the role of communities

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[21] Stewart (1998:253) obtained the concept of Intellectual Capital and its components of Human, Customer and Structural Capital from writers such as Hubert Saint-Onge of the Canadian Imperial Bank of Commerce, and Leif Edvinsson from Skandia AFS.

Human capital is identified as those employees who are both difficult to replace, and have high value contributions towards the organisation. Considering human capital in these terms[22] sheds new light on how to build human capital, as well as on the process of capitalising individual knowledge to create such an organisational asset. The relationship between individual learning and an organisation's human capital (not just its stock of knowledge but its capacity to innovate) involves groups even more than it does individuals.

Stewart argues that it makes sense that a corporate asset should be social in origin. He emphasises that much of the learning and innovation in organisations occur in communities of practice[23], and that they emerge of their own accord - but at the same time they are easy to destroy. They are among the most important structures of any organisation where thinking matters, but they are almost inevitably subversive of its formal structures.

2.4.2.1.2 How to own human capital

Valuable and hard-to-replace knowledge, which is the key to competitive advantage, is forged in communities of practice, but for Stewart they, and the human capital they create, are no respecters of share-holders value. To be effective, knowledge workers need to bond with their employing firms. The true investment in the knowledge society is regarded not to be in machines and tools, but in the knowledge worker. It is no accident that employee stock ownership has risen with the Information Age, and is more prevalent in knowledge intensive businesses than in traditional companies. Nor should it be surprising that incentive-based pay plans have become much more popular.

2.4.2.2 Structural capital

Structural Capital, simply put, is the knowledge that does not go home at night. Structural capital belongs to the organisation as a whole, and it can be reproduced and shared. Also

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[22] In a schema that divides employees into four quadrants based on low versus high value contributions and easy versus difficult to replace, Stewart (1998:91) gives a view of what activities should be outsourced, automated or capitalised on.

[23] Communities of practice are discussed in more detail in section 2.4.4 Communities of practice

among the elements of structural capital are strategy and culture, structure and systems, organisational routines and procedures, and computer networks – assets that are often far more extensive and valuable than the codified assets. Structural capital takes what the organisation knows, and delivers it to customers. It marshals the resources of the corporation in order to augment and support ideas and work. The responses from structural capital are in essence conservative and not innovative - it cannot break the mould, as it is the mould. The reasons for managing structure capital includes rapid knowledge sharing, collective knowledge growth, shortened lead times and more productive people. Fieldworkers (Stewart 1998:110) require both the relevant authority and knowledge.

Just as information can be a substitute for inventory, structural capital can, in the same way, stand in for organisational structures. Also, flatter organisational structures will reduce the navigation of hierarchies to find relevant expertise. At the same time value added knowledge work is rarely routine, because each sale, each project, each legal brief is unique. It is impossible to predict in advance what its specific knowledge requirements will be. Structural capital should serve two purposes (Stewart 1998:132), namely facilitating codified bodies of knowledge to preserve the recipes that may otherwise be lost; and connecting people to data, experts and expertise on a just in time basis.
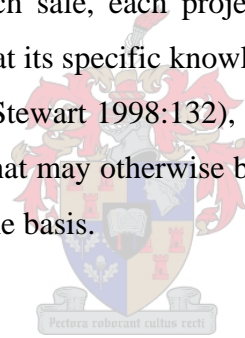
2.4.2.3   Customer capital

In the knowledge economy, Knowledge is the chief ingredient of customer capital, information is more valuable than ever, and generally speaking customers have more knowledge than before.

Stewart identified a number of relevant ways to invest in customer capital:

− Innovation with customers. Innovation, in addition to be an output of human capital, also has a customer capital component. An investment in R&D can be more productive if you already have a customer, and the customer benefits by directly influencing the final product.

− Empower the customer. Pursuing cost saving and intimacy at the same time, with suppliers and customers rummaging around in each others computers - entering orders

directly, and checking stock levels and shipping status.

- Focus on customers as individuals. An eyes-open pursuit of an increased share of the business of your best customers is much more rewarding than the blind pursuit of market share.

- Share the innings with your customers. Customer capital is wealth created when producer and consumer share in the surpluses that they have created together.

- Learn with your customers. Learning along with the customer, based on building joint teams that represent various areas of expertise.

- Become indispensable with the client.

Customer capital is the value of an organisation's relationships with the people with whom it does business. Customer capital resides on the banks of the revenue stream, and it is more often measured in the form of brand equity, than in that of human and structural intellectual assets.

2.4.2.4   Stewart and the knowledge economy

According to Stewart (1998:172), economic activity in the knowledge economy always has too much information, and every economic activity produces more information than it consumes. Talent may be scarce, but not knowledge - and in the knowledge economy, humankind knows more than ever before. Nevertheless, the cost of producing the first copy of a knowledge product is disproportionally high in relation to the cost of further copies. This is due to research and development costs which is, on the one hand, only applicable to the first copy, and on the other hand, a result of how easy information technology replicates knowledge products. Furthermore, there is no or little correlation between knowledge inputs and knowledge outputs, firstly because of the intangible nature of knowledge, and secondly due to the unpredictable and non-sequential nature of knowledge creation. Consequently (Stewart, 1998:172), the value of intellectual assets is not necessarily related to the cost of acquiring it, and this makes it impossible to depict an inherent correlation between what you do and how you are doing it.

2.4.2.5   Stewart's contribution towards organisational learning

Since Stewart did not have the intention to produce any theory or model on the learning organisation, or even to present any theory about organisational learning, it will be unfair to evaluate his study against any model of the learning organisation - however from an organisational learning perspective there are a number of contributions:

i.   Stewart acknowledges that information technology has implications for the time distribution (or flow) of both information and knowledge through established networks of technology. Therefore he emphasises the management of knowledge flows and knowledge stocks.

ii.   For Stewart, an important part of knowledge management is the timely availability, or just in time availability, of that knowledge when the knowledge is needed. For this purpose, knowledge flows and knowledge stocks have to be managed effectively.

iii.   The positioning of learning within the framework of Intellectual Capital include the importance of socialised learning and innovation within communities of practice, as well as the promotion of learning with customers to maximise customer capital.

iv.   Stewart supports the notion that a good strategy supports, frames and fosters knowledge creation: Knowledge assets (Stewart 1998:70-74) are only worth cultivating in the context of a strategy, and knowledge can only be separated from noise by means of a strategy. Intellectual assets therefore do not exist without a purpose, or at least a supporting point of view.

v.   Stewart argues that three new organisational structures came about (Stewart 1998:196) as a result of the implications of information technologies on the economics of information and the cost of transactions, namely Internally Networked organisations, e.g. 3M., Virtual Corporations, e.g. Skandia AFS, and the Economic Web, which is clusters of companies and organisations that collaborate around a particular technology, e.g. mobile phone suppliers in South

Africa. For the purpose of this thesis, the interest is more in the fact that new organisational structures are coming about, as well as the fact that traditional organisational structures cannot nourish the principles for organisation in the knowledge economy.

2.4.2.6   Intellectual Capital versus organisational learning

As one could expect, no cohesive framework for organisational learning emanates from *Intellectual Capital,* regardless of efforts to emphasise organisational learning as a social enterprise through teams, groups and communities of practice. Despite valuable suggestions for learning with customers, and how to grow the different forms of intellectual capital through interplay and interactions between these concepts, Stewart sometimes adds to the confusion of managing knowledge and intellectual assets. Sometimes it appears that he does this deliberately through statements such as: "The changes in economic laws cause that someone hoping to ride the curve of increasing returns needs the temperament of a gambler but the deep pockets of a deep company. [This is] an unusual combination in corporate cultures."

In Stewart's defence one needs to emphasise that he never attempted to define any model, or even relate to any model of the learning organisation. He merely reflected upon trends surrounding the new technologies that introduced the "intangible economy". Nevertheless, these insights were most helpful in understanding the environment in which the learning organisation or knowledge company have to function, as well as in understanding the implications of the knowledge era on the organisation.

2.4.3   Double-loop learning – Argyris & Schön

2.4.3.1   What are the components of double-loop learning?

According to Argyris and Schön, fathers of the double-loop learning concept, people have mental maps that guide them on how to act in situations, and these pervasive models involve

the way people plan, implement and review their actions. They assert that these maps guide people's actions, rather than the theories they explicitly espouse, and that few people are aware of the maps or "*theories of action"* that they use. Two *theories of action* are involved. The distinction made between the two contrasting theories of action is towards those theories that are implicit in what we do as practitioners and managers, and those on which we call to speak of our actions to others. The former can be described as *theories-in-use*, which govern actual behaviour and tend to be **tacit** structures. They contain assumptions about self, others and environment, and constitute a microcosm of science in everyday life. The words we use to convey what we do, or what we would like others to think we do, can then be called *espoused theory*.

A key role of *reflection*, could be argued, is to reveal the theory-in-use and to explore the nature of the 'fit' towards the espoused theory. To fully appreciate the theory-in-use concept, a model of the processes involved is required. To this end three elements are relevant:

− Governing variables are those dimensions that people are trying to keep within acceptable limits. Any action is likely to have an impact upon a number of such variables, and any situation can trigger a trade-off among governing variables.
− Action strategies are the moves and plans used by people to keep their governing values within the acceptable range.
− Consequences are what happen as a result of an action. These can be both intended and unintended. In addition these consequences can be for self, others or for both.
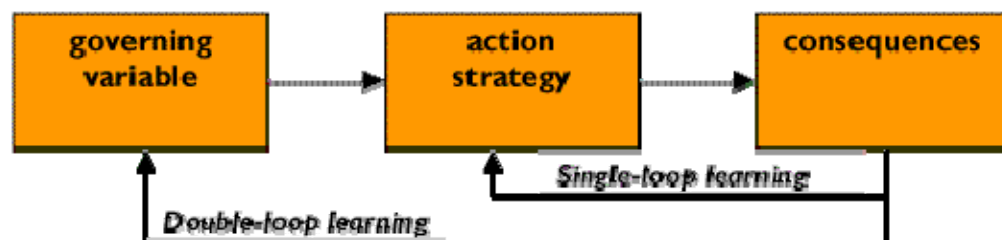
Figure 1 Double-loop Learning

(Obtained from Brown & Duguid - 1991)

2.4.3.2   Double-loop learning as compared to single-loop learning

Single-loop learning seems to be present when goals, values, frameworks, and to a significant extent strategies, are taken for granted - and therefore the emphasis is on techniques and making techniques more efficient. Reflection is directed toward making the strategy more effective. Single-loop learning involves following routines and some sort of preset plan, it is less risky for both the individual and the organisation, and affords greater control.

2.4.3.3   How does double-loop learning constitute organisational learning?

Double-loop learning, in contrast, involves questioning the role of the framing and learning systems which underlie actual goals and strategies. It is more creative and reflexive, and according to Argyris and Schön, involves consideration for notions of the good. Reflection here is more fundamental, and the basic assumptions behind ideas or policies are confronted. Hypotheses may be publicly tested and processes refuted, while actions are not self-seeking.

Double-loop learning, for Argyris and Schön, is necessary if practitioners and organisations are to make informed decisions in rapidly changing and often uncertain contexts. It aspires to include the views and experiences of participants rather than to seek to impose a view upon the situation. Theories should be made explicit in order to allow it to be tested, and positions should be reasoned and open to exploration by others. In other words, double-loop learning can be seen as dialogical, and is more likely to be found in settings and organisations with shared leadership. It intends to emphasise common goals and mutual influence. It also encourages open communication, as well as the public testing of assumptions and beliefs.

By looking at the way that people jointly construct mental maps, it is then possible to talk about organisational learning (involving the detection and correction of error) and organisational theory-in-use. For organisational learning to occur, learning agents, discoveries, inventions and evaluations must be embedded in organisational memory. If it is not encoded in the images that individuals have, and the maps they construct with others, the

individual will have learned, but the organisation will not have done so.

