Control, Value, Sense & System:

Dimensions of Hierarchy in Selected Knowledge Management Theories

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Thesis is presented in fulfilment of the requirements for the degree of
Master of Philosophy (Information and Knowledge Management)
in the Faculty of Arts and Social Sciences
at Stellenbosch University

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April 2014

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Summary

Knowledge management is an organisational science field that is viewed by many as a panacea to the challenge of successfully managing knowledge intensive organisations. Knowledge management is marked by a clear departure from traditional management thinking that viewed the ideal organisation as a bureaucracy with a clear hierarchical structure. Much of this has been the natural result of advances in information technology making new ways of working possible, but frequently, flatter structures are advocated on the assumption that knowledge work is necessarily stifled in hierarchical structures.

The thesis sets out to show that whilst this assumption might be true, it can also be ideological if based on a naive conception of hierarchy and organisation. This is done by describing various notions of hierarchy that go beyond the pure bureaucratic form. Thereafter it is demonstrated that these more nuanced notions of hierarchy lie at the core of some of the foundational knowledge management theories.

The first chapter gives an overview of management thinking; connecting and contrasting scientific management with knowledge management. The case is made for why many assume that knowledge management is inherently anti-hierarchical.

The second chapter describes the various notions of hierarchy by tracing the historical origins of the word and exploring how it has found multiple meanings in the context of society and organisations. Four prominent usage contexts of the notion of hierarchy emerge. The first usage is that of control where hierarchy refers to bureaucracies. The second usage examines the use of hierarchy in identifying various organisational cultures (Markets, Clans, Adhocracies and Hierarchies). The third usage applies to organisation sensemaking levels. The fourth usage refers to the use of hierarchy as it applies to organisations as the coupling of systems and subsystems.

In the third chapter it is demonstrated to what extent each of these notions of hierarchy informs selected mainstream knowledge management theories. It is argued that there are multiple contexts in which the notion of hierarchy can be used and observed in knowledge management thinking.

The fourth chapter concludes by restating the multiple meanings of organisational

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hierarchy and discussing the implications for knowledge management. The thesis comes to the conclusion that the notion of hierarchy is readily acknowledged and used in knowledge management thinking, albeit in different contexts and in more nuanced ways than merely as control. What is needed is to take these various contexts into account before a claim can be made that hierarchy is bad or good for knowledge management. A better conceptualisation of what is meant by hierarchy shows that such blanket claims are neither accurate nor instructive.

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Opsomming

Kennisbestuur is 'n veld in organisasiestudies wat deur baie mense gesien word as die oplossing vir die bestuursprobleem van kennis-intensiewe organisasies. Kennisbestuur word gekenmerk deur 'n duidelike afwyking van die tradisionele bestuursdenke wat die ideale organisasie sien as 'n burokrasie met 'n duidelik hierargiese struktuur. Hierdie afwyking is waarskynlik die natuurlike resultaat van voortuitgang in informasie-tegnologie wat nuwe maniere van werk moontlik maak, maar soms word platter strukture bepleit op die basis van die aanname dat kenniswerk in beginsel deur hierargiese strukture benadeel word.

Die tesis probeer wys dat alhoewel so 'n aanname wel waar kan wees, dit ook ideologies kan wees, veral wanneer gebaseer op 'n naïewe verstaan van hierargie en organisering. Dit word gedoen deur verskeie vorme van hierargie, wat verfynings van die burokratiese vorm is, te beskryf en daarna te demonstreer hoedat hierdie meer genuanseerde konsepsies van hierargie baie van die hoofstroom kennisbestuursteorieë informeer.

Die eerste hoofstuk gee 'n oorsig van bestuursdenke vanaf wetenskaplike bestuur tot kennisbestuur. 'n Argument word gevoer oor hoekom baie mense aanvaar dat kennisbestuur in wese anti-hierargies is.

Die tweede hoofstuk beskryf die verskeie vorme van hierargie deur die geskiedkundige oorsprong van die woord na te spoor en te wys op die vele maniere waarop dit neerslag gevind het in die samelewing en spesifiek in organisasies. Vier prominente gebruikskontekste word geïdentifiseer. Die eerste verwys na hierargie as kontrole in burokrasieë. Die tweede ondersoek die uitbreiding van hieragie as 'n manier om verskillende organisatoriese kulture te identifiseer (Markte, Klans, Adhokrasieë en Hierargieë). Die derde gebruikskonteks het te make met vlakke van organisatoriese singewing. Die vierdie konteks verwys na die gebruik van hierargie in die koppeling van sisteme en hulle subsisteme soos dit in organisasie-denke neerslag vind.

Die derde hoofstuk demonstreer tot watter mate elkeen van hierdie gebruikskontekste geselekteerde hoofstroom kennisbestuursteorieë onderlê. Daar word geargumenteer dat

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daar 'n veelvoud van kontekste is waarbinne hierargie in kennisbestuur gebruik en waargeneem kan word.

Die vierde hoofstuk sluit af deur die verskeie betekenisse van hierargie op te som en die implikasies vir kennisbestuur uit te stippel. Die tesis kom tot die slotsom dat hierargie in kennisbestuur erken en gebruik word, alhoewel in verskeie kontekste en in meer genuanseerde vorme as eenvoudige burokratiese kontrole. Wat nodig is, is om hierdie verskeie kontekste in ag te neem voordat afdoende antwoorde gewaag kan word of hierargie goed of sleg is vir die bestuur van kennis. 'n Beter konseptualisering van wat met hierargie bedoel word wys dat afdoende antwoorde in die verband waarskynlik onakkuraat is.

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Acknowledgements

A husband and wife, who for their entire life had to till the land for basic subsistence, realized that the only way out of poverty for their children would be to dispose of everything that they had in a quest for a better life for their children. And selling they did. They sold all the grain that the small farm, located in dry, sun-scorched rural Zimbabwe, could produce. They sold their goats and sheep and dreamt of the day their children would be successful and well-educated. Sadly, before that dream could materialize the wife fell off a bicycle whilst coming from a local school where she had gone to negotiate with the headmaster to keep their children in school whilst they prepared to send their crops to the market. She would die a year later from wounds sustained in that fall. The husband despaired but did not lose the dream they had shared. He toiled and many, many years later four of their children obtained Bachelor's degrees and by submitting this thesis, hopefully three of their children would have attained a Master's degree. I feel proud to have parents who love me with all they have, no matter how little that is. This is for you, Amai and Baba.

I have had the luck of being married to a beautiful wife and blessed with two children, and expecting a third. To my wife Moleen, who always made sure that the assignments are done, I do not know how to thank you. I did my Bachelors degree under your care and YOU have seen me through this Masters degree. To our children Claire, Tino & Natasha, I know you are intelligent and will have many more degrees higher than a Masters

I would like to that my employers, Uplands College Association, who contributed 75% towards the cost my study program and Mr Clarke in particular for granting me the opportunity to pursue my dreams. You are a good man, sir.

Lastly, and most importantly, I would like to thank my MIKM lecturers for guiding us through the program. Prof Kinghorn, thank you for the very critical but encouraging comments and Christiaan Maasdorp for guiding me throughout and having to put up with pages and pages of, at times, meaningless text.

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Chapter 1

Introduction

1.1 Hierarchy and management thinking

WorldCom, America's then second-largest long-distance phone company, filed for bankruptcy protection on 21 July 2002 after it revealed that it had improperly booked $3.8 billion in expenses. With $107 billion in assets at that time, WorldCom's bankruptcy became the largest in the history of the United States of America[1]. Financial analysts blamed the collapse of WorldCom on fraudulent management practices as well as poor management decision-making. This line of thinking was challenged by organisational knowledge management authors Firestone & McElroy[2] who posited that the collapse of Enron, WorldCom and other companies went beyond bad management decision-making. The companies' failure was systematically deeply rooted in the way the organisations structured themselves and made their knowledge because the hierarchical structures within the firms had concentrated crucial organisational knowledge in the hands (and heads) of a very few top management executives[3].

The notion of hierarchy is frowned upon in most contemporary management literature. The image that comes to the fore when the word is mentioned in organisational management circles is that of a bureaucratic[4] creature typified by centralised authority, subordination and a vertical chain of command[5].

The concept of hierarchy has been a subject of academic debate since the dawn of civilisation. As Charles Darwin noted:

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[1] Luisa Beltran, 2002 in an article that was published in 19/07/2002 on CNN's website.

[2] Firestone & McElroy, 2003

[3] Firestone & McElroy, 2003

[4] In the context of this study, a bureaucracy loosely translates to an image of an organisation characterised by vertical chains of command, levels of authority and subordination.

[5] Myers: "A vertical chain of command is an organisation structure with power emanating from the top down. There's a well-defined chain of command with a vertical organisation, and the person at the top of the organisational chart has the most power. Employees report to the person directly above them in the organisational structure. Each person is responsible for a specific area or set of duties".

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> The perfected quality among the individuals composing the Fuegian[6] tribes must for a long time retard their civilization. As we see those animals, whose instinct compels them to live in society and obey a chief, are most capable of improvement, so is it with. . .mankind. Until some chief shall arise with power sufficient to secure any acquired advantage, such as the domesticated animals, it seems scarcely possible that the political state of the country can be improved[7].

Darwin's contention that equality retards social progress makes interesting reading because the notion prevalent in most academic works on management, and especially knowledge management, is that hierarchy limits flexibility and in the process stifles creativity and innovation. Darwin went on to popularise the biological evolution of species theory. Central to this theory was the 'survival of the fittest' notion, which tacitly implied that any progress social or biological was rooted in and facilitated by inequality amongst species.

Interestingly, Karl Marx, a political scientist of the same era, criticised hierarchical forms of organising, asserting that bureaucracy is a circle of mutual deception between top management and those that they rule because "the top entrusts the understanding of detail to the lower levels, whilst the lower levels credit the top with understanding of the general, and so all are mutually deceived."[8]

Marx's[9] contention was that the hierarchical form of organising is self-defeating in organisational setups because it relies on the top management being trusted to act honourably. The problem of trusting those at the top, even as early as pre-industrial times, is, as remarked

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[6] Indigenous inhabitants of Tierra del Fuego, an archipelago at the southern tip of South America.

[7] This quote is popularly believed to have been extracted from Charles Darwin's diary during the Voyage of the Beagle in 1839. It is posted with a disclaimer clause on the documents found on http*://www.rockvillepress.com/tierra/texts/Journal-2.PHP#Chap10*. Whether this quotation is accurate or not, it still makes interesting reading because it highlights the dilemma that modern management thinking faces. Should organisations be more structured with controlling rules or should they be relaxed with more informal interactions?

[8] Sapru, 2013 citing Karl Marx.

[9] Karl Marx is well known for his critical work on the capitalist mode of production, which is seen by many as consistent with scientific management principles. He went on to develop a popular social theory termed Marxism which became an ideology for many eastern nations with Russia at one point in history adopting a Marxist-Leninist mode of production that ended with the collapse of the Soviet Union in the 90s.

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upon by Wren & Bedeian, noted in the deeds of George Hudson[10]:

> An early, if not the earliest, example of top management malfeasance exists in the deeds of George Hudson. He paid dividends out of capital, existing and borrowed; altered accounts of railway traffic and revenue to indicate more profitability than existed; published false statements to investors and in one instance, bought iron rails from one of his lines for £9 each and sold them to another of his interest for £11, pocketing a £6000 profit[11].

Wren & Bedien's account illustrates the challenge that is central to organisational design and control, and as such, the history of management thinking is replete with conflicting accounts of whether hierarchy improves an organisation's success or not. An interesting observation is that the issue of hierarchy has been addressed in every generation of management thinking starting with the early days of Taylor's scientific management. Scientific management emerged in the post-industrial revolution era to deal with the increasing complexity of managing organisations that were growing in scale and size. Taylor championed the science of managing organisations at that time. The enduring notion of scientific management was a search for a single 'best way' to manage an organisation. Many after Taylor continued this search: Carl Barth dedicated his works towards perfecting the original scientific management ideals[12], Henry Gantt introduced schematic diagrams to aid in planning work flows[13] and the Gilbreths[14] perfected the 'one best way notion' by introducing concepts such as motion study, fatigue study and work simplification.[15] In terms of organisational structures, task supervisors and managers symbolised the organisational hierarchy of those times. The post-scientific management era gave birth to several organisational management theorisations. One such

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[10] George Hudson was a railway financer whose acts of business malpractice are widely cited in corporate governance and ethical practice books.

[11] Wren & Bedeian, 2009

[12] Wren & Bedeian, 2009

[13] Gantt charts are horizontal bar graphs showing the start and completion dates of projects in a multiple task setup.

[14] Schroyer, 1975: 'Frank Bunker Gilbreth (1868-1924) and Lillian Moller Gilbreth (1878-1972) are respected for their unique contributions to the advancement of motion study, fatigue study and work simplification. Their humanistic approach to the problems of management utilised the principles of psychology and the application of experimental results to improve industrial procedures'.

[15] Schroyer, 1975

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enduring theory is Weber's[16] bureaucracy which rationalised that organisations have to exist in a formal hierarchical structure with each level controlling the level below it[17]. This theory is still largely evident today. From the scientific management era, the formal hierarchy became the basis of central planning and decision-making in most modern-day organisations.

Management theories that emerged later such as the human relations approach emphasised the human factor in organisational processes and the concept of an organisation as a social system with complex interrelated variables emerged.

1.2 Towards knowledge economics

The history of organisational management thinking was founded on the notion that an organisation had to be based on a formal hierarchal organisational structure until modern organisational management thinking tried to reconfigure the way organisations were seen and understood. Morgan[18] presented a metaphorical view of the organisation that included views of the organisation as a machine, an organism, a brain, a culture, a political system, a psychic prison, a constant flux and an ugly dominator[19]. Morgan demonstrated that there are several ways of seeing and organising an organisation. Jackson[20] presented a systematic view of organising and the concept of emergence[21] illustrated that an organisation is more than the sum of its agents. Complexity[22] and chaos[23] theorists began to view organisations as complex and adaptive systems. As the nature of world economies transformed from industrial-based manufacturing to service and informational-based transactions, organisational science and theorising moved on to knowledge economics. The knowledge economy[24] brought with it

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[16] Gajduschek, 2003 : Weber is a German organisational scientist who saw bureaucracy as the most rational organisational form and thus as superior to any other form of organisation.

[17] Gajduschek, 2003

[18] Morgan, 2006

[19] Morgan's metaphoric approach is based on the argument that our perception of an organisation is based on one or a combination of the eight metaphors.

[20] Jackson, 2003

[21] The whole is bigger than the sum of the individual parts.

[22] Dann & Barclay, 2006. citing the Santa Fe institute: "a system that adapts through a process of 'self-organisation' and selection into coherent new behaviours, structures and patterns".

[23] Ditto & Munakata, 1995: A chaotic system is non-linear and deterministic; i.e. the future is based on past events and exhibits order within a disorderly pattern, it is very sensitive to initial conditions and only predictable for very short periods of time.

[24] Powell & Snellman, 2004: "production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence. The key component of a

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another wave of organisational science theorisation that is widely known as knowledge management.

Preceding organisational theory was rooted in a resource-based view of the firm; however, knowledge management theory began to realise that the benefits rendered by tangible resources depend on how they are combined and applied according to the firm's know-how.[25] Knowledge management as an organisational science theory aims at improving the way organisations are understood by illustrating how they can optimally manage their knowledge assets[26]. Effective knowledge management bestows any organisation with a competitive advantage enabling it to be profitable in its industry[27]. Knowledge management, by prioritising organisational knowledge as the key resource in organisational success, drastically changed management science as focus shifted from controlling the tangibles to understanding the intangibles.

1.2.1 What is knowledge?

The concept of knowledge is the subject of a wide academic debate and multiple conceptualisations. It is therefore prudent to review it and put it into its proper context before attempting an analysis thereof. A comprehensive summary of knowledge definitions from various authorities is found in the journal article *Understanding Knowledge Management: A Literature Review*[28]. Notable definitions include the view that knowledge consists of truths and beliefs, perspectives and concepts, judgments and expectations, methodologies and know-how[29]. Knowledge can also be understood as a fluid mix of framed experience, contextual information, values and expert insight that provides a framework for evaluating and incorporating new experiences and information[30]. From an operational point of view, knowledge involves reasoning about information to actively guide task execution, problem-solving and decision-making in order to perform, learn and teach[31]. Philosophers perceive

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knowledge economy is a greater reliance on intellectual capabilities than on physical inputs or natural resources".

[25] Alavi & E.Leidner, 2001: (citing Cole 1998; Spender 1996a, 1996b; Nonaka and Takeuchi 1995).

[26] a knowledge asset can be thought of as a combination of a firms, technologies, competences and 'know-how' that makes it competitive. Boisot,1998

[27] Boisot, 1998

[28] Anand & Singh, 2011.

[29] Anand & Singh, 2011 citing Wiig,1993.

[30] Anand & Singh, 2011 citing Davenport & Prusak,1998.

[31] Anand & Singh, 2011 citing Beckman, 1997.

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knowledge to be justified personal belief that increases an individual's capacity to take effective action[32] and extends to the whole set of insights, experiences, and procedures which are considered correct and true which guide the thoughts, behaviours, and communication of people.[33] It originates in the head of an individual (the mental state of having ideas, facts, concepts, data and techniques, as recorded in an individual's memory) and builds on information that is transformed and enriched by personal experience, beliefs and values.[34] Recurrent themes from the definitions presented tend to suggest that knowledge consists of beliefs[35] and experiences[36] that build capacities[37] which inform actions[38].

Many knowledge theorists[39] make a distinction between *tacit* and *explicit* knowledge[40]. Explicit knowledge can be thought of as knowledge that has been formalised and made specific enough to be easily understood without ambiguity and is exemplified by product specifications, manuals and best practice procedures[41]. Tacit knowledge is a form of knowledge that is difficult to articulate[42] and is consistent with Polanyi's[43] personal knowledge as epitomised by the "We know more than we can tell" phrase. It is associated with the possession of deep individualised capabilities required to carry out an epistemic task[44]. The analogy that is often used to describe tacit knowledge is the technique and know-how that is required to balance and avoid falling off a bicycle because such knowledge truly and only belongs to a person who can and has successfully been on a bicycle before.[45]

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[32] Anand & Singh, 2011 citing Alavi,.& Leidner,.1999.

[33] Anand & Singh, 2011 citing Van der Spek, R. & Spijkervet, 1997.

[34] Anand & Singh, 2011 citing Bender & Fish 2000.

[35] Alavi & Leidner, 2001.

[36] Van der Spek & Spijkervet ,1997, Davenport & Prusak 1998.

[37] Alavi & Leidner, 2001, Anand & Singh, 2011, Van der Spek, R & Spijkervet , 1997.

[38] Alavi & Leidner, 2001, Anand & Singh, 2011,Van der Spek, R & Spijkervet, 1997.

[39] Nonaka , 1994, Cook & Brown, 1999.

[40] The first scholarly and notable account of the notion of tacit and personal knowledge is found in the works of Polanyi (1958 & 1966). There is vibrant academic debate on the nature of tacit and explicit knowledge and whether one form of knowledge can be converted to another. This debate is beyond the scope of this study.

[41] Nonaka, 1991: The Knowledge Creating Company.

[42] Anand A & Singh, 2011.

[43] Nye, 2002: Michael Polanyi was a 20th century physical chemist who is credited for his early works (1950s and 60s) and definitions of personal knowledge and the tacit dimension of knowledge.

[44] Cook & Brown, 1999.

[44] Cook & Brown, 1999.

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1.2.2 Where did knowledge management come from?

There are varying accounts of the origins of organisational knowledge management (as there are varying definitions of the concept), but a persuasive account is found in the IBM Systems Journal article *Where Did Knowledge Management Come From?*[46], which suggests that knowledge management as a discipline emerged as a response to real economic and social trends, namely globalisation, ubiquitous computing and a knowledge-centric view of the firm.

Knowledge management has theoretical antecedents in the fields of economics, sociology, philosophy and psychology[47]. Economically, knowledge management resulted from a practical need to account for varying organisational performance. Pertinent issues such as understanding the units of measuring organisational learning were the driving force behind this[48]. Sociology brought to knowledge management the strong tools required in areas of complex network structures and communities analysis[49]. Philosophy enabled knowledge management to cope with the paradox of value deriving from scarcity of expertise that is not readily 'copyable' on one side and the ability to select utilisable knowledge from plenty of sources on the other[50]. Lastly, psychology allowed knowledge management to understand cognitive processes that underpin issues such as motivation, cognitive ability, choice and learning[51] in organisations. Three practices, namely information management, quality movement and human capital movement interacted with the theoretical antecedents to mould the discipline of knowledge management into what it is today[52]. Information management, not to be confused with information technology[53], focuses on information value as a function of user satisfaction. The quality movement brought to knowledge management a scrutiny of organisational internal processes.[54] The human capital approach focused on the individual and knowledge management directed this focus towards group dynamics and related processes that deal with social capital.

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[46] Prusak , 2001.

[47] Prusak , 2001.

[48] Prusak , 2001.

[49] Prusak , 2001.

[50] Prusak , 2001.

[51] Prusak , 2001.

[52] Prusak , 2001.

[53] Information technology, according to Prusak, focuses on infrastructural issues such as efficient data and information transfer, whereas information management is concerned with value/utility of information available from a customer satisfaction point of view.

[54] Prusak , 2001.

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1.2.3 Organisational knowledge management literature is diverse

The knowledge management discourse is, however, littered with so many frameworks, theories and conceptualisations that it is pertinent, at this early stage, to delimit what the study considers to be knowledge management literature. From the onset, it has been acknowledged that knowledge management is a discipline with diverse roots in different theoretical disciplines. Hinton bluntly laments the fact that

> Knowledge management over the past 10-15 years has become a rather prodigious breeder in the literature of information management, organisational development, business strategy, human resources, education, communication, and information technology. It has created its own pedigree with a plethora of publications, articles, courses and consultancies. Like a stud bull, knowledge management has produced enormously but has sometimes fallen short of expectations when quality has been exhausted by over-proliferation.[55]

An early attempt at classifying knowledge management literature understood it from the following perspectives: the need of knowledge management, what knowledge management demands, knowledge management practices, knowledge management and information technology, knowledge management processes, and the holistic nature of knowledge management.[56] Further research presented in *Understanding Knowledge Management: a literature review*[57] added two more perspectives: the 'intellectual capital' dimension[58] and the 'what knowledge management can do'[59] dimension and it seems the classes will continue to grow.

Another compilation of representative knowledge management literature articles is found in the *Twenty-Sixth International Conference on Information Systems*[60] presentation paper *Structurationist Review of KM Theories.* This list is given in Appendix 1. A systematic and

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[55] Hinton , 2003.

[56] Singh, Shankar, Narain, & Kumar , 2006.

[57] Anand & Singh, 2011.

[58] Rehman, Rehman, Rehman, & Zahid, 2011 citing Itami, 1987 and Stewart, 1997: Intellectual Capital is an intangible asset which includes technology, brand name, customer loyalty, goodwill and copyrights, etc. It is knowledge and information which create the value-added efficiency to create the wealth of corporations.

[59] Anand & Singh, 2011.

[60] Timbrell et.al, 2005.

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somewhat credible three stage methodology[61] was used to compile the list. The first stage involved using the following keywords: "knowledge", "knowledge management", "organisational learning", "organisational memory", and "organisational knowledge" to query leading journals[62] and international conference proceedings as well as browsing titles and abstracts of relevant articles. The second stage involved a further search of related and/or similar articles based on the initial results. The last stage engaged an independent source to sift through the articles, group them and organise them[63] to produce the comprehensive list. The search was restricted to the year 1994 and onwards, there being widespread agreement that Nonaka's *A Dynamic Theory of Organisational Knowledge Creation* (1994) marked the beginning of the current wave of KM theorising[64]. However, since the list was produced in 2005, important developments have occurred in the field of knowledge management. Firstly, the Cynefin model[65] and its associated complexity theory has gained acceptance as a viable knowledge management theory and secondly, Firestone & McElroy's *New Knowledge Management* approach presented through their *Open Enterprise*[66] conceptualisation has added a different dimension to knowledge management thinking. This list surprisingly omits Boisot's well documented 'I-Space'[67] model which elaborately explains how organisations can benefit from understanding and managing their knowledge assets.

It is understandable, therefore, that creating an agreeable list or taxonomy of articles that can be conceived as representative and inclusive of all ideas in knowledge management is akin to shooting at a moving target. What is crucial, however, is to identify well-documented and

[61] Webster & Watson, 2002.

[62] A comprehensive list of this presentation's methodology and the list of all the journals and articles that were queried is found in Timbrell et al. *(*2005: 53): *Twenty-Sixth International Conference on Information Systems.*

[63] Timbrell et al, 2005.

[64] Timbrell et al, 2005.

[65] Kurtz & Snowden, 2003: "the Cynefin framework originated in the practice of knowledge management as a means of distinguishing between formal and informal communities, and as a means of talking about the interaction of both with structured processes and uncertain conditions".

[66] In the context of this thesis, the Open Enterprise is viewed as a variant of Knowledge Management theory, which stresses the importance of *using* Knowledge Management to *enhance* knowledge production in organisations, not just knowledge sharing or integration.

[67] The I-Space is a framework developed by Boisot that focuses on knowledge flow-through as social learning process. It emphasises the degree of structure of knowledge (i.e. its level of codification and abstraction) and illustrates its diffusibility as it moves around the social learning cycle.

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renowned theories[68] or frameworks that are representatives of distinct fields that have contributed to knowledge management.

1.2.4 Key theorisations in knowledge management thinking

The current wave of knowledge management theorising is credited to Nonaka's ground-breaking article that introduced the 'knowledge-creating company' notion, which, in its time, focused largely on product evolution. A second major field seen as contributing to knowledge management is that of information management because of technology's ability to analyse and discover patterns in large amounts of data. Though there are many theories emerging from this sector, most of them are 'systems processing' concepts and cannot pass as credible organisational management conceptualisation. Boisot's I-Space framework, however, observes information from an enriching conceptual viewpoint that includes insights into technological innovation, competitive advantage, cultural studies and organisational learning. Thirdly, the notion of organisational learning is important in organisational knowledge studies as there seems to be a realisation that for organisations to be competitive they need to learn how to do things differently. Crossan, Lane & White present a comprehensive '4I' framework that explains how individual intuitions end up solidifying as organisational practices. Fourthly, system thinking is an organisational management school of thought which views an organisation as an integrated whole whose sum cannot be reduced to its constituent parts. A considerable amount of management literature based on systems thinking is available, but Dave Snowden's Cynefin framework[69] has gained prominence in the context of organisational knowledge management thinking, as it examines the behaviour of organisations in conditions of uncertainty and disorder. Lastly, there is an emergent thought in knowledge management circles, championed by Firestone & McElroy, commonly referred to as the 'New Knowledge Management' and presented under the auspices of an organisational 'Open Enterprise' architecture. The Open Enterprise calls for a strategic rethink of the foundations of the field of knowledge management that is based on viewing organisations as complex adaptive systems and the need to subject organisational knowledge management processes to logical evaluation and scrutiny.

[68] In the context of this study the term "theory" is used loosely to denote a piece of literature or framework. It is not confined to the strict definition of the term as it is used to define a theory.

