# Diversity in IS Research: A Fictive Metaphor Analysis

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A THESIS SUBMITTED FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY OF

THE AUSTRALIAN NATIONAL UNIVERSITY

June 2011

# Declaration

This thesis is my own original work. Material previously published or written by others has been duly acknowledged in the text.

Sandy Behrens

# Statement of prior publication

Two published papers have significantly informed this work:

Behrens, S 2007, 'Information systems diversity: metaphor, meaning and myth', *ICIS 2007 Proceedings*, Paper 9.

Behrens, S 2008, 'Fact or fiction: the philosophy of fictions in IS research', *ICIS 2008 Proceedings*, Paper 204.

# Acknowledgments

This thesis would not have been possible in its current form without the help from some very special people. In no particular order I would now like to acknowledge them by name. My principal supervisor, Dennis Hart, must be given a very special thankyou. The hours of what must have been complete agony reading my feeble drafts is something I will never be able to repay. My associate supervisor and also my dear '2$^{nd}$ best friend', Kieren Jamieson, for putting up with my whinging and whining through the whole ordeal, a bottle of Henschke's will be the order of the day. Elizabeth Tansley, also my associate supervisor and purveyor of fine teas, thankyou for being such a word dictator and also for keeping me stocked with a fine array of fantastic teas. I would also like to thank my colleague and friend Kate Ames. You helped me through the process of the thesis with various meetings over coffee and provided a splendid distraction with the *Sport of Kings*. With such fine equine pursuits I am now guaranteed to never have any money but will enjoy it all the same.

My biggest acknowledgement I must reserve for my family. David, my husband, thankyou for the time you have spent on my thesis – not only for our various discussions and your critical detailed feedback – but for encouraging and providing me with the chance to spend time on it. Thank you also for starting and – in the end – finishing your PhD before me. I wasn't aware it was a race (Jones 2011) but I couldn't have lost to a better competitor. To my mum and dad, thankyou for your never-ending support and faith in me. I am blessed to have you as parents. To my children, Anna, Zach and Zeke I hope I can soon say, 'Yes, Mummy has finished working on her PhD'. I hope to spend more time with you all.

# Abstract

In striving to understand Information Systems phenomena Information Systems researchers frequently draw on a seemingly endless array of different disciplines to inform their studies. This act has drawn both the ire and admiration of those within the field as well as those outside its porous boundaries. On the one hand Information Systems researchers are berated for being chaotic and schizophrenic in their combined research endeavour – for producing a collective output that shows neither rhyme nor reason. On the other hand they are praised for being intellectually open and democratic in their approach. These reactions draw their strength from the many issues that stem from diversity in Information Systems research. These reactions are stimulated in part by the assertion that research in the Information Systems discipline is diverse. Despite this assertion not much is known or understood about diversity in Information Systems research.

This thesis addresses this critical oversight by making research diversity the prime focus. The contributions it makes to current understandings of research diversity in Information Systems are philosophical, theoretical and empirical. Philosophically, this thesis relies on the novel approach of fictism – a blend of positivism and interpretivism. Theoretically, it explores diversity through the alternative lens of concepts. Empirically it examines the conceptual diversity of three key Information Systems concepts: organisations, technology and people. Grounded in Lakoff and Johnson's (1980) work with metaphors, the results show that Information Systems research may not be as diverse as was initially thought. Of the three primary views of key Information Systems concepts – machine, organism and culture – the study finds a distinct bias toward conceptualising these concepts as machines. This bias, one that exists at the very core of the Information Systems research endeavour, has important implications not only for individual researchers but the broader Information Systems community alike.

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# Chapter 1 - INTRODUCTION

## 1.1 Introduction

This thesis explores the topic of diversity in Information Systems research. In the past, Information Systems researchers have frequently drawn on a seemingly endless array of disciplines to inform their studies. This act has drawn both the ire and admiration of those within the field as well as those outside its porous boundaries. On the one hand Information Systems researchers are berated for being chaotic and schizophrenic in their combined research endeavour – for producing a collective output that shows neither rhyme nor reason. On the other hand they are praised for being intellectually open and democratic in their approach. These reactions are stimulated in part by the assertion that research in the Information Systems discipline is diverse. Despite this assertion not much is known or understood about diversity in Information Systems research. What does it mean to be diverse in our research? How can we know if we are diverse in our research? If so, are we really as diverse as we think we are? These types of questions are as rare in the Information Systems discipline as attempts to answer them. Yet they are significant. If questions such as these go unasked and unanswered we risk being ignorant not only of who we are (identity) and what we do (practice) but also why anyone should care (relevance). This thesis endeavours to reduce this risk by increasing our knowledge and understanding of this critical yet largely overlooked topic. The results suggest that research in the discipline may not be as diverse as initially thought.

This chapter provides an introduction to, and an overview of, the thesis. In the first section more detail is provided on the background and history to the research problem. Justification for the research and a statement of the research problem follows. The philosophy, theory and method relied upon within the study is outlined briefly before providing a synopsis of the thesis. This introductory chapter finishes with a conclusion that links into a more thorough review of the literature pertaining to diversity in Information Systems research.

## 1.2 Background and history

The Information Systems discipline was conceived in the 1960s (Hirschheim & Klein 2003). Born of multiple parents that were 'significantly different and partly incommensurate' (Swanson & Ramiller 1993, p. 1), its rite of passage has not been easy. The hybrid nature of the discipline has added a whole new dimension of complexity to the normal disciplinary growing pains. This complexity is manifest in continual feelings of inadequacy (Lyytinen & King 2004) and the search for an authentic identity (Robey 2003), as well as the need to feel legitimate, valued and respected (Benbasat & Zmud 2003). Due to the variety and number of informing disciplines in the Information Systems field, the scope and range of Information Systems research has been the source of much interest within its own, and other, research communities. One study, conducted by Swanson and Ramiller (1993), identified eight thematic areas from a total of 397 articles submitted to the *Information Systems Research* journal in a five-year period. Without speculating themselves on whether these outcomes showed a sufficient diversity in the field they encouraged others to do so. Furthermore, Swanson and Ramiller (1993) encouraged community discourse concerning the nature and proper direction of the field. From the debate that followed, evident in the literature, it appears they were successful on both counts: getting others to reflect on whether the field had sufficient diversity and encouraging discourse on the nature and proper direction of the field.

Commentaries presented by both Benbasat and Weber (1996) and Robey (1996) interpreted Swanson and Ramiller's (1993) results as a clear indication that diversity in the Information Systems field was alive and well. They argued this case on the basis that diversity existed in the three key areas of research problems, theoretical foundations, and methods. To date this is only one of two understandings of diversity in Information Systems research. The other alternative understanding – that of conceptual diversity – will be discussed further in the theoretical gaps section. Based on the understanding of diversity in Information Systems research put forth by Benbasat and Weber (1996) there was unanimous support for the assertion that diversity in Information Systems research was both the 'reality and the accepted norm' (p. 389).

From 1996 onward there was significant discussion over what diversity in Information Systems research meant. In 2003 both the *Communications of the AIS*

(*CAIS*) and the *Journal of the AIS* (*JAIS*) devoted special sections to debate on central issues that stemmed from this assumption of diversity. This resulted in at least five articles in the *Journal of the AIS* (DeSanctis 2003; Galliers 2003; Hirschheim & Klein 2003; Lyytinen & King 2004; Robey 1996) and an initial ten part series in the *Communications of the AIS* (Deans 2003; Dufner 2003; ElSawy 2003; Guthrie 2003; Holland 2003; Iivari 2003; McCubbrey 2003; Myers 2003; Power 2003; Wu & Saunders 2003) that could be directly traced to the diversity debate.

At around the same time as scholars were discussing the merits and otherwise of diversity in Information Systems research, a study was published by Orlikowski and Iacono (2001) that would ultimately call in to question such an accepted state of diversity in the field. In this study, Orlikowski and Iacono (2001), like Swanson and Ramiller (1993), were interested in knowing more about the research activities occurring in Information Systems. They differed, however, with respect to how they looked at research. Rather than looking at research in terms of topic as Swanson and Ramiller (1993) had done, Orlikowski and Iacono (2001) examined research in terms of conceptualisations. While this may seem to be a rather small difference it led to a significant difference in results and – perhaps more importantly – interpretations of those results.

In looking at the different conceptualisations researchers had of the IT artefact, Orlikowski and Iacono (2001) reported a distinct lack of diversity. As they attested: 'While there have been a number of attempts over the years to conceptualize IT artifacts in various ways … we find that by and large IT artifacts… continue to be under theorized' (p. 121). They continued stating that 'much IS research draws on commonplace and received notions of technology resulting in conceptualizations of IT artifacts as relatively stable, discrete, independent and fixed' (p. 121). Orlikowski and Iacono's (2001) study presented a picture of Information Systems research that seemed to be at odds with the notion that diversity in Information Systems research was the 'reality and the accepted norm' (Benbasat & Weber, 1996, p. 389).

Orlikowski and Iacono's (2001) work suggests an important alternative understanding of diversity in Information Systems research: that diversity in Information Systems research may be understood in terms of different conceptualisations of key Information Systems constructs. Orlikowski and Iacono's (2001) work is also a good example of a similar problem viewed from different angles yielding different results.

These results in turn may also be interpreted very differently. To explain this further, Orlikowski and Iacono (2001) as well as Swanson and Ramiller (1993) were interested in the same broad phenomenon, research in Information Systems. Swanson and Ramiller (1993) decided to examine research in terms of its research questions. From there they derived a number of fundamental issues or themes. Many in the Information Systems community interpreted their results as evidence of diversity in Information Systems research. Yet, Orlikowski and Iacono (2001) looking at the conceptualisations of a key Information Systems construct, the IT artefact – came to very different conclusions. Again, while not directly related to diversity in Information Systems research, their results do raise questions in this area.

This thesis adopts the alternative understanding of diversity in Information Systems research hinted at by Orlikowski and Iacono (2001). That diversity in Information Systems research may be understood as having diverse conceptualisations of key Information Systems concepts. Although this thesis follows a different theory and method to Orlikowski and Iacono (2001), the results are similar: conceptualisations of key Information Systems constructs appear to be limited. The implication being that – at least when one looks at research in terms of conceptualisations – Information Systems research may not be as diverse as many claim to be the case.

## 1.3 Significance of diversity in Information Systems research

The issue of research diversity has certainly resulted in a great deal of soul searching for those in the Information Systems field. For instance, it has forced us to ask complex and at times troubling questions concerning our disciplinary identity: Who are we? What do we do? And why should anyone care? Benbasat and Zmud (2003) raised these types of questions in relation to what they referred to as the 'identity crisis' (p. 183) of the discipline. They believed that due to the diverse set of topics Information Systems scholars researched and taught, the discipline's central identity was being made all too ambiguous. Furthermore, if the problem were left unattended it would threaten the viability of the Information Systems discipline as a whole.