2.4.3.4   Some important aspects of organisational double-loop learning

Argyris and Schön (1996:xxii) has a strong regard for the relationship between individual learning and organisational learning: "The learning of individuals who interact with one another is essential to organisational learning, which feeds back to influence learning at the individual level.".   From this perspective they focus on organisational inquiry in the Deweyan sense – the intertwining of thought and action by which we move from doubt to resolution of doubt.[24]

In this sense, Argyris and Schön (1996:35) regard organisational practitioners as Deweyan inquirers, each with their own personal knowledge[25] base. Practitioners are sometimes curious about how success and failure are defined in organisational terms, how goals and priorities are set, and how ends of actions are chosen as desirable. Organisational practitioners locate themselves within the problematic situation as concerned actors whose actions and appreciations may be partly guided and changed by better understanding of the situations which prove to be appropriate to their concerns (Argyris and Schön 1996:36). They are designers in the sense that they design products, services, policies, marketing strategies, information systems, organisational roles, organisational structures, jobs, compensation schemes and career ladders. For this reason, the practitioner's mental model

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[24] There are two important implications of Deweyan inquiry: First, although inquiry is aimed at resolving the precarious and confusing aspects of experience with the intent to provide a stable basis for action, does not imply the ineffectiveness of the unstable and contingent, nor justify its relegation to the status of mere appearance. Second, the fact that the meanings we attribute to natural events might change in any particular way in the future as renewed inquiries lead to more adequate understandings of natural events, does not entail that our experience of the world at any given time may as a whole be errant. Thus the implicit skepticism that underlies the representational theory of ideas, and raises questions concerning the authenticity of experience as such, is unwarranted. Dewey stresses the point that sensations, hypotheses, ideas, etc., come into play to mediate our encounter with the world only in the context of active inquiry.

[25] The concept Knowledge Base is discussed in more detail in section 2.4.7 A knowledge base

also serves the purpose of designing, which eventually is judged in the sense of enabling practitioners to do something they wish to do. The process of reflective inquiry then appropriately comes to a close when their inquiry enables them to achieve their intended results, and they can live with the unintended side effects inherent to their designing.

2.4.3.5   A map showing how to migrate to double-loop learning.

Argyris and Schön (1996:112) claim that organisations that embrace double-loop learning will not tend to become rigid and fixed, because of their built-in capacity to continually question the status quo. However, neither one of the authors knows of an organisation that has a fully developed Model O-II learning system, or of any literature that offers a full description of such a system. In addition, they believe that their theory for the transition from single-loop learning to double-loop learning, or from model O-I to model O-II learning systems as they refer to it, is also extremely primitive. The best they claim to be able to do (Argyris and Schön 1996:112), is to present cases on the beginnings of model O-II learning systems in various settings that they have worked in.

However, when asking whether double-loop learning is the answer to the needs of the learning organisation, we must be honest. Double-loop learning is not as much a system as Argyris and Schön sometimes claim, but closer to being guidelines in terms of recommended behavioural strategies for creating an environment that promotes organisational learning. These strategies include (Argyris and Schön 1996:117) sharing of power, and articulateness and advocacy, which is coupled with an invitation to others to confront the views and emotions of self and others.

For this reason, double-loop learning is a step in the right direction. However, to obtain the learning organisation, double-loop learning needs more than sharing of power and openness in order to obtain the learning organisation.

2.4.4   Communities of practice

A discussion of the learning organisation could not be complete without an understanding of

communities of practice. Thomas Stewart, in *Intellectual Capital*, emphasised that communities of practice are among the most important structures of any organisation where thinking [and learning] matters, but at the same time they are almost inevitably subversive of any formal structures or strictures. He also emphasised that much of the learning and innovation in organisations occur in these communities of practice. Brown & Duguid (1991) argue that it should be possible to re-conceive and redesign organisations to improve work, learning, and innovation within an organisation by reassessing work, learning and innovation in the context of actual communities and actual practices. An improved understanding of the construction and operation of communities of practice in the organisation can then improve quality of work, learning and innovation.   The organisation must provide support to communities of practice that correspond to the real needs of the community, rather than to the abstract expectations of the corporation. To understand such needs, however, will require that corporations develop less of a formal, and more of a practice-based, approach to communities and their work.

To do so, organisations need to understand that communities of practice emerge, and are not created. Communities of practice are the natural result of individuals finding themselves in a working environment, and having a need to make sense of their working identity based on their working encounters.   These occupational communities have little hierarchy, and the only real status is that of member. They are more fluid and interpenetrative than bounded, and are often crossing the restrictive boundaries of the organisation to incorporate people from outside.

Workplace learning is best understood then in terms of the communities being formed or joined, and personal identities being changed. The central issue in learning is becoming a practitioner, and not as much learning about practice. This approach draws attention away from abstract knowledge processes, and situates it in the practices and communities in which knowledge takes on significance. The overlapping categories of "narration", "collaboration", and "social construction" as identified by Brown & Duguid (1991), get to the heart of what the members of a community of practice do, despite the fact that these actions may have little place in the organisation's abstracted, canonical accounts of work.

Narration refers to stories and their telling that enables the storyteller to reflect the complex social web within which work takes place. The stories also have a flexible generality that

makes them both adaptable and particular. Within the community of practice they function, much like the common law, as a useful means to interpret each new situation in the light of accumulated wisdom and constantly changing circumstances.

Collaboration refers to the fact that learning is often inseparable from working, and also that individual learning is often inseparable from collective learning. By means of storytelling and "war stories", the insight accumulated becomes a socially constructed and distributed substance.

Social Construction, inter-fused with narration and collaboration, has two components. On the one hand, the members construct a shared understanding from bountiful and often conflicting and confusing data. This constructed understanding reflects the member's collective view of the world. They develop a relevant model of reality, often different from their trainer's view which, in their reality, may have proved to be unsatisfactory. On the other hand, in telling these stories an individual member contributes to the construction and development of his or her own identity as a member of the community of practice, and reciprocally to the construction and development of the community of practice in which he or she works.

To promote efficient communities of practice, Brown & Duguid identified a number of aspects that the organisation has to consider.

Firstly, learners need legitimate access to the periphery of communication - to computer mail, formal and informal meetings, telephone conversations, etc., and, of course, to "war stories". They pick up invaluable "know how" - not just information, but also manner and technique - from being on the periphery of competent practitioners going about their business. It is important to consider the periphery - not only because it is an important site of learning, but also because it can be an important site for innovation. Learning essentially involves becoming an "insider". Learners do not receive or even construct abstract, objective, individual knowledge; rather, they learn to function in a community - be it a community of nuclear physicists, cabinet makers, high school classmates or a street-corner society.

Secondly, the canonical organisation becomes a questionable unit of analysis from this perspective and importantly, communities are emergent. Both shape and membership

emerge in the process of activity, as opposed to being created to carry out a task. The central questions for organisations involve the detection and support of emergent or existing communities of practice. Attempts to introduce "teams" and "work groups" into the workplace to enhance learning or work practice are often based on an assumption that, without impetus from above, an organisation's members configure themselves as individuals. However, people do work and learn collaboratively and the reorganisation of the workplace into canonical groups can disrupt these highly functional non-canonical, and therefore often invisible, communities.

Thirdly, within a large organisation, when perceived as a collective of communities and not simply of individuals in which performing experiments are legitimate, separate community perspectives can be amplified by interchanges amongst communities. Out of this friction of competing ideas may come the sort of improvisational sparks necessary for igniting organisational innovation. As a result, large organisations, reflectively structured, are perhaps particularly well positioned to be highly innovative, and geared to deal innovatively with possible discontinuities.

2.4.5 Understanding tacit knowledge

Hayek in 1945 hinted at tacit knowledge, as it became known, when he highlighting that at the time it was almost heresy to suggest that scientific knowledge is not the sum of all knowledge; and "… that there is beyond question a body of very important but unorganized knowledge, which cannot possibly be called scientific in the sense of knowledge of general rules: the knowledge of the particular circumstances of time and place. It is with respect to this that practically every individual has some advantage over all others because he possesses unique information. And beneficial use of this unique information might be made only if the decisions depending on it are left to the owner of the knowledge or are made with his/her active cooperation".

Michael Polanyi (1966), who conceptualised tacit knowledge, observes that in the pursuit of knowledge, the outcome is an active shaping of experience, performed in shaping or integrating of observations through a great and indispensable *tacit power,* by which all knowledge is discovered, and once discovered, is held to be true. Polanyi (1967:12) also

refs to the cognitive process by which we unknowingly attach meanings to symbols and features; and apart from the fact that we are often not aware that we tacitly made the connection, is it often more difficult to explicitly state the relationship between features of these symbols and the meaning attached to these features. Due to the fact that we are often unaware of these connections, Polanyi argues, we know much more than we can tell.

Polanyi (1967:20) goes further in saying that

"… the process of formalising all knowledge to the exclusion of any tacit knowing[26] is self-defeating". In relation to this, Polanyi argues that any theory "can be constructed only by relying on prior tacit knowing and can function as a theory only within an act of tacit knowing, which consists in our attending from it, to the previously established experience on which it bears. Thus the ideal of a comprehensive theory of experience which would eliminate all tacit knowing is proved to be self-contradictory and logically unsound". He also proposes that understanding the value of tacit knowledge supplies the answer to an age-old and paradoxical argument of Plato asserting that "the search for a solution to a problem is an absurdity; for either you know what you are looking for, and then there is no problem; or you do not know what you are looking for and then you cannot be expected to find anything".

The value of this discussion is in the role that tacit knowledge, according to Polanyi, plays in bringing problem and solution together (in contrast to Plato's belief that this knowledge comes from past-lives experiences). Polanyi (1967:24) argues that: "Tacit knowing is shown to account (1) for valid knowledge of a problem; (2) for the scientist's [or any other individual's] capacity to pursue the problem, guided by his sense of approaching its solution; and (3) for a valid anticipation of the yet indeterminate implications of the discovery arrived at in the end." Polanyi also says: "Thus we do form, intellectually and practically, an interpreted universe populated by entities, the particularities of which we have interiorised for the sake of comprehending their meaning in the shape of coherent entities."

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[26] For Polanyi (1967:7), knowing is a term that denotes practical knowledge combined with theoretical knowledge; and he argues that these two forms of knowledge are interdependent, and that the one cannot exist without the other.

This implies that, according to Polanyi and without going into his theory in more depth, tacit knowledge underlies all forms of knowledge, interpreted reality and intellectual response, and that tacit knowledge is inherently part of all forms of creative thought and problem resolution.

2.4.6   Knowledge transfer and knowledge sharing

Tacit knowledge is difficult to pass on or convey. In fact, in addition to having knowledge that we are unaware that we do have, we have knowledge that we cannot put into words, despite the fact that we may be able to tell about our knowledge of these. To convey this point, Polanyi (1967:5) uses the physiognomy of the human face, which is difficult to describe, yet has a meaning that projects emotions, and even these may be difficult to put into words. For the purpose of knowledge transfer, Polanyi refers to a process of "indwelling" and "interiorising." Indwelling, for Polanyi, had two facets: Firstly the skilful expert who would coordinate his actions and thought by dwelling in them as part of his/her body and existence. For the expert, the learning - applying and improving his/her skill – is where body and mind have internalised the experience. Secondly the observer then tries to correlate these actions and thought by seeking to dwell in them from the outside, and interiorising them for him or herself.

Nonaka & Takeuchi (1995:69) refer to internalisation, a process similar to "interiorising", as identified by Polanyi. The main difference is that internalisation, as part of a cycle or spiral of knowledge sharing in an organisation, has the benefit of interiorised shared mental models – which they argue becomes an invaluable asset for the organisation. Internalisation for Nonaka & Takeuchi, authors of the *Knowledge Creating Company*, is one of the four modes of knowledge conversion, which all form part of a continually, repetitive and growing knowledge creating spiral. [27]

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[27] The knowledge spiral is already discussed in detail in section 2.2.1What is the Knowledge Creating Company?