[69] Kurtz & Snowden, 2003: the Cynefin framework originated in the practice of knowledge management as a means of distinguishing between formal and informal communities, and as a means of talking about the interaction of both with structured processes and uncertain conditions.

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1.3 Problem statement

The underlying and tempting assumption when reading knowledge management literature is to think that hierarchy is an undesirable thing in the context of knowledge management thinking. Nonaka, who is credited with heralding the current line of organisational knowledge management, prefaces his article *The Knowledge Creating Company* by ridiculing conventional Western hierarchical and structured business methodology. This Western view of organisational knowledge, according to Nonaka, only recognises formal, systematic, quantifiable data and resultantly the metrics for measuring organisational knowledge are similarly 'hard' as they take the form of efficiency, lower costs and return on investments. At first reading, Nonaka seems to profoundly dislike the notion of hierarchical and structured forms of organising, as he spells out organisational values that are consistent with his Knowledge Creating Company. '*In the knowledge creating-company, inventing new products is not a specialised activity - the province of R&D department, marketing department or strategic planning... everyone is a knowledge worker*'.[70]

Interestingly, a study on organisations as social hierarchies showed that

> hierarchies can be seen, understood, remembered, and learned faster and easier than other types of relationships. This fluency may draw people toward hierarchies, encouraging people to be a part of them and even create them, and then lead people to actually like hierarchies[71].

A cursory inspection of knowledge management theorists such as Firestone & McElroy and Nonaka creates an impression that hierarchy is an undesirable concept in organisational setups and shouldn't be discussed in the same context with notions such as knowledge management, complexity and innovation. Other organisational and social scientists such as Zitek & Tiedens[72] and Lane, however, are still of the opinion that the concept of hierarchy represents a way and order of understanding things and should not be easily and conveniently ignored. As Lane argues:

> "hierarchy" should occupy a central position in this cluster of concepts around complexity. At first sight, it might seem strange to put hierarchy

[70] Nonaka & Takeuchi, 1995.

[71] Zitek & Tiedens, 2012.

[72] Zitek., & Tiedens, 2012.

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> together with concepts like bottom-up emergence, networks or distributed control; however, like complexity, hierarchy partakes of several meanings, and the relation among these meanings – as well as the relation between them and the concepts associated with complexity – may yield productive and deep connections that make an apparent contradiction seem trivial by comparison[73].

The notion of hierarchy seems still to be central, even in organisational knowledge management thinking, to such an extent that it should not be opposed without consideration. This situation calls for a detailed exploration of its meaning and an understanding of how the concept is used in knowledge management thinking. A starting point could be accepting Simon's assertion that hierarchy is the key to understanding the organisation of complexity[74]. This thesis proceeds on the assertion that the notion of hierarchy is very much alive and still central to knowledge management thinking, contrary to surface perceptions which imply that knowledge management attempts to do away with it.

Two critical questions that need to be answered in order to successfully address the assertion are: What is the meaning of hierarchy in organisational science? And what is the position of knowledge management on the notion of hierarchy? The aim of this thesis is to explore and bring to light the variety of ways in which the notion of hierarchy exists in knowledge management thinking. It does not focus on criticising or endorsing hierarchical forms of organising, but rather acknowledges that the notion of hierarchy may have diverse meanings in organisational science and seeks to establish knowledge management's position on the notion.

1.4 Research method

So far it has been suggested that knowledge management thinking views hierarchy as an undesirable concept in organisational setups. A counter-proposal was given that the notion of hierarchy is, in fact, a way of looking at things and should not be discarded without caution, even in knowledge management thinking. That line of thinking leads this thesis into the domain of theoretical analysis.

In attempts to understand underlying concepts in theoretical works, several approaches are

[73] Lane, 2006
[74] Simon, 1973, in Pattee, 1973

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available, but the two tempting, in the context of this thesis, are the typological approach and the taxonomical approach. Typologists generally follow the logic of ideal types, accentuating key characteristics so as to draw a priori distinctions[75]. In the context of this thesis, such an approach would involve looking at knowledge management theory and trying to find a kind of 'hierarchical type' for it. The other alternative, the taxonomical approach, uses empirical classification based on multivariate analysis of multiple dimensions that may cover structures, processes, strategies, and contexts[76]. The taxonomical approach, in the context of this thesis, would involve creating classificatory categories of knowledge management works based on certain predefined types of hierarchy. The merits of creating a typology or a taxonomy on a social phenomenon is that by identifying similarities and differences among organisational elements, a basis for the explanation, prediction, and scientific understanding of a number of organisational phenomena such as structure, effectiveness, managerial behaviour, strategy, organisational change, and a host of other factors can be provided[77]. These approaches, though tempting, are not considered as viable options in the context of this thesis because the merits of such processes are questionable in that they suggest the existence of ideal types and sometimes lead to the proliferation of fuzzy frameworks which are characterised by pseudo theories formed by causal induction instead of rigorous deduction from theory[78]. A more open ended, analytical and interpretive approach is therefore considered.

An interpretive approach is explained by Bhattacherjee as follows:

> If they (the researchers) believe that the best way to study social order is through the subjective interpretation of participants involved, such as by interviewing different participants and reconciling differences among their responses using their own subjective perspectives, then they are employing an interpretivism paradigm" [79]

The procedure of this research does not involve carrying out interviews but focuses on selecting classical instances in knowledge management theory where the notion of hierarchy

[75] Meyer, Tsui & Hinings, 1993

[76] McKelvey, 1975

[77] McKelvey, 1975

[78] Meyer, Tsui and Hinings, 1993.

[79] Bhattacherjee, 2012

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is evident to prove its existence in knowledge management thinking. This approach is subjective as it relies on the researcher's own interpretation of the theory. While this may seem to be a disadvantage, it can be also argued that analysing social theories and processes is an inherently subjective act and not a statistical science. The aim is to demonstrate that the notion of hierarchy is prevalent in knowledge management and, as such, a reasoned argument is more informative than a list of statistical charts.

1.5 Structure of the argument

There are several ways of thinking about hierarchy and to fully address the notion of it being very much alive in knowledge management thinking, four critical steps are considered in the analytic and interpretive argument put forward.

Firstly, a delimitation of what constitutes organisational knowledge management theory has to be done. The selection of what qualifies as knowledge management literature can be contentious because the field of knowledge management has been observed to be a breeding ground for a multiplicity of theories and frameworks. A credible compilation of representative knowledge management literature articles is found in the *Twenty-Sixth International Conference on Information Systems*[80] presentation but, as has been discussed, identifying an agreeable list is an unachievable task. The previous discussion identified five key theorisations in knowledge management thinking and, for the purpose of this thesis, insights regarding knowledge management will be largely drawn from concepts presented in those theorisations. Table 1.1 summarise the relevant articles. The focus of this thesis, as has been implied, is not on conducting an exhaustive inspection of every knowledge management article ever written, but to select classic instances that establish a case for the existence of the notion of hierarchy in knowledge management thinking.

[80] Timberall et al. (2005).

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Table 1. Key articles in knowledge management thinking

Author	Concept	Article
Nonaka (1991) + Takeuchi (1995)	The Knowledge Creating Company	A Dynamic Theory of Organisational Knowledge Creation
Crossan et al. (1999)	4I Framework	An Organisational Learning Framework: From Intuition to Institution
Kurtz and Snowden (2003)	Cynefin Framework	The New Dynamics of Strategy-Sensemaking in a Complex and Complicated World.
Boisot, M.H. (1998)	The I-Space Framework	Knowledge Assets: Securing Competitive Advantage in the Information Economy.
Firestone & McElroy (2003)	The Open Enterprise	The Open Enterprise: Building Business Architectures for Openness and Sustainable Innovation

Secondly, an attempt to frame and put into context what is meant by the term "hierarchy" has to be made, as the term may have several meanings and limiting its context may become a misleading oversimplification. The second chapter focuses on that discussion to a large extent.

Thirdly, an analysis of each knowledge management theory explaining its position on the notion of hierarchy needs to be done. Establishing a knowledge management theory's position on an issue such as hierarchy can be done in two ways. Firstly, an observation can be made on the theory's prescriptions regarding hierarchy. If a theory directly spells out why a hierarchy is important, then such prescriptions can be treated as its position on the notion of hierarchy. An alternative method involves analysing how a theory is constructed or accomplishes its argument and noting insightful implications regarding the notion of hierarchy.

Consequently, a conclusion may be drawn stating whether the notion of hierarchy is consistent or incompatible with knowledge management thinking. The structure of the argument can thus be summarised in the following steps: (a) define knowledge management; (b) define hierarchy; (c) analyse knowledge management theory, noting instances of hierarchy; and (d) draw insightful conclusions.

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1.6 Layout of thesis

The remainder of this thesis proceeds as follows:

Chapter 2 explores the notion of hierarchy by tracing the historical origins of the word and exploring how it has found multiple meanings in the context of society and organisational science.

In Chapter 3 the notion of hierarchy in knowledge management theory is explored and analysed using a selection of classical knowledge management literature to draw insights into knowledge management's position on the notion of hierarchy.

Chapter 4 concludes this thesis by restating the multiple meanings of organisational hierarchy and discussing their implications for knowledge management thinking.

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Chapter 2

Organisational Hierarchy

2. Introduction

This chapter explores the history, meaning and conceptualisation of the term "hierarchy". It is acknowledged that the term has diverse usages, but the study tries to focus on those aspects that have social and organisational relevance. Four such interpretations emerge, in which hierarchy is understood as an organising phenomenon, a cultural value phenomenon, a systemic issue and an organisational sensemaking phenomenon.

2.1 Definition

The dictionary explanation of the term "hierarchy" as a noun refers to a "system in which members of an organisation or society are ranked according to relative status or authority"[81]. The term could also refer to the clergy of an Episcopal church such as the Catholic Church or the upper echelons of a socially ordered system[82]. A different meaning could also be attached to the term that implies an "arrangement or classification of things according to relative importance or inclusiveness"[83]. Crucial themes that seem to recur in the definitions of hierarchy are the concept of subordination of one element to another and an arrangement or a classification of those elements. The underlying meanings of 'subordination', 'arrangement' and 'classification' in the concept of hierarchy hint at a term that could have a diverse parentage worth exploring.

2.2 The origins of the notion of hierarchy

The origins of the word "hierarchy" date back to the 6th century. The word was formed by

[81] Oxford English Dictionary

[82] Oxford English Dictionary

[83] Oxford English Dictionary

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Pseudo-Dionysius the Areopagite[84] who combined two Greek words, namely *hieros*, meaning "sacred", and *arkhia*, meaning "rule". At that time, the phrase translated to "the governance of things sacred"[85]. Its early usage in religious contexts implied subordination in the church as illustrated by levels that existed in the Clergy, ranging from priests to bishops[86]. The application of the word in the church caused controversy in ancient religion and was at the centre of the Protestant and Catholic discord, as Lutherian ideology argued that neither the Pope nor the bishops nor any man has the right to impose "even one syllable" on a Christian.[87]

In later civilisations, the use of the word "hierarchy" morphed from biblical prescriptions to include civic and societal existence and essentially become a human construct. As Saint Denis, according to the *Encyclopédie*, writes:

> In civil society there are different orders (ranks) of citizens rising one above the other, and the general and particular administration of things is distributed in portions to different men or classes of men, from the sovereign who rules everyone down to the mere subject who obeys[88].

Thereafter, the word dynamically assumed several meanings. Notable usage contexts included human settlement and town planning, societal classification, social class, psychology, and political and organisational setups[89]. The study focuses on those applications and meanings of the word that closely relate to organisations and social setups.

While there are multiple interpretations of the notion of hierarchy in modern times, four contexts of its use in organisational science are of interest in the context of this thesis. The first is what Pumain associated with control, order and subordination and exemplified by obedience- and dependence-based relationships such as employer and employee. Such an interpretation is also closely linked to what Pumain described as the organisation of a set into

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[84] Corrigan & Harrington, 2011: "Pseudo-Dionysius, as he has come to be known in the contemporary world, was a Christian Neoplatonist who wrote in the late fifth or early sixth century CE and who transposed in a thoroughly original way the whole of Pagan Neoplatonism from Plotinus to Proclus, but especially that of Proclus and the Platonic Academy in Athens, into a distinctively new Christian context.

[85] Verdier, 2006.

[86] Verdier, 2006: citing Furetière, A., 1690, Dictionnaire Universel Contenant Généralement Tous Les Mots François…,Arnout & Reinier Leers, La Haye Et Rotterdam.

[87] Verdier, 2006.

[88] Verdier, 2006.

[89] Verdier, 2006.

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an ordered series of elements where each term is superior to the following according to some normative order. Used in this context, organisational hierarchy appeals to the act of organisational management and task coordination as outlined in the prescriptions of renowned organisational theorists such Weber and his bureaucratic organisation.

The second conceptualisation of hierarchy applies to organisational forms based on cultural types, where different levels may correspond to various degrees of power, influence, social status or information[90]. One such conceptualisation is the Competing Values Framework[91] which identifies four competing cultures that determine the form an organisation may take such as a hierarchy, a clan, a market or an adhocracy. A detailed explanation of these organisational forms will be presented later.

The third conceptualisation of the notion of hierarchy pertains to its application in the context of levels of social analysis. Social elements can be observed at three levels, the micro-level, the meso-level and the macro-level[92]. At micro-level, the focus is on particles and individual; at the meso-level are the subsystems made up of a variable number of individual elements; and at the macro level is the system itself which is a collection of subsystems exhibiting some durable and recognisable properties to be treated as a unit[93]. A refinement of this notion of a level hierarchy is the 'sensemaking-levels'[94] concept conceived initially by Wiley[95], who realised that in the context of sensemaking, there are three levels above the individual, namely the inter-subjective, the generic subjective and the extra-subjective[96].

The fourth interpretation of hierarchy is rooted in systems theory. Systemic hierarchy is seen as integrative and is based on the idea that all phenomena are interrelated yet independent. Systems are made up of sub-systems and form part of a larger system. Each system, however,

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[90] Verdier, 2006.

[91] Berrio, 2003: The Competing Values Framework refers to whether an organization has a predominant internal or external focus and whether it strives for flexibility and individuality or stability and control and assesses the dominant organisational culture based on four culture types: Clan, Hierarchy, Adhocracy, and Market.

[92] Johnson, 2008

[93] Pumain, 2006.

[94] Weick, 1995: Sensemaking is a complex and widely-theorised field of organisational science focusing on how organisations and individuals create reality by making retrospective sense of the situations in which they find themselves.

[95] Wiley, 1988.

[96] A detailed explanation of the inter-subjective, generic subjective and the extra-subjective will be attempted later.

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exhibits properties that do not exist at lower levels within the hierarchy[97].

The four conceptualisations of hierarchy, namely the control hierarchy, the culture value hierarchy, the systemic hierarchy and sensemaking levels hierarchy are discussed in detail below.

2.3 Control hierarchy

The most common understanding of the notion of hierarchy as used in organisational setups applies to the notion of who gives orders to whom[98]. In this use "hierarchy refers to a control system in which every entity has an assigned rank, and all power is concentrated in the entity with the highest rank"[99]. Morgan gives an interesting account of this control hierarchy, which he metaphorically views as machine-based or mechanical thinking.

2.3.1 Origins of the control hierarchy in organisations

The word "organisation" originated from Greek, where its root *organon* meant a tool or instrument[100]. Morgan suggests that organisations are formed to be tools or instruments for achieving particular ends. The notion of mechanisation originated in the production factory as Morgan argues that organisations had to morph into machine-like entities in order to effectively cope with the industrialisation that came with machinery. The quest for efficient production based on a mechanised way of doing tasks brought with it the 'division of labour' principle, and in 1801 Eli Whitney publicly demonstrated that guns could be built from piles of separate components[101]. Another development that contributed to industrial mechanisation was Charles Babbage's difference engine[102] which practically demonstrated that mechanical tasks could be automated and set to be done by a machine[103]. Babbage also began to emphasise the importance of planning and division of labour.[104]

The mechanisation of the working environment brought with it mass production and, as a

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[97] Jackson, 2003

[98] Lane, 2006.

[99] Lane, 2006.

[100] Morgan, 2006.

[101] Wren & Bedeian, 2009.

[102] Wren & Bedeian, 2009: The difference engine, built by Charles Babbage, is a mechanical calculator designed to tabulate polynomial functions, and its follow-up model, the analytical engine, demonstrated that mathematical calculations could be automated and done by a machine.

[103] Morgan, 2006.

[104] Morgan, 2006.

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result of Frederick Taylor's works, the control hierarchy began to take pre-formative shape. Using the concept of 'task-management system', Taylor had realised that all work could be timed, with a performance standard set for each piece of work. The task of organising was therefore to select the best person for the task[105]. Work-timing and performance standards monitoring placed a new demand on organisational management: that of ensuring that standards were met[106]. Taylor's proposal was to introduce functional foremen who were to be the link between top management and shop-floor workers. As the concept gained widespread industrial acceptance, the notion of an organisation as functional layers of workers in which the one who is 'on top' controls his/her subordinates was emerging.

If the control hierarchy could be said to have emerged in the time of Taylor, it certainly solidified into an organisational way of life during the times of two prominent organisational scientists, French industrial engineer Henri Fayol and German economic-sociologist Max Weber[107]. Henry Fayol, in the 1870s, proposed 14 principles[108] that he considered to be important in effective organisational management. They are:

- Division of work
- Authority
- Discipline
- Unity of command
- Unity of direction
- Subordination of individual interest to general interest
- Remuneration
- Centralisation
- Scalar chain (line of authority)
- Order
- Equity
- Stability of tenure of personnel
- Initiative
- Esprit de corps

The 14 principles could all be viewed as enhancing the process of organisational control, but authority, unity of command, subordination, and scalar chain speak directly to the notion of control hierarchy.

[105] Wren & Bedeian, 2009.

[106] Wren & Bedeian, 2009.

[107] Wren & Bedeian, 2009.

[108] Wren & Bedeian, 2009

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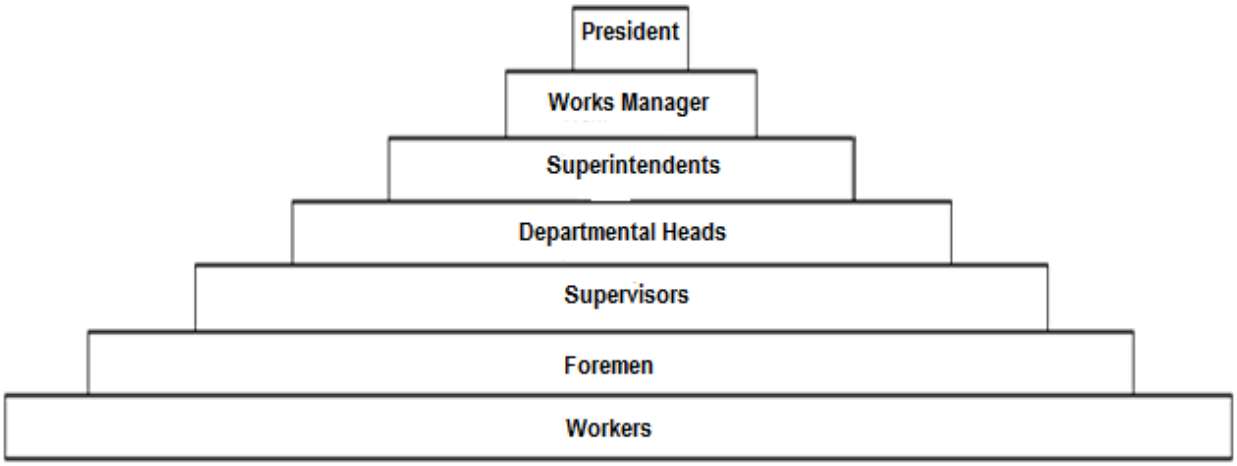
Authority deals with the "right to give orders and the power to exact obedience"[109] and can be formal, as defined by office rank, or it can be personal, deriving from an individual's superior "intelligence, experience, moral worth, ability to lead, past services etc."[110] The 'unit of command' principle implies that every employee has to receive an order from one and only one superior, as no one can serve two masters. Closely linked to the unit of command is the notion of a scalar chain in which the line of authority from the top-most to the lowest position in the organisation has to be used as a channel for communication and decision-making.[111] Lastly, subordination of individual interests to the general interest directs workers to abolish self-interest, as it would create a conflict of interests between organisational objectives and individual objectives[112]. Fayol's organisational hierarchy is typically illustrated in his gangplank.

Figure 1 Fayol's gangplank



[Source: Adapted][113]

Fayol's gangplank shows a typical control-based hierarchy in which the president is the source of absolute authority and a typical scalar chain of commands runs down the president, works manager, superintendent, head of department, supervisor, foreman and lastly the workers.

Max Weber's bureaucracy was, ironically developed as a reaction against administration by

[109] Wren & Bedeian, 2009 citing Fayol. Translations by Strorrs, 1949
[110] Wren & Bedeian, 2009 citing Fayol. Translations by Strorrs, 1949
[111] Morgan, 2006.
[112] Wren & Bedeian, 2009.
[113] Wren & Bedeian, 2009.

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personal and subjective judgements of individuals such as monarchies and dictatorships. The concept set out to develop a system of organisational management where government was by bureaus[114] that were independent (without personal interest in the task) and competent for the task.[115] It is ironic that the usage of the term "bureaucracy" is now associated with "red tape, endless lines and rule encumbered inefficiencies"[116] because Weber's original conceptualisation was that of an ideal (hypothetical) organisation-based legal authority as opposed to charismatic or monarchical and inherited authority[117]. In the context of Weber's bureaucracy, authority belonged to the position and not the person who was holding that position.

Weber prescribed six characteristics of what he termed the ideal bureaucratic organisation. They are: Division of labour, Managerial-hierarchy, formal selection, career orientation, formal rules & controls and impersonality[118]

All characteristics of Weber's bureaucracy were set to improve the efficiency of the organisation and, for such efficiency to occur, a managerial hierarchy had to be put in place to facilitate a clear chain of command from the highest echelons of the organisation to the lowest in a process similar to Fayol's scalar chain principle[119]. A bureaucracy had to have formal rules and controls that were impersonal and uniformly applied, resulting in clear levels of authority in organisational setups.

It is important to note that, although Weber's prescriptive approach may loosely associated with the typical 'machine image'[120] of an organisation conceptualised by Morgan, it was not Weber's intention to create such an organisation. Weber's goal was not perfection but systemisation − moving managerial practice and organisational design towards more logical ways of operating[121]. The control hierarchy is included in this thesis because it allows for the

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[114] Wren & Bedeian, 2009: A government by bureau implies an independent and competent agency or branch of a government.

[115] Wren & Bedeian, 2009).

[116] Wren & Bedeian, 2009

[117] Wren & Bedeian, 2009

[118] Wren & Bedeian, 2009

[119] Wren & Bedeian, 2009

[120] A metaphorical view of organisations as possessing machine-like qualities allowing organisational processes to be designed and operated in a mechanistic and predictable fashion.

[121] Wren & Bedeian, 2009

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inspection of organisational knowledge management from the physical design side of organisational setups.

2.3.2 The control hierarchy in context

Rajan & Zingales[122] understand this controlling approach in the context of the economics of organising. They suggest that a physical hierarchal organisation of organisational workforce into, for example, worker, supervisor, and manager, is necessary to protect an entrepreneur's economic rent[123]. A control hierarchy ensures that at no point will a particular employee along the hierarchy possess all the competences and 'know-how' in the organisation and be tempted to go it alone[124]. Each level of organisational structure has specialised skills that the others do not have and, as such, a continual need for each other is created. This view of the control hierarchy could be understood in similar terms to those used by Weber's bureaucracy and other organisational management scientists like Taylor, whose aim was to have a physical strata of organisational structures in which there is a rank order of individuals within the organisation.

The control hierarchy can also be understood in the context of Evan's work, who started to doubt the iron rule that organisational hierarchy was a functional necessity. The study that Evan undertook sought to empirically establish whether there were degrees of variation in hierarchical structures of organisation. To facilitate such a measurement, Evan went on to establish indicators (symptoms) of hierarchy in the organisation. Evan argued that organisational hierarchy could be measured and framed in terms of three main properties: skills, rewards and authority[125]. These properties are multifaceted and crucial to this thesis and thus need further exploration. Firstly, hierarchy in organisations can be understood and framed in the context of the differentiation of skills within the organisation where junior employees at the lower rungs could be construed as having fewer skills compared to their senior counterparts[126]. The degree of deviation from such a distribution might prove to be a measure of hierarchy. The second and most readily quantifiable measure of the hierarchy of rewards in an organisation is a comparison of the salaries and wages received by people in

[122] Rajan & Zingales, 2001.

[123] The notion of economic rent is used loosely to imply the profits accruing to an investor after investing in labour.

[124] Rajan & Zingales, 2001.

[125] Evan, 1963

[126] Evan, 1963

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different positions[127]. The hierarchy of authority refers to structures in which influence, control, power, dominance, status, and value are differentiated among individuals[128] and has six indicators[129] within it, namely, span of control, levels of authority, ratio of administration to production[130], degree of centralisation, time-span of discretion[131], and decision autonomy.

2.3.3 Control hierarchy in the modern organisation

A recent manifestation of the hierarchy of control in organisational science can be viewed in Elliott Jaques' *Requisite Organization*[132], which is a guideline in the design of organisations based on positions and compensation systems. Most importantly, however, the requisite organisation conceives a hierarchy of levels based on orders of complexity, and the idea that the 'time span of discretion' at each level reflects the complexity of the managerial job[133]. The 'time span of discretion' concept is based on the reasoning that the higher an employee is on the organisational level the more time he/she is afforded to make and effect a decision. An example commonly given is that the Chief Executive Officer of a major firm may be given 15-20 years to implement a decision, while a junior staffer's time span discretion may be several days to a few weeks. Consequently, the requisite organisation has distinctive time spans of discretion for each hierarchical level in the organisation as illustrated below. The number of levels usually depends on the complexity of the organisational tasks and the nature of the organisation because more than six levels in an organisation are usually too many, while fewer may simply not be enough. Smaller companies can operate with four or five levels, very large companies with seven or even eight.[134]

Shepard & Fowke derive a stratified diagram comparing three corporations operating in cancer control, hi-technology and human resources consultancy services. In the table they illustrate the time span of discretion that would be expected of the various hierarchical levels in each organisation.

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[127] Evan, 1963

[128] Zitek & Tiedens, 2012.

[129] Evan, 1963

[130] Melman's ratio of administration to production analyses the ratio of administrators to workforce. It generally indicates by how much support workers exceed the productive workforce.

[131] Jaques used the concept to describe a measure of how much responsibility an employee has in a hierarchy. It is premised on the principle that the higher the person is in a hierarchy the longer he can work to complete a task without supervision.

[132] Shepard & Fowke, 2001.

[133] Shepard & Fowke, 2001.

[134] Shepard & Fowke, 2001.

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Jaques' time span of discretion creates a hierarchically-based organisation that, at face value, may not seem to subscribe to the tenets of Weber, Taylor or Fayol, but in essence uses subtle indicators of time span of discretion to cleverly recreate the concepts of a control hierarchy. The control hierarchy notion is mechanistic in nature and seems to observe a hierarchy from hard and measureable parameters (e.g. time span, levels of authority, remuneration) to such an extent that other organisation scientists have opted to view the facet of hierarchy in organisation from a cultural perspective.