The Information Systems community was swift in their response to Benbasat and Zmud's (2003) call for action. At the next International Conference on Information Systems in Barcelona the President of the AIS, Phillip Ein-Dor chaired a meeting to discuss these and other related matters. Additionally, Alter (2003) responded to the call by writing his own response to Benbasat and Zmud (2003). After submitting his response initially to *Management Information Systems Quarterly* he decided instead to submit his response to the *Communications of the AIS*. This was due to *Management Information Systems Quarterly*'s time and length restrictions, which Alter believed 'interrupt[ed] rather than promot[ed] serious discussion' (Gray 2003, p. 2). The editor at the time, Paul Gray, accepted the article in full. Furthermore, he agreed that the issue of identity – stemming from diversity – was so important to the Information Systems community that it warranted further investigation. He consequently invited all associate editors of *Communications of the AIS* to contribute a think piece. Moreover, the *Communications of the AIS* introduced a special section in its journal devoted to the 'debate on what the core of IS should be' (Gray 2003, p. 1). So started the 'wave of discussion within the IS field' (Gray 2003, p. 1) not only over matters of identity but many other related issues such as practice (what we do) and relevance (who cares?) stemming from the central issue of research diversity.

## 1.4 Justification for the study

The justification for this thesis comes from two fronts: theoretical and empirical. The theoretical gaps concern the dearth of ideas that help understand or explain research diversity in the Information Systems field. The empirical gaps concern the lack of practical studies that build knowledge of diversity in Information Systems research through observation, experience, or experimentation.

### 1.4.1. Theoretical gaps

As a discipline it could be argued that we have shown a certain amount of intellectual maturity (Deleuze & Guattari 1996) by broaching the above issues stemming from the diversity inherent in our research; however, it appears we have missed a more fundamental issue; that is, our understanding of research diversity remains virtually unexplored. The only known theoretical exploration is the one provided by Benbasat and Weber (1996). They state that research diversity can be recognised in three main ways: through the diversity in the problems addressed; the diversity in the theoretical foundations and reference disciplines used to account for Information Systems phenomena; and the diversity in the methods used to collect, analyse and interpret data. This same framework has been relied on as a testament to the diversity in our research; however, as raised previously, this is simply one understanding of diversity in Information Systems research. An alternative way, as hinted at by Orlikowski and Iacono (2001), is to look at the conceptual diversity of key Information Systems concepts in our research. This is because the act of research is an act of cognition or thought and thought itself relies largely on our ability to conceptualise. Hence, before we can recognise research problems, pose theories and pursue various methods, which Benbasat and Weber (1996) rely on in their understanding of diversity in Information Systems research, we must be able to conceptualise our research world. Therefore, this study attempts to extend our knowledge of diversity in Information Systems research by exploring the phenomenon though the lens of concepts.

### 1.4.2. Empirical gaps

A number of meta-analyses of the research conducted in the Information Systems discipline have also been used to form conclusions about the levels of diversity in it's research. There are, however, very few empirical studies that have focused directly on the issue of research diversity. To the author's knowledge there are only three known studies that do so. The first of these more focused studies was by Vessey, Ramesh and Glass (2002), the second by Sidorova, Evangelopoulos and Ramakrishnan (2007) and the third by Behrens (2007), the author of this thesis.

The first study by Vessey, Ramesh and Glass (2002) was built on the theoretical understandings of research diversity provided by Benbasat and Weber (1996); however, they subdivided 'research method' into the generic approach taken toward the research and the specific research method used. In their study they found what they believed to be a 'considerable diversity in each of the key characteristics' (Vessey, Ramesh & Glass 2002, p. 129). Therefore, Vessey, Ramesh and Glass (2002) confirmed the original observation made by Benbasat and Weber (1996) that diversity in research was both the 'reality and the accepted norm' (p. 389).

The second study by Sidorova, Evangelopoulos and Ramakrishnan (2007), which was later to appear in the *Management Information Systems Quarterly* under a slightly modified title *Uncovering the Intellectual Core of the Information Systems Discipline* (Sidorova et al. 2008), also relied on Benbasat and Weber's (1996) theoretical understanding of research diversity. Their study differed from Vessey, Ramesh and Glass (2002) in that their focus was narrowed to research topics and how these topics changed over time. Additionally, unlike Vessey, Ramesh and Glass (2002), they did not pre-define their category set for research topics. Sidorova, Evangelopoulos and

Ramakrishnan (2007) also extended the time period to 22 years rather than the five-year period selected by Vessey, Ramesh and Glass (2002). While these differences existed their results essentially confirmed those of Vessey, Ramesh and Glass (2002). As they stated (Sidorova, Evangelopoulos & Ramakrishnan 2007), the key themes uncovered in their results 'illustrate significant diversity of research published in the mainstream IS research journals' (p. 12). Hence, they supplied further evidence to confirm the widely held assumption that diversity in research was characteristic of the Information Systems discipline.

The last and only other study to be conducted in the area of diversity in Information Systems research was by the author of this thesis (Behrens 2007). Applying a different lens to diversity in Information Systems research this exploratory study focused on conceptual diversity. By using a metaphor analysis and a much finer grained level of analysis than was present in Sidorova, Evangelopoulos and Ramakrishnan (2007) and Vessey, Ramesh and Glass (2002), this study focused on how organisations were conceptualised in Information Systems research. Of the three primary metaphors for conceptualising organisations: machine, organism and culture, it found a distinct bias toward conceptualising the organisation as a machine. The most significant result of this exploratory study was that Information Systems research might not be as diverse as previously thought. Hence, not only was the approach in this study different to those that went before, it also differed significantly with respect to its results.

# 1.5 Research problem statement

The research problem addressed in this thesis has much in common with the previous exploratory study conducted by the author (Behrens 2007). In particular, the same broad research question is raised in this thesis:

*How conceptually diverse is Information Systems research?*

This thesis however, is more comprehensive than the previous exploratory study. Like Sidorova, Evangelopoulos and Ramakrishnan (2007), it seeks to provide not only a current profile of Information Systems research diversity but also an understanding of how this profile has changed over time. This notion of a historical trajectory of diversity in Information Systems research over time was not captured in the initial exploratory study by the author (Behrens 2007). Hence, insight with respect to the broader research question is now gained by two new supporting sub-questions that capture both the current profile of diversity in Information Systems research and how this profile has changed over time:

1. *How conceptually diverse is Information Systems research now?*

2. *Has this diversity changed over time and if so how?*

## 1.6 Approach, theory and method: Fictions, metaphor and discourse

Table 1.1 below introduces the philosophical approach, theory and method that are adopted in this thesis. The general philosophical approach adopted by this study is the philosophy of fictions (Vaihinger 1924). This philosophy is also known as the philosophy of 'As if'. What this means for this study is that research is viewed as an activity centred largely on creating useful but necessary fictions, i.e., models (conceptions) of reality. The theoretical framework adopted in this study is metaphor theory (Lakoff & Johnson 1980). By relying on metaphor theory this study assumes the models or conceptions of reality in Information Systems research are made possible through metaphor. Specifically, in conceptualising our key Information Systems concepts we rely on metaphors. Metaphor theory also asserts that metaphors manifest themselves in our discourse (Lakoff 1993). Discourse analysis, in particular corpus linguistics, is the method used to uncover 'naturally occurring' metaphors, i.e., not invented examples. The particular method, the comprehensive corpus method as proposed by Santa Ana (2002) is used in this study to uncover evidence of metaphors in Information Systems research. The philosophical approach, theory and method will be discussed in further detail in the paragraphs below, specifically how they are applied in this study.

Table 1.1. *The philosophy, theory and method adopted in this study*

| | NAME | DESCRIPTION | SOURCE |
|---|---|---|---|
| Philosophy | Fictions or philosophy of 'As if' | We can never know the real world (although it exists); we construct systems of thought and behave 'as if' these models match reality. | Vaihinger (1924) |
| Theory | Metaphor | Our whole underlying conceptual system is metaphorical in nature. | Lakoff and Johnson (1980) |
| Method | Discourse analysis: corpus linguistics, specifically the comprehensive corpus method. | An approach to analysing written, spoken or signed language. The preference in corpus linguistics is to analyse 'naturally occurring' language and not invented examples. | Lakoff (1993), Santa Ana (2002) |

The worldview of fictions affects three main areas in this study. These are 1) *concepts* themselves, 2) *conceptualisations,* and 3) *diversity*. The key Information Systems *concepts* examined in this thesis are organisations, technology and people. This study recognises that there are certain aspects of these key Information Systems research concepts that actually exist. Physical infrastructure of organisations such as buildings, hardware of technology and people have a real existence. There are, however, many aspects of these concepts that are not. The labels and names, for instance, given to organisations, technology and people are not. These are the fictions. They are not 'real' in the typical sense of the word. We create these labels and names because we make sense of them better than we could do otherwise. So too is the case with *conceptualisations* and *diversity*. *Conceptualisations* are our mental models of things (including real and ideal things). They are fictions – useful and necessary – but with no real existence. *Diversity* is an abstraction – a mental frame – of how different our mental models are – a fiction of a fiction if you will. Hence, most if not all aspects of *concepts*, *conceptualisations* and *diversity* are regarded as fictions. That is, while they are not 'real' in the typical sense of the word, they are still useful and indeed necessary.

This study relies upon metaphor theory, as introduced by Lakoff and Johnson (1980). As shown in Table 1.1, metaphor theory asserts that our whole underlying conceptual system is metaphorical in nature. This means that the *conceptualisations* of key Information Systems *concepts* – the fictions identified in the paragraph above – are largely a matter of metaphors. Our mental models of key Information Systems concepts, including the way we structure and understand them, is made possible largely through metaphor. In terms of *diversity* concerning these conceptualisations Pepper's (1942) work on root metaphors is relied on. These root metaphors are each responsible for very different ways of thinking about the world. In this study it is evidence of these root metaphors in relation to key Information Systems concepts that helps draw conclusions about diversity in Information Systems research.

Metaphor theory asserts that metaphors manifest themselves in language. Hence, in order to gain insight with respect to how diverse Information Systems research is, this thesis looks at language. Through the broader method of discourse analysis it examines the rhetoric used in Information Systems research to conceptualise three key disciplinary concepts: organisations, technology and people. Following the more specific method of corpus linguistics it relies on naturally occurring language in academic discourse. By 'naturally' occurring this means that they are not elicited in an experimental laboratory setting. As per Santa Ana's (2002) comprehensive corpus method naturally occurring language as it exists in the corpus of leading Information Systems journals is examined for evidence of three root metaphors: machine, organism and culture in relation to the three key Information Systems concepts: organisations, technology and people. Although evidence of all three root metaphors are found, so too is a distinct bias toward the machine metaphor. Some examples of machine metaphors from the corpus will illustrate this (mechanistic rhetoric is italicised):

> As demonstrated by entrepreneurial firms such as Amazon.com, E*Trade, and Commerce One, IT is increasingly the *engine driving* the new business models... (Sambamurthy & Zmud 2000, p. 105)

> The *clockspeed* of the firm (Yoffie and Cusumano 1999) may be fundamentally different in conventional and e-commerce environments ... (Subramani & Walden 2001, p. 138).