2.4.7 A knowledge base

The term "knowledge base" emerged during recent years, and a very diverse set of interpretations for the concept knowledge base exists. It appears that every organisation creates its own definition to agree with its own application of this concept: An American Project Management Services firm defined its knowledge base as a body of knowledge that disseminates knowledge; and in this statement refers to the Project Management Institute's (PMI) Body Of Knowledge – a reference manual which in essence is a guideline for the PMI's best practices in the project management discipline. Another paper, also American, defines the knowledge base as the intellectual capital[28]. Other definitions of a knowledge base would have something to do with meta-knowledge, meta-information or meta-data. Koulopoulos (2000:204) defines a knowledge base as a term typically used to describe any collection of information that also includes contextual or experiential references to other metadata.

Nonaka & Takeuchi see the knowledge base as a repository forming a knowledge layer spanning the organisation, and where organisational generated knowledge is re-categorised and re-contextualised. For them the knowledge base is not necessarily an organisational entity, but is embedded in the corporate vision, organisational culture, and technology.

Joseph M. Firestone (PhD), CEO and Chief Scientist of Executive Information Systems (EIS) Inc. views a system's knowledge base as: "the set of remembered data; validated propositions and models (along with metadata related to their testing); refuted propositions and models (along with metadata related to their refutation); meta-models; and (perhaps, if the system produces such an artifact) software used for manipulating these, pertaining to the system and produced by it." With "system" he refers to any intelligent, adaptive system composed of interacting agents. An interesting observation from Firestone is that this definition of a knowledge base does agree with the necessity of justification as a necessary condition for knowledge; but it insists that justification be specific to the validation criteria

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[28] Sussex University - Science and Technology Policy Research – Electronic Working Paper Series – Paper No. 119.

used by a system to evaluate its descriptions and evaluations. The definition also agrees that knowledge is a particular kind of belief, provided that belief extends beyond cognition alone, to evaluation.

The biggest discrepancy of the above definition with the popular definition of knowledge (as justified true belief), is in not requiring that justified beliefs be known as true. The system in question can never say for sure that a proposition or a model within its knowledge base is true, or right; but only that it has survived refutation by experience better than the alternatives, and therefore that the system "believes" it is true or right. So instead of knowledge as "true, justified belief", the position taken here is that knowledge equals justified belief that some conceptual formulation, fact, or evaluation, is true or right as the case may be.

Finally, the emphasis on a system's knowledge base, rather than its knowledge, recognises that an identification of knowledge as individual conceptions, propositions, or models is inconsistent with the reality that acceptance of a piece of information into a system's body of knowledge is dependent on the background knowledge already within the knowledge base. This background knowledge is used to filter and interpret the information being evaluated. In a very real sense, a system's knowledge is the analytical network of propositions and models constituting the knowledge base. It is, therefore, just for convenience that one may refer to a particular proposition or model as something a system "knows," because it knows that "something" only if one assumes that numerous unspecified background propositions and models are also known by it.

3   THE NEED FOR A NEW MODEL AND FRAMEWORK FOR THE LEARNING ORGANISATION

3.1   Collective shortcomings of evaluated views of the learning organisation

A definite shortcoming to date is a generic definition of the learning organisation. If a conceptual view of the learning organisation emerged from looking at models and frameworks for organisational learning, it should resemble an organisation that, in interaction with its environment[29], has engrained into its internal fibres the inherent ability to a) perceive, in relation to organisational purpose and intent, the outcome of the organisation's actions on the environment; b) evaluate its effectiveness, and efficiency, in the interaction with the environment based on the organisational vision and strategy; c) gain and learn improved responses to internal and external stimuli, through acting on the knowledge and insights gained from perception and evaluation; and d) identify reforms when required - whether these reforms are behavioural or structural.

On the assumption that a structured and generic approach to organisation, that will facilitate the learning organisation, may exist, current theories on organisational learning, knowledge creation and knowledge management were evaluated.   From the critical review of these theories, it became apparent that:

a. Much is said about the cognitive processes that surround knowledge sharing and knowledge creation.

b. There is a great deal of focus on shared knowledge creation and shared mental models for individuals within the organisation. Mental models and mental maps featured in all the models for organisational learning and knowledge creation.

c. There is one viewpoint that all the evaluated theories and models share - the importance of organisational purpose and intent, either in the form of mission and vision (Nonaka & Takeuchi and Senge), or in the form of strategy (Stewart), in guiding organisational learning and knowledge creation.

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[29] Organisational environment include suppliers, customers, and social, economic and natural environments.

d. Little focus, except maybe for Stewart, exists on internal process and organisational structural considerations.

Stewart, as mentioned before, does not present a theory or a model for organisational learning, but he merely explains a set of trends surrounding management of intellectual capital that, as he explains, includes knowledge management. Nevertheless, Stewart makes a strong argument that information technology has changed the way organisations conduct their business. In fact, in his argument that in the new economy Intellectual Capital is more important than any financial assets, he probably shares Peter Drucker's (1993) view that knowledge has become a more important resource than land, labour and capital. In many studies, much has been said about the "new economy" (Castells 1999), "knowledge economy" (Drucker 1993) or "intangible economy" (Stewart 1998). In an effort to grasp the implications of information technology on organisational thinking and behaviour, Stewart's framework of Intellectual Capital[30] has been the most successful. On producing a model for organisational knowledge creation, Nonaka and Takeuchi has been quite successful - despite a focus towards product development projects, and the fact that their learning model may rests strongly on the Japanese culture. Senge, on the other hand, presented the need for a complementary skills set disseminated throughout the organisation, and supported by a shared vision, in order to facilitate organisational learning. Via Systems Thinking, Senge promotes a powerful tool with which organisations can test the implications of assumptions. This of course, was done with the purpose to trigger learning, in line with views from Argyris and Schön, by testing mental models.

Nevertheless, we still lack a generic model of a highly responsive learning organisation in the knowledge era. Areas that have not been addressed successfully to date by the current theories include:

i. The relationship between knowledge flows within the organisation and organisational structure. This has been addressed in different ways: Stewart portrayed the implications of computer networks on organisational structures, and presents persuasive evidence that the importance of middle management is

diminishing, and that middle management are being replaced by information technology. In contrast, the model presented by Nonaka & Takeuchi gave middle management the important and central role to manage the flow of knowledge between front line workers and senior management. Yet, it is general knowledge that the role of middle management in Japan is diminishing. A logical explanation for this disparity in Nonaka & Takeuchi's model may be that their focus on product development limited their view on knowledge creation to projects and their invention, the project layer of their organisational structure. In fact, almost no reference is made to knowledge creation within the business system layer of their model. Keeping in mind that Stewart (and other observers) highlights project management as one of the careers of the knowledge era, one may realise that Nonaka & Takeuchi's model mainly refers to a special case of knowledge creation, namely knowledge creation within projects. This explains their organisational structure that may be super-imposing a layer of projects onto the business system and therefore they needed another layer, namely the knowledge-base layer with vision, culture and technology, to bind these two layers together.

ii. How knowledge of, and learning from, the organisational environment[31] may have implications for organisational vision and strategy. All the studies highlight the importance of organisational vision and organisational strategy, and both Senge and Nonaka & Takeuchi show, to a degree, how knowledge creation and knowledge sharing may interact with organisational vision and strategy. However, these are all done through very specific case studies of established companies, and does not make it clear what exactly the relationship between knowledge of organisation, knowledge of its environment, and knowledge of strategy will be. This now leaves an unclear road of action for organisations that have to strategise for the first time, or that have to change their approach towards strategising to befit the knowledge era.

iii. A structured approach for managing the relationship between internal processes and knowledge flows within the organisation. Stewart especially highlights how

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[31] Organisational environment again include suppliers, customers, social, economic and natural environments.

information technology replaced organisational structures; and if there now are fewer visible layers of structures, it does not imply that there are now fewer processes. In fact, if Stewart (1998) is right in saying that middle management is disappearing, and that technology, with abilities such as workflow management, supplies the structure instead - then there must be a case for proper planning of workflows and management of organisational processes and process flows.

3.2 The argument for a new model for business organisation

A strong case for a new and improved model of the learning organisation originates from Argyris and Schön in their criticism that current views of the learning organisation in literature differ according to the organisational functions to which the authors give primary attention (1996:181-188). Of interest here is that no theoretic model for the learning organisation, that will reasonably integrate at least a number of the following important viewpoints, exists:

− Organisational strategy tends to be seen as requiring continual development of new understandings, models and practices where planning and implementation combines these into a process considered as organisational learning.

− The production process is considered as the starting point for organisational learning, and one can argue that Nonaka and Takeuchi's focus on product development place them in this category.

− Economic development focus on institutional structures and incentives that compel or attract individuals to learn to produce behaviour conducive to development.

− The socio-technical system, also known as the Quality of Work Life, or the Industrial Democracy Movement, focuses on the idea of collective participation by teams of individuals, especially workers, in developing new patterns of work, career paths, and arrangements for combining family and work lives.

− Systems Dynamics, as a focus through using the systems modelling discipline, e.g. as used by Senge in *The Fifth Discipline.*

- Human Resources development, being the focus point and stressing the development of human capability for questioning, experimenting, adapting and innovating on the organisations behalf.

- Organisational culture, where the focus is on an organisational culture that promotes perpetual learning.

From this criticism from Argyris and Schön, it is clear that an integrated model for the learning organisation is still lacking. However, the reader need to be reminded at this point that the focus of this thesis is on the implications of organisational strategy, structure and process management on knowledge creation within the organisation.

Furthermore, up to this point, the required new basis for organisation is still not defined. However, two of the three items identified as shortcomings in section *3.1 Collective shortcomings of evaluated views of the learning organisation* are about knowledge flow. In fact, when one argues that the act of organising is a reflexive activity, the only constant in organisational behaviour in the knowledge economy may be the flow of knowledge and knowledge artefacts between the organisation and its environment. The words of Fritz Mchlup come to mind: "At any moment in time there is a stock of knowledge, during any period of time there is a flow of knowledge."[32] It is often said that, through asking the right questions, one will get the right answers. In this case the right question may be one of focus. Will it then make a difference if we move our focus from knowledge creation (or the building of knowledge stocks) towards knowledge flows? Or differently stated: What difference will it make for organisational behaviour if the appropriate management of knowledge flows become a focus area, in addition to appropriate knowledge creation? We have seen that the computer networks changed organisational structures (Stewart 1998:185), and that the reason for this change is that computer networks can deliver information of value more quickly and accurately than a bureaucracy. If the technology that improves the flow of knowledge and information[33] has an impact on organisational structures, then in order to assure a controlled

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[32] Stewart quotes Fritz Mchlup (1980:161) from his work Knowledge and knowledge production

[33] Knowledge, when made explicit, become information and is transferred in the form of information. Tacit to tacit knowledge transfer, on the other hand, can only flow from one individual to the other as knowledge.

organisation, that technology which speeds up the flow of knowledge and information will put pressure on the organisation to manage the flow of knowledge and information. If knowledge is the most important and most valuable resource and product of the new economy, then surely business organisations must at least be aware of their internal knowledge flows and also know i) what valuable information and knowledge products and artefacts flow into the organisation, and how dependent the organisation is on these knowledge sources and knowledge artefacts; ii) what the knowledge requirements are throughout the organisation, to warrant the appropriate and timely contributions on knowledge components; iii) which knowledge is proprietary to the organisation and will provide competitive advantages to the organisation, and iv) how the competitive advantage of proprietary knowledge can be maximised through delivering it appropriately, and adding other knowledge components to it.