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Table 2 Application of Jaque's time span of discretion hierarchy

Time Span of Discretion			Associated Job titles		
TITLE	**TIME SPAN IN YEARS**	**LEVEL**	**CANCER PREVENTION AND CONTROL**	**HI-TECH GROWTH BEYOND STARTUP**	**PROFESSIONAL COMPANY H.R. CAPACITY**
Corporate CEO	10-20	**6**	Deputy Minister		President and CEO
Business Unit President	05-10	**5**	Assistant Deputy Minister	CEO	Divisional Vice Presidents
General Manager	02-05	**4**	Director General	Vice-Presidential Support Needed	Unit General Managers
Mid-Manager	01-02	**3**	Director of Bureau	High Potential Twenty Somethings	Senior Project Professionals Training Director
First Line Manager	3 Months – 1 year	**2**	Chief of Division or Senior Professional	Designers, Programmer	Project Professionals
Operator, Worker, Clerk	1 Day to 3Months	**1**	Junior Professional	Coders, Testers	Foremen, Workers

[Source][135]

[135] Shepard & Fowke 2001.

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2.4 Cultural value hierarchy

An alternative approach to understanding organisational hierarchy is to consider the way the term is used to describe organisational types. In this context, the term is used to distinguish a particular type of organisation that is focused on internal control, structure and stability. The difference between an organisational hierarchy viewed in terms of control and an organisational hierarchy viewed in terms of culture can be viewed in the context of Morgan's machine and culture metaphors. While the 'machine' image looks at the bare rules and regulations that shape an organisation into a hierarchy, the cultural metaphor looks at manifestations of beliefs, values and ideologies that are at the heart of organisations and influence how individuals behave and view the behaviour of other members[136]. Culture has the potential to shape the form of the organisation as Morgan claims that the samurai culture[137] in Japanese societies enabled Japanese companies such as Matsushita to create an organisation that prized employee protection, service and accepting one's place in and dependence on the overall organisation[138]. Several organisational typologies[139] exist in the field of organisational science, but this section focuses on crucial insights from Cameron & Quinn's Competing Values Framework[140] organisational types.

2.4.1 The competing values typology

The Competing Values Framework (CVF) was originally designed by Quinn and Rohrbaugh (1983) and uses two dimensions, namely 'organisational focus' and 'preference for structure' to unearth the underlying organisational culture[141]. The organisational focus dimension examines the extent to which an organisation is internally or externally focused. The preference for structure dimension analyses the emphasis the organisation places on either flexibility or control[142]. The result is a quadrant with four regions, each representing a distinct one of the following organisational culture types: hierarchy, market, clan, and

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[136] Bush, 2003.

[137] "Samurai" implies men of service to society.

[138] Morgan, 2006.

[139] Another popular such typology is Mintzberg's typology which has six organisational forms, with the machine bureaucracy (hierarchy) on one end and the adhocracy on the other extreme end. They are as follows: Machine Bureaucracy, Professional Bureaucracy, Division Organization, Adhocracy.

[140] The competing values framework.

[141] Cameron & Quinn, 2005.

[142] Cameron & Quinn, 2005.

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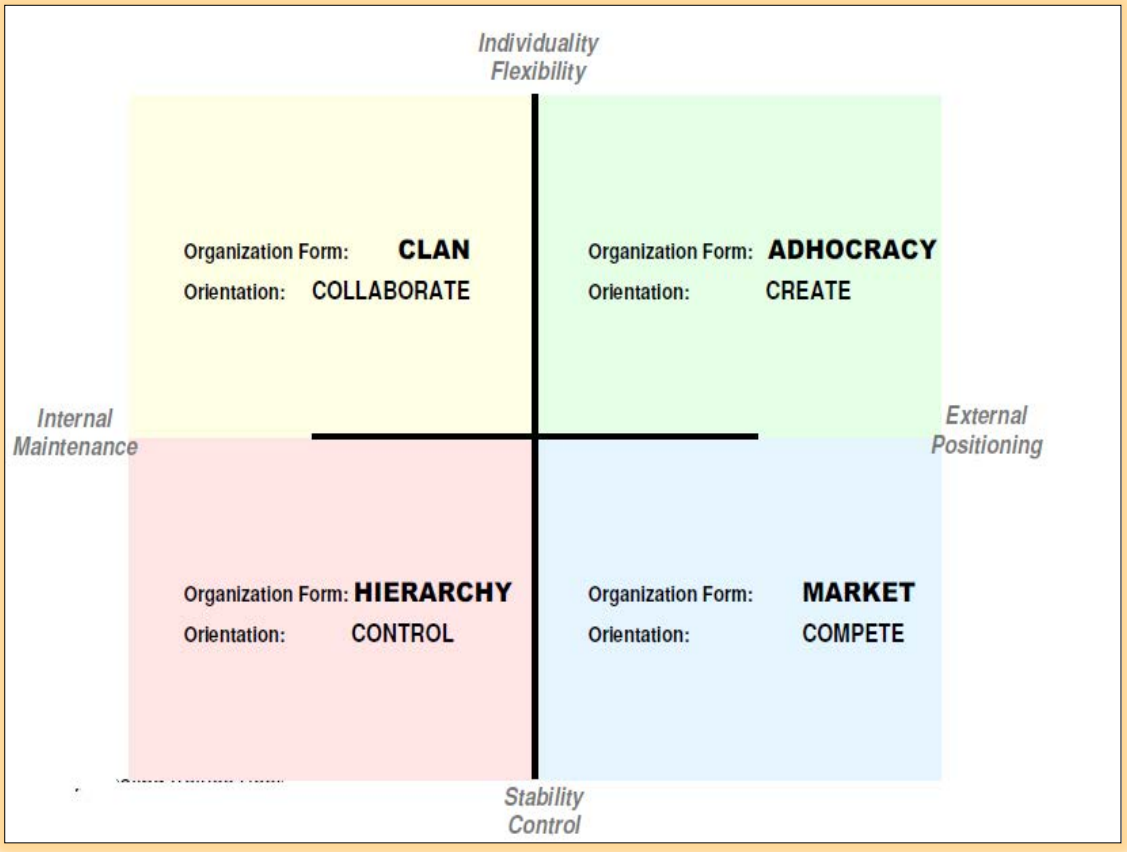
adhocracy (Figure 2). The framework has found usage in several business contexts such as strategy, planning and innovation analysis, but in this thesis, the focus is mainly on the framework's typological approach to organisational cultures.

2.4.1.1 The hierarchy organisational culture

A hierarchy organisational culture is characterised by a determined focus on internal stability, control and inward-looking posture[143]. Such organisations are dominated by assessing and measuring, controlling processes, structuring, efficiency improvement and quality enhancement[144], and are similar in conceptualisation to the control hierarchy discussed in the works of Weber, Taylor and other scientific management authors. The three other forms of organisational cultures are discussed below.

Figure 2: Competing Values Framework



[source][145]

[143] Cameron & Quinn, 2005.

[144] Cameron & Quinn, 2005.

[145] Cameron & Quinn, 2005.

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2.4.1.2 The adhocracy organisational culture

The notion of an adhocracy can be traced to the work of Bennis & Slater[146], who were trying to describe the emergence of a network of experts assembled for specific projects[147]. The adhocracy is described by Grudin as

> highly decentralized organisations of professionals deployed in small teams in response to changing conditions in dynamic, complex environments. The adhocracy is the organisational type that least adheres to traditional management principles, relying on constant contact to coordinate among teams.

The original idea of an adhocracy was to develop flexible organisations that could counter hierarchies that were seen as being too rigid and not flexible. The adhocracy culture is, therefore, externally oriented and supports a flexible organisational structure. It is normally discussed in issues around innovation, creativity, articulating future vision, transformation change and entrepreneurship[148].

2.4.1.3 The market organisational culture

The market culture has its roots in the economic principle of 'Pareto Optimality'[149], which essentially entails that it is economically impossible to make someone better off without making someone else worse off[150]. The culture is therefore based on the principle of competition for the limited benefits. The Competing Values Framework views market structured organisations as externally focused with a heavy inclination towards stability. Attributes of a market organisational culture are competitiveness, fast response, decisiveness, driving through barriers, and goal achievement[151]. It is evident that, from a hierarchical analysis point of view, a market organisation has to have stable organisational structures that enable it to build the efficiencies required of it to compete.

2.4.1.3 The clan organisational culture

A clan, in the organisational context, should be understood in the context of sociologist

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[146] Bennis & Slater 1964,.

[147] Dolan, 2010.

[148] Cameron & Quinn, 2005.

[149] Pareto optimality, an economic and income distribution concept originating from the works of Italian economist Vilfredo Pareto, is based on the allocation of resources in which an argument is put forward implying that it is impossible to make any one individual better off without making at least one individual worse off.

[150] Adler, 2001.

[151] Cameron & Quinn, 2005.

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Durkheim's illustration of an organic association which resembles a kin network but does not involve blood relations[152]. In a clan, culture is based on collaborative relationships and relationships in such an organisation are negotiated. The clan culture type is internally oriented and is reinforced by a flexible organisational structure. It addresses issues of teamwork, collaboration, talent management, empowerment, and inter-personal relationships[153].

2.4.2 Cultural value and organisational forms

The Competing Value Framework is an interesting phenomenon in studying organisational forms as it spells out dominant formats that an organisation can morph into, depending on what values it prioritises. Organisations obsessed with control will naturally morph into hierarchies and bureaucracies, competitive organisational setups result in market types of organisation, creative organisations take an 'adhocratic' form and organisations that operate on the basis of individual talent and brilliance gravitate towards the clan form.

The organisational culture facet allows this thesis to view the notion of hierarchy in the context of describing a particular type of organisation based on a culture of control, internal focus and regulation. The thinking behind the Competing Values Framework was, however, criticised in a recent study by Hartnell, Ou, & Kinicki[154], who suggested that a co-existential and complementary relationship existed between the supposedly competing culture types.

The cultural value hierarchy dimension of organisational analysis is crucial in analysing knowledge management thinking because it allows for the notion of hierarchy to be illustrated from the perspective of cultural types and practices existing in organisational setups.

2.5 Organisational sensemaking levels hierarchy

A third way to examine the notion of hierarchy as it applies to social setups such as organisations is to pursue Wiley's distinction of abstract levels inherent in the organisation that are based on the notion of organisational sensemaking.

2.5.1 The essence of sensemaking

Sensemaking is an organisational theorisation that deals with how individuals construct

[152] Adler, 2001

[153] Cameron & Quinn, 2005.

[154] Hartnell, Ou, & Kinicki, 2011.

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meanings out of their realities. Extensive coverage on the subject is found in the works of Weick[155]. Among the many definitions of sensemaking the following one, by Weick, is simple but encompassing. Sensemaking is the "reciprocal interaction of information seeking, meaning ascription, and action".[156] The notion of sensemaking is also viewed as involving the development of cognitive maps necessary for individuals to cope with the environment[157] and, most importantly, sensemaking is about the way people generate what they interpret[158]. According to Turner, to engage in sensemaking is to construct, filter, frame, create facticity and render the subjective into something more tangible[159]. Weick identified seven properties that "serve as a rough guideline for inquiry into sensemaking", involving "what it is, how it works and where it can fail". The seven properties of sensemaking inform that it is:- grounded in identity construction, retrospective, enactive of sensible environment, social, on-going, focused on & by extracted cues and driven by plausibility rather than accuracy [160].A brief explanation of the seven properties of sensemaking is as follows. 'Identity construction' deals with understanding the multiple selves that exist in an individual. It is this array of selves that enable an individual to extract frames that they can impose on a situation in order to generate meaning[161]. The 'retrospective' deals with analysing the meaning of lived experiences[162]. Sensemaking involves action and people actively create ('enact') the "materials that become the constraints and opportunities they face"[163]. Sensemaking as an activity cannot be restricted to the individual. It is a 'social' process in the sense that constructing and sharing meaning is done inter-subjectively through a common language used in everyday social interaction[164]. The process of sensemaking is an 'on-going' activity and to understand it involves analysing how people chop moments out of continuous flows and extract cues from those moments[165]. Reality is wide and quick and as a result the process of sensemaking focuses on extracting 'minimal sensible cues' (pieces) from the stream of

[155] Weick, 1995

[156] Thomas, Clark & Gioia, 1993 in Weick, 1995

[157] Weick, 1995 citing Ring & Rands 1980.

[158] Weick, 1995

[159] Turner, 1987 in Weick, 1995

[160] Weick, 1995

[161] Weick, 1995

[162] Schultz, 1976 in Weick, 1995

[163] Weick, 1995

[164] Walsh & Ungson, 1991 in Weick, 1995

[165] Weick, 1995.

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reality. Such cues are then treated as representatives of the entire set from which they are extracted[166]. Lastly, the process of sensemaking is driven by 'plausibility rather than reality'; implying that people are likely to see what they believe as opposed to believing what they see[167].

Wiley noted the problem of dealing with the micro-macro[168] conceptualisation of social reality in the context of sensemaking, and introduced three other levels above the individual that are referred to as the inter-subjective, the generic subjective and the extra-subjective. An explanation of these levels follows.

2.5.2 Sensemaking levels

Sensemaking at the individual level involves "an individual who has thoughts, beliefs, feelings, desires, intentions etc." It is also called the intra-subjective level. The next level above the individual is the inter-subjective level, which is the level of social interaction at which actors create inter-subjective meanings. At the inter-subjective level, "meanings, thoughts, feelings and intentions are merged or synthesised into conversations during which the self gets transformed from the 'I' into 'we'"[169]. The level above interaction is the level of social structure. Organisations exist at this level[170]. Social reality is characterised by generic subjectivity[171]; selves are left behind at the interactive level[172]. A concept of a generic self emerges where individuals become fillers of roles and followers of rules[173]. The last level is the extra-subjective. It is viewed as the level of culture and of "symbolic reality"[174], and it is "conceptualised as an abstract idealised framework derived from prior interaction"[175]. In a knowledge management context, Cecez-Kecmanovic & Jerram, designed an organisational knowledge management typology by extrapolating the four sensemaking levels.

2.5.3 Knowledge management and sensemaking

[166] James, 1950 in Weick, 1995.

[167] Weick, 1995.

[168] The micro-macro level originally viewed social reality as existing at micro (the individual) and macro (the wider cultural) level. Wiley believed this created gaps in social reality.

[169] Weick, 1995.citing Linnell & Markova.

[170] Willey, 1988 in Weick, 1995.

[171] Cecez-Kecmanovic &. Jerram, 2002.

[172] Weick, 1995.

[173] Weick, 1995.

[174] Weick, 1995.

[175] Weick, 1995. citing Barley, 1986.

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Cecez-Kecmanovic & Jerram understood that the task of knowledge management is carried out by a different entity at each level. The model creates an organisational knowledge management typology with four levels, namely individual knowledge, collective level knowledge, organisational level knowledge and cultural level knowledge.

Figure 3 Knowledge and sensemaking levels perspective

[Source][176]

The framework puts individual knowledge at the intra-subjective level, involving a person's values, believes, assumptions, experiences, skills and so forth that enable the individual to interpret and make sense of the environment, his/her own actions and the actions of others.[177] At the inter-subjective level, they placed collective knowledge that deals with the way knowledge is understood in the context of shared meanings and mutually shared understanding[178]. Inter-subjective knowledge deals with knowledge sharing not within but between and among individuals[179]. Organisational level knowledge denotes generic meanings and social structures[180] and "includes notions of organisational structure, resources, roles, policies, norms, rules and control mechanisms, patterns of activities or actions, and scripts[181]

[176] Cecez-Kecmanovic & Jerram , 2002.

[177] Cecez-Kecmanovic & Jerram, 2002.

[178] Weick, 1976

[179] Ryle, 1949 cited in Cecez-Kecmanovic & Jerram , 2002.

[180] Cecez-Kecmanovic & Jerram , 2002.

[181] Barley, 1986 in Weick, 1995: scripts and plots are types of encounters whose repetition constitute the organisational setting's interaction order.

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or standard plots"[182]. Lastly, embedded cultural knowledge refers to stocks of tacit beliefs, assumptions, values and experiences that organisational members use to make sense of a situation and frame meanings from cues at all levels, be they individual, collective or organisational[183].

2.5.4 Hierarchy and sensemaking levels

It is prudent to note that the levels of sensemaking above the level of the individual should not be understood in a strict hierarchal order but as general descriptors of sensemaking, indicating how far each is displaced from the individual knowledge[184]. An issue that needs clarity is the inclusion of the notion of sensemaking as a dimension of organisational hierarchy. A valid argument could be a suggestion that sensemaking levels do not denote hierarchy in the strict interpretation of the word. However, limiting the meaning of term hierarchy to the ranks of organisational workers or organisational types as noted in the control-hierarchy and the cultural value hierarchy derivatives is a misleading oversimplification. Taking into consideration that the notion of knowledge management belongs to the abstract realm of intangibles, the sensemaking levels approach allows for knowledge to be domiciled to particular abstract levels within social setups such as the organisation. The notion of sensemaking, consequently, allows for a systematic and structured view of organisational reality in its social context and, in the process, fulfils the "arrangement or classification of things according to relative importance or inclusiveness"[185] dimension of the definition of hierarchy. Sensemaking levels allow for organisational knowledge to be understood from its lowest observable level, at the individual level to its highest possible level, the level of culture. An incremental hierarchy of knowledge is thus conceivable beginning with individual knowledge, followed by collective knowledge, organisational knowledge and finally societal knowledge which can be understood as cultural knowledge. This line of reasoning persuades the inclusion of the organisational sensemaking levels approach as a dimension of hierarchy existing in knowledge management thinking heeding a call by Weick that "there are ways to talk about organization that allow for sensemaking to be a central activity in the construction of both the organization and the

[182] Barley, 1986 in Cecez-Kecmanovic & Jerram , 2002.

[183] Cecez-Kecmanovic & Jerram , 2002.

[184] Cecez-Kecmanovic & Jerram , 2002.

[185] Oxford Dictionaries, 2010.

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environment it confronts"[186].

2.5 Systemic coupling hierarchy

The last conceptualisation of hierarchy to be discussed in this section is what Lane calls the "inclusion hierarchy" and will be loosely referred to as the "systemic coupling hierarchy" for the sake of clarity. The inclusion hierarchy refers to recursive organisation of entities[187] as the famous Chinese box image used by Simon illustrates. The Chinese box is a setup in which a box encloses a second box which in turn encloses another box[188]. The Chinese box image creates a systemically coupled hierarchy of inclusion type as a box is in itself nothing but other boxes[189]. This closely relates to the notion in systemic thinking where systems are nothing but an integration of other systems.

2.5.1 Key issues in systems thinking

Systems thinking has its roots in what Morgan describes as the "organism metaphor" and resulted from the need to move away from the 'closed system' conceptualisation of organisations that was prevalent in traditional management thinking. The concept of systems thinking is underpinned by the notion that organisations are open systems that dynamically interact with their environments[190]. Systems should be able to self-regulate through a process of homeostasis.[191] Closely linked to the notion of homeostasis is the concept of 'negative entropy' that allows systems to sustain themselves by importing energy and in the process limiting self-deterioration[192]. The notion of requisite variety states that the internal regulatory mechanism of a system must be varied enough to cope with diversity in its environment. On the other hand, the concept of evolution states that a system's survival depends on its ability to move to more complex states of differentiation and integration when adapting to its environment. Most important to hierarchical studies, however, is the notion that systems have structure, function, differentiation and integration.

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[186] Weick, 1995.

[187] Lane, 2006.

[188] Lane, 2006.

[189] Lane, 2006.

[190] Morgan , 2006.

[191] The concept of homeostasis is related to the self-regulation of an open system through the concept of a negative feedback loop.

[192] Morgan, 2006.

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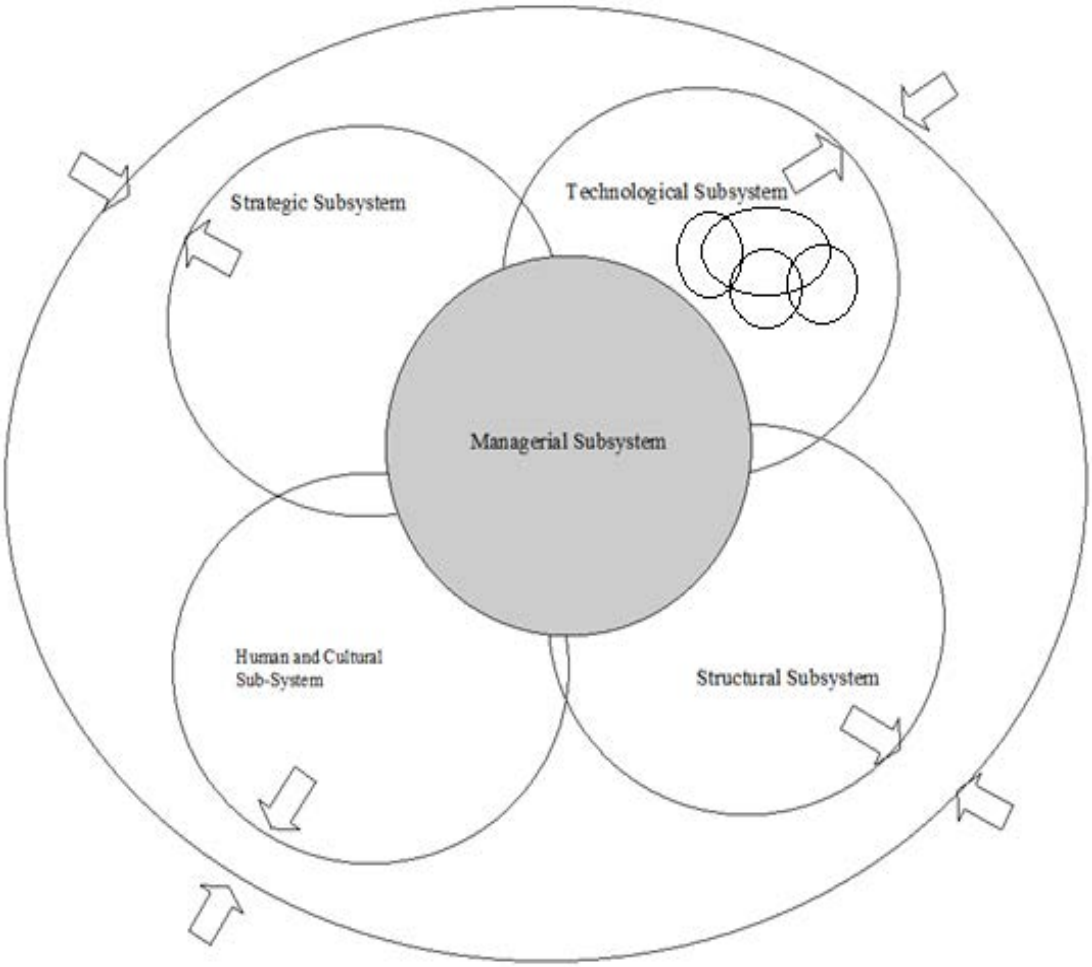
Systems thinking argues that organisations, just like living organisms, cannot be reduced to their constituent parts. Organisations as systems are made up interrelated subsystems at each level and, as one moves up the system, it consists of a combination of other subsystems. For example, the technological subsystem of an organisation may be made up of other small subsystems.

Figure 4: How an organisation can be seen as a set of subsystems



[Source][193]

The value of systemic coupling to organisational science was noted by Carpra, who in recent times has attempted to model organisations as adaptive and self-organising entities[194], and in the process refuted reductionist thinking which asserts that phenomena can only be understood by breaking them into increasingly smaller parts

[193] Adapted from a contingency view of organisational management. Kast and Rosenzweig (1973) as cited in Morgan (2006).

[194] Dann, & Barclay, 2006

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2.5.2 Systems thinking and organisational management

Systems thinking gave birth to several offspring. A detailed account is found in Jackson's *Systems Thinking: creative holism for managers*. Two variations of systems thinking, the chaos and complexity theories, are worth pursuing in the context of knowledge management studies.

Chaos theory appears to provide an explanation to the challenge of understanding non-deterministic systems that exhibit order within a random context[195]. In simpler terms, chaos theory sets out to provide an explanation to the seeming inconsistencies in cause-and-effect relationships by demonstrating through the 'butterfly effect' that small actions can, under certain conditions, produce wildly magnified consequences unimaginable in the context of the initial causal factors.

Chaos theory's cousin complexity theory has found even wider application in organisational theory, especially in an attempt to understand organisations as Complex Adaptive Systems (CASs). A Sante Fe Institute[196] definition in Dann & Barclay explains a CAS as one "that adapts through a process of 'self-organisation' and selection into coherent new behaviours, structures and patterns"[197]. Mitleton-Kelly uses the term Complex Evolving Systems (CESs) and goes on to summarise the characteristic behaviours of such as system as underpinned by:

- Interaction and feedback effects through networks
- Sensitive dependence on initial conditions
- Unpredictability of outcomes
- Dissipative structures and self-organised criticality
- Adaptive evolution and natural selection
- Hierarchically-nested levels
- Co-evolution
- Simple rules and complex behaviour[198]

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[195] Su & Roan, 2006

[196] The Santa Fe Institute (SFI) is an independent, non-profit theoretical research institute located in Santa Fe (New Mexico, United States) and dedicated to the multidisciplinary study of the fundamental principles of complex adaptive systems, including physical, computational, biological, and social systems. (http://en.wikipedia.org/wiki/Santa_Fe_Institute).

[197] Dann, & Barclay, 2006

[198] Dann, & Barclay, 2006 citing Mitleton-Kelly, 2003

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In short, the systemic hierarchy inspires an understanding of the organisation as an integrated whole whose definition cannot be reduced to its constituent elements. Its variations, such as CAS thinking, explain the behaviour of such systems and how sensitive they are to initial conditions as they co-evolve with their environments.

2.5.3 Hierarchy and systems thinking

Understanding organisational hierarchy from a systems point of view is essential because the first three approaches, control hierarchy, cultural value hierarchy and sensemaking levels, attempted to dissect the organisational reality in order to understand their inner workings. Systems thinking, however, views organisations as integrated and complete wholes that behave and respond to their environment as compact units though they are made up of integrated sub-units.

2.6 Conclusion

2.6.1 Summary

This chapter explored the notion of hierarchy as it is conceptualised in organisational science and intimated that the concept eludes an exact definition because of a myriad of other terms (such as “power”, “control” and “influence”) that arise. It is further complicated by the need to acknowledge the cultural, social and systemic dynamics that always emerge when organisations are discussed.

The concept of an organisational hierarchy was found to be multifaceted; four broad conceptualisations were explored in detail. Firstly, an organisational hierarchy was viewed in simple terms and explained in the context of everyday organisation structures and stratifications as conceived by traditional organisational scientists such as Max Weber, Taylor and consistent with the works of Evan who made an attempt to measure organisational hierarchy using a set of indices. Such a view is analogous to Morgan’s machine metaphor[199] and is described by Rajan & Zingales as a steep hierarchy[200]. A second perception explored the form of organisation that emerges as a result of persistent cultures found in organisations. Analysed in this way, hierarchy denotes one of the four organisational forms characterised by a high degree of central control and an inward-looking focus. Such analysis is inspired by the

[199] The machine is a metaphor used by Morgan to describe organisations that operate on typical bureaucratic rules and are inflexible.