> In such a routinised situation, the knowledge structure [of people] ... becomes *hardwired* ... (Kim, Malhotra & Narasimhan 2005, p. 419).

By relying on such mechanistic understandings of key Information Systems concepts the machine metaphor was established as a powerful and dominant image in Information Systems research – not only in more recent times but over time. Metaphor excerpts such as these are the foundation for this study of academic discourse on key disciplinary concepts. These metaphors help shape not only how the academic community thinks about its research but what they do in terms of it. Ultimately, these metaphors shape the worldview of Information Systems academics and, as will be shown in this thesis, the worldview may not be as diverse as many would claim to be the case.

In this thesis the term 'discourse' is used to refer to the way in which academics talk about their research. In particular it focuses on the material content consisting of quantifiable pieces of speech expressed in print. In this study the academic discourse from three leading Information Systems journals: *Information Systems Research*, *Management Information Systems Quarterly* and the *European Journal of Information Systems*, were examined for discussions on three key Information Systems concepts: organisations, technology and people. These discussions were then analysed with respect to fictive metaphor theory, which asserts that image formation is central to human thought and understanding. This thesis applies this theory, as outlined in more detail in Chapter 3, to a large academic language data set: 362 articles and almost 6,000 pages of text.

Relying as it does on a unique combination of philosophical approach, theory and method, this thesis goes beyond the purely quantitative works that have gone before it – as well as the initial exploratory work of the author – to further knowledge and understanding of diversity in Information Systems research: both past and present. Through the structure of metaphor theory this study provides a more detailed understanding of how researchers conceptualise their key subjects of interest with respect to three known principal metaphors. Furthermore, it provides an idea of those metaphors that are relied on the most in thinking about and conducting research in the discipline. By using the method of discourse analysis language within the Information Systems realm can be explored for evidence of conceptual diversity. Hence, through a combination of fictism, metaphor theory and discourse analysis Information Systems research and its relative diversity can be examined.

## 1.7 Synopsis

This thesis follows a relatively standard format of presentation (Perry 1998). As shown in Table 1.2 this introductory chapter, Chapter 1, has provided some initial background to the thesis as well as a statement of and response to the problem of diversity in Information Systems research. Chapter 2, the Literature Review, moves on to examine the gaps in terms of what has been said and done before on the thesis topic of diversity in Information Systems research. Chapter 3 outlines the unique combination of philosophical approach, theory and method adopted in this study. The following three chapters, Chapters 4–6, present the results. These chapters consist of the primary evidence for the root metaphors used in conceptualising key disciplinary concepts in Information Systems research. Chapter 7 presents an analysis of the results with Chapter 8 illustrating how a greater level of diversity might improve knowledge and understanding in Information Systems research. The final chapter, Chapter 9 discusses the results and provides some final conclusions. The synopsis of this thesis is outlined in more detail in the paragraphs that follow Table 1.2.

Table 1.2. *Outline of chapters in this thesis*

| CHAPTER NO. | CHAPTER NAME | PURPOSE |
|---|---|---|
| 1 | Introduction | Present background, problem statement and problem response. |
| 2 | Literature review | Identify gaps in what has been said and done before. |
| 3 | Philosophy, theory and method | Outline the worldview, theoretical framework and practices adopted in this study |
| 4 | Current conceptualisations for organisations, technology and people | Present results of metaphor analysis for all three concepts on all three journals in 2008. |
| 5 | Changing images for organisations | Present results of metaphor analysis for a single concept in a single journal from 2000–2008. |
| 6 | Changing images for key Information Systems concepts over time | Present results of metaphor analysis for all three concepts on all three journals in 2000, 2001 and 2005. |
| 7 | Analysis: secondary evidence | Present analysis of primary results. |
| 8 | What benefits does diversity bring? | Illustrate the difference diversity makes. |
| 9 | Discussion and conclusions | Present initial and final reflections on results and analysis. |

The review of the literature, which is the subject of Chapter 2, provides a more detailed consideration of the background and justification for the study than is possible in this introductory chapter. Of particular importance is situating the study in terms of what work has already been undertaken on the topic of Information Systems research diversity. Chapter 3 considers the philosophical approach, theory and methods adopted in this study. As stated previously, the philosophical approach of fictions and metaphor theory are combined with ways of conducting research that allow for empirical examination of scholarly prose. It is the purpose of Chapter 3 to outline this particular combination in more detail. Chapters 2 and 3 show why this study was chosen and also make clear the particular worldview, reasoning and practices behind the study.

Chapter 4 is the first of three chapters presenting the results of the fictive metaphor analysis on key academic discourse surrounding core Information Systems concepts: organisations, technology and people. The sub-question of key importance in this chapter is: How conceptually diverse is Information Systems research now? The most significant result of this chapter is that the machine metaphor is the most favoured and salient way of conceptualising key Information Systems concepts: organisations, technology and people.

While Chapter 4 provides a relatively recent snapshot of diversity in Information Systems research both Chapter 5 and Chapter 6 provide a picture of how this profile has changed over time. In Chapter 5 the three root metaphors taken up in Chapter 4 are examined; however, this chapter isolates its focus to a single disciplinary concept: the organisation, over an extended eight-year period. The root metaphors for the organisation: machine, organism and culture; and how they have changed over time are examined in this chapter. Chapter 5 extends the concepts to include both the technology and people concepts explored in Chapter 4 but concentrates the focus to two historical snapshots in time: 2000/2001 and 2005. The results as presented in both Chapter 5 and Chapter 6 are a reflection of those that were uncovered in Chapter 4: the machine metaphor is the most favoured and salient way of conceptualising key Information Systems concepts. Specifically the results as presented in these chapters show that the popularity and saliency of the machine metaphor has not changed over time.

Chapter 7 presents the analysis of the results in the previous three chapters. While the previous three chapters essentially focus on the primary evidence – that is discourse – this chapter focuses on secondary evidence. Secondary evidence encompasses sub-metaphors, high-level entailments and logical reasonings associated with the three root metaphors as conceptualisations for key Information Systems concepts. As will be shown in this chapter, the secondary evidence reveals that the machine metaphor is even more powerful and salient than the primary evidence suggests.

Chapter 8 illustrates the difference diversity might make through three concrete examples. Thus far, this thesis finds a distinct bias toward the machine metaphor in conceptualisations of key IS concepts – both in terms of primary and secondary evidence. This chapter extends that finding by showing the impact of such a bias. Metaphors work by both highlighting and hiding aspects of a given target domain. This chapter shows how more light might shine on a given research problem through the use of multiple metaphors and consequently how knowledge and understanding might be extended in an area of Information Systems research. Chapter 8 intends to make clear the answer to the 'So what?' question of diversity in Information Systems research in a concrete way.

Chapter 9 discusses the most significant findings from this study: that the assumption of diversity in Information Systems research, so widely held in the discipline, holds little evidence to support it – at least in terms of its conceptual diversity. On the contrary, there appears to be a bias, both past and present, in academic discourse toward conceptualising key disciplinary concepts with a mechanistic lens. Rather than an equal balance of the three root metaphors for structuring and understanding key Information Systems concepts, this study finds a preference toward the machine metaphor. Chapter 9 not only discusses the results but also provides some potential reasons for them. Limitations of this study and future work are also outlined before concluding with some final reflections.

## 1.8 Conclusions

This introductory chapter provided the necessary background information, problem statement and problem response concerning the thesis. The background information showed that diversity in Information Systems research has led to many important discussions in the discipline over aspects of identity, practice and relevance. Yet, despite its significance not much is known about the nature or state of diversity in Information Systems research. The next chapter, Chapter 2, examines this shortfall in our knowledge and understanding in further detail.

# Chapter 2 - LITERATURE REVIEW

## 2.1 Introduction

The research questions posed in this thesis touch upon three major areas of scholarship that will subsequently be reviewed in this chapter:

a) research

b) diversity in research and

c) diversity in Information Systems research.

The focus of the review is different in each area.

With regard to research the focus is the nature of research. Understanding the nature of research is essential in answering the questions of this thesis. It is important to recognise that research is a cognitive activity and as such relies largely on metaphors.

With regard to diversity in research the intent is to review its significance and how diversity in research is understood. The significance of diversity in research is apparent through debate – particularly that which has occurred in Organisation Science. In terms of how diversity in research is understood, work originating in Philosophy and further developed in Organisation Science holds some important discoveries. Work here suggests that root metaphors provide very different ways of thinking about the world. As research is a way of thinking one may gain some insight into the relative diversity in of research by examining the root metaphors that are present or absent from research.

The focus of the final area of scholarship – that of diversity in Information Systems research – consists of three main areas: significance of the area; theoretical understandings of the area; and empirical understandings of the area. Significance of diversity in Information Systems research is evidenced through strong scholarly debate. Theoretically, however, it is found that little is understood about the diversity in Information Systems research – theoretically or empirically. In terms of theory, apart from a single exploratory study by the author of this thesis (Behrens 2007), metaphors that are so important in other disciplinary understandings of research and its relative diversity remain largely overlooked. Empirically, it is found that very few studies have tried to uncover how diverse our research really is. This final discovery of the literature review is essentially the gap that this thesis seeks to fill. Namely, this thesis intends to contribute both theoretically and empirically to the knowledge and understanding of a critical yet largely overlooked phenomena: diversity in Information Systems research.

## 2.2 Research

Given the magnitude of the research industry – said to be worth 2.3% of GDP worldwide – the sheer number of texts, articles and how-to books that exist on the topic of research may come as no surprise. From books aimed clearly at the first-time researcher such as Kumar's (2005) *Research methodology: a step-by-step guide for beginners* to those aimed at more experienced researchers such as Miles and Huberman's (1994) sourcebook *Qualitative Data Analysis* there is an almost inexhaustible array of scholarship on research – particularly how-to texts – for almost every target audience imaginable. The review of the literature that follows, however, is focused on sources that deal with the nature of research. Understanding what research is, is critical to this study. Hence, it is only the sources that illuminate the nature of research that are directly relevant.

The most significant discovery in terms of reviewing the literature on research is that research is – first and foremost – a cerebral activity; it relies on thought or conceptualisation. This is discussed in some detail in the first sub-section (Section 2.2.1). The following sub-section (Section 2.2.2) deals with the question of conceptualisation. In particular it looks at the question of how we think. An important finding here is that conceptualisation, our ability to think, is reliant on metaphors. The final sub-section (Section 2.2.3) deals with scholarship on metaphors and their importance not only in everyday life but also in research.