This view may lead towards looking at the knowledge driven organisation as a knowledge factory with knowledge resources as inputs from customers, suppliers, employees and other stakeholders[34] - a knowledge factory with controlled internal knowledge sharing and knowledge creation, and knowledge products or knowledge artefacts produced and delivered to customers.
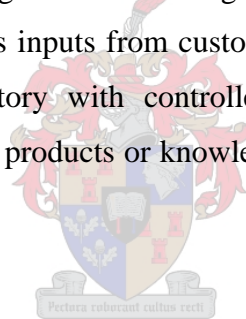
3.3   What would this new business model look like

A knowledge factory with knowledge workers needs to be organised, and this section will endeavour to demonstrate the effectiveness of knowledge flows as a basis for organisation. Stewart (1998) says that the knowledge manager can only manage the stocks of knowledge and the flows of knowledge: *Specialist knowledge, general knowledge, role based knowledge; locations of knowledge stocks, processes for knowledge creation; the basic flow of knowledge within the organisation; the intangible value chain and; exceptional knowledge requirements within the flows.* With knowledge flow as a basis, an organisation may be built

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[34] We take the view from Pedler et al (1991) that the stakeholder of the learning organisation include the owners as well as different groupings of employees, customers, suppliers, owners, neighbours, the environment and even competitors.

on this principle in order to see what it may look like.

3.3.1 The knowledge of the social purpose of the organisation

If there is one element that appears in all the theories on organisational thinking in the knowledge economy, it is organisational purpose or organisational intent to guide the actions of all employed knowledge workers. The role of a strong organisational vision is supported by Chris Argyris, Peter Senge, Nonaka & Takeuchi and Thomas Stewart alike. Drucker (1993:88) argues that the knowledge economy requires a responsibility based organisation, and that the first and foremost responsibility of any organisation is to be true to its purpose - that purpose for which it expects to be rewarded by its stakeholders. For the organisation in the retail industry, the organisational purpose, for instance, will be the distribution of needed products towards the related customers. For this service, the organisation may expect a reward in the form of a surcharge, that when accumulated may supply a profitable income stream. And this profitability, in a market economy, is the responsibility of the organisation towards employees and other stakeholders, in order to ensure its survival and their income streams. Another affirmation that Drucker (1993) makes about the responsible organisation, is that the organisation accept responsibility for the limits of their power. Organisations, Drucker argue, can only do damage to themselves and to society if they tackle tasks beyond their specialised competence, their specialised values and their specialised function; and knowledge workers will be more loyal and committed towards the organisation when they know that their contributions will be towards the "greater good", and not towards exploitation of the organisation's influence. For Senge (1990), the "greater good" must drive the vision of the organisation in order to foster commitment from workers. Stewart (1998:101) quotes Harigan and Dalmia from their work *Knowledge Workers: The last bastion of competitive advantage*:

> "Knowledge workers are likely to split their loyalty between their profession and peers on the one hand, and their organisation on the other hand. … To be effective knowledge workers need to bond with their employing firm."

3.3.1.1 The organisational purpose in the knowledge era is knowledge driven

It is clear that the organisation needs to define its social purpose or mission, despite that this may be similar for organisations in the same industry. However, the mission can create a value laden timeless relationship with society, e.g. for the retail company: "The distribution of quality and needed domestic products towards customers." The mission statement, to remain timeless, should not contain any variables that may easily change, and should steer away from economic terms such as markets, niches and profit. It should focus on the primary contribution of the organisation to society in general. For a retail company it may be the distribution of goods along with some related services and conditions. For an organisation in the mining industry it may be the economic viable and environment 'friendly' unearthing of minerals. For a food producer it may be: "The production of long-lasting shelf-based food products." Yet, the fact that it is value oriented as well as action oriented, establishes a knowledge-driven relationship between the organisation and its environment.

Within the framework of this organisational purpose as defined in the mission statement, an attainable vision for the organisation needs to be established. The organisational vision needs to serve a dual purpose. First it needs to set noble and challenging goals that will bind the organisation together around this vision. Secondly, it needs to bridge the gap between organisational mission and strategy. Note that the vision, despite being noble, must be attainable, otherwise it serves no purpose. However, when attained, the result may not necessarily be a pat on the back, but rather producing another more challenging vision. Furthermore, organisational members may have reason to be as proud to work towards the new vision as they may be of putting the old vision within reach.

Since the vision can change from time to time, it may contain variables that will explain the organisation's knowledge relationship with its environment. These variables may now include economic terms, e.g. market niche, geographic and economic goals, if relevant. Note, however, that the vision statement does not have to contain economic terms, especially for non-profit and public organisations.

The purpose of the organisational vision statement must be to establish a knowledge oriented relationship between the actions of the organisation and its direct environment, e.g. "To be seen as the preferred on-your-doorstep supplier of quality domestic goods to those customers that are willing to pay a premium for quality, and by 2010, attain 75 percent of the market share in this market niche - nation wide". The vision statement, to distinguish it from the

organisational strategy, must not include any leverage or vantage points, apart from those necessary to delimit its responsibility, because then it ventures into the knowledge terrain of the organisational strategy.

By now it must be clear that the mission, vision, and strategy form different levels of abstraction, and communicate different aspects of the knowledge relationship of the organisation with its environment and stakeholders. The mission statement is about the relationship or role of the organisation within society as a whole. The vision now is about the relationship of the organisation with (or rather positioning of the organisation within) its industry. The organisational strategy will be leading towards the organisational relationships with customers. Following the strategy, the organisational structure needs to be about internal knowledge-driven relationships. The organisational processes and technology then need to be about knowledge flows with customers, as well as with suppliers.

An important observation about the model thus far is that mission and vision statements may be implemented a bit different than we may be used to, but when giving it a little thought, it makes perfect sense. The mission, although it may originate from within the organisation, should represent society's view of what the organisation's mission should be. The organisation's vision is really the vision of the members of the organisation, for turning the mission into reality.
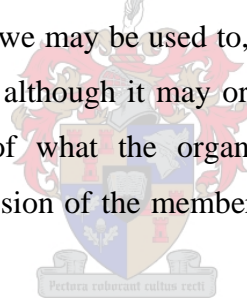
3.3.2   The knowledge of action and a strategic approach

Once the relationship with society and the chosen industry has been understood, the future relationship with the chosen client-base needs to be explored. Since this section will also address action plans that will have an impact on the customer directly in the near future[35], whenever possible, the customer or its representative (a knowledgeable middleman) should be included in this section.

The first step in strategy determination is to uncover the list of strategic vantage or leverage

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[35] Senge (1990:210) warns about a general mistake being made, namely to focus too much on today's problems when strategising, instead of focussing on tomorrow's opportunities.

points that can be exploited by the organisation and competitors alike. The purpose of this part of the exercise is, prior to determining an actual strategy, to create an understanding of all possible forces and influences that (a) for the competitive organisation may contribute to the successful exploitation of the chosen customer-base or market niche, and (b) for the non-competitive organisation may contribute both to attainment of vision and failure to achieve the vision. Some profitable organisations such as private schools and private hospitals may prefer the latter approach, because they need to find a balance between their responsibility towards their society, and their responsibility to be profitable and competitive. At this point, the focus is to understand what these vantage points or forces may be, what they look like, or how they can be identified. It is equally important to refrain from any value judgements and counteractions. Keep an open mind, since no idea may be too small or too absurd. Today's threats may be tomorrow's opportunities, and what looks like insignificant today may become a dominant trend in the near future.

The second step in strategy determination is then to define the preferred strategy for each vantage point, whether it may be defensive or attacking. Every vantage or leverage point will either have an assertive, defensive strategy or alternatively will be monitored. For defensive strategies, specific counter actions will need to be put in place to protect the investment of the organisation in (or sometimes on behalf of) the client. From a knowledge flow perspective, it makes sense to now move away from the all too familiar strategic objective, which is found to be very difficult to turn into action. The strategic approach is an approach in the literal sense of the word. It is action orientated, and must include at least one verb - but preferably two to denote a knowledge relationship, and the format should be something like this: *resulting action* [through/by means of/via/ supported by] *inducing action*. When defining two dependant actions, we will denote a knowledge flow by default, e.g. "Leveraging the customer's quality expectations through achieving agreed standard deviations in terms of normal product failures." Despite being a short and powerful statement, this way of formulating strategies has definite advantages. This specific statement is a very strong strategic approach with a strong message, and to illustrate, let's look at what the message communicates, or differently stated, how much knowledge this statement holds. After reading this specific strategic approach, we know that i) quality is going to be important; ii) the word leveraging implies that the management of quality expectations may

become (or is expected to be) a competitive advantage; iii) agreed implies contractual relationship with customers; iv) quality expectations imply that the customer will be consulted to confirm quality requirements; v) agreed also indicate that regular reviews of agreed expectations may be required; vi) statistical imply counting failures; and vii) the customer and his or her opinion matters.

This approach to strategy definition also allows for the fact that much of actual learning involves a process of avoiding undesirable results when in action, as depicted by Morgan (1986:87).

3.3.3 Knowledge flows as the basis for organisational structure

One of the main concerns around knowledge management was already described by Hayek in 1945: "The economic problem of society is thus not merely a problem of how to allocate given resources - if 'given' is taken to mean given to a single mind which deliberately solves the problem set by these 'data'. It is rather a problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know. Or to put it briefly, it is a problem of the utilisation of knowledge which is not given to anyone in its totality." This statement from Hayek implies that knowledge in a social setting will flow between individuals in order to benefit from that knowledge.

Knowledge flows can be used as the basis for determining the organisational structure within the knowledge economy, for a number of reasons. Firstly, any inefficient structure will be challenged as a result of information technology and computer networks – the technology that carries information, and maintain the flow of knowledge between knowledge stocks. In this line of thought, Stewart (1998:130) argues that electronic mail and data networks inherently threatens, and will ultimately destroy, a traditional business hierarchy.

Secondly, when the organisation is structured to promote knowledge flows, it will ensure that knowledge flows are managed effectively, with appropriate knowledge contributions into the knowledge stocks, as well as timely and appropriate availability of knowledge distributed from knowledge stocks.

Thirdly, one of the primary strengths of the fundamental technology of the knowledge era, is the speedy distribution of information and knowledge (at the speed of light), and the organisational structure should be built not only to support this attribute, but to exploit this characteristic. In other words, ensure that structural capital is maximised.

Lastly, to ensure that no unnecessary structural delays are allowed into the organisational structure and, that additional hierarchical layer(s) will only be introduced when needed to maximise knowledge flows, and support knowledge needs of knowledge workers and knowledge stocks. This line of thinking is supported by Polanyi's view of hierarchical function. Polanyi (1967:45) argues that the logical structure of the hierarchy implies that a higher level can come into existence only through a process not manifested at the lower level.[36] Hence, hierarchical structures introduced in the knowledge based organisation should only be to maximise the structural investments. The role of these additional layers must only be, according to the defined principle for this organisational model, to ensure efficient flow of appropriate knowledge, and only those knowledge flows that cannot be supplied by technology or by the knowledge practitioners[37] themselves.

Stewart makes the statement that the best organisational structure is the one that does not seem to exist – "a transparent, superconducting connection between people and customers." The best, if not the only way to achieve such a structure, is probably by shaping internal knowledge flows, and knowledge flows to and from customers and suppliers. The desire to

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[36] Although Polanyi uses this argument in the context of political societies, to prove limitations of the communist socio political system, it is based on the internal functioning of organisms. "Within an organism, each higher principle controls the boundary left indeterminate by the next lower principle. It relies, for its operations, on the lower principle without interfering with its laws, and because the higher principle is logically unaccountable in terms of the lower, it is liable to failure through operating through it. "In the same way that internal structures in organisms operate independent of each other, one can argue in the knowledge-based organisation, that the knowledge manager of the knowledge worker need only be concerned with the knowledge inputs and outputs of the knowledge worker, and will not be fully knowledgeable of the job-content and skills of the knowledge worker. In fact, Peter Drucker (1993) argues that the manager of the knowledge worker cannot be knowledgeable of the job-content of the knowledge worker.