[200] A steep hierarchy, as opposed to a horizontal hierarchy, has many levels of reporting structures. A horizontal hierarchy is wider and several subordinates report to one manager.

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Competing Values Framework. Thirdly, an organisational hierarchy was analysed in the context of levels of organisational sensemaking as pioneered in the works of Wiley, resulting in leading organisational scientist Weick acknowledging that there is a way to view organisations that accommodates the individual, social interaction, social structure and the level of organisational culture. Lastly, there is a conceptualisation dominant in social theory that organisational hierarchy is the systematic integrative coupling of systemic agents and super-systems as expressed in systems theory and its siblings, chaos theory and complexity theory.

2.6.2 Relation between the notions of hierarchy

It would be a mistake to conceive of the different notions of hierarchy as mutually exclusive and exhaustive. The intention is not to provide an exhaustive list of all the notions of hierarchy that can be discerned in organisation theory in general and knowledge management in particular. Instead four different notions of hierarchy are identified as examples of the ways in which hierarchy informs a selection of the mainstream knowledge management theories. In other words, the purpose of this chapter was to establish that hierarchy could be conceived in ways other than merely bureaucratic control. What follows is a demonstration of how more nuanced notions of hierarchy lies at the core of some of the foundational theories of knowledge management. The eventual purpose of this demonstration is to criticise the assumption that hierarchy is inherently bad for knowledge management (so often found in the knowledge sharing school of knowledge management).

What should be clear from the overview in this chapter is that whilst hierarchy as control has a strong tradition in organisation theory, the Competing Values Framework shows how hierarchy fits into various organizational forms (the various other forms of organising categorised according to how they deal with hierarchy). These first two views of hierarchy have to do with social relations (often power relations – sometimes directly via the organisational design, but at other times indirectly via mediators like culture, tradition, habit, etc). However, hierarchy can also be conceptualised at a meta-level. The various levels of sensemaking also constitute a hierarchy as does the recursive levels of systems. Whilst these hierarchies do not exist as phenomena (observable in social relation), they inform phenomena from the meta-level – sensemaking in terms of the relation between the generic structure and the intersubjective interaction and systems theory in terms of the coupling between subsystems and the overall system in focus and even the wider environment.

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Chapter 3

Hierarchy Contexts & Knowledge Management Thinking

3. Introduction

This chapter focuses on eliciting the positions of key knowledge management theories on the four notions of hierarchy discussed in the previous chapter. It is evident that not all theories will make pronouncements on each and every notion of hierarchy. The study focuses on illustrating instances where the concept of hierarchy is evident in knowledge management thinking. As argued earlier, the aim of this thesis is not to produce a quantitative report but to make a case for the acknowledgement of the notion of hierarchy in knowledge management thinking. The chapter is presented in five sections for purposes of clarity. The first four sections focus on the conceptualisations of hierarchy in organisations according to the observations made in the second chapter, namely, the control hierarchy, the cultural value hierarchy, the sensemaking levels hierarchy and the systemic coupling hierarchy. The last section summarises and tries to put together the issues that are discussed in this chapter.

The first section focuses on the control hierarchy, and draws insights from Nonaka's ground breaking Knowledge-Creating Company theorisation and Firestone & McElroy's new approach to organisational knowledge management, the Open Enterprise. In this section, the theorist's position on knowledge management is elucidated by analysing the pronouncement that the theory makes about hierarchy in relation to knowledge management.

The second section presents the cultural value hierarchy by analysing Boisot's I-space framework in the context of organisational cultures and extends the discussion to include the I-Space's application in analysing national cultures. In this section, the theorist's position on knowledge management is elucidated by analysing the pronouncement that the theory makes about hierarchy in relation to knowledge management.

The third section interrogates the notion of organisational hierarchy from an abstract sensemaking levels hierarchy point of view. In this context, a knowledge management theory's position on hierarchy is elicited by analysing the extent to which it acknowledges the

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'individual-collective-organisational-cultural' incremental nature of organisational knowledge. Four knowledge management frameworks are used to illustrate the concept of the sensemaking levels hierarchy in knowledge management. Firstly, Nonaka's SECI model is revisited and analysed in the context of sensemaking levels hierarchy. Secondly, Boisot's I-space model is illustrated and analysed using a sensemaking levels hierarchy analysis. Thirdly, the thesis illustrates how the 4I[201] model, an organisational learning based model, can be viewed as an instantiation[202] of the notion of the sensemaking levels hierarchy. Lastly, this section illustrates how Firestone & McElroy's new concept within knowledge management, the Open Enterprise, can be viewed in the context of a sensemaking level hierarchy.

In the fourth section, the 'edge of chaos' phenomenon, the CAS concept and the Cynefin Model are analysed and illustrated as knowledge management phenomena exhibiting systemic coupling hierarchy properties.

The fifth section summarises the arguments presented in this chapter and illustrates the positions of each knowledge management theory on the notion of hierarchy.

[201] The 4I (Intuition, Interpretation, Integration and Institutionalisation) is an organisational learning approach to knowledge management and focuses on individual intuitions and how they propagate from the individual level to the institutional level via group contexts.

[202] The concept of instantiation is borrowed from the Object-Oriented Programming principle, where to instantiate implies to create an object using its class (blueprint). In this case, the implication is that the sensemaking levels hierarchy is the blueprint and the 4I framework is seen as built along the sensemaking-levels hierarchy notion.

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Section 1
Knowledge Management and the Control Hierarchy

3.1 Introduction

In this section, the study focuses on two knowledge management theories and their pronouncements on the control hierarchy. The Knowledge Creating Company and The Open Enterprise approach are considered in this section because they make direct reference and pronunciations on the control hierarchy notion. The control hierarchy, in its simplest application, examines control, power, authority and decision-making dynamics in the organisation.

3.2 Nonaka and the control hierarchy

3.2.1. The Knowledge Creating Company

Nonaka's Knowledge-Creating Company is based on a knowledge framework involving a dynamic conversion[203] between what he described as tacit and explicit knowledge. The exchange supports four distinct processes identified as socialisation, externalisation, combination and internalisation (SECI)[204]. In the context of the control hierarchy, Nonaka's position is evident in the argument leading up to the SECI framework. In a ground-breaking article that is popularly acknowledged as heralding the arrival of knowledge management as a competent organisational management theory, Nonaka argues that

> in an economy where markets shift, technologies proliferate, competitors multiply and products become absolute overnight, companies need to consistently create new knowledge, quickly disseminate it widely throughout the organisation and quickly embody it into new products[205].

In this quote Nonaka's philosophy can be deduced as implying that successful companies have to create new products, be quick in doing so and dominate emergent technologies.

[203] This SECI model will be discussed in later sections. This section focuses on the Knowledge Creating Company's foundations

[204] Hereafter shortened to SECI.

[205] Nonaka & Takeuchi, 1995.

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Consequently, in the context of a control hierarchy, knowledge-creating companies have to structure themselves in a way that enables such product innovation and quicker response to markets. Nonaka is not convinced that conventional Western hierarchical and structured business methodology is the best organisational structure to implement in successful knowledge-creating companies. The Western view of organisational knowledge, according to Nonaka, only recognises formal, and quantifiable data and resultantly the metrics for measuring organisational knowledge are similarly 'hard' and take the form of efficiency, lower costs and return on investments. Nonaka's article does not only focus on organisational values that are consistent with knowledge management in the organisation, it directly spells out how organisations should be physically configured to be successful in the knowledge economy. "In the knowledge creating-company, inventing new products is not a specialised activity – the province of R&D department, marketing department or strategic planning ... everyone is a knowledge worker". [206]

3.2.2 Achieving companywide innovation

The Knowledge-Creating Companying is based on companywide innovation that is achieved through five critical enabling conditions, namely intention, fluctuation and creative chaos, autonomy, redundancy and requisite variety[207]. The enabling conditions are implemented over a five-phase model consisting of knowledge sharing, creating concepts, justifying concepts, building archetypes and cross-levelling knowledge[208]. The enabling conditions and the implementation phases lead to two important insights on the Knowledge-Creating Company's conceptualisation of the notion of the control hierarchy: firstly, a management style called 'middle-bottom-up' and an organisational structure called the 'hypertext' organisation. These will be explored in detail later, after a discussion of the knowledge-creation enablers is presented.

3.2.3 Knowledge-creation enablers

Intention – Organisations require clear direction and purpose for the future, and this is

[206] Nonaka & Takeuchi, 1995.

[207] Nonaka & Takeuchi, 1995.

[208] A concept used by Nonaka in which Japanese firms use different functional teams in defining an organisation al concept, and in the process organisations get a holistic picture of the concept by experiencing it from different points of view.

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normally observed in the organisation's mission, vision and critical performance areas[209].

Fluctuation and creative chaos – the Knowledge-Creating Company acknowledges that individuals and organisations tend to be more creative when circumstances force them to re-evaluate their perception on reality. Such chaos should not only be created by external circumstances, but could also come from organisational intent[210].

Autonomy – individuals in organisations need some leeway to think creatively and have influence on organisational processes[211].

Redundancy – using different cross-functional and overlapping teams in carrying out organisational roles. In this process the organisation gets a holistic picture of the task by experiencing it from different points of view as no secrets are hidden between departments[212].

Requisite variety – is a concept that is meant to imply that an organisation has to be internally as diversified as the variety and complexity of its external environment[213].

3.2.4 Impact of knowledge-creation enablers on organising

The enabling conditions have a telling effect on the control hierarchy. The organisational logic of redundancy and requisite variety involves having multiple teams working and competing on the same projects. In such contexts, workers are not seen as permanent keepers of roles. The Knowledge-Creating Company advocates for job rotation across departments as a basic organisational principle. Rotation helps workers to understand the business from a multiplicity of perspectives. The Knowledge-Creating Company's approach to organising advocates for free access to crucial company information for all involved. It is conceivable to understand why an information differential amongst organisational employees is viewed unfavourably as in such situations employees would not be engaging as equals.

The redundancy and job-rotation approach can be viewed as the Knowledge-Creating Company's first attempt to limit the effects of the control hierarchy because it eliminates the notion of highly controlled and centralised internal decision-making. It frees employees to experience the various facets of organisational life because no single department or group of

[209] Nonaka & Takeuchi, 1995.
[210] Nonaka & Takeuchi, 1995.
[211] Nonaka & Takeuchi, 1995.
[212] Nonaka & Takeuchi, 1995.
[213] Nonaka & Takeuchi, 1995. & Morgan, 2006.

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experts has exclusive responsibility for creating new knowledge as "senior manager, middle managers and frontline employees all play a part"[214]. A management model that fitted the new dynamics of the Knowledge-Creating Company had to be conceptualised; thus, the notion of the 'middle-up-down' approach to management was introduced. A detailed exploration of this middle-up-down approach to organisational management is therefore worth exploring in order to explicate its meaning in the context of the control hierarchy.

3.2.5 Middle-up-down management

The Knowledge-Creating Company, however, faced a dilemma regarding how the legitimate operational demands for control in a business could be achieved whilst promoting autonomous innovation at the same time. It acknowledges the existence of role differentials (read: skills) in an organisation and goes further to imply that new insights are created as a result of the dynamic interaction of the organisation's frontline employees, middle managers and executives. Frontline employees engage in day-to-day operations and are the ones who normally discover the changing dynamics of the world. On the other hand the executives are romantics who indulge in excessive ideals that may be far removed from reality. The Knowledge-Creating Company views middle managers' role as that of bridging the romantic executive ideals and the frontline employees' realities. The middle managers become the architects of new knowledge in the knowledge-creation company[215]. The middle-up-down approach to organisational knowledge management has three levels of knowledge workers, with each category having distinct competences.

Knowledge Officers – These are top-level managers who give the Knowledge-Creating Company direction through vision articulation and set standards of performance and justify the value of the knowledge being generated. Besides being able to articulate and communicate the company vision, knowledge officers need to be skilled in the art of creating creative chaos within teams. [216].

Knowledge Engineers – These are the middle-level managers who facilitate the knowledge creation process around the socialisation, externalisation, combination and

[214] Nonaka & Takeuchi, 1995.

[215] Nonaka, 1991

[216] Nonaka & Takeuchi, 1995.

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internalisation. Knowledge Engineers should be excellent project managers, skilled hypothesis creators and have the ability to integrate various methodologies in amplifying the SECI process.

Knowledge practitioners – They are the frontline staff, comprising of knowledge operators, who focus on accumulating rich tacit knowledge, and knowledge specialists, who focus on aggregating well-structured explicit knowledge in the form of technologies, scientific inventions and other quantifiable data and, as such, they are high intellectuals[217].

Having outlined a new approach to management, the middle-up-down approach, the Knowledge-Creating Company implements a special type of organisational structure commonly referred to as the 'hypertext' organisation.

3.2.6 The Hypertext organisational structure

The Knowledge-Creating Company concept realised that knowledge management required a novel form of organisational structure that could be neither the formal hierarchy nor the flat and distributed taskforce teams. A combination of the two was seen as an advantage, as the new organisational structure would benefit from the efficiency of the bureaucratic hierarchy combined with the flexibility of the taskforce model[218]. The aim of the hypertext[219] organisation was to create a flexible organisation that utilises the efficiency of the control hierarchy and, accordingly, such an organisation had to have three abstract layers (contexts) at which individuals could engage.

The 'Business Systems' Layer – This, in the context of the Knowledge-Creating Company, is a layer in which routine business can occur within the bureaucratic context of the control hierarchy in a predetermined and predefined fashion[220].

The 'Project Team' Layer − This is seen as the contexts in which multiple teams can be implemented to facilitate new insights and knowledge-creating activities such as new product innovation and development. In this layer, tacit

[217] Nonaka & Takeuchi, 1995.

[218] Nonaka & Takeuchi, 1995.

[219] LAC Region's: *Leading With Impact Project Team*-Book Review: The metaphor of a website best describes the hypertext organisation, where layers of web pages, pictures, text, videos and graphics are presented on screen and consequently searches on a particular object unveils even more detail beneath that object.

[220] Nonaka & Takeuchi, 1995.

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knowledge is extracted out of individuals and converted into explicit knowledge by developing new concepts, ideas and products[221].

The 'Knowledge Base' Layer – The knowledge base layer codifies insights generated in the two levels by concretising them into a vision/mission that is accessible to all in the company and serves as the organisation's performance template as it becomes embedded in the organisation's values and systems[222].

3.2.7 The Knowledge-Creating Company and the control hierarchy

Having outlined the premises on which the Knowledge-Creating Company is based, it is logical to analyse it from a control hierarchy point of view. It is evident that the Knowledge-Creating Company acknowledges the need to have autonomy, requisite variety, redundancy and innovation in organisations that will boost creativity. At the same time, the concept realises the huge benefits that arise out of controlled and standardised practices that manifest themselves in control hierarchies. This seemingly paradoxical situation is implemented using the middle-up-down approach to management and a hypertext organisation. Could it be safe, then, to hypothesise that The Knowledge-Creating Company is against the notion of control hierarchy? The answer is certainly circumstantial. From one angle, the Knowledge-Creating Company views the control hierarchy in its bureaucratic context and Western usage as highly restrictive and damaging to knowledge creation processes. On the other hand, when the same hierarchy is conceptualised from the perspective of knowledge innovation, where frontline workers are viewed as knowledge practitioners, middle-level managers are viewed as knowledge engineers and top-level management is viewed as comprising of knowledge officers, the notion of hierarchy becomes a very effective knowledge-creation phenomenon.

The notion of hierarchy is also evident in the way the Knowledge-Creating Company is layered into a hypertext organisation in which the business systems layer appeals to the notion of a controlling hierarchy, allowing repetitive and pre-programmed operational tasks to be carried out efficiently while higher layers such as the project teams layers and knowledge base layers allow for innovation and conversion of tacit knowledge into explicit knowledge. A less controversial concluding remark regarding Nonaka's theorisation on the notion of the control hierarchy would be to acknowledge that the Knowledge-Creating Company advocates for a reform in the way the control hierarchy is implemented in

[221] Nonaka & Takeuchi, 1995.

[222] Nonaka & Takeuchi, 1995.

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organisations. The hierarchy cannot be utilised in the strict mechanical way that Morgan implied, but rather in a more innovative way that benefits efficiency but accommodates creativity. To a large extent, a control-hierarchy is still evident, alive and part of Nonaka's knowledge management thinking as proved by the 'middle-up-down' approach to management and the hypertext organisation.

The concept of hierarchy in its controlling context is also pursued by recent knowledge management theorists Firestone & McElroy in their new knowledge management and Open Enterprise Architecture and is the focus of the next section.

3.3 Firestone & McElroy and the control hierarchy

3.3.1 The new knowledge management

The Knowledge-Creating Company and its proposed hypertext organisation attempted to balance the autonomous dimension demanded by organisational innovation and the structured dimension required in organisational efficiency. A similar dilemma was raised by Firestone & McElroy when Firestone asked "How can we change organisations so that all participants may contribute to problem-solving and adaptation, while still maintaining the authority and integrity of management?[223] The authors' proposal was a new knowledge management approach that they termed the Open Enterprise based on a derivative from Popperian[224] doctrine called 'falsification'[225]. The Open Enterprise approach appeals to more than one conceptualisation of this thesis's notions of hierarchy and this section analyses the Open Enterprise's pronouncements on the control hierarchy.

3.3.2 Employees and organisational knowledge management

The Open Enterprise approach was Firestone & McElroy's attempt to conceive a type of organisation that is optimised for adaptation and innovation[226] and in which all stakeholders have meaningful participation in the knowledge-processing activities of the organisation.

[223] Firestone J.M (KMCI-Online).

[224] Sir Karl Raimund Popper was a 20th century philosopher who emigrated from Austria to England and is regarded as one of greatest philosophers of his time whose critical rationalism philosophy was based on the doctrine of falsification.

[225] Falsification philosophy made a claim that a theory could only be considered scientific if it was falsifiable. Detailed formulation of Popper's ideas and arguments are beyond the scope of this thesis. (For reading on Popper's works refer to: Rowbottom D (2010) Popper's Critical Rationalism: A Philosophical Investigation (Routledge Studies in the Philosophy of Science.)

[226] Firestone & McElroy, 2003.

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Their chief concern was the fact that organisations were increasingly becoming oligarchies[227] in which absolute power is concentrated in the hands and heads of very few top executives. As a result, many corporations have, in essence, become fiefdoms of their Chief Executive Officers[228]. The Open Enterprise argues that only if all organisations were to operate as machines, where everyone had the capacity to do as required of them, there would not be a need for employee participation in organisational decision-making, as the stockholders would appoint the board, which in turn would employ top executives with the fiduciary role of managing the organisation[229]. The fact that organisations are complex and adaptive systems requires of them a genuine employee involvement in their knowledge-processing activities if they are to be successful. The need for full employee participation stems from the fact that:

- Employees are the best placed actors in an organisation to be the first to identify and experience any knowledge gaps within organisational processes[230]. Organisations would rather equip them with necessary problem-solving and knowledge-processing abilities than expect someone else to do it[231].
- Employee expertise would be valuable in crafting ways to close the knowledge gaps that they would have identified[232].
- Important knowledge decisions have to be based on knowledge that has been rigorously tested and survived an evaluation from a variety of perspectives[233].

If all employees are to participate in organisational knowledge management activities, how then does the Open Enterprise implement such a setup without undermining management's legitimate authority as formulated in the control hierarchy? Firestone & McElroy solved this particular problem by splitting process of organisational knowledge management into tiers. The first, a higher-level tier that they called "knowledge processing", focuses mainly on epistemic challenges resulting from the demands of organisational knowledge processing.

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[227] An oligarchy is an organisational system in which power rests with a small number of people.

[228] Firestone & McElroy, 2003

[229] Firestone & McElroy, 2003

[230] Firestone & McElroy, 2003

[231] Firestone & McElroy, 2003

[232] Firestone & McElroy, 2003

[233] Firestone & McElroy, 2003

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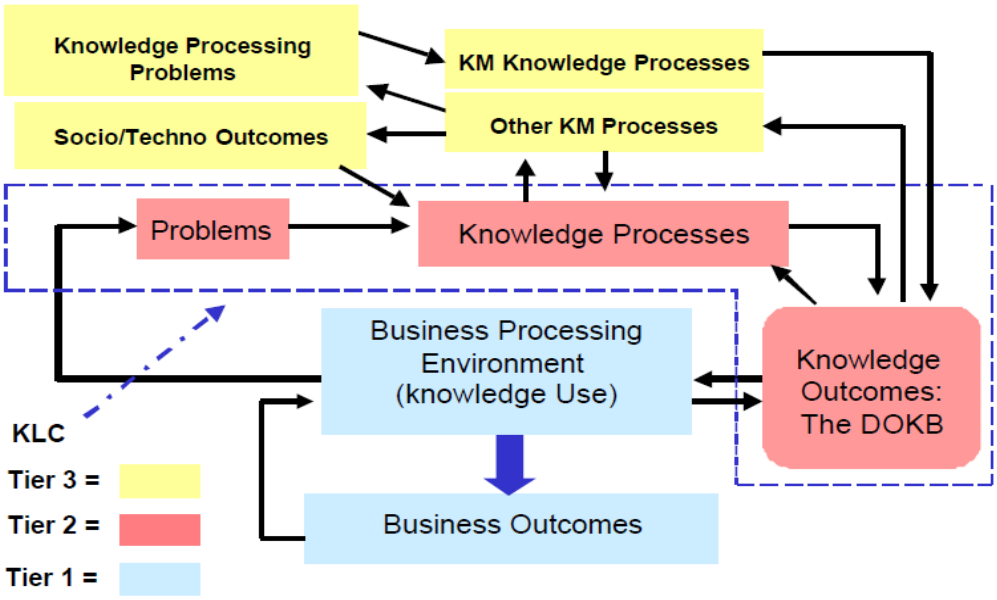
The lower is an operational concept that they called “business processing environment”. In this way, Firestone & McElroy separated the demands of managing an organisation from the task of knowledge management, as illustrated in Figure 5.

Figure 5: Knowledge processing is different from organisational management



Source: Firestone & McElroy[234]

3.3.3 The Open Enterprise and the notion of the control hierarchy

By splitting organisational knowledge management into a three tier system, Firestone & MacElroy allowed the notion of hierarchy to be discussed in the organisational control context without having to involve knowledge management issues. Put bluntly, Firestone & McElroy tacitly imply that operational control is a management and administrative process, while knowledge processing is an innovative and adaptation concept. The implication is that, in the context of administration, organisations can be hierarchical but have to be treated as complex adaptive systems in the knowledge management context. Firestone & McElroy could then be viewed as acknowledging that the control hierarchy is necessary in the lower tiers of the organisational knowledge management chain. Their claim is that as one makes an epistemic ascent up to the higher ontological dimension of organisational knowledge management conceptualisations, the concept of the organisation and its knowledge processes become more difficult to be managed and understood as an exact science - the way it is conceptualised in the control hierarchy.

[234] Firestone & McElroy, 2003

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Section 2
Knowledge Management and the Cultural Value Hierarchy

3.4 Introduction

This section focuses on the cultural value hierarchy or, put differently, the hierarchy that is derived from cultural practices. The tempting approach would be to easily interchange this cultural value hierarchy with the control hierarchy observed in the works of Taylor, Weber and Fayol and, in most circumstances, the difference would be merely academic. An informative way to visualise the difference between the two is to view them as if they were being discussed under the metaphoric conceptualisation of Morgan. According to that analogy, where this thesis mentions 'control hierarchy' Morgan would see 'machine' and where this thesis visualises cultural-value based organisational types, Morgan would mention 'bureaucracy', 'markets' and 'clans'. Pursued in a cultural context, organisational culture gives rise to different types of organisational forms and typologies. Popular typologies are:

- *Competing Values Frame Work* – Hierarchy, Market, Clan, Adhocracy.
- *Mintzberg's typology* – Simple Structure, Machine Bureaucracy, Professional Bureau cracy, Divisionalised Form and Adhocracy.
- *Boisot's culture space* – Bureaucracy, Markets, Fief and Clan.

The Competing Values Typology seems to appeal largely to contexts of organisational strategy, while Mintzberg appears to have been focusing mainly on general and administrative organisational management. Consequently, their theorisations will not be pursued in greater detail in this section. In a different but informative context, though, Boisot immerses his organisational typology and makes it a crucial factor in an information management theorisation, The I-Space[235] that has become central in the context of organisational knowledge management thinking in recent years. While the Knowledge-Creating Company went as far as giving prescriptions (hypertext & 'middle-up-down') on the layout of the organisation in the knowledge economy, Boisot set out to identify typical organisational cultures that are compatible with the state[236] and availability[237] of an

[235] A detailed discussion on the I-Space framework is given in the next sections of this thesis.

[236] "State of information" implies level of codification and abstraction.

[237] Availability implies the extent to which information is diffused.

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informational-good[238] in order to secure competitive advantage in the knowledge economy. The four culture types are bureaucracy, clan, fief and markets. A detailed discussion of these is presented shortly, but the study begins by focusing on the hallmark of Boisot's theorisation: an information framework called the I-Space.

3.5 Boisot's Information-Space Framework

-Obituary-

Max was fortunate to intuit a question of fundamental theoretical and social significance while young. The intellectual challenges of expressing, exploring, expanding, and testing it sustained his seemingly boundless academic enthusiasm and appetite throughout his life. He pointed us towards a post-Newtonian discourse in which our attempts to organise in situations that are partially self-organising is radically reframed, throwing up insights that bear directly on the most portentous aspects of our socio-economy". Spender (2012)

Boisot's I-Space model theorises organisational knowledge management by analysing the flow of information in the organisation through three dimensions, namely abstraction, codification and diffusion[239]. Boisot's contention is that organisations can attain competitive advantage by creating and managing the way information goods flow in and around the codified, abstract and diffused dimensions competently. An explanation of the key terms is presented below.

3.5.1 Codification, abstraction and diffusion

Codification – The act of codification can be understood as a procedure for shedding surplus (fluff) information to make it easier to process by assigning phenomena to categories[240]. It is an intellectual and perceptive skill that creates categories allowing phenomena to be classified and understood. In most cases it is a result of experience and training[241].

Abstraction – refers to the generalisation of codified insights in order to apply them to a wider range of situations[242]. While codification allows for allocating of

[238] An information good can be construed as a type of commodity whose value is derived from the information it contains, such as a CD carrying a computer code. The value of the information on the CD is probably more that the cost of the media itself.

[239] A detailed discussion of these terms will follow.

[240] Boisot, 1998

[241] . Boisot, 1998

[242] Boisot, 1998

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phenomena to categories, abstraction improves information-processing capacity by minimising the number of categories required to carry out a particular task. Abstraction works by teasing out the underlying structure of phenomena relevant to our purpose[243].

Diffusion – is a complex process that focuses on the availability of data and information to those who want to use it[244].

Codification and abstraction save on processing demands[245] in two ways. Codification allocates phenomena to categories by using perception, while abstraction limits the number of categories required for a particular information-processing task by using concepts[246]. On the other hand, diffusion impacts on the degree of scarcity of the information-good to those who may want to utilise it[247]. The three concepts are the logical pillars of Boisot's I-Space knowledge management framework.