### 2.2.1. Nature of research

Despite the plethora of sources on research, uncovering the nature of research is more difficult than one might initially imagine. As Wadsworth (1997) asserts, this may be largely attributed to the almost impenetrable language most of these sources use when discussing research. Wadsworth (1997) suggests the language of 'Research Proper' used to describe and discuss research may as well be written in some archaic sorcerer's script. He goes on to say that to the uninitiated there appears 'all kinds of magic incantations that can be said to produce Real Facts and The Truth known only to the initiated priesthood of Research Scientists' (Wadsworth 1997, p. 2). Drew (1996) agrees but goes further stating that the type of mystical shroud discussed by Wadsworth (1997) does not disappear when one becomes a student of research. To the new initiate it seems that not only does the shroud of secrecy stay firmly in place but that there is a vested interest in doing so. Drew (1996) states that it is often difficult for students of research to find a clear and useful definition for the very thing to which they are supposed to be devoted. The new student is often plunged into the deep end of research with courses that focus on a limited aspect of research such as statistics with a sink or swim type of mentality (Drew 1996). What is implicitly assumed in these courses is that one implicitly knows, or at the very least should know, what research is just as one instinctively knows how to swim. This might explain why there are so many texts devoted to research methods, research designs and data analysis rather than research per se. While a Foucouldian type of discussion on the particular conspiracies that exist in the academic realm has its attractions, what is of interest here is at least some basic understanding of what research is. As a starting point the dictionary provides a useful and necessary beginning. Research according to *The Oxford English Dictionary* (1989) is:

1. The act of searching (closely or carefully) for or after a specified thing or person.

2. a. A search or investigation directed to the discovery of some fact by careful consideration or study of a subject; a course of critical or scientific inquiry. (Usu. in pl.)

   b. Without article: Investigation, inquiry into things. Also, as a quality of persons, habitude of carrying out such investigation.

3. Investigation or pursuit of a subject. rare.

So, despite the difficulty in finding a definition, it appears that a basic definition for research would be that it is an intellectual activity that creates knowledge.

Delving further, some more scholarly definitions can be found. While these definitions typically come in the form of introductory texts they help extend our basic definition further. Some examples are provided below:

> Research is a systematic way of asking questions, a systematic method of inquiry. The purpose of research is to obtain knowledge or information that pertains to some question. The question may be very simple … or it may be more complex. The emphasis of this definition is on the term systematic. There are many ways of asking questions and obtaining information. Research is a method that attempts to undertake this task in a systematic fashion to obtain objective and unbiased information. (Drew 1996, p. 2)

> Research is something that anyone can do, and everyone ought to do. It is simply collecting information and thinking systematically about it. The word 'research' carries overtones of abstruse statistics and complex methods, white coats and computers. Some social research is highly specialized, but most is not; much of the best work is logically very straightforward. Useful research on many problems can be done with small resources, and should be a regular part of the life of any thoughtful person involved in social action (Connell 1975, p. 1)

> Research is a process, which begins with people having reasons for asking questions, then setting about getting answers to them. They do this by systematically and rigorously amassing observations and imaginatively generating explanation about how and why such and such is the case. Research is fundamentally about understanding and explaining – about 'knowing'. (Wadsworth 1997, p.6)

These three definitions provide some different responses to the question of what constitutes research. Drew (1996) relies on more formal and perhaps terse terminology where Wadsworth (1997) and Connell (1975) respond in a more informal and seemingly friendly way. Yet, in these different responses is a kernel of agreement. That research is at its heart an intellectual pursuit. Without our ability to think of new and interesting problems or even to re-imagine and reflect on old problems there would be no research. Additionally, one needs to think of particular things, whatever they may be, in order to be engaged in the activity of research. As

Kumar (2005) asserts research is more than a set of skills; it is a way of thinking. But how do we think? This question – as addressed in the literature – is explored in the next section on conceptualisation.

## 2.2.2. Conceptualisation

If research is a way of thinking, how do we actually think? In this section, the fundamental properties of thought are covered. The main finding is that there appears to be a changing recognition in the way scholars think we think. This change can be thought of as going from the age of form to the age of imagination. The age of form tries to understand cognition through the results of thought - their forms. The age of imagination is a different approach that holds identity, integration and imagination as being at the heart of our ability to think. Specifically, the age of imagination regards conceptual blending of which metaphors are the most basic and elementary type as critical to the way we think.

### The way we think we think

> It is far more useful to view computational science as part of the problem, rather than the solution. The problem is understanding how humans can have invented explicit, algorithmically driven machines when our brains do not operate this way. The solution, if it ever comes, will be found by looking inside ourselves.
>
> - Merlin Donald

This particular quote from Merlin Donald found on the opening pages of Fauconnier and Turner's (2002) book *The Way We Think* highlights the difficulties in understanding the nature of thought or how we think. Fauconnier and Turner (2002) provided this particular quote as a way of introducing the changing shift in perspective on how people, in particular scholars devoted to such studies, think they think. Fauconnier and Turner (2002), state that we live in the 'age of the triumph of form' (p. 3). We eat genetically engineered corn; we buy groceries through our credit cards and have our taxes calculated by formulas. According to Fauconnier and Turner (2002), all of these things that are part of our daily life come from the systematic manipulation of forms. They provide the example of a picture of your newborn baby sent over the Internet. Such a picture becomes a long string of 1s and 0s and arrives at its destination with no loss of meaning. As they say, 'A picture is worth a thousand 1s and 0s, and vice versa' (Fauconnier & Turner 2002, p. 4). According to Fauconnier and Turner (2002), the manipulation of form has become so powerful that human learning has been centered around how to do such manipulation. Furthermore, and of specific relevance to this thesis, they state that scholarly understandings of how we think have traditionally revolved around finding the deeper hidden forms behind more visible ones. This is what Fauconnier and Turner (2002, p. 3) refer to as 'the age of form'.

The age of form, however, as Fauconnier and Turner (2002) explain, fell into decline when scholars started to realise that form is not substance. As they state, the blueprint is not the house, the recipe is not the dish and just as one might hold the armor of Achilles one never holds Achilles. Having the form is, according to Fauconnier and Turner (2002), never having the meaning no matter how intricate those transformations are. According to Fauconnier and Turner (2002), regardless of the progress that was made during the Age of Form scholars kept running up against the mysteries of meaning (Fauconnier & Turner 2002). Problems that were never even seen as problems before were encountered. For example, what is simpler than recognising that a tree is a tree? Fauconnier and Turner (2002) assert that no matter how much money, time and energy were devoted to making progress on these types of problems the form approach inevitably led to an insurmountable wall. This led to the rise of what Fauconnier and Turner (2002) term the 'Age of Imagination'.

The Age of Imagination as described by Fauconnier and Turner (2002) is a different approach to how scholars think people think. In this approach the assumptions that are taken for granted in the form approach are central. As Fauconnier and Turner (2002) explain, conceptual blending and in particular metaphors are seen as being at the heart of all possible meaning. They assert that knowing a cup is a cup, telling the difference between in and out and making the analogy between your mother and your mother's mother all involve the same complex operations as did the creation of an artistic masterpiece or developing the most ingenuous scientific breakthrough. Both the simplest and the most complex thought processes are enabled by conceptual blending - in particular various simple and complex uses of metaphor. Hence, according to Fauconnier and Turner (2002) conceptual blends, in particular metaphors are the alternative and most current approach to how scholars think people think.

To summarise, the way scholars think we think has changed from form approaches to ones that are based more on imagination – in particular conceptual blending. According to Fauconnier and Turner (2002), metaphors are the simplest and most recognisable forms of such blends. From this perspective if research is a way of thinking then this way of thinking relies on a conceptual system that is largely metaphorical in nature. Fauconnier and Turner (2002) as well as other proponents of conceptual blending rely heavily on Lakoff and Johnson's (1980) work with metaphors to develop their theories. It is this work that is discussed in the next section.

## 2.2.3. Metaphors

In this section scholarship concerning the nature of metaphors and their significance in research will be discussed. As raised in the previous sections research can be considered a way of thinking and thinking itself considered largely a matter of metaphor. Hence, what metaphors are – their natures – is of prime importance to this study. The nature of metaphors, their importance to cognition and how they work is covered in the first sub-section. The second sub-section reviews the importance of metaphors to research. As will be highlighted in this section the importance of metaphors to research has been known since at least Kuhn (1979) some thirty years ago.

### The nature of metaphors

> Metaphor is a tool so ordinary that we use it unconsciously and automatically, with so little effort that we hardly notice it. It is omnipresent … It is conventional … and it is irreplaceable. (Lakoff & Johnson 1980, p. xi)

The above quote appearing in Lakoff and Johnson's book *Metaphors We Live By* is indicative of the importance they and other proponents of metaphor theory place on metaphor. Metaphor, according to the theory, is critical to thought. As Lakoff and Johnson state: 'Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature' (1980, p. 3). From the mundane activities of everyday life to higher order intellectual pursuits metaphor allows us to make sense of our world. This of course includes the intellectual pursuit of research. It is important to note here that in terms of metaphor theory there is no substantial difference between research and more mundane activities. Metaphor governs both activities to the same degree. Research, like the little things we do every day, involves thought. According to the theory of metaphor (Lakoff & Johnson 1980) if one relies on metaphors in order to think so too would one rely on them in the act of research.

Metaphors are essentially understood as a cognitive mapping 'mechanism'. That is, they transfer the most salient characteristics from one domain – known as the source domain – to another domain – the target domain. Typically, but not always, the source domain is more concrete and the target domain more abstract. For example, the *organisation is a machine* metaphor involves transferring the most salient characteristics from the source domain of the machine to the target domain of the organisation. The machine here is the more concrete domain and the organisation more abstract. It is by this mapping from the concrete to the abstract that brings forth new meaning and understanding in the abstract domain.

In terms of metaphor theory, particularly as proposed by Lakoff and Johnson (1980), it is important to point out that the cognitive mapping involved in metaphors goes beyond how we think and talk about a given concept. It impacts on what we actually do in terms of that concept. This is what Lakoff and Johnson (1980) refer to as a deeper experiential gestalt. In the example of the *organization-as-machine* metaphor raised previously, this metaphor (according to the theory) would not only structure how we think and talk about organisations it would structure what we do in terms of them. This would apply to every type of thinking concerning organisations including research. Hence, if one employs the metaphor that the organisation is a machine – even sub-consciously – in researching organisations, then the research that occurs will be impacted in the most fundamental of ways. The problems that are seen, the theories that are relied on and the methods that are used will all be impacted by that metaphor. In everyday life as in research, therefore, the metaphors we rely on are said to impact our thoughts, our speech and our actions.

## Metaphors and research

In this section the centrality of metaphors to research is reviewed. This review is important as such recognition has been largely overlooked in the area of diversity in Information Systems research. As highlighted previously research is a way of thinking and metaphor is critical to how we think. As will be shown in this section there is nothing particularly new about this assertion. Thomas Kuhn (1979), the

American physicist who developed several important ideas in the philosophy of science, was a strong proponent of metaphors and their importance to research.