[37] Nonaka & Takeuchi (1995:152) refer to knowledge practitioners and include knowledge specialists and knowledge operators under this term.

structure knowledge flows does not imply that knowledge flows can be restricted. The net result of this exercise must be an organisational structure that will deliver knowledge where and when it is needed.

To obtain an organisational structure based on knowledge flows, it is necessary to list the knowledge requirements for each strategic approach, including i) skills required – quality not quantity and may include technical skills as well as specific strategic critical technologies; ii) available knowledge versus the need for creativity and innovation; iii) demands on tacit and explicit knowledge; iv) expected learning curves and expected actual learning; and v) knowledge dependencies.

To find the best structure may be a challenge in itself, however the knowledge requirements as identified above should be valuable in determining the appropriate structure. In order to develop an organisational structure, the best starting point may be to identify the knowledge flows between the organisation and its clients on the demand or request side, and then to complete the flow through production and service delivery back to the client. This, while adding additional identified knowledge inputs along the way. These knowledge flows should then be structured in such a way that logical groupings of flows and knowledge flows, and knowledge stocks appear. This "knowledge mapping" (at this stage) should be high-level only, since the detailed definition of knowledge flows will belong in the process definition phase. Nevertheless, a feeling for both the volume (syntactic perspective) and the content (semantic perspective) of the knowledge should be obtained for this exercise to be successful, and to set the foundation for the next level of organisational definition.

A distinction will need to be made between knowledge, information and data. If the knowledge requirements are addressed by a knowledge grouping, it can be explicitly listed as a knowledge component of that knowledge area. Knowledge requirements not addressed by the defined knowledge flow must then be logically grouped together in additional knowledge areas (knowledge stocks), and the relationship between all the knowledge areas within the knowledge flow must be mapped out. The Knowledge flow diagram should look like the known network chart with nodes and flows, where the nodes represent knowledge stocks and knowledge centres, and the lows represents knowledge flows. The advantage to this approach is: It saves one from having to go into the detail of process flows, and at the same time it gives a view of the different knowledge stocks and knowledge flows the organisation

will maintain. Since the management requirements and management skills for different knowledge areas may be different, it will be relatively easy to group these knowledge flows and knowledge stocks into manageable groupings that then may become the basis for the organisational structure. From an organisational structure point of view, it may be wise at this stage to refrain from developing the complete organisational structure. It may be premature to make decisions such as centralised vs. decentralised technology support & development, and to include all organisational support areas and services such as Human Resources.

3.3.4 Organisational processes, technology and knowledge management

Koulopoulos & Frappaolo (2000:38) define knowledge management as "the leveraging of collective wisdom to increase responsiveness and innovation". In analysing this definition, a few things become clearer:

− Wisdom implies knowledge and the applied value of knowledge. The Cambridge Dictionary of Learners defines wisdom as "the ability to use your knowledge and experience to make good decisions and judgements".

− Collective in this sense implies a combined set of experience and knowledge from different individuals within an organisation.

− Responsiveness refers to the ability to have quick and positive reactions.

− Leveraging must be about exploiting wisdom, knowledge and intellectual abilities towards improved responsiveness.

Stewart, on the other hand, in *Intellectual Capital* (1998) argues very practically that knowledge management must be about the managing of knowledge flows and knowledge stocks within an organisation. At the same time, process owners, together with strategists, talent, project managers and resource providers, are acknowledged as some of the Knowledge Age careers (Stewart 1998:207). Process owners, according to Stewart, are senior managers and executives responsible for the smooth functioning of processes and sub-processes. Whether it is an experienced process owner or not, who will define the organisational processes, this person must first of all understand what the implications of

effective management of knowledge flows and knowledge stocks is on organisational processes. In order to promote organisational learning at the interfaces of the organisation with its environment, in addition to effective management of knowledge flows and requirements, process owners will also have to allow for flexible processes.

When defining the organisation's processes, there are a few important considerations. First and foremost is the effective and efficient flow of knowledge, conforming to knowledge flows as defined when designing the organisational structure; as well as to the general requirements for knowledge flows listed in section 3.3.3 Knowledge flows as the basis for organisational structure. Another consideration is the readily availability of knowledge from knowledge stocks, as determined during defining the knowledge flow, and the maintenance of knowledge in knowledge stocks. Processes must, by default, feed and maintain the knowledge stocks as far as possible, in order to minimise the management efforts to maintain and grow the knowledge stocks.

Also important is the optimisation of interfaces with customers and suppliers in order to promote intimacy and improved relationships with customers and clients. The connected corporation, according to Stewart (1998:152), estimates that 30% to 40% of the saving from customer-supplier alliances is derived from establishing joint processes with customers. Stewart (1998:155) argues that it is vital that the business manage customer relationships in new ways, and they must invest in their customers so that a company and its customers can grow intellectual capital that is their joint property.

Finally, the challenge of effective and effectual integration of process logic with supporting technologies can be dealt with. These are important decisions that need to be made at this stage. By nature, these decisions need to be in line with the strategies and vision as defined earlier. More important however, is that all these decisions will have structural implications for the organisation, and need to be done in line with guidelines to maximise human capital - in addition to maximising knowledge flows.[38] Once these decisions have been made, the organisational structure can be finalised by adding the necessary functions that every organisation require in order to be complete. These may include functions such as financial

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[38] Some of the guidelines supplied by Stewart (1998:88-93;192-198) are most helpful for this purpose.

record keeping, human resource support and information technology support; which might not be part of the core processes, but which still need to be added to have a complete and functional organisational structure.

3.3.5 The Knowledge Worker

Stewart (1998:41) states that an ever-growing percentage of people are knowledge workers, which he defines as workers for whom information and knowledge are the raw material, as well as the product of their labour. Drucker (1993:7) identifies knowledge workers as knowledge employees, knowledge professionals and knowledge executives who know how to allocate knowledge to productive use.

Note that the sequence of relationships created in the model, when implemented, must result in a mental model or a map that incorporate society, the relevant industry, market niche or customer base, organisational role-players (including suppliers and value-add partners), and desired knowledge sharing relationship (in order to develop customer capital) with the customer. Also important, from a corporate perspective, is to demarcate the responsibilities of organisational role-players into different levels of abstraction. In the hierarchy of knowledge "domains" demonstrated as part of this model, provision need to be made for the four layers of knowledge workers - each with their relevant knowledge domains and related responsibilities. Note that these levels of knowledge workers are a combination of how the knowledge worker concept is applied by the different texts reviewed within this thesis:

Knowledge practitioners, in line with Nonaka & Takeuchi's design[39], will consist of knowledge operators who will mainly be responsible for knowledge flows within relationships of the organisation with its customers, suppliers and partners, as well as knowledge specialists responsible for the maintenance of knowledge within the knowledge stocks. Knowledge engineers will be responsible for maintenance of the organisational structure through the detail planning of knowledge flows, supporting processes and

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[39] Nonaka & Takeuchi (1995:152) give more information on the differences between knowledge operators and knowledge specialists.

technologies, and the maintenance of knowledge flows, knowledge creation and knowledge stocks. Knowledge officers (the CEO, CIO and other members of the leadership team) need to be responsible for definition and maintenance of the organisation's strategy, high-level planning of knowledge flows, and the design of organisational structure. Knowledge executives (typically known as the company board of directors) need to be responsible for definition and maintenance of the organisation's mission and vision. By nature, the execution of this responsibility needs to be based on extensive knowledge of the environment of the organisation.

To promote innovation amongst knowledge workers, communities of practice have a special role to play in the corporate organisation. Brown & Duguid (1991) argues that, if the internal communities of practice of large organisations have a reasonable degree of autonomy and independence from the dominant world view, these organisations might actually accelerate innovation, and therefore such organisations are uniquely positioned to generate innovative potential incrementally.

3.3.6 Structured organisational learning

3.3.6.1 By maintaining a framework for the organisational learning space

For organisational learning, an explicit framework that formalises the organisation's learning space may be very helpful. By explicitly claiming the organisational learning space in a framework that incorporates the organisational purpose and intent (mission and vision), values, strategy, guidelines, policies, and rules and regulations, double-loop learning just may then become an organisational reality. This framework must be a living document, or at least a living set of documents, that need to ensure that it stays up to date, and it must guide all action and decisions within the organisation. The organisational model would then look somewhat like this:
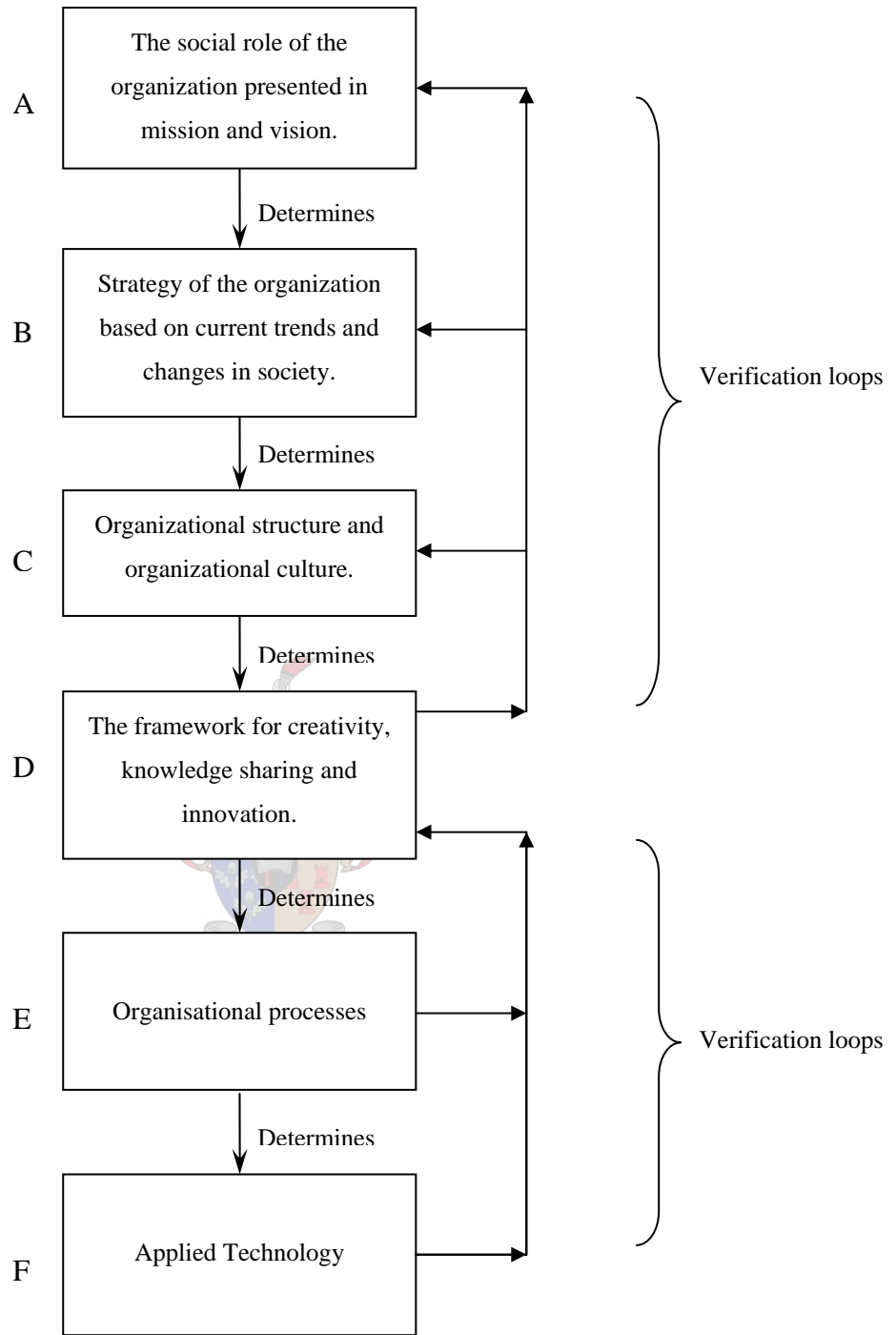
Figure 2 Framework defining the learning space

Learning then may occur when points F and E feed back into D, in the sense that their outcome are 'reflectively' tested against D - the Framework for Creativity, Knowledge Sharing and Innovation. Any amendments in this framework must be tested against, and

verified within, the mission, vision, strategy and structure (A, B and C), and where relevant, these amendments may influence the strategy. This then may become a model for the learning organisation.