3.5.2 The I-Space

Boisot's I-Space is a conceptual framework[248] presented in form of a cuboid that analyses data and information along the codification, abstraction and diffusion dimensions. The I-Space has widespread application in Boisot's works, ranging from knowledge analysis, social learning analysis, and technological evolution to organisational systems analysis. This section, however, focuses on the framework's organisational culture analysis in the context of the notion of hierarchy, while later sections will focus on the framework's social learning dimension.

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[243] Boisot, 1998

[244] Boisot, 1998. Diffusion should not be confused with absorption which focuses on the uptake of information by those with access to it. In the context of Boisot's argument, diffusion simply means the information is available to those who may want to use it.

[245] Boisot, 1998

[246] Boisot, 1998

[247] There are several contexts that can lead to information-good scarcity such as deliberate efforts to limit availability such as scrambling of signals, patents, and copyrights.

[248] For a detailed and in-depth reading on how the I-Space model was derived refer to Boisot, 1998 and Boisot's C-space model, Boisot, 1998

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3.5.3 Boisot's cultural types summary

The framework has four critical analytical regions and, when applied to organisational culture, gives rise to four organisational culture types: the bureaucracy, the market, the clan and the fief. Table 3 summaries the properties of the four organisational culture types.

Table 3 Boisot's organisational culture types

Bureaucracies	Markets
• Information is codified and abstract • Information diffusion is limited and under central control • Relationships are impersonal and hierarchical • Submission to superordinate goals • Hierarchical coordination • No necessity to share values and beliefs	• Information is codified and abstract • Information is widely diffused, no control • Relationships are impersonal and competitive • No superordinate goals • Horizontal coordination through self-regulation • No necessity to share values
Fiefs	**Clans**
• Information is uncodified and concrete • Information diffusion is limited by lack of codification and abstraction to face-to-face relationships • Relationships are personal hierarchical (feudal/charismatic) • Submission to superordinate goals • Hierarchical coordination • Necessity to share values and beliefs	• Information is uncodified and concrete. • Information is diffused but still limited by lack of codification and face-to-face relationships • Relationships are personal but non-hierarchical • Goals are shared through process of negotiation. • Horizontal coordination through negotiation • Necessity to share value and beliefs.

The bureaucratic culture operates well in contexts where information is highly abstract and codified[249], and such codified and abstract information is easy to express to such an extent that it can be thought of as resembling explicit knowledge. Information utility is at its highest

[249] Boisot, 1998

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in the bureaucracy[250] and organisations try to maximise their economic gains by limiting diffusion and reproducing informational goods efficiently. Organisations introduce structures and rules and constrain information diffusion so that they can fully gain from such an asset[251]. The information in the bureaucratic setup is codified and abstract and organisations become inherently bureaucratic and routine in order to gain on efficiencies of production and reproduction of the same good. In such setups, personal relationships are not vital because the information being shared is well abstracted and codified to be easily understood. Boisot's bureaucratic culture can, therefore, be seen as operating well under the control hierarchy discussed in earlier sections of this thesis.

Fiefs represent organisational cultural contexts where information is 'uncodified' but concrete in the heads or control of a few people. Information diffusion is limited by a lack of codification and abstraction, and may have to be shared through face-to-face communication. Such a setup tends to create a feudal system in which reliance is placed on a few knowing experts[252]. Relationships in this cultural setup are personal and hierarchical[253]. A hierarchy arises out of the skill and expertise differential, as the setup relies heavily on individuals who are respected either for their expertise or charisma.

Clans represent organisational cultural contexts in which relationships are personal and non-hierarchical and information sharing is limited to face-to-face communication because of lack of communication. Organisations operating in the clan culture tend to promote individual empowerment and networked relationships[254]as there is no coercive dynamic to enforce rigid compliance. Goals are achieved and shared through a process of negotiation and there is a necessity to have shared values and beliefs.

In a market culture, information is codified and abstract but well-diffused. The fact that the critical information resource is widely diffused leads to relationships that are impersonal and competitive[255]. In these environments, organisations normally adopt an impersonal and competitive attitude in order to stay ahead[256] of the competition because the critical

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[250] Boisot, 1998

[251] Boisot, 1998

[252] Boisot, 1998

[253] Boisot, 1998

[254] Boisot, 1998

[255] Boisot, 1998

[256] Boisot, 1998

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information resource is widely available to all. Values and beliefs are not shared in this environment because of its competitive nature.

Understanding organisations from a cultural perspective, especially in the context of information dynamics as discussed by Boisot, has implications for organisational knowledge management and hierarchy. These implications for knowledge management are discussed below.

3.5.4 Boisot's cultural types and knowledge management

Boisot's cultural types should not be seen as a recommendation of organisational form, but an acknowledgement that certain organisational forms are more compatible and amenable to specific knowledge management processes and, accordingly, the role of organisational knowledge management would be to inform the context in which a particular type of information-good best thrives. Boisot advises that a well-developed information asset that gives an organisation a competitive advantage has to be managed in a bureaucratic (hierarchical) context to maximise its economic rent[257]. On the other hand, clans represent contexts in which the knowledge asset is widely diffused and comprising of fuzzy signals that the best approach in extracting value out of it is networking- (which is not hierarchical). Fiefs represent organisational contexts in which the knowledge asset is confined to a few heads, and organisations have to be feudal in nature in order to acknowledge their experts and utilise them[258]. Markets represent a context in which an information-good is well-defined and concrete but diffused to competitors as well, such that gaining value from it requires competing and performing better than organisational competitors. A brief account of how the cultural types affect organisational transactions across cultures is given by Boisot and is explained in the case study below.

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[257] Economic rent loosely translates to profit.

[258] Boisot, 1998

> *The United States has long been known for its open and competitive way of doing business and contracts are normally valued and awarded on the basis of performance and its culture can then be viewed as market-oried lrefacrodnepriomaetorluefplwaadolleara d places more emphasis on government statutes than individual relations. They are thus more bueaaci ctuaghir des. Tha Cheps tumrepfereantcitca difpmdexge based on cultural respect for seniority and thus tend to the fiefdoms (Feudal Hierarchy). The Japanese, on the other hand, value individual innovation, dedication, commitment and service and their organisations are more of clans.*
>
> *[Source[259]]*

3.5.5 Boisot's cultural types and cultural hierarchy

Boisot's I-Space model presents four organisational types and two are hierarchical in nature. The bureaucracy culture handles knowledge management processing best in contexts where the information-good is highly structured, codified and abstract. The organisation has to employ methods of operation that restrict diffusion and maximise efficiency. The feudal hierarchy recognises that in certain instances critical knowledge resources are lodged in the heads of a few experts in the form of tacit knowledge. Organisations operating in contexts where the critical information-good is concrete but not codified rely heavily on their experts, fiefdoms and feudal hierarchies tend to work better here. The remaining cultures are the market, where competitive relations are needed in order to gain advantage from a widely available resource; and the clan, which represents situations where the information-good is widely diffused but its utility is limited by lack of codification and abstraction.

It is evident that Boisot's argument is more about illustrating organisational contexts required to handle the various states of information-goods than it is about denouncing hierarchy. Boisot acknowledges that hierarchies, both bureaucratic and feudal, have relevance in organisational knowledge management and what is critical is understanding the context in which hierarchy needs to be applied. A concluding and balanced view on Boisot's organisational culture types could acknowledge that Boisot views hierarchy as necessary and even desirable in circumstances where knowledge is highly codified, abstract and limited in diffusion.

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259 Case adapted from Boisot, 1998 (1998), pp 147-148.

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Section 3
Knowledge Management and the Sensemaking Levels Hierarchy

3.6 Introduction

The last two sections focused on eliciting knowledge management's position on the control hierarchy and the cultural value hierarchy. It was established that the knowledge-creating company concept calls for an innovative application of the control hierarchy through 'middle-up-down' approaches and hypertext organisational configurations in knowledge management. In the cultural value hierarchy context, it was established that knowledge management acknowledges the existences of various cultures types that shape organisations into hierarchies, fiefs, clans and markets. What is crucial in the context of organisational knowledge management is to understand the fitting culture for a particular knowledge-processing context.

The knowledge management concept as presented in the organisational sensemaking levels context is not a hierarchy in the sense of subordinate and superordinate relationships[260]. It is an abstract conceptualisation based on levels of social analysis borrowed from the sensemaking context inspired by Wiley's discovery of sensemaking levels above the individual (namely the inter-subjective, the generic-subjective (or organisational) and the extra-subjective (or culture) level). It was however argued in chapter 2 that the sensemaking levels notion is still a hierarchy in the abstract sense because it views society and organisations as heaped and incremental social layers that begin at the individual and move to groups, organisation and society. An effort is made in the following sections to relate knowledge management's to this sensemaking levels type of hierarchy.

This section draws insights from four knowledge management works: The Knowledge-Creating Company, Boisot's Social Learning Cycle, the 4I framework (an organisational learning approach to organisational knowledge management) and Firestone & McElroy's Open Enterprise approach.

[260] Cecez-Kecmanovic & Jerram, 2002

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3.7 Nonaka and the sensemaking levels hierarchy

It was highlighted in previous sections that Nonaka is particularly interested in organisational setups that promote innovation and knowledge creation. In that context, the Knowledge-Creating Company emphasised innovative organising characterised by middle-bottom-up management setups and hypertext architecture in an attempt to centre crucial organisational knowledge processes around the middle tier of the organisation. This section focuses on analysing Nonaka's SECI[261] framework as a sensemaking levels hierarchy phenomenon. The SECI model of knowledge management, when expertly analysed, seems to account for individual-level knowledge management, collective-level knowledge management, organisational-level knowledge management, and cultural-level knowledge management, as will be illustrated shortly.

3.7.1. Tacit knowledge and explicit knowledge

Nonaka envisaged the knowledge creation process as revolving around a continuously dynamic conversion between tacit knowledge and explicit knowledge in a four-stage process comprising socialisation, externalisation, combination and internalisation. He distinguishes tacit knowledge and explicit knowledge as follows: tacit knowledge is viewed as highly personal, difficult to communicate and deeply rooted in an individual's commitment to a craft or profession[262]. It comprises mental models, beliefs and perspectives so ingrained that we take them for granted[263]. Nonaka realised that for knowledge to be useful to an organisation, it has to be in a form that is easily understandable, easy to use and reproducible; a form he called "explicit knowledge". Explicit knowledge is objective and rational knowledge that can be expressed in words, sentences, numbers or formulas (context-free). It includes theoretical approaches, problem-solving, manuals and databases[264].

3.7.2 Nonaka's SECI framework

The dynamic conversion of knowledge from tacit to explicit and vice-versa involves four processes namely socialisation, externalisation, combination and internalisation (SECI). An explanation of the SECI framework is as follows.

Socialisation (tacit – tacit) – involves the sharing of tacit knowledge between two individuals

[261] At this juncture the reader should be familiar with SECI model.

[262] Nonaka & Takeuchi, 1995

[263] Nonaka & Takeuchi, 1995

[264] Nonaka & Takeuchi, 1995

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and may be in the form of workers observing each other or a junior employee being apprenticed by observing an experienced and senior workmate[265].

Combination (explicit – explicit) – involves combining discrete pieces of knowledge into a new whole by synthesising explicit knowledge from various sections of the organisation[266].

Externalisation (tacit – explicit) – also understood as articulation, involves converting tacit knowledge into explicit knowledge and is a crucial knowledge management process in the Knowledge-Creating company because it allows tacit knowledge embedded within individuals to be articulated and hence become sharable[267]. Nonaka uses a metaphorical analogy to explain the transition between tacit knowledge and explicit knowledge. Metaphoric analogies enable individuals to articulate tacit knowledge to explicit knowledge. He describes this as the 'metaphor to model' approach. Metaphoric language has the power to explain ideas and conceptualisations that are difficult to explain using conventional methods of communication[268.]

Internalisation (explicit – tacit) – occurs when employees use the explicit knowledge available in the organisational setup to increase their tacit abilities[269].

An illustration of the SECI model is provided below. The spiral of knowledge from the individual to groups and finally company-wide values and practices completes the SECI's theorisation and will be discussed shortly.

[265] Nonaka, 1991

[266] Nonaka, 1991

[267] Nonaka, 1991

[268] Morgan, 2006. .

[269] Nonaka, 1991

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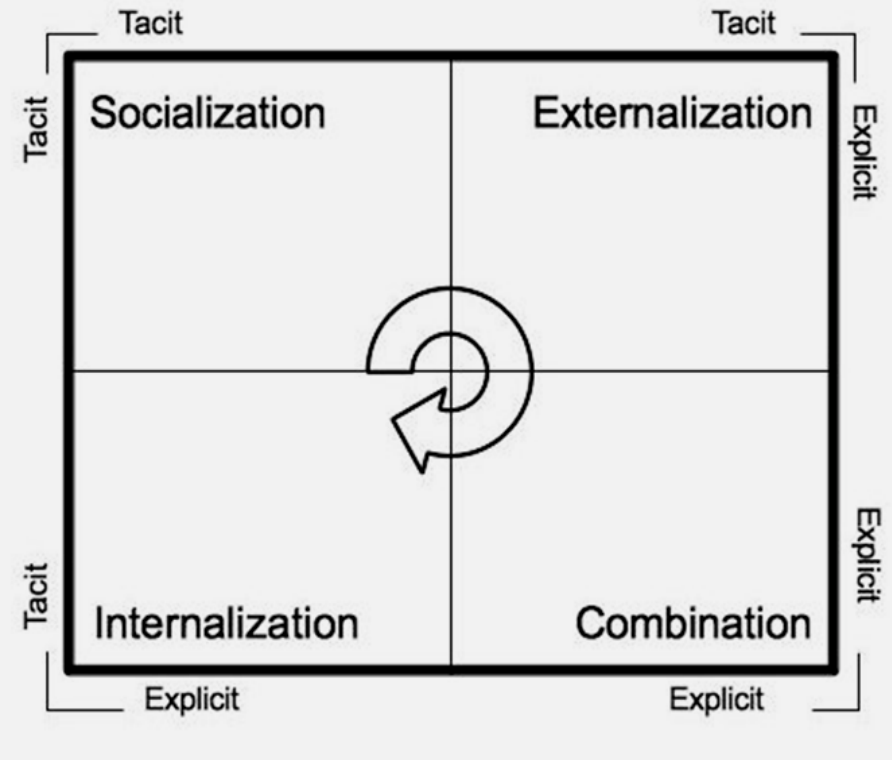
Figure 6: Nonaka's SECI framework



[Source][270]

3.7.3 Nonaka's SECI framework as a sensemaking levels hierarchy

The SECI framework approach to organisational knowledge management can be intuited from the abstract sensemaking levels hierarchy if it is taken into account that it conceives knowledge as originating from an individual's tacit abilities and spirals up to organisational knowledge social values.

The fact that tacit knowledge is deeply individualised tempts a conclusion that Nonaka was thinking of knowledge processes at the individual level – the intra-subjective[271] level that philosopher Mead described in the frames of the 'I-me duality'[272] and Peirce as the 'I-you'[273].

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[270] Adapted for clarity from Nonaka & Takeuchi, 1995.

[271] Weick, 1995

[272] The I-me duality and the I-you concept is rooted in the philosophy of the dialogical self and advocates that "Thinking is a process of conversation with oneself when the individual takes the attitude of the other, especially when he takes the common attitude of the whole group, when the symbol that he uses is a common symbol, has a meaning common to the entire group, to everyone who is in it and to anyone who might be in it": Mead, 1936 in Wiley, 2006.

[273] Mitchell, 1991

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Nonaka's socialisation process, which involves individuals exchanging tacit knowledge through observation, imitation, practise[274] and by deduction, could be seen as occurring at the level above the individual that Cecez-Kecmanovic & Jerram identified as the collective level. Socialisation should be observed as an inter-subjective-level phenomenon because it creates shared meanings between the master and the apprentice. Combination is the dynamic exchange of explicit, structured and quantifiable knowledge that can occur at the individual, collective and organisational level. The other two processes of internalisation and externalisation represent an epistemological shift from explicit to tacit knowledge along the individual, collective, organisational[275] and cultural dimensions of the organisation spectrum.

The processes of socialisation, externalisation, combination, and internalisation are, according to Nonaka & Takeuchi, repeated and spiral throughout the organisation (from individual, group, and organisational levels) and in the process create company-wide knowledge (organisational knowledge level). Figure 7 is a conceptualisation of Nonaka's SECI model of organisational knowledge and has been annotated to indicate the sensemaking levels dimension. The knowledge spiral indicates a distinct movement from an individual (intra-subjective) who has tacit knowledge that they share with others in groups through socialisation (inter-subjective) and moves up to organisational meanings (generic-subjective) where it results in new behaviour that can be passed on to cultural contexts (extra-subjective).

[274] Nonaka & Takeuchi, 1995.

[275] Weick, 1995 puts organisations at the at the generic-subjective level.

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Figure 7 Nonaka's SECI as a sensemaking level hierarchy

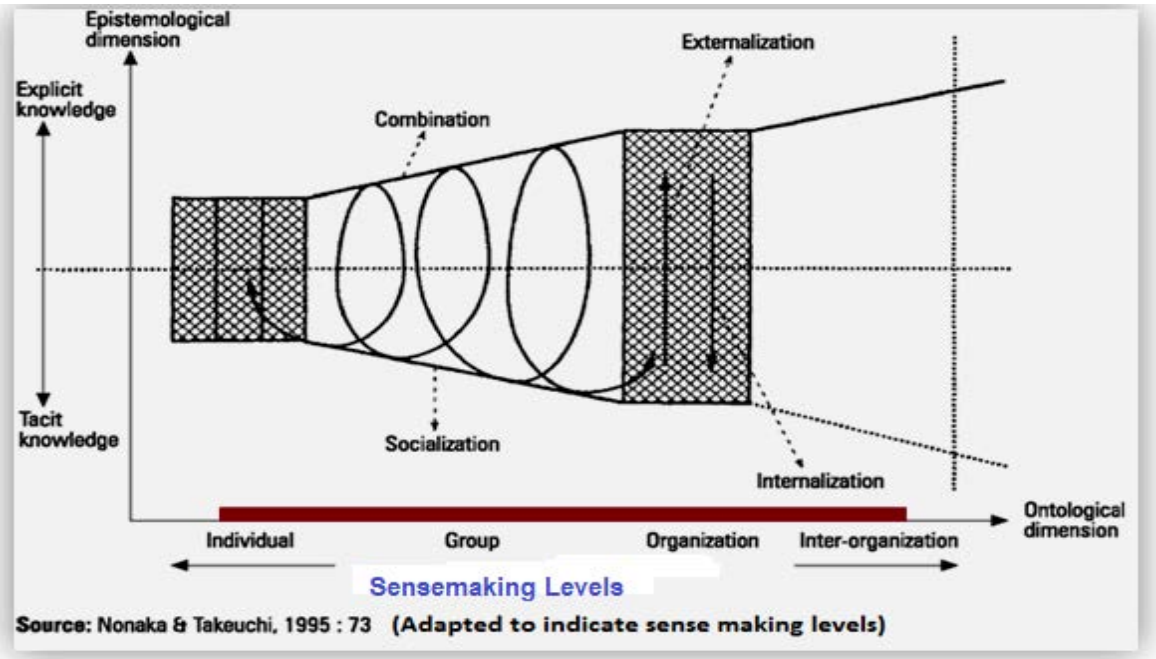

Figure 7 illustrates a conceptualisation of Nonaka's knowledge spiral and indicates that the SECI model conceptualises knowledge as originating at the individual level (intra-subjective), moving to group level (inter-subjective), and to the level of the organisation meaning (generic-subjective) and finally to the inter-organisational which can be intuited as representing the cultural standard practices in the industry (extra-subjective).

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3.8 Boisot's I-Space and sensemaking levels hierarchy

In the first section of this chapter, Boisot's I-space model was explored as an organisational cultural phenomenon and an observation was made that it has four distinct regions that map onto four cultural types; namely bureaucracy, market, clans and fiefs. This section analyses the I-Space concept using an abstract conceptualisation of hierarchy in a sensemaking levels context and places emphasis on the Social Learning Cycle derived from the I-Space.

It was observed that the I-Space is conceptualised as a cuboid focusing on three dimensions analysing information's level of codification, abstraction and diffusion. The I-Space creates a six-point Social Learning Cycle that is the focus of this section.

3.8.1 Explorations within the I-Space: the Social Learning Cycle

Scanning – originates in the diffused region and involves identifying opportunities or threats in generally available but often fuzzy signals[276]. These scanned signals become the possession of an individual or small groups and inherently become tacit knowledge.

Problem-solving (codification) – involves giving shape and coherence to the scanned signals in order to minimise on future processing[277].

Abstraction – reduces the codified signals into their essential conceptualisations and allows them to be generalised[278].

Diffusion – abstract and codified data is less problematic to understand and hence becomes easily sharable and diffuses to become common knowledge[279].

Absorption – the codified and widely-diffused insights are applied to different situations in a learning-by-doing or learning-by-using fashion[280].

Impacting – involves embedding abstract knowledge into concrete practices such as productive artefacts, technical or organisational rules as well as behavioural patterns[281].

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[276] Boisot, 1998

[277] Boisot, 1998

[278] Boisot, 1998

[279] Boisot, 1998

[280] Boisot, 1998

[281] Boisot, 1998

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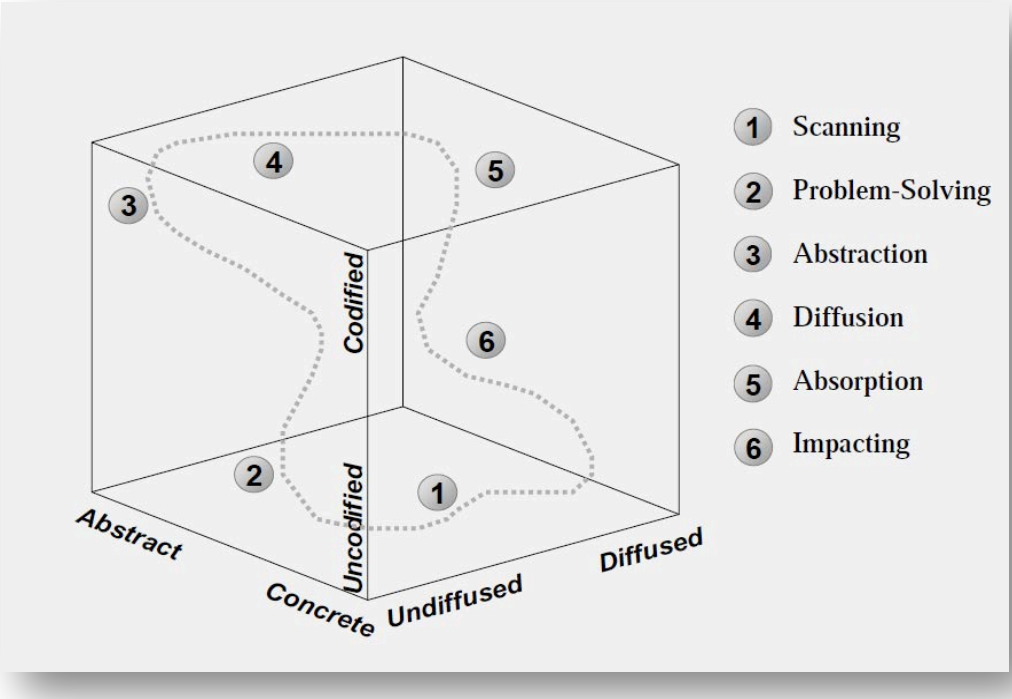
Figure 8: Social Learning Cycle



[Source][282]

3.8.2.The Social Learning Cycle as a sensemaking levels hierarchy

An inspection of I-Space's Social Learning Cycle reveals that it in essence focuses on knowledge flows in and around the individual, group, organisation and cultural context[283]. It is logical to analyse Boisot's Social Learning Cycle in the context of a sensemaking level hierarchy because what Boisot focuses on essentially reduces itself to an understanding of the dynamics of managing the flow of knowledge in and around organisational and societal contexts.

The analysis begins by acknowledging the Social Learning Cycle's description that the scanning process (process 1 in the diagram) originates in the diffused region and involves identifying opportunities or threats in widely available but often fuzzy signals. These fuzzy signals are processed at individual level and they create insights that are only meaningful to the individual. The scanned signals, processed into meaningful intuitions, become the

[282] Boisot, 1998

[283] Care, however, needs to be exercised in the process of interpreting Boisot's conceptualisation from a level perspective because the sensemaking level approach used in this study is one dimensional, while Boisot uses a three dimensional approach. There is, therefore, a risk of missing some of Boisot's crucial insights through oversimplification.

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possession of individuals or small groups and consequently their tacit knowledge. Tracing the I-Space's logic, the fuzzy signals represent knowledge that is widely available and can be construed as common sense[284] and, by extension, such commonly available and shared knowledge can be loosely translated to widely-held views such as those informed by cultural context. The scanning process can therefore be interpreted as a knowledge movement from cultural contexts (extra-subjective) into individual contexts (intra-subjective).

The next process is problem-solving (process 2) and it involves processing the weak scanned signals in order to give them shape and coherence so that their future processing requirements can be minimised[285]. The follow-up process, abstraction, often works in tandem with problem-solving and involves reducing the codified signals into their essential conceptualisations to allow them to be generalised. The two processes, especially problem-solving, are as a result of an intellectual and perceptive skill that creates categories allowing phenomena to be classified and understood; and in most cases are a result of experience and training[286]. It is evident that abstraction and codification are individual level based processes and should be viewed in the context of intra-subjective knowledge processing because of the inclusion of terms such as "tacit possession of the individual", "perceptive skills" and "intellectual abilities". .

The next process in the I-Space is diffusion, which involves sharing well-codified and abstract data with a large population. "One's immediate family is the most plausible locus of shared context, followed by close work colleagues"[287]. The knowledge diffusion in and around the organisation can be logically associated with collective-level (inter-subjective) sensemaking where inter-subjective dialogue occurs not within but, between and among individuals[288].

The next process (which is a logical continuation of the diffusion process) involves the absorption and application of diffused knowledge into different situation in a process that the Social Learning Cycle describes as 'learning by doing' or 'learning by using'[289]. This process

[284] Boisot, 1998

[285] Boisot, 1998

[286] Boisot, 1998

[287] Boisot, 1998

[288] Ryle, 1949 cited in Cecez-Kecmanovic & Jerram, 2002

[289] Ryle, 1949 cited in Cecez-Kecmanovic & Jerram, 2002

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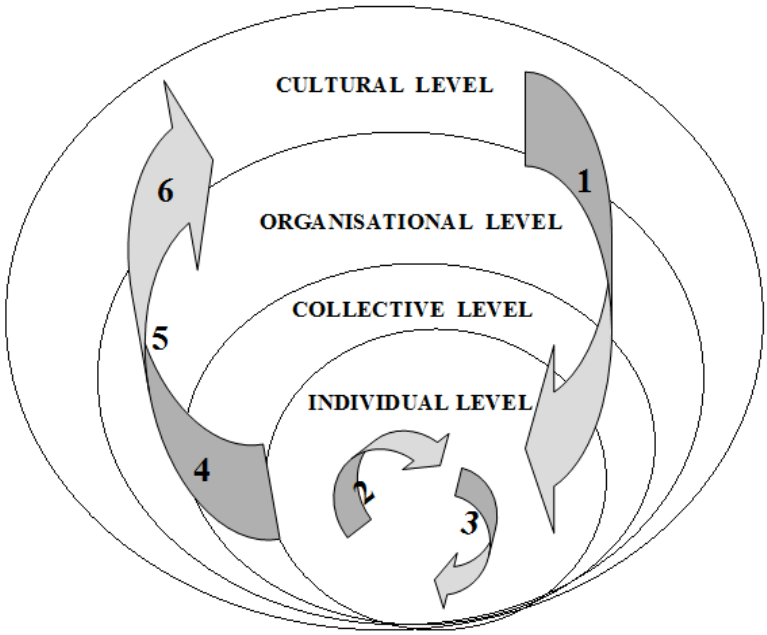
logically happens at, but is obviously not limited to, the organisational knowledge-processing level, a level that is viewed by Wiley as the generic-subjective level.