When talking on the significance of metaphors to research, Thomas Kuhn (1979) had this to say:

> Metaphor plays an essential role in establishing links between scientific language and the world. Those links are not, however, given once and for all. Theory change, in particular, is accompanied by a change in some of the relevant metaphors and in the corresponding parts of the network of similarities through which terms attach to nature. (Kuhn 1979, p. 416)

According to Kuhn (1979), metaphors provide new ways of talking and thinking about phenomena. Scientific revolutions in particular are – according to Kuhn (1979) – revolutions in metaphor. This understanding is captured well in Kuhn's (1979) discussion on how the understandings of atoms in physics changed from the nineteenth century understanding of atoms as solar systems to an early twentieth-century understanding of atoms as billiard-balls:

> I agree with Boyd [in relation to the importance of metaphors in teaching or explaining theories] but would nevertheless draw attention to the way in which metaphors like that relating atoms and solar systems are replaced. Bohr and his contemporaries supplied a model in which electrons and nucleus were represented by tiny bits of charged matter interacting under the laws of mechanics and electromagnetic theory. That model replaced a solar system metaphor but not, by doing so, a metaphor-like process. Bohr's atom model was intended to be taken only more-or-less literally; electrons and nuclei were not thought to be exactly like small billiard or Ping-Pong balls; only some of the laws of mechanics and electromagnetic theory were thought to apply to them; finding out which ones did apply and where the similarities to billiard balls lay was a central task in the development of quantum theory. Furthermore, even when that process of exploring potential similarities had gone as far as it could (it has never been completed), the model remained essential to the theory. Without its aid, one cannot even today write down the Schrodinger equation for a complex atom or molecule, for it is to the model, not directly to nature, that the various terms in that equation refer. ... Models are not, however,

> merely pedagogic or heuristic. They have been too much neglected in recent philosophy of science. (Kuhn 1979, p. 414)

Research in physics might at first appear to involve a much more complex thought process than those which are involved in less ambitious cognitive activities. Yet, the same thought processes that are involved in understanding what an atom is are involved in understanding very simple concepts, such as a table or a chair. The research endeavor, just like any other cognitive endeavour, relies on metaphors. By changing from one metaphor to another new meaning and understanding is brought to light regardless of whether the phenomena of one's focus is an atom or something more simple. Regardless of what one is thinking about, it appears that metaphors are at the heart of meaning and understanding.

## 2.3 Diversity in research

Scholarship on diversity in research – as identified in the introduction (Section 2.1) – is the next major area touched upon by this study. This section will begin by reviewing the significance of this area in terms of disciplinary debate. The debate in Organisation Science is of particular interest here due to its status as a reference discipline to Information Systems. The section then moves on to uncover the ways in which scholars have understood diversity in research. An important discovery here is the idea that 'root' metaphors offer valuable insights into understanding diversity in research. Scholarship in the area of Philosophy was the first to uncover this – most notably with the work of Pepper (1924) – published in his text *World Hypotheses*. Pepper proposed that there were a small number of root metaphors with each offering a relatively adequate view of the world. Those in Organisation Science relied on the notion of root metaphors to review scholarship in their own discipline. Through this lens they found a distinct bias in their research – specifically toward mechanistic understandings. This idea of root metaphors proposed by Pepper (1942) and extended by those in Organisation Science holds an important key to studying the diversity in our own discipline – a topic taken up in the final section of this chapter: diversity in Information Systems Research.

### 2.3.1. Significance

Diversity in research is a popular topic of debate in many disciplines. From Philosophy (Archard 1996; Callahan 2000; Kekes 2000; Visker 2004) to Economics, Psychology and Political Science (Baghramian & Ingram 2000) scholars have debated the advantages and disadvantages of being diverse in their research. While the debates occurring in these disciplines are important to the topic of diversity in research, the debate that has occurred in Organisation Science deserves further attention. Not only is Organisation Science a direct reference discipline to Information Systems – we frequently borrow theories from this discipline – but the debate in Organisation Science was particularly heated and impassioned. Additionally, as will be shown in the next section (Section 2.4) on diversity in Information Systems research many of the arguments developed by those in Information Systems – particularly those of Robey (1996) and Benbasat and Weber (1996) – rely on the arguments developed in Organisation Science.

The debate that occurred in Organisation Science involved two key scholars: Pfeffer and Van Maanen. Pfeffer opposed diversity in research, which is evident in the following quote:

> The domain of organization theory is coming to resemble more of a weed patch than a well-tended garden. Theories ... proliferate along with measures, terms, concepts, and research paradigms. It is often difficult to discern in what direction knowledge of organizations is progressing. (Pfeffer 1982, p. 1)

More than a decade later, the weed patch of organisation theory and the associated chaos of the discipline was still a concern for Pfeffer. In 1993 he published a paper entitled 'Barriers to the advance of organizational science: paradigm development as a dependent variable' (Pfeffer 1993) in the *Academy of Management Review* where he revisited his old concerns. Pfeffer was clearly concerned with what he saw as a field that was becoming 'more fragmented and diverse than it has been' (Pfeffer 1993, p. 608). This high diversity was equated in Pfeffer's article with a low level of paradigm development. According to Pfeffer (1993), such diversity and fragmentation of the discipline was a barrier to the advancement of Organisation Science.

As Pfeffer (1993) was pleading with the discipline to become unified, Van Maanen made it clear that Pfeffer's requests were impossible to grant. More than that, however, he regarded them as fascist. Additionally, while Pfeffer's ideas appear to have gained ground with some in the Organisation Science discipline, Van Maanen was not one of them. A quote from Van Maanen (1995a) illustrates this:

> I suspect I am a weed in Jeffrey's dreamtime garden. I am therefore a candidate for pruning, paring and discarding. But whether I am a tulip, wildflower or weed, I want to suggest here that this sour view of our field is – to be gentle – insufferably smug; pious and orthodox; philosophically indefensible; extraordinarily naive as to how science actually works; theoretically foolish, vain and autocratic; and – still being gentle – reflective of a most out-of-date and discredited father-knows-best version of knowledge, rhetoric and the role theory plays in the life of any intellectual community. (Van Maanen 1995a, p. 133)

It was clear in this initial response to Pfeffer (1993) that Van Maanen was prepared to take up the call to arms Pfeffer alluded to previously. In this instance, though it was to fight against Pfeffer rather than with him. Van Maanen (1995a) stated that he would be 'debunking the would-be towers of power in our field' (p. 133) where Pfeffer was the main offender.

> We are told that Peter Frost's characterization of my article as 'less restrained than we are used to was an understatement' .... Guilty as charged. Yet the phrase 'less restrained' is a sneaky one and when it is used as an opprobrium to reasoned discourse and used as a broadside to undercut arguments that are otherwise ignored, a reader must surely wonder why a 'more restrained' piece of writing is to be preferred? This is indeed an odd complaint since Jeffrey initiated this skirmish in the first place in a pitch hardly designed to be placating. Are we not allowed to be annoyed - and show it? And, if annoyed, must we resort to the impersonal, forumulaic and dull discourse so loved by journal editors? My response was, after all, published in a forum called Crossroads where some of the pinched constraints of the 'scientific article' are supposedly lifted. (Van Maanen 1995a, p. 687)

In his efforts to debunk Pfeffer's arguments as well as calling Pfeffer's scholarship into question Van Maanen (1995a) firstly describes Pfeffer's actions as a 'Stalinist purge' (p. 133). He then moves on to assert that Pfeffer's actions constitute a clear desire to establish his own 'Pfefferdigm' (p. 133). Later Van Maanen (1995a) asserts Pfeffer's behavior is also sycophantic. Pfeffer, according to Van Maanen is trying to found a 'I'm-a-Pfeffer, you're-a-Pfeffer, wouldn't-you-like-to-be-a-Pfeffer-too' (p.

134) research world. As shown here and in the following quote Van Maanen relies extensively on the arts of rhetoric to discredit Pfeffer's arguments:

> I think a disarmament program is in order to take away certain taken-for-granted tropes that govern organizational theorizing - tropes like progress, truth and reality (singular), as well as those terms drawn from bipolar hierarchies that privilege certain terms over others, like hard over soft, objective over subjective, perception over imagination, quantitative over qualitative and masculine over feminine. (Van Maanen 1995a, p. 140)

Van Maanen (1995a) finishes with his own view of Pfeffer's portrait of the field. Rather than seeing the then current state of the Organisation Science discipline as a pastoral but wild field in need of pruning paring and discarding Van Maanen sees it in terms of a conversation that needs planting, nurturing and cultivating. According to Van Maanen, research if it is to be seen as a garden flourishes in diversity and is stunted when such diversity is restricted.

While this section has highlighted the significance of diversity in research in the related discipline of Organisation Science it has not covered what is meant by it. This is the topic covered in the next section.

## 2.3.2. Philosophy

The discipline of Philosophy - in particular the work of Pepper (1942) – holds some key information in terms of how diversity in research is understood. Pepper's (1942) work with root metaphors asserts that we rely on a small number of metaphors – what he also referred to as world hypotheses – in order to structure and understand our world. These root metaphors provide very different but relatively adequate views of the world. The discovery of root metaphors is important to this study as it provides a strong foundation for understanding diversity in research – an understanding that has been extended by those in Organisation Science to their disciplinary endeavours.

### Root metaphors in Philosophy

In *World Hypotheses*, Pepper (1942) published the results of his struggle to understand 'just how men can get at the truth' (Pepper 1942, p. ix). In this book Pepper demonstrates that there is no such thing as data free from interpretation – this is the error of *logical positivism* – and that root metaphors are necessary in epistemology. Objectivity, according to Pepper, is a myth: there is no such thing as objective fact. Instead we rely on root metaphors to gain a 'relatively adequate view of the world' (p. X). Pepper (1942) proposed four root metaphors: mechanism, organicism, contextualism and formism. These four root metaphors, as described by Pepper (1942), are outlined in Table 2.1 along with their various metaphysical dimensions.