3.3.6.2   By maintaining a hierarchy of knowledge domains

In addition to the *framework for creativity, knowledge sharing and innovation*, when feedback loops, or learning loops, are applied to the knowledge domains (or knowledge spheres) of the four levels of knowledge workers, this model may develop into a multiple-loop learning model. This will be made possible by the different levels of abstraction of the different knowledge spheres inherent to the model, as well as by applying the principles of double-loop learning between each pair of successive knowledge spheres.

Knowledge practitioners, when finding their actions to be ineffective, may verify the structure, processes and technologies (and the related mental models and supporting assumptions) provided by the knowledge engineers. Knowledge engineers, when finding their attention ineffective, may verify the strategy and structure provided by the knowledge officers. Knowledge officers, when finding the organisational strategy to be ineffective, may verify the vision and mission provided by the knowledge executives.

The result is that learning will occur between the four different levels of knowledge domains within the organisation, and this will create not only a double-loop learning scenario, but also a multiple of learning loops. On the assumption that the *framework for creativity, knowledge sharing and innovation* includes the right to challenge assumptions, and is freely communicated and upheld throughout the organisation, mental models and assumptions can then be challenged when necessary. See figure 3.
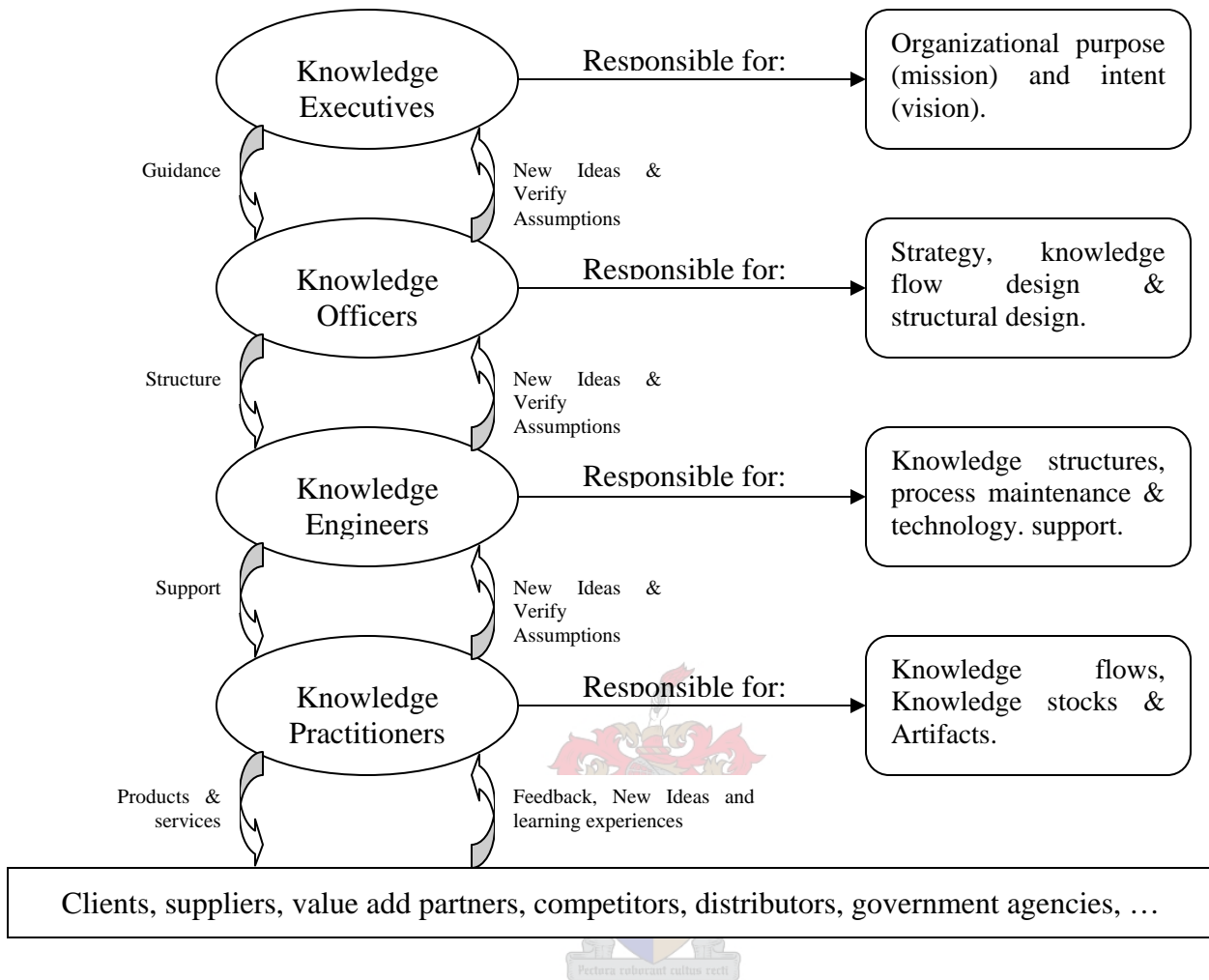
Figure 3 The multiple learning loop scenario

Note that this model of learning depend on two factors:

Abstraction of knowledge spheres becomes a requirement for the latter interaction within the model. It is through the abstraction of organisational knowledge layers that individuals will be allowed to focus on the relevant knowledge within that layer, and to ensure the correct content for knowledge flows within those layers - as well as to and from other layers. Also note that this conceptualisation of abstraction is completely in line with knowledge work, as well as knowledge products. Peter Drucker (1993:82), on knowledge work, states that the manager of the knowledge worker will often not know about the content of the knowledge

worker's work. Although they may not know how to interpret their knowledge from an organisational perspective, they know more about their work content than anybody else. They know what works, and what does not.

In addition, abstraction of knowledge work will only allow for a feasible structure if there is some measure of autonomy in the different layers of abstraction. Therefore, as much responsibility and accountability towards autonomous decision-making as reasonably possible, need to be contained at every lower level of abstraction. At the same time, to improve the flow of knowledge, "higher" layers should not contain functions that can be included into "lower" layers.

3.3.7   The model does not represent a complex hierarchy

It is important to emphasise that the model should not create just another hierarchy, but that it should result in a flat and flexible structure where people manage themselves, and use the network to transfer knowledge and artefacts when possible. The focus always needs to be on efficient and effective flow of knowledge. Flexibility also needs to be built into the network in order to allow for knowledge to be easily transferred to any person in the organisation, when the situation demands. All organisational activities, responsibilities, job descriptions and rewarding systems need to take note of the importance of managing knowledge flows and stocks effectively. Each member (Drucker 1993:49) in an organisation makes (at least in theory) a vital contribution, without which there can be no results. But no one by himself or herself produces these results. Keeping this in mind, each knowledge worker in the flow of work should not only be aware of a crystal clear organisational mission, but should also know exactly what the organisational strategy is, as well as his or her role towards the organisational strategy - since (Stewart 1998:74) only through strategy, can knowledge be separated from noise. Just as important, is the need to have access to all the knowledge inputs when required, and to understand exactly what his or her role is towards maintaining and improving the organisational flow of knowledge and knowledge artefacts.

3.3.8   Testing the proposed model

The purpose of this section is two-fold. Firstly, it is to demonstrate that the notional model for the learning organisation, as created by this thesis, incorporates the strengths of the evaluated models from Senge and Nonaka & Takeuchi. Secondly, it is to demonstrate that the model addresses the criticism against these two models, as identified in section *3.1 Collective shortcomings of evaluated views of the learning organisation* . This will be done in table form with the first entry as a reference to the original item as addressed earlier in this thesis, and with the second entry then being the remark to the original comment.

3.3.8.1   Incorporating the strengths of the evaluated models?

Identified Contribution From Senge (2.1.2. i)
Making Systems Thinking applicable to the organisation and its interaction with its environment, enabling the organisational member to see the consequences of the organisation's interaction - whether internal interaction, or interaction with the environment.
Addressed By Means Of And How
The proposed model does not attempt to replace Systems Thinking as a learning enabler of organisation learning, nor does it contest the need for Systems Thinking. The underlying assumption is that Systems Thinking is an explicit activity, and that organisational members do not always have the time to stop and go through a process of "Systems Thinking" when making decisions. Rather, the model represents a "system" of its own, a system that will implicitly deal with the learning disabilities that Senge highlights in his text in an effort to establish the need for Systems Thinking. Important aspects of this solution includes the following:

 − Each "level" of knowledge workers in the hierarchy of knowledge domains (see figure 3) has a responsibility to address certain needs of the organisation in order to improve the interaction of the organisation with the bigger system.

 − The managing of knowledge flows between the organisation and its environment, in

combination with well defined and a well understood hierarchy of knowledge domains, intends to create a "system" that is better integrated with its environment. However, nothing prevents the knowledge worker to apply Systems Thinking in any decision-making process.

− The organisational ladder implicitly allows for feedback loops and testing of assumptions.

Although the model has not been tested yet, it would be reasonable to assume that the organisational impediments, or learning disabilities as identified by Senge (1990:17-26), may be addressed as such:

i. "I am my position", by required learning at all levels (multiple loop learning in figure 3) and the related testing of assumptions.

ii. "The enemy is out there syndrome" (as a result of looking at the world in non-systemic ways), is addressed by the fact that the knowledge flows form the basis of the organisational design, and the resultant improved knowledge of the organisation's interaction within, as well as with its environment and the bigger system. For example, the tendency to focus on knowledge flows from the customer will increase the organisation's knowledge of the customer, and reduces the probability of perceiving the client an unfamiliar enemy.

iii. "The illusion of taking charge", by improved knowledge of interaction with the environment that leads to more focused activities from all individuals.

iv. "The fixation on events" by the working (action in order to achieve action) strategy approach, where the strategy focuses the organisation on actions instead of static objectives.

v. "The parable of the boiling frog" can be addressed by the testing of incorrect assumptions?

vi. "The delusion of learning from experience", by moving away from functional divisions towards focussing on knowledge flows and the related interactions; and hence broadening the vision of the knowledge worker as well as his or her learning space.

vii.	"The myth of the management team", by the continuous upward verification of assumptions, and the continuous learning that ensue.

Identified Contribution From Senge (2.1.2. ii)
The intention for an organisation to be true to its purpose. Senge (1990:148) sees this as a commitment that is an essential part of a powerful and just organisational vision.
Addressed By Means Of And How
Directly addressed by knowledge of purpose (3.3.1 The knowledge of the social purpose of the organisation), and the fact that this knowledge flows directly into knowledge of intent.

Identified Contribution From Senge (2.1.2. iii)
The emphasis on the role that shared mental models perform in organisational learning; through challenging and clarifying existing assumptions, discovering internal contradictions in those assumptions, and thinking through new strategies based on new assumptions. Systems Thinking, in particular, assists in exposing flaws in mental models, and thus in identifying opportunities for learning.
Addressed By Means Of And How
This thinking is in line with the double-loop learning concept from Argyris and Schön (1996), and is inherently built into the model through the verification of assumptions between layers of knowledge workers. It needs to be emphasised that the organisational practitioner is by no means discouraged from applying Systems Thinking. It is simply argued that the practitioner cannot rely on Systems Thinking for all learning situations.