Lastly, the absorbed knowledge impacts and modifies practices as it gets imbedded into productive artefacts thereby modifying societal and social practices in a process that should naturally be viewed as happening at the cultural level; a level known as the extra-subjective. A conceptual illustration of the argument presented above is illustrated in Figure 9.

Figure 9 An illustration of the analysis of the Social Learning Cycle from a sensemaking levels hierarchy



KEY

1. Scanning
2. Codification
3. Abstraction
4. Diffusion
5. Absorption
6. Impacting

The analysis above presented a view of Boisot's knowledge management theorisation from a sensemaking levels hierarchy point of view. The sensemaking levels hierarchy, though abstract and conceptual, extends the notion that knowledge management thinking still relies heavily on understanding organisations as heaped social layers.

The next sub section presents another sensemaking levels hierarchy analysis using an organisational learning theory commonly referred to as the 4I framework.

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3.9 The 4I and the sensemaking levels hierarchy

The 4I (Intuition, Interpretation, Integration and Institutionalisation)[290] is an organisational learning approach to knowledge management that focuses on individual intuitions and how they propagate from the individual level to the institutional level via group contexts.

3.9.1 From intuition to institution

The notion of organisational learning was presented first by Cangelosi & Dill[291] and grew in popularity as it found its way into organisational knowledge management discourse[292]. Although there are several works on organisational learning[293], the 4I framework by Crossan, Lane & White is a classical theorisation and exploration of the notion of organisational knowledge management at all sensemaking levels. It explores the individual, the collective, the organisational and the cultural facets of organisational knowledge management. As an organisational knowledge management theorisation, the 4I framework describes organisational learning as a phenomenon involving four processes, namely intuiting, interpreting, integrating and institutionalising (4I). These processes connect the individual, group and organisational levels. The following table presents the 4I premises[294].

[290] From hereon shortened to *4I* framework.

[291] The initial study by Cangelosi & Dill, 1965 analysed learning processes of a seven-man team in a complex management decision exercise. Four phases of organisational development were identified: an initial phase, a searching phase, a comprehending phase, and a consolidating phase. The setting of that research is beyond the argument of this study.

[292] Crossan, Lane & White,. 1999.

[293] Other known works and organisational learning theorists are: Daft & Weick, 1984, Huber 1991, March, 1991, Senge, 1990, Watkins & Marsick, 1993.

[294] A detailed discussion of how Crossan, Lane & White, 1999 developed the 4I framework is beyond the scope of this thesis. For an in-depth reading on the framework consult (Crossan, M., Lane, H., & White, R. 1999. An organisational learning framework: From intuition to institution. *Academy of Management Review*, 24: 522–537).

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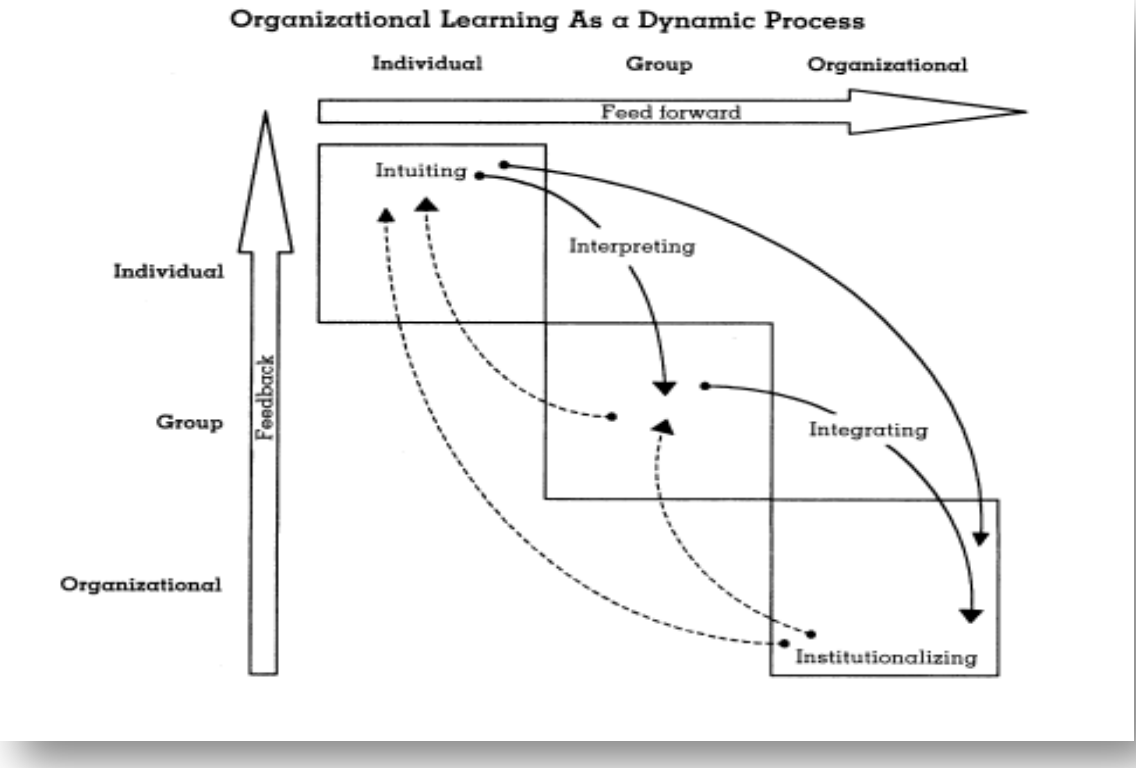
Table 4 Premises of the 4I framework

Premise	Proposition
Premise 1	Organisational learning involves a tension between assimilating new learning (exploration) and using what has been learned (exploitation)
Premise 1	Organisational learning is multi-level: individual, group and organisation
Premise 3	The three levels of organisational learning are linked by social and psychological processes: intuiting, interpreting, integrating and institutionalising
Premise 4	Cognition affects action (and vice versa)

The 4I framework contains four sub processes (intuiting, interpreting, integrating and institutionalising) that occur at three levels: individual, group and organisational levels. The levels define the structure and the processes glue the structure together[295].

Figure 10: The 4I framework



[Source][296]

[295] Crossan, Lane & White, 1999.

[296] Crossan, Lane & White, 1999

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Intuiting – is the preconscious recognition of the pattern and/or possibilities inherent in a personal stream of experience[297], similar to Cecez-Kecmanovic & Jerram's notion of 'individual level knowledge' that is characterised by knowledge creation, maintenance and use at intra-subjective level.

Interpreting – is the explaining, through words or actions, of an insight to oneself and or to others[298], and thus it begins at the individual level and moves on to include other individuals through conversation and dialogue[299].

Integration – is a group level process in which shared understanding among individuals is developed by taking coordinated action through mutual adjustment[300].

Institutionalising – is the process of ensuring that 'routinised' actions occur through task definition, specified actions and organisational mechanisms such as systems, structures, procedures and strategy[301].

Crossan, Lane & White acknowledge that the processes naturally flow into one another and it is difficult to define boundaries between them. However, intuiting occurs at individual level, while institutionalising occurs at organisational level. Interpreting links the individual level to the group level and integrating links the group to the organisational level. In the forthcoming sections this thesis examines the 4I model as an organisational knowledge management theory and explores the associated hierarchical dynamics.

3.9.2 The 4I Framework as a sensemaking levels hierarchy

Intuiting – is located within the individual; individuals develop novel insights based on their experience and their ability to ascertain underlying or potential patterns in that experience, and they then translate those insights into metaphors that provide the possibility of their communication.[302]

Crossan, Lane and White (1999) dwell on two kinds of intuiting: expert intuiting, which is a process of pattern recognition, and entrepreneurial intuition, which deals with innovation and

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[297]Crossan, Lane & White, 1999 citing Weick, 1995.

[298] Crossan,, Lane & White, 1999

[299] Lawrence, Mauws Dyck & Kleysen., 2005.

[300] Crossan, Lane & White, 1999.

[301] Crossan, Lane & White, 1999

[302] Lawrence, Mauws & Kleysen, 2005.

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change. Expert intuition requires practice, time[303], and acquisition of thousands of chunks[304] of knowledge[305]. Once achieved, expert intuition becomes tacit knowledge, subjective, rooted in individual experiences and very difficult to bring to the surface, examine and explain.[306] Metaphors and imagery aid the individual in his/her interpretation of intuitions and communicating to others. The intuiting process, therefore, tends to align itself with the notion of individual-level knowledge-processing occurring at the intra-subjective level.

Interpretation has been noted as the explaining, through words or actions, of an insight to oneself and or to others (e.g. group). Through language and cognitive maps, individuals are able to articulate their intuitions to others. The process suggests a movement from individual to collective knowledge processing as it links the individual to the group[307] and can be logically thought of as a movement from the intra-subjective level of conceptualisation to the inter-subjective level, where dialogue is between and not within individuals.

Groups link the individual to the institution through a process called integration. This process is characterised by shared understandings, interaction, mutual adjustments and dialogue[308]. In situations where dialogue is dominant, mutual trade-offs are likely to occur in order to sustain it. Context is paramount as individuals, groups and organisations adopt cues that apply to them and drop what does not apply[309]. At this level, individuals engage in exchanges to achieve mutual understanding and interpretation of events and situations inter-subjectively to create meanings that go beyond individual knowledge[310]. This is expressed by Ryle as inter-subjective knowing (collective). This integration process linking groups to organisations can therefore be thought of as similar to a movement in conceptualisation from the inter-subjective to the generic-subjective conceptualisation level of knowledge processing. A level that Kecmanovic &. Jerram viewed as representing organisational knowledge.

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[303] Crossan, M., Lane, H., & White, R. 1999 citing Simon 1989 suggests 10 years as the required time to achieve expertise.

[304] Crossan, Lane & White, 1999 citing Simon, 1989 suggests 50000 different chunks of knowledge as the required amount of knowledge required to achieve expert intuition.

[305] Crossan, Lane & White, 1999 citing Simon, 1989.

[306] Crossan, Lane & White, 1999 citing Simon, 1989.

[307] Crossan, Lane & White, 1999

[308] Crossan, Lane & White, 1999 citing Simon 1989

[309] Crossan, Lane & White, 1999

[310] Cecez-Kecmanovic & Jerram, 2002.

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Organisational knowledge is more than the sum of the organisational employees' knowledge because it is embedded in systems, structures, strategies, routines, practices and firm infrastructure[311]. Institutionalising is the process of embedding learning that has been acquired by individuals and groups into the organisation, and it includes systems, structures, procedures, and strategy[312] similar to Kecmanovic &. Jerram's organisational level knowledge processing which typically includes notions of organisational structure, resources, roles, policies, norms, rules and control mechanisms, patterns of activities or actions, and scripts or standard plots[313]. The Institutionalisation process can be viewed as encompassing two sensemaking levels, the generic subjective (organisational knowledge processing) and the extra-subjective (cultural level knowledge conceptualisation) levels. An explanation of this claim is as follows. When knowledge becomes embedded in organisational systems, social reality, characterised by generic subjectivity, kicks in. Selves are thus left behind at the interactive level and individuals become fillers of roles and followers of rules'[314]. In another context, at institutionalisation level, cultural practices emerge as a result of organisational routines that would have been put in place and "symbolic reality" [315] takes over. This level of cultural reality has been previously described as the extra-subjective level of knowledge processing.

An interesting observation is that the process of organisational learning is a bi-directional process in which the individual intuits and influences the organisation while the organisational practices, norms and values also impact on the individual. Figure 11 illustrates the conceptualisation of 4I frameworks as an organisational sensemaking level hierarchy.

The 4I framework, as has already been discussed, is an example of classical sensemaking level-based knowledge management thinking because it dwells on the individual level (intra-subjective), the collective (inter-subjective) and the organisational level (generic-subjective). At each level the task of knowledge management is carried out by a different knowledge agent, individual, group and organisation in organisational learning and innovation. The extra-subjective, which is the level of culture, can be easily deduced from the fact that once intuitions are institutionalised they become and inform cultural practices within the

[311] Crossan, Lane & White, 1999 citing Simon, 1989

[312] Crossan, Lane & White, 1999

[313] Cecez-Kecmanovic & Jerram, 2002

[314] Weick, 1995

[315] Weick, 1995

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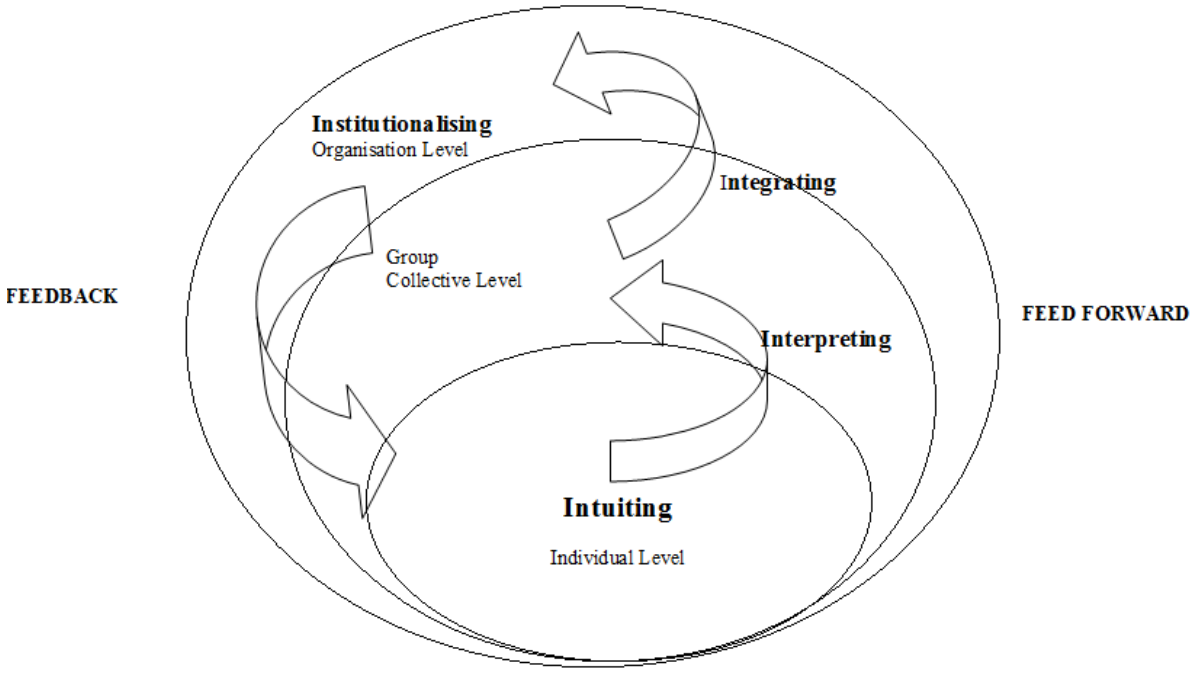
organisation and social setups that interact with it.

Figure 11: Intuition to institution as a level hierarchy



In the 4I context, the focus of knowledge management can be deduced as that of understanding the roles and impact of the knowledge entities at each level and designing appropriate strategies to enhance their knowledge value generation capabilities. The 4I framework explains the knowledge creation process by illustrating the influence of intuition on organisational knowledge management processes.

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3.10 The Open Enterprise and sensemaking levels hierarchy

3.10.1 The New Knowledge Management

In the first section of this chapter, the concept of Firestone & McElroy's Open Enterprise was discussed under the control hierarchy and a point was made to the effect that the Open Enterprise approach (commonly referred to as the New Knowledge Management) realises that the task of organisational knowledge management is complex and has to be split into epistemic tiers. The tier approach emphasises the notion that knowledge management is a multifaceted concept such that each tier or level must focus on a particular epistemic task that the other cannot handle.

Tier 1 is the business operations level, where the organisation has to apply knowledge management in the context of carrying out business operations such as order processing, manufacturing and accounting[316]. This level is consistent with the control hierarchy because it focuses mainly on business-operational requirements in which the efficiencies that come with routine and codified responses would be more important than judgement and evaluation. The first tier, however, generates problems that require a higher epistemic level of conceptualisation; for example, a decline in customer loyalty cannot be treated at the same level as a delayed order delivery. The latter is a tier 1 epistemic task but the former is a tier 2 knowledge management problem. Loss of customer loyalty focuses on challenges inherent in knowledge processes and their outcomes and calls for an inquiry into the 'hows' and 'whys' of the company's operations at tier 1. The last tier (tier 3) considers the social and technical spinoffs of both tiers that create 'knowledge beliefs'[317]. Tier 3 deals with evaluating the beliefs that the organisation holds as true to ensure that they uphold their claim to truth.
The Open Enterprise also acknowledges the sensemaking levels hierarchy dimension in knowledge management by indicating that knowledge processing occurs at the levels of the individual, team, group, community and organisation.

3.10.2 Firestone & McElroy and the sensemaking levels hierarchy

The Open Enterprise approach is based on the notion that all knowledge and forms of knowing or knowledge claims have to pass an evaluation. Firestone & McElroy acknowledge

[316] Firestone & McElroy, 2003

[317] Firestone & McElroy, 2003

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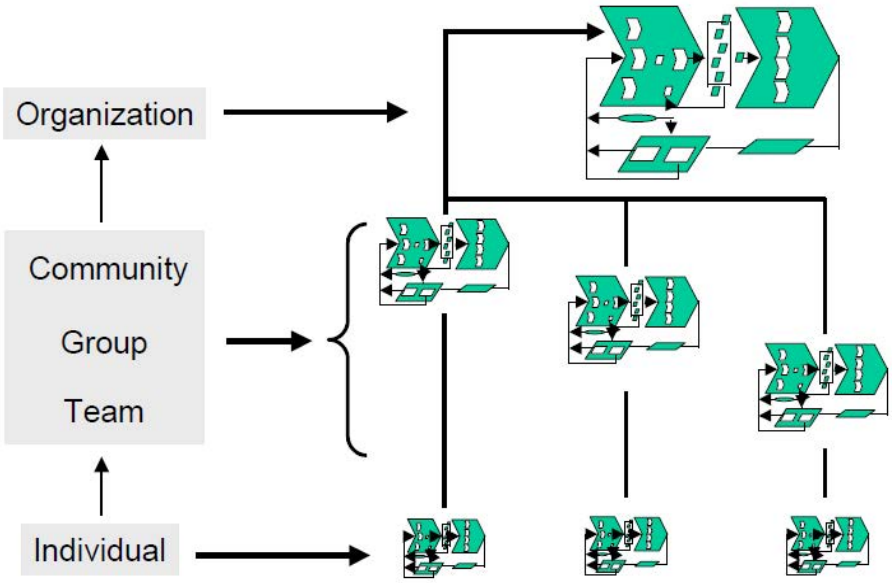
Nonaka's 'knowledge spiral' but argue that the role of knowledge management is to filter knowledge claims as they propagate from the individual, team, group, community and organisation levels. The individual possesses beliefs that are in part tacit and not expressible linguistically[318]. The knowledge claim by an individual has to pass a group, team and community test before it morphs and solidifies into organisational knowledge. Firestone & McElroy's conceptualisation, though not a perfect fit in the sensemaking levels hierarchy, seem to echo the point of view that knowledge processes in organisations revolve around the individual , collective, social and cultural contexts as Figure 12 illustrates.

Figure 12: Firestone & McElroy: hierarchy as sensemaking levels



[Source: (Firestone & McElroy, 2003)]

The New Knowledge Management thinking introduces a different dimension of thinking to the sensemaking levels hierarchy and its function. Nonaka suggested that the individual and group organisational arrangement is there to facilitate the knowledge spiral. Boisot views the individual, group and organisation arrangement as facilitating the social learning cycle, while the 4I framework sees sensemaking levels' role as that of enabling the institutionalisation of intuitions. The Open Enterprise views the role of the individual, group and organisation arrangement as that of filtering knowledge claims as they emerge from the individual and propagate upward to the organisational level. Only those claims that survive scrutiny will be validated as true organisational knowledge.

[318] Firestone & McElroy, 2003

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Section 4
Knowledge Management and the System Coupling Hierarchy

3.11 Introduction

The discussion of the notion of hierarchy and knowledge management has to a large extent focused on three notions of hierarchy, the organisational sensemaking levels approach, organisational control hierarchy and the cultural value hierarchy. Systems thinking, however, views organisations as integrates[319] of subsystems. One small sub-system couples with another sub-system and the two join up to make another major system. This section focuses on this systemic kind of hierarchy.

Systems theory and systems thinking has produced multitudes of mutant theories on organisation science in general and in organisational knowledge management[320]. Two variants of systems thinking, chaos theory and complexity theory, have found extensive application in academic writing and, of late, in knowledge management. Knowledge management theorists have started to probe this theoretical realm in an attempt to explain seemingly inconsistent occurrences in organisational knowledge management observations.

Complexity and chaos thinking complement bureaucrats' obsession with order and structure by equally focusing on the study of disorder. Complexity theory focuses on disorder, irregularity and randomness[321]. According to complexity theory, organisational management is not an exact science because organisations are complex adaptive systems that co-evolve with their environments. A major contribution made by complexity and chaos theory to knowledge management literature is the 'edge of chaos[322]' phenomenon discovered by physicist and mathematician Packard[323] and championed by Stacey[324]. Stacey uses the 'edge of chaos' concept to illustrate how organisations can learn and innovate. Organisations are seen as existing in one of three zones, a stable zone characterised by formal hierarchy, a

[319] Morgan, 2006

[320] A comprehensive list of the variation of systems thinking theories is found in Michael Jackson, 2003.

[321] Michael Jackson, 2003

[322] Stacey, 1996

[323] Jackson, 2003.

[324] Stacey, 1996.

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chaotic zone characterised by unpredictability and finally a very narrow transition zone between stability and instability called the "edge of chaos". The edge of chaos presents an opportunity for an organisation to be creative because it promotes creative tension between forces of stability and instability resulting in a state of constant flux and thus enabling new ideas to be generated. The role of knowledge management is to keep the systemic organisation at the edge of chaos[325]. The implication for organisational hierarchy, control and decision are aptly summed up by Jackson thusly: "The most important thing that managers can do is change their ways of thinking, abandoning mechanism and determinism."

The notion of systems coupling in the context of knowledge management is well covered in the works of Dave Snowden's Cynefin Model and Firestone & McElroy's Open Enterprise[326]. Insight into systems coupling hierarchy will, for purposes of simplicity, be derived from the Cynefin framework.

3.12 The Cynefin Model and systems coupling

3.12.1 Cynefin domains

The Cynefin[327] framework examines organisational contexts as they are and gives decision-makers constructs to make sense of a wide range of organisational problems[328]. It has five domains, four of which are named, and the fifth which is the domain of disorder[329]. The first two domains, the known and the knowable, are ordered and the complex and chaotic domains represent disorder[330]. The Cynefin domains inform organisational scientists on situational contexts that may arise in the business environment and recommend how organisations should adapt to such changing environments.

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[325] Firestone & McElroy, 2003

[326] Firestone& McEroy's Complex Adaptive Systems derivative is long and complicated for the scope of this study. It will not be included in this section in the interest of clarity.

[327] Kurtz & Snowden (2003): understood as the place of multiple affiliations. For detailed reading on the origins and derivation of the Cynefin framework consult Kurtz & Snowden, 2003.

[328] Kurtz & Snowden, 2003

[329] Kurtz & Snowden, 2003

[330] Kurtz & Snowden, 2003

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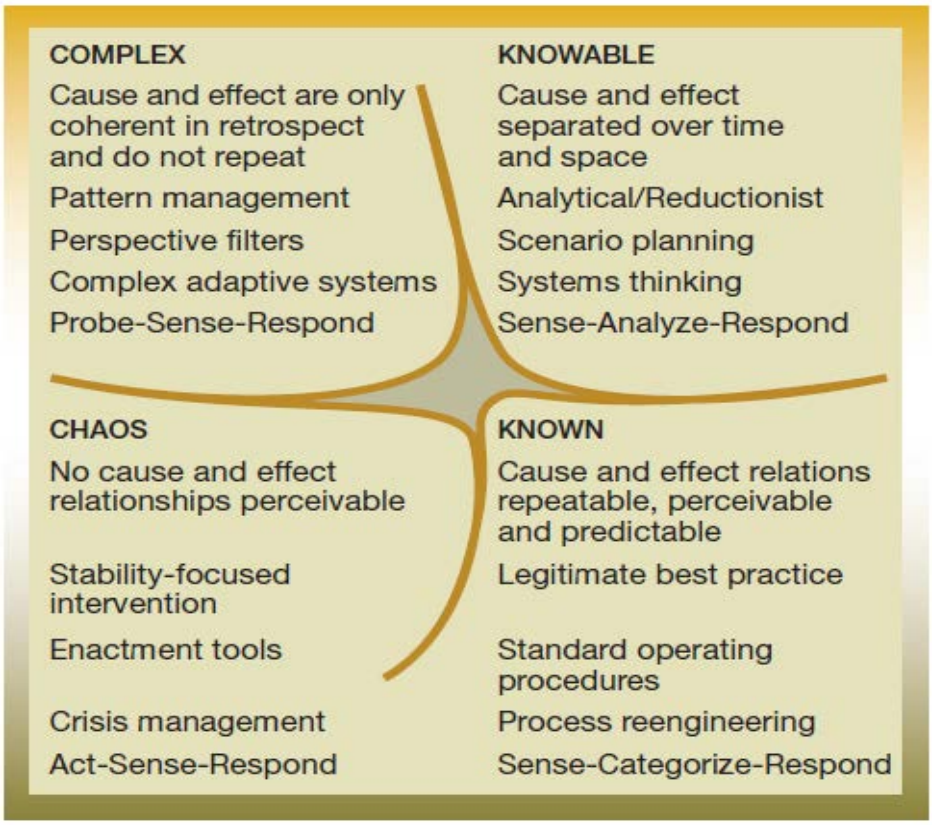
Figure 13 Cynefin framework[331]



[Source[332]]

The known domain represents organisational environments, contexts, problems and situations that are known, predictable and even repeatable.[333] This is a domain where processing engineering is applicable and best practices are adoptable[334]. Knowledge is captured and embedded in structured processes. Best practices can be applied in this domain because the context is stable and can be sensed, categorised and a standard response deployed[335]. It is a safe environment for structured, coordinated organisational forms because it requires only straightforward management and monitoring[336]. What is required is an assessment of the facts of the situation, categorising them, and responding according to established practice. This is the case in heavily process-oriented situations such as loan payment processing[337]. The role

[331] Kurtz & Snowden, 2003

[332] Kurtz & Snowden, 2003

[333] Kurtz & Snowden, 2003

[334] Kurtz & Snowden, 2003

[335] Kurtz & Snowden, 2003

[336] Kurtz & Snowden, 2003

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of organisational management in this context can thus be postulated as facilitating or building organisational capacities that encourage the organisational systems to do what they do well.