Table 2.1. *Pepper's (1942) four root metaphors and their metaphysical dimensions*

| | **ROOT METAPHOR** | | | |
|---|---|---|---|---|
| *Dimensions* | Mechanism | Organicism | Contextualism | Formism |
| Paradigm Associations | Naturalism, materialism, realism (by some) | Absolute (or, objective) idealism | Pragmatism | Realism, Platonic idealism |
| Order Presumed | Predictable | Predictable | Problematic | Problematic |
| Theory Type | Analytical | Synthetic | Synthetic | Analytical |
| Theory Plan | Integrative | Integrative | Dispersive | Dispersive |
| Approach | Deterministic | Deterministic | Non-deterministic | Non-deterministic |
| Inadequacies | Scope | Scope | Precision | Precision |
| Associated Philosophers and schools of thought | Democritus, Lucretius, Galileo, Descartes, Hobbes, Locke, Berkeley, Hume, Reichenbach | Schelling, Hegel, Green, Bradley, Bosanquet, Royce | Peirce, James, Bergson, Dewey, Mead | Plato, Aristotle, the scholastics, neoscholastics, neorealists, modern Cambridge realists |

Source: Pepper (1942)

In Table 2.1, while the dimensions of approach and plan are relatively self-explanatory theory type and theory plan deserve further explanation. In the table both organicism and contextualism are listed as synthetic world theories while mechanism and formism are listed as analytic. This does not mean as Pepper (1942) asserts that the synthetic theories do not analyse or analytic theories do not synthesise. In analytic theories basic facts or *danda* are in the form of elements so that synthesis becomes derivative. In synthetic theories basic facts are complexes where analysis becomes derivative. While both organicism and contextualism have a similar theory type they do not have a similar plan. Indeed mechanism and organicism are both integrative theories whereas contextualism is dispersive. This means that analysis is treated in an integrative way by mechanism as is the synthesis of organicism whereas synthesis is treated in a dispersive way by contextualism. Therefore, while the three root metaphors are adequate views of the world they are very different in terms of their metaphysical dimensions, that is, they offer very different ways of thinking and reasoning about the world.

Due to their subsequent importance in Organisation Science the following sections outline in some detail the reasonings associated with mechanism, organicism and contextualism. These are the metaphors that are built on by those in Organisation Science to see how differently the organisation is understood. They are also important for this study and are referred to again in Chapter 3.

### *Mechanistic reasonings*

In relation to the machine metaphor Pepper (1942) asserted that there are six mechanistic reasoning categories that underlie this metaphor. These categories are split between the primary or effective categories and the secondary or ineffective categories. They are listed below along with a brief description.

The first three primary categories are:

1. Field of location – the machine is a configuration of parts having specific locations. Whatever can be located is real, and is real by virtue of location: only particulars exist. Location is defined in terms of space and time.

2. Primary qualities – parts of the machine are expressed in exact quantitative terms. Qualities are what differentiate the field of location: field and matter are complementary concepts.

3. Laws holding for configurations of primary qualities in the field (primary laws) – there is an effective relationship or law, which holds among the parts of the machine.

The three secondary categories are:

4. Secondary qualities – qualities, which are irrelevant to the machine, such as texture, colour and odour, still exist. What we experience are secondary qualities only from which we can infer the primary categories.

5. A principle for connecting the secondary qualities with the first three primary or effective categories – although the secondary qualities have no bearing on the machine they nevertheless seem tied to it by some principle.

6. Laws, if any, for regularities among secondary qualities (secondary laws) – just as the primary qualities have primary laws so too might there be secondary laws that exist around the secondary qualities.

Pepper (1942) asserts that there is a 'loose' attachment between the primary and secondary reasoning categories and at times in their actual use they drift apart. A materialist, he argues, denies the existence of the secondary categories and a subjective idealist does so with the primary categories. Each of these views is, as Pepper asserts, 'miserably lacking in scope' (p. 194) but are nevertheless regarded as relying on the machine metaphor.

***Organic reasonings***

Pepper (1942) asserts that the organicist believes every worldly event is a 'more or less concealed organic process' (p. 281). Hence, the categories of organicism consist in noting the steps involved in this process and noting the principal features in the organic structure. Where the machine metaphor has a division in terms of primary and secondary reasoning categories the organism metaphor does so along ideal and progressive reasoning categories.

The progressive categories include:

1. Fragments of experience – the organic process itself is one of integration. It is as Pepper (1942) asserts a 'sort of negative category' (p. 290), which acquires significance in terms of the integration not achieved. Fragments of experience appear with

2. Nexuses or connections or implications. Within the fragments are nexuses, which Pepper (1942) asserts are the 'internal drives' (p. 291) toward the connections,

which complete them. Facts are not organised from without but instead organise themselves. These nexuses spontaneously occur as a result of

3. contradictions, gaps, oppositions, or counteractions. In reaching out to be part of a whole fragments inevitably encounter obstacles in the form of contradictions, gaps, oppositions, or counteractions. The resolution comes about in the form of

4. an organic whole. Resolution is the integration of conflicting fragments. Progress of the organic process moves from level to level of integration always in the direction of further integration.

The ideal categories include the fourth category above (which is the pivotal point of the system) and include three others. This complete set is:

4. an organic whole (as outlined above), which is found to have been,

5. implicit in the fragments. Fragments are implicit within a whole. The organic whole also

6. transcends the previous contradictions by means of a coherent totality. Contradictions are transcended in the organic whole. This coherent totality

7. economises, saves, preserves all the original fragments of experience without any loss.

As Pepper (1942) asserts ardent followers of organicism believe that the ideal categories are the only categories of organicism. It is nevertheless possible to rely on the organism metaphor without the progressive categories.

### *Contextualistic reasonings*

Pepper (1942) asserts that the event or act is the basis for contextualism (note those in Organisation Science refer instead to the *culture metaphor* rather than contextualism). Hence, all categories of contextualism are derived from what he calls the 'total given event' (p. 233). Pepper identifies four categories of this metaphor – all of which are based on the total given event. Two are what he terms 'ineradicable contextualistic categories' (p. 235) which are change and novelty. These two ineradicable categories exist as details within two other categories quality and texture which are described below:

1. Quality – is roughly the total meaning of an event. To gain an understanding of quality one must understand:

1.1 the spread of an event (or its specious present). The quality of an event has a spread. The spread reaches both forward and backward. Meaning is taken up with what has preceded but also with what is yet to come.

1.2 its change. No matter what the event is, it is continuously changing. This is as Pepper argues a categorical feature of all events. The world is events, events are never the same, the world is always changing.

1.3 its degrees of fusion. Fusion, to some degree, is always exhibited by a combination of texture details. Generally, there is some degree of fusion in an event and there may be several levels of fusion in a given event.

2. Texture – is the details and relations that make up the quality of an event. To understand what is meant by texture one must consider:

2.1 the strands of a texture – whatever directly contributes to the quality of a texture may be regarded as a strand. These are strands as they contribute directly to the total meaning , i.e., the texture.

2.2 its context – whatever indirectly contributes to the quality of a texture may be regarded as its context.

2.3 its references. Context, texture and strand are all relative to one another.

### 2.3.3. Organisation Science

Those in Organisation Science reviewed their research by relying on the idea of root metaphors outlined in the previous section. They found a distinct bias toward mechanistic understandings. This work in Organisation Science is an important discovery for this thesis. It shows that Pepper's work can be relied on to view the more specific topic of diversity in research. It also shows in theoretical terms how this can be done; that is by applying the root metaphors to a key disciplinary concept. The following sections outline these points in more detail.

## Root metaphors in Organisation Science

Scholars within Organisation Science relied heavily on the foundational work done by Pepper (1942) to uncover what they believed to be a conceptual bias in their discipline. There are no known empirical studies to back up their assertions; however, there is a great deal of theoretical work and anecdotal evidence to suggest that such a bias does indeed exist (Adams & Ingersoll 1985). Furthermore, this conceptual bias exists at the very heart of the discipline: at the level of organisations, the key object of interest for Organisation Science, both in research and in practice. The rationale is based on Pepper's (1942) original idea that the world, which includes organisations, can be understood through root metaphors. Those in Organisation Science, however, only relied on three of Pepper's original four root metaphors: machine (mechanism), organism (organicism) and culture (contextualism). It is not known why scholars in Organisation Science did not include formism. One possible reason is that Pepper (1942) himself held some reservations about formism. As he stated: 'The lack of precision and promise in formism makes this theory appear the least adequate of the four favored ones, and we should be tempted to drop it out of the list altogether were it not for the very strong feeling of certainty which attaches to its root metaphor' (p. 144). Regardless of the reason why formism was dropped the remaining three metaphors appear to have provided those in Organisation Science with what they needed: a basis on which to review the work conducted in their discipline. Furthermore, these three metaphors enabled those in Organisation Science to identify gaps in their research as well as ways of addressing those gaps.

### *Machine metaphor*

According to those in Organisation Science the *organization-as-machine* metaphor is the single most dominant way of thinking about organisations. When one relies on the organisation as a machine metaphor their perspective is rational. In doing so attention is drawn to the formal structures of an organisation and the idea that organisations operate according to the prescribed behavior of fulfilling goals (Schultz 1995). Classical management theory and scientific management, all very rational perspectives of organisations, are built on the notion that organisations are indeed machines (Morgan 2006). While classical management theory looks at the design of the organisation as a whole and scientific management looks at the design of individual jobs both rely on the machine metaphor. These views – built on the machine metaphor – have become firmly entrenched in our everyday thinking about organisations. This is the bureaucratic organisation (Morgan 2006). Organisations are seen as rational entities where attributes such as efficiency and effectiveness are critical. Just as the machine is expected to operate with the precision of clockwork so too are our modern organisations (Morgan 2006).

In addition to how we think about organisations Morgan (2006) points out (consistent with metaphor theory) that the machine metaphor impacts what we actually do in terms of them. As Morgan (2006) asserts the *organization-as-machine* metaphor shapes not only the types of things we think are important about organisations but also frames our actions in the most detailed ways:

> Organizational life is often routinized with the precision demanded of clockwork. People are frequently expected to arrive at work at a given time, perform a predetermined set of activities, rest at appointed hours, and then resume their tasks until work is over.... Often, the work is very mechanical and repetitive. Anyone who has observed work in the mass-production factory or in any of the large 'office factories' processing paper forms such as insurance claims, tax returns, or bank checks will have noticed the machinelike way in which such organizations operate. They are designed like machines, and their employees in essence expected to behave as if they were parts of machines. (p. 12)

Among many others, Morgan (2006) and Schultz (1996), remind us that the particular actions which arise from thinking about organisations as machines also flows through to the activity of research in Organisation Science. The things that are highlighted as being important, the rational perspective frames the types of problems we see, the theories we use, and the methods on which we rely. The machine metaphor has brought with it some spectacular successes but is also responsible for many modern organisational problems. This leads naturally to the most popular alternative for viewing organisations, the functionalist view: which is aligned with the *organisation as organism* metaphor.

### *Organism metaphor*

The organism metaphor, while not as entrenched in thinking about organisations is still said to be a popular alternative. As Morgan (2006) asserts, many organisation theorists have been drawn toward this metaphor as a source of thinking about organisations. In Organisation Science the organism metaphor is aligned with a functionalist perspective. This perspective draws our attention away from the formal to the informal structures and the notion that organisations operate according to survival behaviors (Schultz 1996). Morgan (2006) argues that this particular metaphor has had an enormous impact on how we now think of organisations. No longer are we 'locked' into post-industrial thinking where organisations are essentially bureaucracies. The notions of goals, structures, and efficiency are subsidiary to the problems of 'survival and more "biological" concerns' (Morgan 2006, p. 34). Recognising the importance of the environment and the view that organisations are open systems is essential to viewing the organisation as an organism. Theories of alignment, and particularly contingency theory in the practice of organisational development are all, according to Morgan (2006), excellent examples of theories that rely on the organisation as organism view. They are all very 'functional' ideas on the organisation hence the association of the organism metaphor with the functional perspective in organisational theory.