Identified Contribution From Nonaka & Takeuchi (2.2.5 i)
The emphasis on tacit knowledge, and incorporating tacit knowledge into a realistic and workable model of knowledge sharing and knowledge creation[40], namely the knowledge creation spiral.
Addressed By Means Of And How
Tacit knowledge is inherently part of the model, and the use of this concept is strongly guided by Michael Polanyi's view that all thought is underpinned by tacit knowledge. Each and every knowledge worker will implicitly make use of their own tacit knowledge. Consequently, the knowledge spiral as a tool for knowledge sharing and knowledge creation is promoted at all areas and spheres of organisational behaviour.

Identified Contribution From Nonaka & Takeuchi (2.2.5 ii)
Combining the knowledge creation spiral into the five phase model of the organisational knowledge creation process, and setting a standard which other models can be measured against, or could use as a starting point.
Addressed By Means Of And How
The proposed model complements Nonaka & Takeuchi's model in the sense that these models address complementary scenarios. The model from Nonaka & Takeuchi focusses on product development scenarios, with the new notional model focussing on the organisational learning within the business flow and processes.

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[40] Michael Polanyi was the first in 1966 to describe tacit knowledge. His views are explained in more detail in section 2.4.5 Understanding tacit knowledge.

Identified Contribution From Nonaka & Takeuchi (2.2.5 iii)
Nonaka & Takeuchi (1995:59) show how organisational knowledge creation (or organisational learning, which is the preferred term of reference in this thesis) touches on many aspects of organisational behaviour, including organisational structure, organisational culture, organisational vision and intent, management roles and management practices.

Addressed By Means Of And How
− Structure is addressed when advancing knowledge flows as the basis for creating organisational structure.   − Organisational culture is determined to be outside the scope of this thesis.   − Organisational vision and organisational intent is used, and applied directly into the model.   − Management roles and management practices are utilised and incorporated. The different roles for knowledge workers are incorporated, i.e. knowledge executives, officers, engineers and practitioners. A variation to the middle-up-down management style is also represented in the model where the knowledge engineers will mediate between knowledge officers and knowledge practitioners. In contrast to Nonaka & Takeuchi's equivocal vision, the vision according to the notional model should be quite clear and attainable. At the same time, strategies – which are not provided for in Nonaka & Takeuchi's model - should be clear and specific.

Identified Contribution From Nonaka & Takeuchi (2.2.5 iv)
The view that both information and knowledge are context specific, in that they depend on the situation; and relational in the sense that knowledge is created dynamically in social interaction among people. People, interacting in a certain historical and social context, share information from which they construct social knowledge as a reality, which in turn influences their judgement, behaviour, and attitude. Similarly corporate vision, presented as an equivocal strategy by leadership, is organisationally constructed

into knowledge through interaction with the environment by the organisation's members, which in turn affects the business behaviour.

Addressed By Means Of And How
The context specificity of information and knowledge is implicitly built into the notional model by means of allocating context specific knowledge domains to the hierarchy of knowledge workers. The creation of social knowledge is guided by a combination of the corporate vision to guide corporate direction, corporate strategies to provide context for knowledge creation and managed knowledge flows to give structure to production of knowledge products and artefacts.

Identified Contribution From Nonaka & Takeuchi (2.2.5 v)
The relationship between individual and organisational knowledge creation is clearly defined and illustrated through many case studies. The organisation is required to support "creative individuals, or provide contexts for them to create knowledge. Organisational knowledge creation, therefore, should be understood as a process that 'organisationally' amplifies the knowledge created by individuals, and crystallises it as part of the knowledge network of the organisation. This process takes place within an expanding 'community of interaction', which crosses intra- and inter-organisational levels and boundaries."
Addressed By Means Of And How
The individual in the notional model is empowered to be innovative and creative within his or her area of responsibility, since only the individual knowledge employee decides in large measure what he or she contributes, and how great the yield from his or her knowledge should be. Furthermore, designing of the organisation to accommodate knowledge flows based on knowledge needs will improve the availability of appropriate knowledge. The correct application of technology within the organisation will further enhance the availability of appropriate knowledge within the organisation, in that the correct application of technology can support process, work and knowledge flows.

Identified Contribution From Nonaka & Takeuchi (2.2.5 vi)
Through promoting the knowledge base layer of the organisational structure, Nonaka & Takeuchi highlight the need to have knowledge accessible in different contexts throughout the organisation. They also see that much of this is done with the aid of technology.

Addressed By Means Of And How
This need is implicitly addressed by making sure that the knowledge requirements drive the definition and design of knowledge flows. Furthermore, flexibility is provided for within process design and process management, specifically to ensure appropriate allocation of knowledge throughout the organisation when required.

3.3.8.2   Addressing the weaknesses of the evaluated models?

Identified Shortcoming From Senge (2.3.1 i)
Systems Thinking then becomes a tool that will assist in identifying structural impediments, and that may be a learning experience - but it is doubtful whether applying Systems Thinking in itself will constitute the learning organisation, even when applied along with widely disseminated team learning, personal mastery and a strong corporate vision.

Addressed By Means Of And How
This impediment is dealt with in the model by means of presenting a structure that inherently promotes learning within different (and abstract according to Drucker) knowledge domains.

Identified Shortcoming From Senge (2.3.1 ii)
The implications of organisational structure and process management are only addressed by Senge as far as Systems Thinking will assist in identifying structural and process related impediments.
Addressed By Means Of And How
Using knowledge flows as the basis for organisational design and process design, has the primary objective to be more in line with the environment, and more adaptable to changes in the environment. Furthermore, the model primarily intends to build a structure and framework for the organisation that fosters dynamic interaction, and will promote organisational learning through individuals learning from, and about, the organisation and its environment.

Identified Shortcoming From Senge (2.3.1 iii)
Senge's work seems to lack an adequate understanding of the pervasiveness of power in organisational life, or any realistic strategy for incorporating this into the theory and practice of the learning organisation. For example, Senge notes that although organisational vision will most certainly be influenced by individuals with personal vision throughout the organisation, the role of top management in vision creation is underplayed, almost to the point where it appears that creating an organisational vision is a "bottom up" exercise and can only be done if there are enough individuals in the organisation with strong personal visions and high levels of personal mastery.
Addressed By Means Of And How
A balance in the contributions of top management and other organisational members is promoted through the upward testing of assumptions throughout the hierarchy of interacting knowledge domains.

Identified Shortcoming From Senge (2.3.1 iv)
Senge emphasises an organisation's ability towards team learning as a building block for organisational learning. However, there must be a lot more to inter-personal learning within the organisation than team learning. Teams are regarded by Senge as the primary learning unit of the learning organisation, but are they? The learning organisation by default has to provide for interactive learning, and other learning entities do exist - such as communities of practice that often originate at own accord in and across organisations; and which are not necessarily team oriented.
Addressed By Means Of And How
In addition to acknowledging organisational learning as a result of communities of practice, the premise of the proposed model is that of learning by correcting inefficient actions. Teams may (and most probably will) be involved in this learning, however the primary interest is not in team dynamics, but in an organisational structure that fosters and promotes learning.

Identified Shortcoming From Nonaka & Takeuchi 2.3.2 i)
A limitation on this theory is the admitted focus towards new product development. This focus introduces a few restrictions, such as the fact that, for a generic model of organisational knowledge creation, the knowledge needs of business services also need to be incorporated. Furthermore, general business processes are ignored altogether, and no reference is made to organisational learning within business processes.
Addressed By Means Of And How
The intention of the notional model is not to offer an alternative to the model from Nonaka and Takeuchi, but rather to complement their model, since their approach to product development is quite complete. However, their model, apart from the fact that it does not address business services, offers little room for applying it to business services. This is simply due to their focus on product development, which ignores the business system where business services are delivered. Business services can easily be

incorporated into the notional model, since business processes are implicitly addressed by the model.

Identified Shortcoming From Nonaka & Takeuchi (2.3.2 ii)
The suggested Hypertext organisational structure is a hybrid of the familiar project or matrix structure, and adds limited value to organisational learning, except for framing the context of projects in terms of organisational learning, and highlighting the importance of organisational vision, organisational culture and technology in terms of organisational learning.
Addressed By Means Of And How
The notional model does not promote a specific structure, but instead promotes knowledge flows as the basis for organisational structure. When implemented, this may lead to quite inventive structures for organisations.

Identified Shortcoming From Nonaka & Takeuchi (2.3.2 iii)
It is unclear to what extent this model is influenced by the Japanese culture, and it should be emphasised that each culture is an iceberg of tacit knowledge in itself.
Addressed By Means Of And How
The only reasonable response to this argument would be that the presented notional model is culture independent. The test would be to evaluate the response and acceptance of people from different cultures towards the model. In all likelihood this will be a learning experience that will result in a number of corrections or improvements to the model. Nevertheless, the model used, as primary inputs, texts that originated from both Eastern and Western cultures. In doing so, the proposed model may just be accepted, and that by people from several cultural backgrounds.

Identified Shortcoming From Nonaka & Takeuchi (2.3.2 iv)
Their argument is that the Japanese model for knowledge creation is the main reason for the success of Japanese companies during recent years. However, in presenting this model, Nonaka & Takeuchi acknowledge that there are other factors contributing to the success of Japanese companies. However, it may be that this assumption in their argument has not been tested, and in all fairness it will be very difficult to test.

Addressed By Means Of And How
The response to point 2.3.2 iv also applies here. However, the notional model stems from managing knowledge flows, instead of from a model for knowledge creation. Nevertheless, the notional model inherited much from Nonaka & Takeuchi's model of the Knowledge Creating Company.

3.3.8.3   The aspects identified from Intellectual Capital?

Contributions From Stewart (2.4.2.5 i & ii)
i.   Stewart acknowledges that information technology has implications for the time distribution (flow) of both information and knowledge, through established networks of technology. Therefore he emphasises the management of knowledge flows and knowledge stocks.
ii.   An important part of knowledge creation is the timely availability, or just in time availability, of that knowledge when the knowledge is needed. For this purpose, knowledge flows and knowledge stocks have to be managed effectively.

Addressed By Means Of And How
The management of knowledge flows is addressed in a number of ways within the notional model, the first being through creating the organisational structure based on the designed flows of knowledge. Secondly, specific attention is given to the structure of knowledge flows when designing knowledge flows prior to designing actual processes. An important aspect is the ongoing management of knowledge flows by means of

distributing the responsibilities towards the development and maintenance of knowledge flows and knowledge stocks, between knowledge officers, knowledge engineers and knowledge practitioners.

Contributions From Stewart (2.4.2.5 iii)
The positioning of learning within the framework of Intellectual Capital include the importance of socialised learning and innovation within communities of practice, as well as the promotion of learning with customers to maximise customer capital.
Addressed By Means Of And How
Learning with customers has been implicitly addressed within the model, through the knowledge practitioners as interface with customers. Another important joint learning experience with customers will occur when customers can be included into the strategy determination exercise. Socialised learning within communities of practice cannot be underestimated, and is included into the model.

Contributions From Stewart (2.4.2.5 iv)
Stewart supports the notion that a good strategy supports, frames and fosters knowledge creation: Knowledge assets (Stewart 1998:70-74) are only worth cultivating in the context of a strategy, and knowledge can only be separated from noise by means of a strategy. Intellectual assets, therefore, do not exist without a purpose - or at least a supporting point of view.
Addressed By Means Of And How
The guidance of a clear mission, vision and strong strategy is the premise of the notional model.

Contributions From Stewart (2.4.2.5 v)
Stewart argues that three new organisational structures came about (Stewart 1998:196) as a result of the implications of information technologies on the economics of information and the cost of transactions.