The knowable domain is characterised by the existence of stable cause-and-effect relationships that are unknown to the organisation, but can be unearthed with enough investment in time and resources[338]. The recommended course of action is to sense the situation, analyse it and then respond appropriately. This is the domain of expert thinking[339]. "Complicated context calls for investigating several options – many Organisational leaders are warned to guard against entrained thinking and analysis paralysis[340]. An organisational culture encouraged by Snowden and Boone is one in which external and internal stakeholders challenge expert opinions to combat entrained thinking. Experiments and games are used to force people to think outside the familiar. The role of organisational knowledge management in the knowable context seems to suggest an inclination towards building organisational capabilities to critically assess and judge the applicability of standard methods and operating procedures to a given context.

The known domain focuses on coherent and predictable contexts, but the complex domain focuses on retrospective coherence[341]. The complex domain is best understood when analysed from a complexity theory perspective. It assumes the existence of underlying patterns in events that can only be understood retrospectively, i.e. after they have occurred. This is the domain of emergence and belongs to the realm of "unknown unknowns"[342]. In this context, organisations are encouraged to watch out for patterns such that they can read the situation better. The role of organisational management would logically involve building organisational pattern-sensing and analytical abilities.

In the chaotic domain there are no perceivable cause-and-effect relationships. The operative phrase is "action first". This is the context of high turbulence[343] and as such there is no point in looking for right answers[344]. The role of knowledge management should thus be to build

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[337] Kurtz & Snowden, 2003

[338] Kurtz & Snowden, 2003

[339] Snowden & Boone , 2007

[340] Snowden & Boone , 2007: entrained thinking refers to a situation in which the organisation is trapped by repeating its ways of conceptualisation and failing to see situation from another angle.

[341] Kurtz & Snowden, 2003.

[342] Snowden & Boone , 2007

[343] Snowden & Boone , 2007

[344] Snowden & Boone , 2007

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systemic abilities to read patterns and find stabilising points.

3.12.2 Cynefin domains and organisational knowledge management

Although the Cynefin is an organisational tool conceived in the decision-making arena, its prescriptions implicitly hint towards its underlying assumptions about the nature of organisational culture, control and behaviour. The known domain is a stable domain; a best practice scenario with known cause-and-effect relationships. Therefore, organisations can afford to be structured, formal and tailored to optimally respond to the predictable environment. The knowable domain is the domain in which contexts can be known with enough investment in resources and time; therefore the organisation will have to invest in building capacities that encourage flexibility and guard against entrained thinking. The complex domain has a myriad of interlocking contexts that exert pressure on organisational structure. In such circumstances stability and internal status are always under threat and challenge. The chaotic domain is unstable with contexts that cannot be monitored using existing organisational forms of knowing; thus the role of knowledge management should shift towards pattern-reading.

3.12.3 Cynefin domain and systemic coupling

The systemic hierarchy was observed as an inclusion hierarchy characterised by how sub-systems integrate and couple together to form even larger super-systems. The Cynefin model gives a detailed explanation on the nature of systemic coupling and describes the nature of each domain's systemic bonds[345].

The known domain has a strong central but weakly distributed coupling system. Structures and systems in this domain tend to have a strong central director and restrict behaviour[346]. The knowable domain has strong central coupling and strong distributed networks and, just like the known domain, systems tend to resist behavioural change[347].

The other side of the Cynefin framework, chaos and complexity, is made up of systemic elements that exhibit weak connections and attempts to control such systems often fail

[345] For a detailed reading and background on systemic bond, refer to Kurtz & Snowden, 2003

[346] Kurtz & Snowden, 2003.

[347] Kurtz & Snowden, 2003

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because of lack of visible patterns[348].

3.12.4 Cynefin framework and the notion of hiearchy

There is abundant literature on the conceptualisation of an organisation as a coupling of subsystems in systems theory. A popular conceptualisation is the viable systems model and its recursive[349] approach to organisational modelling. Rebuilding the systemic thinking and arguing that organisations are made up of systems that are made of subsystems would be belabouring the obvious. There is not enough space to embark on an extensive discussion of the 'concept' of systems coupling in relationship to the Cynefin model. But for the purpose here it must be understood that the Cynefin model views the organisation as existing in different systems contexts. The 'Cynefin framework is derived from several years of action research into the use of narrative and *complexity theory* in organizational knowledge exchange'[350] It has been established that complexity theory has its roots in systems thinking.

The Cynefin framework realises the need to view organisational knowledge management phenomena as a hierarchy of coupled systems. In this way, systemic coupling allows knowledge management theories to explain and derive useful insight with regards to organisational behaviour and knowledge management. What is even more interesting is that the Cynefin model does not abandon even the control hierarchy. It realises that there are organisational contexts (such as the knowable domain) that are served by a structured and methodical way of thinking. Snowden's main focus, however, is on understanding how an organisation can appropriately reconfigure itself to adapt to the contexts of the changing environment. Adapting to change may involve a higher degree of integration in order to build the necessary requisite variety needed to cope with the environment. The Cynefin model, therefore, is not advocating for an abandonment of the notion of hierarchy in organisational knowledge management thinking, but rather calls for a careful understanding of the contexts in which the organisation finds itself and advises appropriate response actions for each of the four organisational contexts.

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[348] Kurtz & Snowden, 2003

[349] Recursion views an organisation as unit made out up of other smaller identical units. The viable systems model claims that a viable system contain viable systems that can be modelled using an identical cybernetic description as the higher (and lower) level systems. Beer, 1972 calls this the containment hierarchy.

[350] Kurtz & Snowden, 2003

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Section 5

Summary: Knowledge management and the notions of hierarchy

3.13 Introduction

This chapter explored the position of prominent knowledge management works on the notion of hierarchy. Four such notions were explored: the control hierarchy, the cultural value hierarchy, the sensemaking level hierarchy and the systemic coupling hierarchy. The next discussion sums up the arguments raised in this chapter.

3.14 Knowledge management and control Hierarchy

The first section explored the pronouncements of two key knowledge management theorists on the simpler and more direct conceptualisation of the notion of hierarchy as it is used in implementing organisational control. The Knowledge-Creating Company and Firestone & McElroy's Open Enterprise were discussed. Both theories were observed as calling for an innovative application of the notion of control hierarchy and not an abandonment of the concept.

The Knowledge-Creating Company would rather have an organisation in which crucial knowledge-creating decisions emerge from the middle managers who are viewed as the true architects of knowledge in the Knowledge-Creating Company. The top management is described as too romantic to be practical and the lower operatives are constrained by too much detail to be insightful. Middle managers are seen as appropriately placed to be key drivers of knowledge creation. This concept is described as the middle-up-down approach to management. To facilitate the 'middle-up-down' approach, an innovative organisational structure called the "hypertext organisation" is conceived. It is based on three layers of organisational knowledge workers, with functional teams working across the layers. A careful examination of the 'middle-up-down' management approach and the hypertext organisation reveals that what the Knowledge-Creating Company advocates for is a clever application of the notion of hierarchy and not an abandonment of the notion.

Firestone & McElroy observed that the key misconception in knowledge management thinking was mixing operational issues with knowledge issues. In order to resolve such challenges that come with control hierarchy, Firestone & McElroy urge that the knowledge

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management approach[351] to organisational management should be different. They argue that the task of knowledge management is a complex epistemic process that has to be approached at different tiers. The lower epistemic tiers focus on business management and the higher epistemic tiers focus on knowledge processing. Firestone & McElroy's tiers allow organisations to use the control hierarchy in operational processes such as processing and scheduling where efficiency is required. In short, Firestone & McElroy acknowledge that operational contexts can implement control hierarchy to benefit from production efficiencies.

3.15 Knowledge management and cultural value hierarchy

The second section explored the notion of hierarchy in cultural value contexts using Boisot's organisational cultural types. In that context, hierarchy describes a type of organisational culture that develops in business environments that are regulated and internally focused. From a knowledge management perspective, Boisot conceives four culturally-based organisational forms that he identified as the bureaucracy, clan, fief and markets. What is commonly conceived of as a hierarchy culture, Boisot views as a bureaucracy, and explains that such organisational cultures operate in instances where the information-good is highly abstract and codified with limited diffusion. Boisot's reasoning is based on the fact that once an information-good is highly abstract and codified, its diffusion to competing parties is likely to occur. Organisations should, therefore, introduce structures, rules and methods to maximise the extraction of value out of the information-good and most importantly to limit its diffusion. The fief culture indicates a business context in which the crucial information is concrete but not diffused and existing in the heads of a few experts. From a knowledge management perspective, organisations end up configuring themselves as feudal hierarchies in which the organisation relies heavily on the charisma of its leading experts. Boisot's clan culture represents situations in organisations where information is diffused but still limited by lack of codification. Clan cultures operate on horizontal interactions and relationships are less hierarchical. Lastly, a market culture represents a business context in which the information-good is codified, abstract and widely diffused to all such that competition is the key to gaining competitive advantage. Boisot does not advocate for an abandonment of the bureaucracy or the feudal hierarchy. He rather advises on contexts in which each of his cultural types is beneficial to organisational knowledge management.

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[351] Firestone & McElroy, 2003 named their approach the Open Enterprise. It is also loosely referred in knowledge management circles as the New Knowledge Management.

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3.16 Knowledge management and sensemaking levels hierarchy

The third section focused on finding the position of knowledge management thinking on the notion of the sensemaking levels hierarchy by exploring how knowledge management thinking conforms to the four sensemaking levels inspired by Wiley. These levels are the level of the individual (the intra-subjective level); the level of social interaction at which actors create meanings inter-subjectively; the level of social structure (organisations) where social reality is characterised by generic subjectivity, and the level of culture called the extra-subjective level[352]. Four knowledge management theorisations were analysed under this context, namely the Knowledge-Creating Company, Boisot's Social Learning Cycle, The 4I framework and Firestone & McElroy's Open Enterprise approach[353].

Nonaka's theorisation goes to a great length in describing how knowledge is created though a dynamic combination of tacit and explicit knowledge. This dynamic exchange was viewed as cutting across the four sensemaking levels. Tacit knowledge was seen as originating at the level of the individual and socialisation was observed as occurring at the inter-subjective level of knowledge management because it involves the dynamic exchange of mutual meaning between and among individuals[354]. Nonaka's knowledge spiral, in which organisational knowledge originates from the individual, is shared in groups to become company-wide (even industry-wide) standard constructs, is an acknowledgement that he understood that knowledge management had to operate in the same way society is stratified and as conceived by Wiley.

Another knowledge management theorisation that was seen as conforming to the sensemaking levels hierarchy was the 4I framework[355] developed by Crossan, Lane & White. The 4I is an organisational learning framework which highlights the fact that learning begins with the individual, who influences the group that goes on to influence practices and norms that are cemented at the institutional level. The 4I was similarly construed from a sensemaking level hierarchy because it involves the intuiting process that happens at the individual level, the interpreting process that links the individual to the group, the integration

[352] Cecez-Kecmanovic & Jerram, 2002 citing Wiley, 1988

[353] Also referred to as the Open Enterprise.

[354] Cecez-Kecmanovic & Jerram, 2002 citing Wiley, 1988

[355] 4I is a framework for understanding organisational learning developed by Crossan, Lane & White and presents organisational learning as involving the processes of intuiting, interpreting, integrating, and institutionalising that links to the individual, group, and organisational levels.

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process that links the group to the organisation and the institutionalisation process that cements intuitions into organisational systems and cultures. The process described above happens in a feed-forward loop whilst a counter-process in which the organisational practices influence groups and individuals happens in a feedback loop.

Boisot's Social Learning Process as presented in the I-Space Model was found to be similarly layered according to the sensemaking levels hierarchy. The model illustrates how organisations can create a competitive advantage by understanding and developing superior competences in handling the dynamics of information diffusion from the individual level, the collective level, the organisational level and the cultural context. The individual level involves people scanning weak signals that are widely diffused (from society) and refining them into their tacit knowledge that Boisot viewed as concrete but un-diffused. From that individual level, the knowledge has to be codified and abstracted into its generalised and reproducible form. Once the knowledge is codified and abstract its diffusion is easy as it will be in a form that is reproducible. It can be shared by individuals inter-subjectively and impact the organisation and societal cultures.

The third argument focused on insights from the New Knowledge Management theorisation by Firestone & McElroy and established that it acknowledges that critical insights emerge at individual level and propagate through the group, team and organisation to become organisation-wide insights, but they have to be validated by each level before they are accepted as valid and true organisational knowledge.

Knowledge management thinking was observed as generally acknowledging the notion that 'doing' knowledge management involves understanding the individual, the collective, the social and the cultural dynamics of the process.

3.17 Knowledge management and system coupling hierarchy

Lastly, in section four, knowledge management thinking was analysed in the context of systemic hierarchy, where it was noted that other knowledge management theorists have started conceptualising organisational problems as neither structural nor social. Such knowledge management theorisation tends to view organisations as hierarchies of coupled systems and they place emphasis on understanding the dynamics of situations that affect the organisation as a whole. Key insights from a comprehensive system-based knowledge management framework, the Cynefin model, were used. A complete analysis of the dynamic

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of situations and a recommendation regarding the behaviour required of organisations is presented in the Cynefin Model, which postulates that organisations can exist in one of its four domains namely the known, knowable, complex and chaos domains. The known domain is a stable domain; a best practice scenario with known cause and effect relationships, therefore organisations can afford to be structured, formal and tailored to optimally respond to the predictable environment. The knowable domain is the domain in which contexts can be known with enough investment in resources and time; therefore, the organisation will have to invest in building capacities that encourage flexibility and guard against entrained thinking. The complex domain has a myriad of interlocking contexts that exert pressure on organisational structure and, in such circumstances, stability and internal status is always under threat and challenge. The chaotic domain is unstable with contexts that cannot be monitored using existing organisational forms of knowing, thus the role of knowledge management should shift towards pattern-reading.

The role of knowledge management, therefore, is not to prescribe an ideal situation or to condone hierarchy but to illustrate that several contexts exist and the survival of the organisation depends on adapting by introducing higher coupling mechanisms that apply to the new contexts.

The following chapter concludes this thesis. The original argument is restated, followed by a brief recap of the notions of hierarchy conceived in this thesis. The implications of this thesis are presented by way of proposals for future research in the areas of knowledge management theory, organisational management and conceptualisation of the notion hierarchy.

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Chapter 4

Conclusion

4. Introduction

This thesis set out to establish whether the notion of hierarchy is still compatible with modern-day knowledge management thinking. The study set out to understand the context in which the notion of hierarchy is understood and used in knowledge management theory by eliciting the positions of select knowledge management literature on the notion of hierarchy. General organisation theory has been slowly distancing itself from the typical hierarchical structures and modes of thinking that were established in the early industrial era. Organisational knowledge management is saturated with concepts like flexibility, adaptation, learning and innovation to such an extent that it is tempting to assume that hierarchy is an undesirable concept in knowledge practice and inconsistent with knowledge management formulations. It is beneficial to understand knowledge management thinking's general position on the notion of hierarchy, considering that knowledge management is a recent organisational science theorisation that treats knowledge as a key strategic resource in organisations ahead of physical assets. Consequently, the study set out to provide answers to questions arising from the following: what is the meaning of hierarchy in organisational science and, more importantly, what is the position of organisational knowledge management on the notion of hierarchy? Establishing the position of knowledge management on the notion of hierarchy focused on critically assessing knowledge management's pronunciations on the concept and analysing the way a knowledge management theory/framework conforms to established hierarchy notions.

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4.1 Discussion

4.1.1 The notions of hierarchy

The notion of hierarchy eludes an exact definition in organisational science as the term has taken on different meanings, usages, contexts and applications since its conceptualisation in the Clergy some centuries ago. This has huge implications for its use in organisational science and in knowledge management in particular.

The first and most easily recognisable usage context of the term pertains to its application in describing power relations and positions of influence in organisations. It relates to who tells who, what to do. Such a context has been observed as the control hierarchy. This is the form of hierarchy that is easiest to observe[356] in knowledge management thinking as it involves examining the pronunciation made by a knowledge management theory on how organisations should be structured, how tasks need to be carried out as well as functional roles of organisational units. The simplicity of the control hierarchy also betrays its naivety. When organisations are viewed as social systems, the control hierarchy fails to accommodate the higher and more abstract organisational constructs.

The second conceptualisation of the notion of hierarchy in organisational setups involves its usage in the context of describing an organisational type that results from cultural environments where control is high and decision autonomy is normally restricted. Many theorists have attempted organisational typologies based on cultural values. Such cultural typologies normally give rise to distinct organisational configurations along the lines of 'hierarchy', 'market', 'clan', 'adhocracy'[357] or 'bureaucracy', 'fief', 'clan' and 'market'[358]. The cultural value hierarchy thus gives rise to other variations of hierarchies such as fiefdoms. The bureaucracy and hierarchy cultural types can be analysed using the control hierarchy notion, but care needs to be exercised as the analysis would be happening at different levels of abstraction. The control hierarchy operates at a mechanical level of conceptualisation that is synonymous with Morgan's machine metaphor while the cultural value hierarchy analysis would be operating at a more social and subtle level. To observe the cultural value hierarchy in organisations is to observe the nature of subtle social processes

[356] does not mean abundant but implies the cognitive skills needed to tease out the notion out of a theoretical work.

[357] Competing Values Framework.

[358] Boisot, 1998.

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such as the dynamics of relationships, the way goals are set and are achieved. The cultural value hierarchy analysis misses another abstract conceptualisation of the organisation that is common in social level analysis: the sensemaking levels hierarchy.

The sensemaking levels hierarchy is an abstract representation of organisational stratification in social contexts. It conceives reality as negotiated dialogues that begin at the intra-subjective (individual), inter-subjective (collective), generic-subjective (organisational) and extra-subjective (cultural). To observe the sensemaking levels hierarchy in organisational knowledge management is to look at how social dialogue or knowledge moves in and around the sensemaking levels.

Hierarchy of levels of systems coupling sees organisations as subsystems integrated at a higher whole systems level. Emphasis is placed on understanding the behaviour of an organisation as a systemic whole as opposed to dissecting it to understand the behaviour of its individual elements. Viewed from the systemic point of view, Snowden is a good example of how organisations can be seen as existing in known domains, knowable domains, complex domains and chaotic domains.

4.1.2 Hierarchy and knowledge management

The second challenge in this thesis, after understanding the meaning of hierarchy, was to establish *select* organisational knowledge management theories' position on hierarchy. This was done by analysing pronouncements made by a *few key* knowledge management theorists as well as inspecting how the theories conform to derived contexts of hierarchy.

4.1.2.1 Control hierarchy and knowledge management

There is still a role for the control hierarchy, albeit in a modified form, in organisational knowledge management. The Knowledge-Creating Company adopts a 'middle-up-down' approach to management and a hypertext organisational configuration to revive the control hierarchy in a form that is innovative and beneficial to knowledge management. The hypertext configuration and the middle-up-down approach should not be viewed as an abandonment of control hierarchy in the organisation, but an innovative use of the concept. In the 'middle-up-down' approach, the Knowledge-Creating Company calls for key knowledge processes to move down to mid-level managers, as this is the level that is crucial for knowledge creation. Even in the hypertext organisation, layers of knowledge management personnel are still evident, indicating that the control hierarchy is still around and going

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nowhere.

Logic should inform that changing the way you use a tool as the Knowledge-Creating Company did is different from throwing away the tool. The same argument can also be extended to Firestone & McElroy's split of organisational knowledge management into epistemic tiers. In the lower level, business processing, the framework conceives business processing as a hierarchical phenomenon that can and should be routinely used.

4.1.2.2 Knowledge Management and cultural value hierarchy

Different knowledge contexts require different operational modes. The mantra of recent knowledge management theorists has been to the effect that knowledge management is about innovation, creativity and loosening on control. What Boisot's cultural analysis informs is that, yes, knowledge management is about networking in clans; yes, knowledge management is about competing in the markets; but it is also about controlling and guarding organisational competitive positions in bureaucracies as it is about extracting value out of the organisational experts in a feudal hierarchy setup. Knowledge management should not be built around a singular cultural property. Understanding the different cultural contexts and adopting the best and most suitable one is the critical success factor.

4.2.2.3 Knowledge management and sensemaking levels hierarchy

Organisations are social entities made up of many dialoguing beings and an abstract analysis of how knowledge management theories conform to this basic social construct informs whether the notion of hierarchy is a mis-match in the knowledge management context or not. In the select theories[359] analysed, it was observed that knowledge management routinely focuses on understanding the individual, who is a communicating self; the collective, which interacts inter-subjectively; the organisation, which is the generic subjective; and the cultural, which is the extra-subjective. All theorists try to explain how these levels interact in enhancing organisational knowledge management. An observation can be made that although this level analysis does not appeal to the control hierarchy or cultural values hierarchy, it acknowledges a crucial realisation by knowledge management thinking that knowledge processes are not flat; rather, they occur at different but intertwined social levels.

4.1.2.4 Knowledge management and systemic hierarchy

Knowledge management thinking acknowledges that organisations are integrative wholes made up of dynamically-linked constituencies. The implication of that dynamic, besides

[359] Nonaka, Firestone & McElroy, 4I, I-Space –Boisot.

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confirming that organisations are inclusively coupled in an incremental way, has been a call to treat organisational knowledge management as a complex adaptive process demanding holistic treatment and not reductionism.

4.2 Concluding remark

The analysis above has given insights into the position of *select* organisational knowledge management on hierarchy. The general and often casual remark in knowledge management circles is to view the notion of hierarchy with disdain, as the usage of the term has for long been associated with control and inflexibility. In this thesis, a point has been made to the effect that the notion of hierarchy is widely used and acknowledged in *certain* key knowledge management theorisations, albeit in different contexts. Disparaging connotations of the notion of hierarchy have to be, thus, considered carefully and done in a qualified context.

4.3 Future research

This thesis could be understood as a corrective on popular thinking based on a naive conception of hierarchy that claims that hierarchy is the foremost evil for knowledge management (often conceived of as mostly knowledge sharing). Four issues arise from this research that need following up on.

Firstly, a small classical sample of knowledge management literature was used to illustrate that the notion of hierarchy is evident in knowledge management thinking. The idea was not on establishing a statistical confirmation of the fact, but an explorative teasing-out of an idea to generate the necessary debate in academia. Follow up research on a wider scale of theories could bolster (or perhaps weaken) the tentative position put forward in this thesis.

A further limitation is the possible flat refusal of any conception of hierarchy other than hierarchy as control. It is argued here that cultural value, sensemaking levels and systems coupling are all ‘types’ of hierarchies that matter for organisations. A plausible argument could be raised that these types of hierarchies do not fit the definition of a hierarchy in the strict sense of the word. The thesis however tried to demonstrate that over time the notion of hierarchy has developed a multiplicity of meanings that goes beyond bureaucratic control. Consequently limiting its application to a narrow definition of who gives what orders would

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constitute a misleading oversimplification, especially, when abstract concepts such as organisational knowledge are at stake. What this thesis does, is bringing to fore the multiple conceptualisations of the notion of hierarchy and highlighting how they have found usage in knowledge management thinking. The debate on whether sensemaking levels, cultural value, and systems coupling comply or do not comply as instances of organisational hierarchy could be a subject of a follow-up research. What is called for is further conceptual research into how these various (and perhaps even other) notions of hierarchy relate to each other.

Thirdly, the sensemaking levels hierarchy analysis largely relied on association as opposed to deduction. A typical case could be Nonaka's knowledge spiral. Does the fact that Nonaka mentioned that knowledge spirals out of the individual and the group and into the organisation necessarily imply that Nonaka was thinking in the same frame of mind as Wiley's dialoguing levels? A close alignment analysis of all knowledge management theory discussed in this thesis to Wiley's sensemaking levels analysis could establish whether the association of knowledge management levels with sensemaking levels made in this thesis is a widespread phenomenon or a once-off academic coincidence.

Lastly, the conceptualisation of knowledge management along the four notions of hierarchy discussed in this thesis inspires a line of thinking worth probing as summed up in the following question. What is being '*managed* when the term *knowledge management* is discussed? Could it be the organisational structures and processes as depicted by the control-hierarchy? Could it be the cultural practices as conceived in the cultural-value hierarchy? Could it be a case of managing the social dialogues at sensemaking levels as conceptualised by Wiley or could knowledge management be about understanding the dynamics of situations in the organisation as outlined in the Cynefin model? Chances are that knowledge management could be about all the contexts raised above and that knowledge management, as a field, is now littered with conflicting conceptualisations to such an extent that theories and theorists are just 'talking past each other'[360]. In this context, a proper stock take of knowledge management theory could therefore be required and possibly lead to the creation of a unified theory of organisational knowledge management.

[360] '*Talking past each other*'. A situation where people are talking about a different concept yet they believe that they are talking about the same thing.

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Glossary

4I framework (Crossan, Lane & White)	4I is a framework for understanding organisational learning developed by Crossan, Lane & White and presents organisational learning as involving the processes of intuiting, interpreting, integrating, and institutionalising that links the individual, group, and organisational levels.
Boisot – Scanning	Involves identifying opportunities or threats in generally available but often fuzzy signals.
Boisot – Diffusion	The process of codified and abstract information becoming available to those who can use them.
Boisot – Feudal Culture	Feudal Culture is maintained by the leaders' personal power and influences
Boisot – Absoption	Assimilating new information or knowledge and in the process enhancing one's own capabilities and applying to different situations in a 'learning by doing' or 'learning by using' fashion.
Boisot – Abstraction	Reduces the codified signals into their essential conceptualisations and allows them to be generalised.
Boisot – Codification	Involves giving shape and coherence to the scanned signals in order to minimise their future processing.
Boisot – Impacting	Involves embedding the abstract knowledge into concrete practices such as productive artefacts, technical or organisational rules as well as behavioural

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	patterns.
Bounded rationality	The notion of bounded rationality was proposed by H. Simon as a challenge to mathematical decision-making modelling. Simon reasoned that individuals are constrained by capacity, time and resources in decision-making to the extent that they seek satisfactory solutions as opposed to rational choices in a process called satisficing.
Bounded rationality path-dependent exploration	Model that explains the creation of new technologies and knowledge by drawing from and recombining stream of existing technologies. Nerkar's argument emphasises the fact that knowledge evolution as a recombinant process is driven by wilful acts of investors who deliberately choose which strand or path to take. They are, however, constrained by a lack of adequate information and they therefore end up 'satisficing' and the result is not necessarily an optimal solution.
Bureaucracy /Bureaucratic Image	Loosely translates to imply an image of an organisation characterised by vertical chains of command, levels of authority and subordination.
Chaos theory	Used in systems thinking to describe a system that is highly sensitive to the tiniest changes in initial conditions and produces seemingly random and unpredictable behaviour that can, however, be understood using certain rules.
Communities of Practice	Collaborative, interactive networks of individuals within a generally defined topic of knowledge.