Organisational development is a good example of how the organism metaphor affects what is done with respect to the target domain (Morgan 2006). Based on contingency theory, researchers in this area have developed diagnostic and prescriptive models that are used to identify organisational ailments and to prescribe cures. Morgan (2006) asserts that researchers in this area have taken on the role of 'organizational doctors' (p. 55). In this view successful organisational change and development hinges on bringing the various elements of an organisations sub-systems into alignment so that the organisation can meet the challenges of the environment. Just as the organism exists in a certain harmony with its environment, so too, is it believed necessary for the organisation to exist in a similar harmony with its environment.

The link between how organisations are viewed and subsequent research is also visible. The problems that are seen, the theories that are developed and the methods that are employed are all impacted by the underlying metaphor. Yet, Morgan (2006) and others assert that the organism metaphor, while bringing its own successes to the field of Organisation Science, has also brought its own problems. One of the most significant of these is the notion that the organisation is goal-driven and that any human-like qualities of the organisation are subsumed by the biological concerns of the organisation.

It is important to note how the understanding of the organism metaphor offered by those in Organisation Science diverges from the original understanding provided by Pepper (1942). The understanding of the organisation as organism provided by those in Organisation Science is clearly biological. The understanding provided by Pepper (1942), however, is not. As he suggested 'The common term "organism" is too much loaded with biological connotations, too static and cellular … . Yet there are no preferable terms' (p. 280). This particular point has significant practical implications for this study and will be followed up further in Chapter 3.

### *Culture metaphor*

The culture metaphor is – according to those scholars in Organisation Science – the least favoured way of viewing the organisation. This is despite the advantages and insights gained from the metaphor – ones that are difficult if not impossible with the machine or organism metaphors. The culture metaphor is aligned with the symbolic perspective. This perspective focuses attention more directly on the human-like qualities of an organisation. These are the qualities, which tend to be neglected by both the machine and organism metaphors. The *organisation as culture* metaphor views the organisation as a human system that expresses complex patterns of symbolic action. Schultz (1996) asserts that the fundamental question asked by those relying on the culture metaphor is: what is the meaning of the organisation to its members? In symbolism the physical world becomes a symbolic universe (Cassirer 1944). Therefore, relying on the culture metaphor to view organisations the organisation becomes a part of this symbolic universe.

Understanding the organisation while relying on the culture metaphor requires a very different approach to the machine or organism metaphors. It is more of an anthropological exercise. One does not 'engineer' or 'diagnose' organisational problems and solutions as they do with the machine and organism metaphors. Rather the organisation is 'read' with the intention of crystallising a pattern of meanings. When relying on the culture metaphor the aim is not necessarily to change the organisation, as is typically the case when relying on the machine and organism metaphors, but to understand it for its own sake. To understand the meanings and symbols of organisations as the members of the organisation create them. This is of course a very different approach than that which is witnessed with the machine and organism metaphors.

In terms of research the impact of the culture metaphor is, as one might expect, very different to the impact that comes from relying on the machine or organism views. When one thinks in terms of organisations being socially constructed, the items of interest in the research endeavor are very different. One looks at the values, norms and beliefs that encompass the organisation. Hence the endeavour of research is shaped in a very different way. The problems that are seen, the theories that are developed and the methods used in research are completely different. For example, when operating from the culture metaphor, one would be interested in the aspects and problems of shared norms and beliefs in organisations. Specific aspects of interest might include the rituals, myths and traditions that occur in an organisation. Like Geertz (1973), they would be more likely to adopt interpretive and critical approaches in an effort to understand how the organisation is socially constructed (Schultz 1996). Hence, relying on the culture metaphor would result in research that was very different to what would result when relying on a machine or organism metaphor.

### Discoveries of bias

In the previous outlines of the machine, organism and culture metaphors it was highlighted that not only do each of the metaphors provide a very different view of the organisation they also result in very different research goals and methods. One of the key criticisms that exist within the Organisation Science area is that there is an overemphasis on the machine and organism metaphors both in research and in practice. By focusing on these metaphors the organisation is structured and understood as a rational, stable and purpose-driven entity. When viewing research as a cognitive process such structuring and understanding of organisations completely dominates the thinking and subsequent action of researchers and practitioners in the Organisation Science field.

This foundational work of those in Organisation Science is an important discovery in terms of this study. It provides important theoretical guidance in terms of how diversity in research can be understood. That is, diversity in the root metaphors used for a key research concept.

## 2.4 Diversity in Information Systems research

In this section scholarship on diversity in Information Systems research is reviewed. First, reviewing scholarly debate in this area will highlight the significance of the topic. It will be shown that many of the same issues raised by those in Organisation Science exist in the Information Systems disciplinary debate. Following on from this discussion the theoretical understandings of diversity in Information Systems research is reviewed. To date there are only two understandings of this phenomena. Benbasat and Weber (1996) provided the first understanding stating that diversity in Information Systems research can be understood as diversity in problems, theories (and reference disciplines) and methods. The author of this thesis provided the second understanding. This alternative understanding asserts that diversity in Information Systems research can be viewed as holding diverse conceptualisations of key Information Systems concepts (Behrens 2007). Empirical studies specifically on the topic of diversity in Information Systems research are limited. While many meta-analyses have been done on the discipline only three empirical studies exist on diversity in Information Systems research. Two of these studies rely on the theoretical understanding of diversity in Information Systems research provided by Benbasat and Weber (1996). The remaining exploratory study, conducted by the author of this thesis, relied on the alternative understanding of diversity in Information Systems research.

### 2.4.1. Significance

One of the aims of this thesis is to contribute to the theoretical debate of diversity in Information Systems research. To do this it is necessary to review the debate thus far. As will be shown in this section, the debate holds great significance for those in the Information Systems discipline. Many of the critical issues raised in the Organisation Science discipline – ones that resulted in such impassioned discourse – are reflected in our own discipline. These issues include identity, practice and relevance – issues that are central to most, if not all, disciplines.

> … of all the ridiculous things that have been foisted on the long-suffering executive in the name of science and progress, the real time management information system is the silliest. (Dearden 1966, p.123)

This derisive quote by Deardon (1966) is typical of the types of criticisms the Information Systems discipline has had to endure over the years. This particular criticism and many others appear to be a result of perceived diversity in the Information Systems discipline. As Deardon (1972) later stated: 'It is difficult even to describe the MIS in a satisfactory way … It is nearly impossible to obtain any agreement on how MIS problems are to be analysed, what shape their solutions might take, or how these solutions are to be implemented' (p. 91). The variability and diversity inherent in the Information Systems discipline, were seen as being completely at odds with being disciplined. Hence, due to the field's diversity, its legitimacy and credibility on the academic stage was called into question; an argument followed to this day.

While the problems of diversity have weighed heavily on the Information Systems discipline (Benbasat & Weber 1996) the field has nevertheless managed to enjoy success. From the many top-tier journals devoted specifically to the subject of information systems, to the number of Information Systems conferences available to Information Systems researchers and practitioners, to the truly global institution the Information Systems discipline has become. All these successes do not appear to have been easy victories for the field, especially given its history for attracting what some may term the wrong type of attention (as seen in Deardon's quotes above). Unlike Dearden however, there are many in the Information Systems discipline who believe the reason for these successes were directly attributable to the high levels of diversity inherent in our discipline. They view their disciplinary diversity as a positive trait – one that should be further fostered and encouraged (Banville & Landry 1989; DeSanctis 2003; Hirschheim 1985; Robey 1996). Diversity, particularly in research, should be viewed not as something to be merely tolerated, but as an 'irresistible' (Hirschheim 1985, p. 36) necessity, that is, for the discipline to survive and thrive over time Information Systems academics must build on the diversity of what they actually do. The viewpoint for the proponents of diversity are perhaps best summed up by Robey's (1996) catch-cry: *Let many flowers bloom.*

On the other hand there are those in the discipline of Information Systems who were, and still are, not as willing to accept this liberal view toward diversity in research. This group believes in a monistic view of science (Landry & Banville 1992) and are perhaps best summed up as conservative when it comes to the levels of diversity that are acceptable in the IS discipline. This group asserts that encouraging diversity is essentially encouraging a free-for-all (Benbasat & Weber 1996). Furthermore, they argue that the discipline has already become too diverse and we should act immediately to prevent any further degeneration. Moreover, if the discipline becomes further diversified the most likely result is the ultimate starvation and death of the field as an academic enterprise (Benbasat & Zmud 2003). On this point the conservatives appear to agree more with Dearden's (1972) original argument than with some of their fellow Information Systems scholars. That is, to them – as was the case with Dearden – consensus rather than diversity is essential for a clear identity and survival over the long term.

It is important to note here that diversity in research has and remains a significant topic of interest for those in Information Systems. It is, however, important to understand what is really meant by diversity in research. This is the topic to which we now turn.

### 2.4.2. Theory

As stated in the introduction to this sub-section there are only two theoretical understandings of diversity in Information Systems research. The first is provided by Benbasat and Weber (1996). They state that research diversity can be recognised in three main ways:

1. through the diversity in the problems that are addressed in the discipline
2. through the diversity in the theoretical foundations and reference disciplines that guide Information Systems research
3. through the diversity in the methods used to collect, analyse and interpret data.

This definition appears to resonate with many common understandings of research (see for example the commonalities with Deardon's statements previously). Yet this understanding tends to overlook research as a cognitive process. Such an oversight may not, at least initially, seem significant: it seems obvious that one must think in order to research. Bailyn (1977), however, suggests otherwise. As she states, while few would deny research is a cognitive process such a lack of denial is not the same as open and direct acknowledgement. Bailyn (1977) goes further to state that recognition of research as a cognitive process is critical, as it can and does result in a very different view of research. Bailyn (1977) suggests that rather than looking at research as a final product one should look at research as a flow of cognition – as an act of imaginative engagement.

This leads to the only other known theoretical understanding of diversity in Information Systems research – one that does look at research as a flow of cognition. This is the understanding of diversity in research originally proposed by the author of this thesis in an exploratory study (Behrens 2007). In this research it was asserted that one way of understanding research was to view it as an act of cognition. In viewing it as an act of cognition it was also suggested that according to metaphor theory our research is largely a matter of employing different metaphors. Furthermore, as argued by those in Organisation Science finding bias or diversity in research was a matter of uncovering what root metaphors were relied on and to what extent for key research concepts.