Addressed By Means Of And How
The fact that new organisational structures are coming about may be a reflection of the limitations of traditional organisational structures in the knowledge era. The contribution of the notional model in this regard is that new and very innovative organisational structures may come about when using knowledge flows as the basis for organisational design. When maintaining efficient knowledge flows, these structures have to be proficient.

3.3.8.4 Collective shortcomings of evaluated views of the learning organisation

Collective shortcomings (3.1 a)
Much is said about the cognitive processes that surround knowledge sharing and knowledge creation.

Addressed By Means Of And How
The primary focus for management of knowledge flows is to ensure the proficient delivery of knowledge by means of networks.

Collective shortcomings (3.1 b & c)
b. There is a great deal of focus on shared knowledge creation and shared mental models for individuals within the organisation. Mental models and mental maps featured in all the models for organisational learning and knowledge creation.

c. There is one viewpoint that all the evaluated theories and models share - the importance of organisational purpose and intent, either in the form of mission and vision (Nonaka & Takeuchi and Senge), or in the form of strategy (Stewart), in guiding organisational |

learning and knowledge creation.

Addressed By Means Of And How
Mental models feature at all levels of the organisation as depicted by the notional model. Some of these mental models are quite inclusive, such as the mission, vision and strategies. Only when these mental models are widely acknowledged throughout the organisation, can effective learning occur at all echelons of knowledge domains, and in line with the organisational learning philosophy depicted by Argyris and Schön.

Collective shortcomings (3.1 d)
Little focus, except maybe for Stewart, exists on internal process and organisational structural considerations.

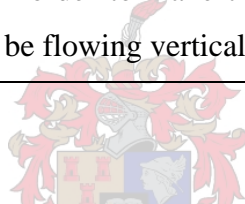| **Addressed By Means Of And How** |
|---|
| At least two factors within the notional model support processes and organisational structure, the first being the implicit relationship between knowledge flows, process flows and organisational structure which should contribute towards the ongoing maintenance of these components. Secondly, the clear hierarchy of knowledge domains within the new model aims at creating a structure for people that can complement and maintain the primary structure provided by the predefined knowledge flows. |

Collective shortcomings (3.1 i)
The relationship between knowledge flows within the organisation and organisational structure.

Addressed By Means Of And How

This is addressed in two critical ways.

− The building of the organisational structure based on desired flow of knowledge and knowledge artefacts. The knowledge flowing here could be anticipated to be mostly explicit knowledge, although processes may require tacit knowledge to be externalised or extracted, e.g. the marketing department that wants to learn from the sales force how their customers experience a range of products or services. The flow of knowledge here would be seen as flowing predominantly horizontal.

− The hierarchy of knowledge domains that promote the exchange of ideas, testing of assumptions and the related exchanging of mental models. This process provides for the exchange of tacit knowledge, and one can assume metaphors and colourful language to be indispensable in order to make this a reality. If one can talk about flow of knowledge here, it will be flowing vertically through the organisation.

Collective shortcomings (3.1 ii)
Addressing the need to appreciate how knowledge of the organisational environment may have implications for organisational vision and strategy.

Addressed By Means Of And How

This also is addressed in a number of ways, and from different perspectives.

The mission, which determines the vision, is a direct result of the knowledge executive's and knowledge officer's understanding of the social purpose and role of the organisation.

A good understanding of socio-economic trends and dynamics is implicitly built into the strategising process.

A vertical flow of knowledges and experiences is tied into the model to make sure that implications of decisions can be tested and verified throughout the organisation. It is expected that this will be addressed through pro-active and ongoing testing of

assumptions that may involve both structured and non-structured communications. Structured communications may include reporting on measurable and non-measurable variables, as well as structured workshops and dialogue for testing assumptions and implications of decisions and behaviour.

Collective shortcomings (3.1 iii)
A structured approach for managing the relationship between internal processes and knowledge flows within the organisation.
Addressed By Means Of And How
The model incorporates defined responsibilities towards management and maintenance of knowledge flows. These include knowledge officers and knowledge engineers that, together, are responsible for the design and maintenance of knowledge flows and processes. Furthermore, knowledge flows is the basis for process design, because it is important to give consideration to the implications on processes of the technology that maintains the flow of explicit knowledge and knowledge artefacts.
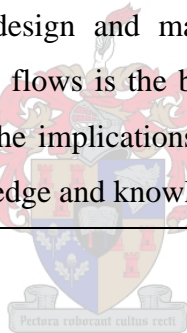
4   CONCLUSION

4.1   Testing the model against the proposed benchmark

When looking at the definition of a learning organisation as defined in this thesis, it is clear that the most important organisational attribute is the ability in organisations to influence its respondents (people) to realise and apply knowledge in accordance with organisational purpose (mission and vision), while being true to defined strategy, and equally able to perceive and react on mistakes, threats and opportunities. This is in addition to the skill to effectively and rapidly create, distribute and share knowledge. In addition to focusing on the managing of knowledge flows between knowledge stocks, by assigning specific knowledge domains to the different "levels" of knowledge workers, will we be able to foster organisational learning? This question needs to be heuristically tested in order to answer it with any certainty.

Nevertheless, despite not having a tested model, there is still reason to believe that knowledge flows, and hierarchical knowledge domains with a sufficient measure of abstraction, can create the basis for a model of the learning organisation. This is based on the notional model which attempts to explain a mental model that does not only build on the works of others, but hopefully justly captures what they have been saying all along. All the major sources of this thesis, namely Senge, Nonaka & Takeuchi, Stewart, Drucker and Argyris & Schön, are strongly rooted in observations from real-life organisational behaviour, and all are speaking from a wealth of case studies that support their observed patterns and trends. The notional model is thus an attempt to meaningfully integrate the concepts, that were identified by these studied scholars, which contribute towards improved organisation and organisational learning. These concepts include:

1. The importance of a clearly defined social purpose, a widely accepted "commitment to the whole" (Senge 1990:171), and an involvement bigger than the individuals involved in the organisation.

2. Organisational intent, as referred to by Nonaka & Takeuchi, worded into the organisational vision as the driving force for all knowledge creating activity within the organisation.

3. The need for a good strategy that frames and fosters knowledge creation. Stewart's notion that knowledge assets are only worth cultivating in the context of a strategy, and that knowledge can only be separated from noise by means of a strategy (Stewart 1998:70-74), is applicable.

4. Abstraction of knowledge work, as recognized by Peter Drucker (1993:82), where the manager of the knowledge worker will often not know about the content of the knowledge worker's work; and at the same time the knowledge worker may not know how to interpret their knowledge from an organisational perspective, despite the fact that they know more about their work content than anybody else. The correct application of the principle of abstraction of knowledge is required in order to create the learning organisation, and it will only allow for a feasible structure if there is some measure of autonomy in the different layers of abstraction. This includes the correct balance of responsibility and accountability towards autonomous decision-making.

5. The testing of mental models and assumptions, as recognized by Argyris and Schön in their double-loop learning concept. This dialogical set of organisational behavioural characteristics aims at promoting shared leadership behaviour, and emphasising the value of common goals and mutual influence for organisational practitioners.

6. The role of middle management (knowledge engineers) to mediate between senior management and the workforce. Although the model took its idea from Nonaka & Takeuchi's middle-up-down management model, this concept was applied somewhat differently, but still remained recognisable, as depicted in Figure 3 The multiple learning loop scenario). These knowledge engineers are responsible for managing the flow of explicit knowledge, as well as the transferring of tacit knowledge.

7. Knowledge and information flows that form the basis for organisational structure. This was triggered by Stewart's observation that computer networks changed organisational structures (Stewart 1998:185), and that the reason for this change is that computer networks can deliver information of value more quickly and accurately than any bureaucracy can.

While building this notional model in order to integrate these concepts, a few principles for organisation in the knowledge era may have emerged. The principles that we are searching for should be the following:

1. Organisational purpose and organisational intent are principle organisational values that guide the knowledge contributions of knowledge workers. Equally important is the role of an organisational strategy towards framing knowledge within the organisation.

2. The exposing and managing of shared mental maps, and the related testing of hidden assumptions, is required in order to ensure and promote organisational learning.

3. The management and optimisation of knowledge flows need to allow for the flow of explicit knowledge, as well as the transfer of tacit knowledge and concepts.

4. The levels of abstraction maintained towards organisational responsibilities must promote practical learning within knowledge areas, as well as between these levels of abstraction. This must be done with the notion that as much responsibility and accountability as feasible, need to be contained at every level of abstraction.
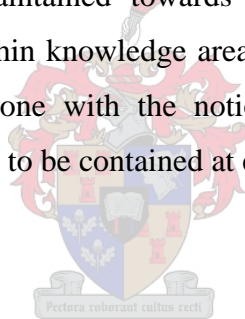
4.2   A final observation

This thesis does not intend to produce a new workable model, but merely intends to create appreciation of the fact that a generic framework for the learning organisation may exist in the same way that generic organisational principles existed for organisation in the Industrial Era. Organisations in the Industrial Era were organised around process flows, and managed on principles such as "division of labour", also known as Taylorism or Fordism. In the knowledge era, change is the only constant, and it may just make sense to "become relative" and manage organisations around process flows that are managed towards the only true constant in nature, i.e. the speed of light[41], that through technology, determines the speed of knowledge flows. The speed of light is indiscriminate - and the processes, products, services,

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[41] Einstein produced evidence that the only true constant in nature is the speed of light - and that time, space, matter and energy is both bound by, and related to, the speed of light.

technology or people that are implicated by this knowledge synthesis, may at any point in time be left behind.

4.3   Possible future studies

For this notional model to be accepted as functional and realistic, it is dependant on a number of themes that still need to be inquired into. Consequently, possible further studies include:

A.   Assessing the authenticity of knowledge flows as a basis for organisational structure.

B.   Building a practical understanding of the shared values and shared mental models required within the learning organisation, in order to foster and promote organisational learning.

C.   Determining a framework, that will define knowledge based process management practice, for the learning organisation. This is necessary in order to improve the understanding of the relationship between managing knowledge flows and managing process flows.

In closing, a quote from Argyris and Schön (1996):

> "The utility of the prototype lies in its ability to generate explanation and experimentation in a new situation. When it is carried over to a new situation, its validity must be established there by a new round of inquiry through which it is very likely to be modified. And serve, in turn, as a basis for reflective transfer to a new situation."

APPENDIX A – A TABULAR COMPARISON OF CURRENT MODELS

The purpose of the table below is not to give a detailed understanding of the evaluated models, but to take their building block concepts and use that as a basis to strike a comparison between these theories. It is interesting to note how well the first two columns, and then also the last two columns, compare. It appears that double-loop learning and Senge's learning organisation are more concerned with organisational behaviour, while the remaining two models focus more on organisational structural considerations.

Double-Loop Learning Argyris & Schön	The Learning Organisation Peter Senge	The Knowledge Creating Company Nonaka & Takeuchi	Intellectual Capital Thomas Stewart
Strategy and vision	Shared vision	Equivocal vision	Focus more on strategy
Mental Maps & Assumptions	Mental Maps	Mental Maps	Assumptions
Learning is social	Team learning a building block	Project teams the learning unit	Communities of practice
N/A	N/A	Knowledge base organisational layer	Manage structural capital
N/A	N/A	Knowledge flow through middle management	Knowledge flow through computer networks
N/A	N/A	Define knowledge creation cycles	Accept role for knowledge creation cycles
Model II learning may lead to visionary behaviour	Personal Mastery may lead to visionary behaviour	N/A	N/A
Systems Thinking to test mental models	Test assumptions to test mental models	N/A	N/A
N/A	N/A	Client's Tacit knowledge base	Customer Capital
Less of focus	Less of focus	Importance to organisational culture	Importance to organisational culture

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