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Competing Values Framework	The Competing Values Framework refers to whether an organization has a predominant internal or external focus and whether it strives for flexibility and individuality or stability and control and assesses the dominant organisational culture based on four culture types: Clan, Hierarchy, Adhocracy, and Market.
Complexity theory	Used in conjunction with Complex Adaptive systems and describes a system that adapts through a process of 'self-organisation' and selection into coherent new behaviours, structures and patterns[361].
Cynefin model	A framework developed by Dave Snowden to provide a typology of contexts that complex adaptive systems like organisations may find themselves in. It provides parameters for decision-making under conditions of uncertainty.
Cynefin model – Chaotic domain	A context in which there is no relationship between cause and effect and a novel (original) solution has to be developed.
Cynefin model – Complex domain	A context in which the cause and effect relationship can only be understood in retrospect. The system's behaviour emerges out of a dynamic interaction of several interrelated systemic agents.
Cynefin model – Complicated domain	A context in which some analysis and expert thinking will be required to come up with a solution.

[361] Dann & Barclay, 2006

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Cynefin model – Simple domain	A context that is well structured and easy to understand in which a straightforward standard solution can be deployed.
Emergence	Used in systems thinking to imply a notion that in any given system, the whole is bigger than the sum of its constituent parts. Alternatively, the whole is not reducible to its individual units.
Explicit knowledge	Knowledge that has been formalised and made specific enough to be easily understood without ambiguity.
Galilean moment	A term coined in this thesis to imply a moment of inconvenient truth, similar to the instance when Galileo Galilee had to labour the fact that the earth went around the sun thereby opposing popular thinking of that time.
Human Capital Approach	An emergent thinking in management and labour environments emphasising the importance of people's skills and competences as decisive in organisational success.
Institutionalising (4I framework)	The process of ensuring that routinised actions occur by defining tasks and specifying actions as well as putting in place mechanisms that enforce prescribed actions[362].
Integrating (4I framework)	The process of developing shared understanding among individuals and of taking coordinated action through mutual adjustment[363].

[362] Crossan, Lane & White, 1999

[363] Crossan, Lane & White, 1999

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Interpreting (4I framework)	Interpreting is the explaining, through words or actions, of an insight to oneself and or to others. It begins at the individual level and moves on to include other individuals through conversation and dialogue[364].
Intuition (4I framework)	The preconscious recognition of the pattern and/or possibilities inherent in a personal stream of experience[365].
I-Space Model	A framework developed by Max Boisot that focuses on knowledge flows through the social learning process. It emphasises the degree of structure of knowledge (i.e. its level of codification and abstraction) and illustrates its diffusibility as it moves around the social learning cycle.
Knowledge assets	There is no universally agreed-upon definition of the term. In the context of this research, knowledge assets can be conceptualised as the accumulated capabilities found in an organisation. They would be a fluid mix of the organisation's competencies, technologies and 'know-hows'.

[364] Crossan, Lane & White, 1999

[365] Crossan, Lane & White, 1999

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Knowledge economy	"Production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence. The key component of a knowledge economy is a greater reliance on intellectual capabilities than on physical inputs or natural resources[366]".
Melman's ratio	A measurement of the cost dynamics within an organisation that examines and tries to keep track of the amount by which administrative costs compare to actual production costs.
Morgan's machine metaphor	Based on the original principles of Taylorism, the machine metaphor conceptualises an organisation as a system of well-structured and co-ordinated activities in which roles and tasks are formally designed with vertical top-down chains of command.
Morgan's brain metaphor	Focuses on how organisations learn and reproduce their competences across subunits
Morgan's constant flux metaphor	Organisations are never static or constant. They are in a state of constant change.
Morgan's cultural metaphor	Examines a system of values, norms and practices that define how organisations understand and interpret their social cues.

[366] Powell & Snellman, 2004.

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Morgan's organism metaphor	Assumes a more dynamic concept of an organisation including aspects of conception, death and how organisations can evolve and cope with the environment.
Morgan's political systems metaphor	Organisations are places where power play is dominant with each person, faction or department constantly trying to assert its views on the rest.
Morgan's psychic prison metaphor	'Organisations are ultimately created and sustained by conscious and unconscious processes, with the notion that people actually become imprisoned in or confined by the images, ideas, thoughts, and actions to which these processes give rise[367]'.
Morgan's ugly dominators metaphor	Organisations are ugly dominators that thrive on using and abusing workers.
Open Enterprise (Firestone &McElroy)	Variant of knowledge management, which stresses the importance of using knowledge management to enhance knowledge production in organisations, not just knowledge sharing or integration.
Organisational Culture – Adhocracy	The adhocracy culture is externally-oriented, supports a flexible organisational structure and addresses issues around innovation, creativity, articulating future vision, transformation change and entrepreneurship.

[367] Morgan, 2006.

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Organisational Culture – Bureaucracy	Used by Boisot to describe an organisational setup in which "relationships are impersonal and hierarchical". Information in such contexts is well-codified and abstract.
Organisational Culture – Clan	Clan culture type is internally-oriented, focuses on a flexible organisational structure and highlights issues of teamwork, collaboration, talent management, empowerment, and inter-personal relationships.
Organisational Culture – Fief	Used by Boisot to describe an organisational setup in which information diffusion is limited by lack of codification and abstraction. Communication is on a face-to-face basis.
Organisational Culture – Hierarchy	A hierarchy culture is typical of Taylor's original management principles. Focuses on internal control, rules and regulations.
Organisational Culture – Market	A market culture is defined by an external organisational focus that is characterised by competitiveness, fast response, decisiveness, driving through barriers, and goal achievement.
Organisational Hierarchy – Control Hierarchy	A conceptualisation of the organisation that focuses on rules, procedures and positions of power within an organisation (who gives what orders).
Organisational Hierarchy – Sensemaking levels hierarchy	A view of an organisation based on the sensemaking levels inspired by Wiley's levels of the individual, the inter-subjective, the generic-subjective, and cultural.

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Organisational Hierarchy – Systemic hierarchy	A conceptualisation of an organisation that views it as a system made up of interrelated and integrated coupling of subsystems (systems within a system).
Organisational Hierarchy – Cultural value hierarchy	A view of the organisation that classifies organisations into a hierarchy, a clan, a market and an adhocracy based on the dominant culture within the organisation.
Random path dependent exploration	Model that explains the creation of new technologies and knowledge by drawing from and recombining streams of existing technologies. It asserts that the knowledge outcomes that emerge from a recombination of streams of technology are as a result of a process that is devoid of rationality on the part of the organisation.
Rational non-path-dependent exploration	Model that explains the creation of new technologies and knowledge by drawing from and recombining stream of existing technologies. It draws from neoclassical economics and assumes perfect information and complete rationality on the part of the organisation[368]. The organisation chooses among alternative streams and includes the best choices in their recombination process, leading to an optimal outcome[369].
Redundancy	A concept used by Nonaka in which Japanese firms use different functional teams in defining an organisational concept, and in the process organisations get a holistic picture of the concept by experiencing it from different points of view.
Satisficing theory	Refer to bounded rationality.

[368] Nerkar, 2003
[369] Nerkar, 2003

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Scientific management	A system of managing or running an organisation based on measuring and analysing production workflows. It also invokes the notion of inhumane treatment of workers.
Sensemaking	A field in social, psychological and philosophical studies that specialises in understanding how people and organisations give meaning to experience.
Sensemaking – collective level	Also understood as the inter-subjective.
Sensemaking – cultural level	"Assumes a stock of tacit, taken-for-granted convictions, beliefs, assumptions, values and experiences that members of an organisation draw upon in order to make sense of a situation and create meanings at all other levels"[370].
Sensemaking – individual level	The level of an individual who has thoughts, beliefs, feelings, desires, intentions, etc., that is called the "intra-subjective".
Sensemaking – inter subjective level	"Represents shared understanding that emerges through social interaction. Namely, individuals engaged in communication and oriented toward mutual understanding interpret events and situations inter-subjectively and create synthesised meanings that transcend individual knowledge"[371]
Sensemaking – intra subjective level	Also understood as individual-level sensemaking.
Sensemaking – organisational level	Also understood as social level.

[370] Cecez-Kecmanovic & Jerram, 2002.
[371] Cecez-Kecmanovic & Jerram, 2002

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Sensemaking – Social level	"Denotes generic meanings and social structures that emerge in and reproduce an organisation"[372].
Span of control	Used in management to loosely imply the number of subordinates a supervisor has.
Tacit knowledge	Tacit knowledge is a form of knowledge that is difficult to articulate and associated with the deep individualised capabilities that are required to carry out an epistemic task.
Taylorism	Translates to management thinking based on Frederick Taylor's management principles
Taylorites	Loosely translates to management theorists who crafted their thinking based on Frederick Taylor's management principles
Time-span of discretion	Jaques used the concept to describe a measure of how much responsibility an employee has in a hierarchy. It is premised on the principle that the higher the person was in a hierarchy, the longer he could work to complete a task without supervision.

[372] Cecez-Kecmanovic & Jerram, 2002

Stellenbosch University http://scholar.sun.ac.za

Bibliography

ADLER P. S. (2001) Market, Hierarchy, and Trust. O*rganization Science*/Vol. 12, No. 2, March–April 2001

ALAVI, M., & E.LEIDNER, D. (2001). Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly Vol 25* No 1 , 108.

ALAVI, M., & LEIDNER, D. (2011). Knowledge Management Systems: Emerging views and Practices from the Field. *International Conference on System Sciences,* (p. 239).

ANAND, A., & SINGH, M. D. (2011). Understanding Knowledge Management: A Literature Review . *International Journal of Engineering and Science Technology* Vol 3 No 2 .

BARLEY, S. (1986). Technology as an Occasion for Structuring: Evidence from Observations of CAT Scanners the Social Order of Radiology Departments. *Administrative Science Quarterly,31* , 78-108.

BELTRAN, L. (2002, 07 19). news/worldcom_bankruptcy. Retrieved 06 10, 2013, from cnn.com: *www.money.cnn.com*

BENNIS &. SLATER. (1964). Democracy is inevitable. *Harvard Bus. Rev*. (March–April).

BERRIO, A. A. (2003). An Organizational Culture Assessment Using the Competing Values Framework: A Profile of Ohio State University Extension. *The Journal of Extension - www.joe.org* , Volume 41 // Number 2 .

BHATTACHERJEE, A. (2012). "*Social Science Research: Principles, Methods, and Practices".* Collection. Book 3. (. South Florida,: Scholarstic Commons USF Tampa Bay Open Access Textbooks.

BOISOT, M. (1998). *Knowledge Assets. Securing Competitive Advantage in The Knowledge Economy* . Oxford: Oxford University Press.

BUKOWITZ, W., & PETRASH, G. (1997). Visualizing, Measuring, and Managing Knowledge. *Research Technology Management* . Vol. 40 Issue 4

BUSH, T. (2003). *Theories of Educational Leadership and Management: Third Edition.* Sage.: London.

BUSINESS DICTIONARY. (n.d.). Retrieved 07 08, 2013, from Business dictionary: http://*www.businessdictionary.com*/definition/iceberg-principle.html

Stellenbosch University http://scholar.sun.ac.za

CAMERON,K.(N.D.) An Introduction to the Competing Values Framework. Retrieved 09 22, 2013, from: http://www.wave-fcm.com/Attachments/

CAMERON, K. S., & QUINN, R. E. (2005). *Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework.* (The Jossey-Bass Business & Management Series) [Paperback]) .

CECEZ-KECMANOVIC, D., & JERRAM, C. (2002). Sensemaking Model of Knowledge Management in Organisations. *ECIS* , 894-904.

COOK, S. D., & BROWN, J. S. (1999). Bridging Epistemologies: The Generative Dance Between Organizational Knowledge and Organizational Knowing. *Organization Science/Vol. 10,* No. 4, , 381–400.

CORRIGAN, K., & HARRINGTON, M. L. (2011, FALL 2011). *plato.stanford.edu/cgi-bin/encyclopedia/archinfo.cgi.* Retrieved 09 29, 2013, from Stanford Encyclopedia of Philosophy: http://plato.stanford.edu/archives/fall2011/entries/pseudo-dionysius-areopagite

CROSSAN, M. M., LANE, H. W., & WHITE, R. E. (1999). An Organizational Learning Framework: From Intuition to Institution. *The Academy of Management Review,* Vol. 24, No. 3 , 522-537.

CURRALL, S. C., & EPSTEIN, M. J. (2003). The Fragility of Organisational Trust: Lessons From The Rise and Fall of Enron. *Organisational Dynamics Vol*. 32, No 2 , 193-206.

DANN, Z., & BARCLAY, I. (2006). Complexity Theory and Knowledge Management Application. *The Electronic Journal of Knowledge Management* Volume 4 Issue 1, , 11-20.

DANN, Z., & BARCLAY, I. (2006). Complexity Theory and Knowledge Management Application. *Electronic Journal of Knowledge Management* Volume 4 Issue 1 , 11-20.

DAVENPORT, T. H., & PRUSAK, L. (1998). *Working Knowledge: How organisations Manage What They Know.* Boston: Harvard Business School.

DITTO, W., & MUNAKATA, T. (1995). Principles and Application of Chaotic Systems. Communications of the *ACM* , 38 : 11.

DOLAN T. E. (2010). Revisiting Adhocracy: From Rhetorical Revisionism To Smart Mobs. *Journal Of Futures Studies,* November 2010, 15(2): 33 - 50

Stellenbosch University http://scholar.sun.ac.za

ESPEJO, R. (2012). Seeing Organisations. *Emerald Group Publishing Limited* Vol. 41 No. 3/4, , 327-338.

EVAN, W. M. (1963). Indices of Hierarchial Structure of Industrial *Organisations. Management Sciences,* Vol 9, No 3 , 468-477.

FIRESTONE, J. M., & MCELROY, M. W. (2003). *The Open Enterprise Building Business Architectures for Openness and Sustainable Innovation*. Hartland Four Corners, Vermont: KMCI Publications Group.

FIRESTONE, J. (N.D.). The New Knowledge Management: A Paradigm and Its Problems. Retrieved 09 25, 2013, from *KMCI: http://www.kmci.org/media*/Firestone-tnkmparadigm.pdf

GAJDUSCHEK, G. (2003). Bureaucracy: Is It Efficient? Is It Not? Is That The Question? Uncertainty Reduction: An Ignored Element Of Bureaucratic Rationality. *Administration & Society,* Vol. 34 No. 6 , 700-723.

HAMBRICK, D. C. (1984). Taxonomic Approaches to Studying Strategy: Some Conceptual and Methodological Issues. *Journal of Management* Vol 10. No. 1. , 27-41.

HARTNELL, C. A., OU, A. Y., & KINICKI, A. (2011). Organisational Culture and Organisational Effectiveness: A Meta-Analytic Investigation of The Competing Values Framework Theoretical Suppositions. *Journal of Applied Psychology* , 677-694.

HINTON, B. (2003). Knowledge Management and Communities of Practice: an experience from Rabobank Australia and New Zealand. *The International Food and Agribusiness Management Review* Vol 5 Iss 3 , 1-15.

JACKSON, M. C. (2003). *Systems Thinking: Creative Holism for Managers*. Massachussetts: Wiley.

JAQUES, E. (1996). *Requisite Organization: A Total System for Effective Managerial Organization and Managerial Leadership for the 21st Century*. Arlington: Cason Hall & Co.

JOHNSON, D. P. (2008). *Contemporary Sociological Theory An Intergrated Multi-Level Approach.* Lubbock Texas: Springer+Business Media LLC.

KURTZ, C., & SNOWDEN, D. (2003). The New Dynamics of Strategy-Sensemaking in a Complex and Complicated World. *IBM Systems Journal* Vol 42, NO 3 .

LANE, D. (2006). Hierarchy, Complexity, Society. In D. Pumain, *Hierarchy in Natural and Social Sciences* (pp. 81-119). Netherlands: Springer .

Stellenbosch University http://scholar.sun.ac.za

LAWRENCE, T. B., MAUWS, M. K., DYCK, B., & KLEYSEN, R. F. (2005). The Politics Of Organizational Learning: Integrating Power Into The 4I. *Academy of Management Review*, Vol. 30, No. 1 , 80–191.

LEVY, Y., & ELLIS, T. J. (2006). A Systems Approach to Conduct an Effective Literature Review in Support of Information Systems Research. *Informing Science Journal* Volume 9, , 181-212.

MACH, J. G., & SIMON, H. (1958). *Organisations.* New York: Wiley.

MARKUS, M. L. (2001). Towards a Theory of Knowledge Reuse: Types of Knowledge Reuse Situations and Factors in Reuse Success. *Journal Of Management Information Systems,* 18 , 1 (Summer) , 57-93.

MCKELVEY, B. (1975). Guidlines for the Empirical Classification of Organisations. Administrative Science Quarterly, 20 , 509 - 525.

MEAD GH. 1934. *Mind, Self, and Society. Chicago:* University of Chicago Press.

MEYER, A. D., TSUI, A. S., & HINNINGS, R. (1993). Configurational Approaches to Organisational Analysis. *The Academy of Management Journal* Vol 36, No 6 , 1175-1195.

MITCHELL, A. (1991). *Philosophy Social Theory and The Thought of Herbert Mead.* Albany: State University of New York Press.

MITLETON-KELLY, E. (2003). *Complex Systems and Evolutionary Perspective of Organizations: Application of Complexity Theory to Organizations: Ten Principles of Complexity and Enabling Infrastructures'*, London: Elsevier Ltd.

MORGAN, G. (2006). *Images of Organisation.* London: Sage Publications, Inc.

MYERS, C. (N.D.). definitions-horizontal-vertical-organizations-23483.html. Retrieved 09 27, 2013, from *smallbusiness.chron.com/*: http://smallbusiness.chron.com/

NELSON, R. R., & WINTER, S. G. An Evolutionary Theory of Economic Change. Massachussettes: Belknap Harvard.

NERKAR, A. (2003). Old Is Gold? The Value of Temporal Exploration in the Creation of New Knowledge. *Management Science*, Vol. 49, No. 2 , 211-229.

NONAKA, I., (1991). The Knowledge-Creating Company. *Harvard Business Review, 69(6):* 96-104.

NONAKA, I. (1994). A Dynamic Theory of Organisational Knowledge Creation. *Organization Science,* 5(1).

Stellenbosch University http://scholar.sun.ac.za

NONAKA, I., & TAKUCHI, H. (1995). *The knowledge - creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.

NYE, M. J. (2002). Michael Polanyi (1891-1976): HYLE Biographies. *HYLE--International Journal for Philosophy of Chemistry*, Vol. 8, No.2 , 123-127.

OUCHI W.G (1980) Markets, Bureaucracies, and Clans. *Administrative Science Quarterly* Vol. 25, No. 1, Mar., 1980

OXFORD DICTIONARIES (2010) *Oxford Dictionary of English 3rd Revised* edition Oxford University Press, Oxford

PATTEE, H. (1973). *Hierarchy Theory: The Challenge of Complex Systems*. New York: George Brazille.

POLANYI, M. (1958). *Personal Knowledge: Towards a Post-Critical Philosophy*. Chicago: University of Chicago Press, .

POWELL, W. W., & SNELLMAN, K. (2004). The Knowledge Economy. *Annual Review of Sociology* , 199–220 .

PRUSAK, L. (2001) Where Did Knowledge Management Come From? *IBM Systems Journal*, VOL 40, NO 4 , 1002-1007.

PUMAIN, D. (2006). Hierarchy in natural and social sciences. In D. PUMAIN, *Hierarchy in natural and social sciences (pp. 1-12)*. Dordrecht, The Netherlands: Springer.

QUINN, R. E., & ROHRBAUGH, J. (1983). A Spatial Model of Effectiveness Criteria: Towards a Competing Values Approach to Organizational Analysis. *Management Science 29*(3), , 363-77.

RAJAN, R. G., & ZINGALES, L. (2001). The Firm As A Dedicated Hierarchy: A Theory Of The Origins And Growth Of Firms. *The Quarterly Journal of Economics* , 805-851.

REHMAN, W. U., REHMAN, C. A., REHMAN, H. U., & ZAHID, A. (2011). Intellectual Capital Performance And Its Impact On Corporate Performance: An Empirical Evidence From Modaraba Sector Of Pakistan. *Australian Journal of Business and Management Research* Vol.1 No.5 , 08-16.

RYLE, G. (1949). *The Concept of Mind. Chicago.:* University of Chicago Press.

SAPRU, R. K. (2013). *Administrative Theories and Management Thought 3rd Edition*. New Delhi: PHI Learning Private Limited.

Stellenbosch University http://scholar.sun.ac.za

SCHROYER, H. Q. (1975). Contributions Of The Gilbreths To The Development Of Management Thought. *Academy of Management Journal* , 7-9.

SENGE, P. M. (1990). *The fifth Discipline.* New York: Doubleday.

SIMON, H. (1973). The Organisation of Complex Systems. In H. Patee, *Hierarchy Theory.* New York: George Braziller.

SHEPARD K. & FOWKE D (2001) Why Hierarchy is Important: Getting Work Done at the Right Level. The New Management Network, Spring 2001, Volume 13, Number 1

SINGH, M. D., & ETAL. (2006). Survey of Knowledge Management practices in Indian manufacturing industries. *Journal of Knowledge Management* 10 (6), , 110-118.

SINGH, M. D., SHANKAR, R., NARAIN, R., & KUMAR, A. (2006). Survey of Knowledge Management practices in Indian manufacturing. *Journal of Knowledge Management* 10 (6) , 110-118.

SNOWDEN, D. J., & BOONE, M. E. (2007). A Leader's Framework for Decision Making. *Harvard Business Review* , 69-76.

STACEY, R. D. (1996). *Complexity and Creativity in Organisation*. San Francisco: Berrt-Kohler.

STRORRS C (1949) *General and Industrial Management.* Sir Isaac Pitman & Sons, London

SU, C. Y., & ROAN, J. (2006.). Application of Chaos Theory to the evaluation of Knowledge Sharing System effectiveness. *Fourth Conference on Knowledge Economy and Electronic Commerce* , (pp. 322-335). Taiwan.

TEECE, D. J. (2000). Strategies for Managing Knowledge Assets: The Role of Firm Structure and Industrial Context. *Long Range Planning* Vol 33 Issue 1 , 35-54.

TIMBERALL, G., & ET.AL. (2005). Structurationist Review of Knowledge Management Theories. *Twenty-Sixth International Conference on Information Systems.*

TSOUKAS, H. (2001). What is Organisational Knowledge. *Journal of Management Sciences* 38: 7 , 974 -993.

VAN_DER_SPEK, R., & SPIJKERVET, A. (1997). *Knowledge Management: Dealing Intelligently with Knowledge. Knowledge Management And Its Intergrative Elements,* eds (Liebowitz, J. & Wilcox, L.). New York:: CRC Press.

Stellenbosch University http://scholar.sun.ac.za

VERDIER, N. (2006). Hierarchy: A Short History Of A Word In Western Thought. In *Hierarchy In Natural And Social Sciences* (pp. 13-35). Dordrecht: Springer, The Netherlands.

WEBSTER, J., & WATSON, R. T. (2002). Analysing the Past to Prepare for the Future: Writing a Literature Review. *MIS Quartely* , 26.

WEICK, K. E. (1976). Educational Organisations as loosely Coupled Systems. *Administrative Science Quarterly* 21 , 1-19.

WEICK, K. (1995). *Sensemaking in Organisations*. Thousand Oaks, CA: Sage.

WEICK, K., & K.H., R. (1993). Collective Mind in Organisations: Heedful Interrelating on Flight. *Administrative Science Quarterly*. , 357-381.

WEICK, SUTCLIFFE, AND OBSTFELD (2005): Organizing and the Process of Sensemaking. *Organization Science* 16(4), pp. 409–421

WIIG, K. (1993). *Knowledge Management Foundations*. Arlington: Schema Press.

WIIG, K. M. (1993). *Knowledge management Foundations: Thinking about thinking- How People and Organisations Create, Represent and Use Knowledge,*. Arlington: Schema Press.

WIIG, K. M. (1999). Knowledge Management: An Emerging Discipline Rooted in a Long History. *Knowledge Research Institute, Inc*. (Draft Article) .

WILEY. N (1988) The Micro-Macro problem in Social Theory. *Sociological Theory*, 6, 254-261

WILEY N (2006) Pragmatism and The Dialogical Self. *International Journal for Dialogical Science* Spring 2006. Vol. 1, No. 1, 5-21

WORAM, J. (N.D.). Charles Darwin's Journal of Researches and Voyage of the Beagle Comparison of Selected Editions. Retrieved 10 05, 2013, from rockvillepress.com: http://*www.rockvillepress.com/tierra/texts/Journal-2.PHP#Chap10*

WREN, D., & BEDEIAN, A. (2009). *The Evolution of Management Thought*. Danvers, Massachusetts: John Wiley and Sons Inc.

ZITEK, E. M., & TIEDENS, L. Z. (2012). The Fluency of Social Hierarchy: The Ease With Which Hierarchical Relationships Are Seen, Remembered, Learned, and Liked. *Journal of Personality and Social Psychology* 2012, Vol. 102, No. 1, , 98–115.

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APPENDIX:
Knowledge Management Articles

Author	Article
(Nonaka 1994)	A Dynamic Theory of Organisational Knowledge Creation
(Szulanski 1996)	Exploring Internal Stickiness: Impediments to the Transfer of Best Practice Within the Firm
(Hansen 1999)	The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge Across Organisation Subunits
(Alavi and Leidner 2001)	Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues
Crossan et al. (1999)	An Organisational Learning Framework: From Intuition to Institution
(Gupta and Govindarajan 2000)	Knowledge Flows Within Multinational Corporations
(Wasko and Faraj 2000)	"It is What One Does": Why People Participate and Help Others in Electronic Communities of Practice
(Markus 2001)	Toward a Theory of Knowledge Reuse: Types of Knowledge Reuse Situations and Factors in Reuse Success
(Holsapple and Joshi 2000)	An Investigation of Factors that Influence the Management of Knowledge in Organisations
(von Krogh 2002)	The Communal Resource and Information Systems
(Reagans and McEvily 2003)	Network Structure and Knowledge Transfer: The Effects of Cohesion and Range
(Griffith et al. 2003)	Virtualness and Knowledge in Teams: Managing the Love Triangle of Organisations, Individuals, and Information Technology
(Nerkar 2003)	Old is Gold? The Value of Temporal Exploration in the Creation of New Knowledge
(Inkpen and Tsang	Social Capital, Networks, and Knowledge Transfer

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2005)	
(Droge et al. 2003)	Does Knowledge Mediate the Effect of Context on Performance? Some Initial Evidence
(McFadyen and Cannella 2004)	Social Capital and Knowledge Creation: Diminishing Returns of the Number and Strength of Exchange Relationships
(Ko et al. 2005)	Antecedents of Knowledge Transfer from Consultants to Clients in Enterprise System Implementations
Lawrence et al. 2005)	The Politics of Organisational Learning: Integrating Power into the 4I Framework

[Source: Timberall, G., & Et.Al. (2005). Structurationist Review of Knowledge Management Theories. *Twenty-Sixth International Conference on Information Systems.]*