This thesis is an extension of the previous exploratory study done by the author of this thesis. It therefore, extends not only work done in the Information Systems discipline with respect to diversity in research but should also contribute more broadly to work done outside the discipline. In particular, disciplines that focus on metaphors and metaphor theory development such as Linguistics but also Organisation Science and Philosophy where work on diversity and diversity in research are key areas of importance.

### 2.4.3. Empirical

Very few empirical studies have been conducted on *diversity* in Information Systems research; however, a number of studies have been conducted on the broader topic of Information Systems research. These broader studies are still relevant to the topic at hand and as such deserve further examination. These broader studies, particularly the approaches adopted in empirical examination of research, will be discussed before moving on to the few empirical studies that have focused more narrowly on diversity in Information Systems research.

Reflections on – and subsequent empirical studies on – research have been popular in Information Systems since the field's inception. At the very first *International Conference on Information Systems* Peter Keen (1980) challenged the Information Systems community to reflect on research occurring in the discipline. Some of the key questions asked were: what are the reference disciplines for MIS, what is the dependent variable, how do we build a cumulative tradition, what is the relationship between MIS research and computer technology, what is the relationship of MIS research to practice, and where should MIS researchers publish? In response to these challenging questions, researchers responded in kind by assessing MIS as a field using both a historical and a 'forward-looking' perspective. Of particular importance in many of these studies was examining the relationship of MIS to its reference disciplines.

One popular approach at this time, which has been effectively carried on in to current studies in Information Systems, was citation analysis. Hamilton and Ives (1982a, 1982b, 1983) are a good example of those first scholars who relied largely on citation analysis to determine the communication between MIS and its reference disciplines. Another approach also based on citation analysis was to develop an intellectual mapping of MIS based on citation patterns. Perhaps the earliest and most prominent example of this type of study was by Culnan (1986, 1987). These particular studies used citation analysis as a way of reflecting on research that was conducted in the field. As Culnan (1987) asserted:

> While doing research is essential if a field is to establish a cumulative research tradition, it is also important to step back periodically and think about the research which constitutes a field. Even new fields like MIS have a sense of history; those which cut themselves off from curiosity and reflection are likely to atrophy. (p. 341)

Culnan (1987) further asserted that by understanding the intellectual roots of Information Systems through citation practices could also identify the basic intellectual commitments which serve as the foundations for a maturing discipline.

While these first studies relied on citation analysis as a way of reflecting on research being done in the field, metaphors were also used as a way of assessing the progress MIS had made toward establishing a cumulative research tradition. In particular Culnan (1987) in referring to Ritzer (1975) asserted that if one accepts MIS – like all social sciences – is multi-paradigmatic; they also accept that it can be defined in terms of three basic competing approaches to research. Each approach is characterised by 1) an exemplar or defining work; 2) images of the subject matter; and 3) theories and methods. In direct relation to 2) Culnan (1987) quotes Martin's

(1982) metaphor of the garbage can to describe research in IS. That is, it is a 'loose collection of ideas, rather than a coherent structure having a shared intellectual paradigm' (Martin 1982, p. 22). Culnan (1987) asserted that such a description seemed to be an appropriate characterisation of MIS research. Therefore, while metaphors were not directly relied on in these early studies as a way of understanding the research conducted in the discipline they were used – however briefly – as a way to describe the progress of the discipline.

At this point it should be noted that the above studies were not on diversity in Information Systems research per se. They did, however, play an important part in setting the stage for subsequent debates on diversity in Information Systems research. One particular study by Swanson and Ramiller (1993) was important in this regard. In their study Swanson and Ramiller (1993) conducted an analysis of the manuscripts submitted to the journal *Information Systems Research* during a five-year period from its startup years, 1987 through 1992. In an effort to examine the performance of *Information Systems Research*, as well as to open a window on to the information systems field during this five-year period, they examined the primary research questions for each of 397 submissions to the journal and then categorised them. From their iterative classification procedure they identified eight thematic areas. In their discussion of the results the researchers urged the Information Systems community to reflect on whether these outcomes showed a sufficient diversity in the field. Furthermore, they encouraged community discourse concerning the nature and proper direction of the field. From the debate that followed, as outlined in the introductory chapter they were successful on both counts. The results of their study were taken as evidence that the field was indeed diverse. Further, Swanson and Ramiller's (1993) study spawned a great deal of discussion over the nature and proper direction of the field.

Despite the conclusions on the relative diversity of the IS field, ones that are drawn from Swanson and Ramiller's (1993) study conducted more than a decade ago, as well as a continued interest in the topic of diversity in Information Systems research, there are very few conceptual or empirical studies that have focused directly on the issue of research diversity. The only known studies to do so were conducted by Vessey, Ramesh and Glass (2002) and more recently by Sidorova, Evangelopoulos and Ramakrishnan (2007) and Behrens (2007).

The study by Vessey, Ramesh and Glass (2002) built on the understandings of research diversity provided by Benbasat and Weber (1996) adding two further characteristics: research approach and research method. In their study they found what they believed to be a 'considerable diversity in each of the key characteristics' (Vessey, Ramesh & Glass 2002, p. 129). The study by Sidorova, Evangelopoulos and Ramakrishnan (2007) that was later re-focused into a paper about the intellectual core (2008), used latent semantic analysis to gather key research themes over a period of 20 years. While Sidorova, Evangelopoulos and Ramakrishnan (2007) argued that their results were richer than those of Vessey, Ramesh and Glass (2002), their study essentially confirmed the findings of Vessey, Ramesh and Glass's (2002) study, that is, they revealed a 'rich and varied field with a wide collection of research themes' (p. 1). Therefore both Vessey, Ramesh and Glass (2002) as well as Sidorova (Sidorova, Evangelopoulos & Ramakrishnan 2007; Sidorova et al. 2008) confirmed the original observation made by Benbasat and Weber (1996) that diversity in Information Systems research was both the 'reality and the accepted norm' (p. 389).

While not directly related to the topic of diversity in Information Systems research Orlikowski and Iacono (2001) hinted at a more biased profile of Information Systems research than those conducted by Vessey, Ramesh and Glass (2002) as well as Sidorova (Sidorova, Evangelopoulos & Ramakrishnan 2007; Sidorova et al. 2008). Additionally, this study by Orlkowski and Iacono (2001) relies on what could be interpreted as a quasi-metaphor approach in gaining understanding of the various ways in which a key disciplinary concept is understood. This particular study by Orlikowski and Iacono (2001) while not directly related to diversity in Information Systems research was significant in motivating the initial exploratory study by Behrens (2007), which was directly related to the topic.

In Orlikowski and Iacono (2001), a very different approach to research was employed. Rather than citation analysis or the thematic approach, Orlikowski and Iacono (2001) focused on the different conceptualisations of the IT artefact in Information Systems research. Furthermore, rather than finding a broad and diverse array of conceptualisations of the IT artifact, Orlikowski and Iacono revealed something quite different. As they stated, 'much IS research draws on commonplace and received notions of technology, resulting in conceptualizations of IT artifacts as relatively stable, discrete, independent and fixed.' (p. 121). Although Orlikowski and Iacono's (2001) study did not make its prime focus diversity of Information Systems research it shows how a similar problem looked at in different ways might reveal different results, that is, by looking at the same journal over the same period of time Orlikowski and Iacono (2001) came to vastly different conclusions than Vessey, Ramesh and Glass (2002) and Sidorova, Evangelopoulos and Ramakrishnan (2007). Where Vessey, Ramesh and Glass (2002) revealed a rich and varied field, Orlikowski and Iacono (2001), by focusing on the IT artefact, revealed a more restricted view of Information Systems research.

The original exploratory study conducted by the author of this study (Behrens 2007), of which this thesis is an extension, took up the hint provided by Orlikowski and Iacono (2001) that all may not be as it seems in the realm of Information Systems research. This is particularly the case when one takes a more conceptual and focused view of the research process. Unlike Orlikowski and Iacono (2001) and more like Vessey, Ramesh and Glass (2002), this initial exploratory study conducted by Behrens (2007) sought to directly address the paucity of empirical studies concerning research diversity. Therefore, like Vessey, Ramesh and Glass (2002) it asked the same broad research question, 'How diverse is Information Systems research?' (p. 131). This study took up the thread already provided by Orlikowski and Iacono (2001) in its approach; it is interested in research as a cognitive process. In terms of cognition, however, this study relied on the discoveries made by those in Organisation Science to do so. In particular this study relied on the notion of root metaphors to discern whether or not Information Systems research was as diverse as many held to be the case. This study looked for evidence of three root metaphors – machine, organism and culture – used to structure and understand a key disciplinary concept - organisations - in Information Systems research. Analysing the discourse of all articles published in the *Information Systems Research* journal during the period 2000-2006, this study revealed a bias toward the machine metaphor. This study suggested that research in the Information Systems discipline may not be as diverse as initially thought. This thesis is a more comprehensive extension of this initial exploratory study: one that gives full and open recognition to the power of metaphor in research.

## 2.5 Conclusion

In this chapter the literature concerning both the broader and narrower contexts surrounding the topic of diversity in Information Systems research were reviewed. Of particular importance was highlighting the significance of metaphor in the research endeavor. Metaphor is as Kuhn (1979) asserts key to the research endeavour and the hallmark of all scientific revolutions: past and present. Furthermore, metaphor has been a critical part of identifying relative biases in Organisation Science research, a close reference discipline to Information Systems. Yet, despite the importance of metaphor to research and the corresponding interest in the topic of diversity in Information Systems research, metaphor has been a largely overlooked part of the relatively few investigations into this area. The current study published in this thesis intends to build on one notable exception to these investigations. This study was a previous exploratory study conducted by the author of this thesis, looking at how diverse conceptualisations are in the discipline for three key disciplinary concepts: organisations, technology and people. The next chapter will now turn to the philosophical, theoretical and methodological approaches and practices adopted in this study.

# Chapter 3 - PHILOSOPHY, THEORY AND METHOD

## 3.1 Introduction

The aim of this research is to examine the issue of diversity in research within the Information Systems discipline. Chapter 2 established that knowledge and understanding of diversity in Information Systems research is limited. This study aims to extend current theoretical understandings by focusing on the conceptual diversity in Information Systems research. Empirically, it will add to the dearth of knowledge concerning how conceptually diverse our research is by examining the conceptual diversity of three key disciplinary concepts: organisations, technology and people. The aim of this chapter is to describe the philosophy, theory and methods – as summarised in Table 3.1 – that are drawn upon to extend current understandings of diversity in Information Systems research.

Table 3.1. *Philosophy, theory and method relied on in this study*

| COMPONENT | THESIS SECTION | DESCRIPTION |
|---|---|---|
| Philosophy | Section 3.2 | Fictism (Vaihinger 1942) |
| Theory | Section 3.3 | Metaphor theory (Lakoff & Johnson 1980) |
| Methods | Section 3.3 | Comprehensive corpus method (Santa Ana 2002) |

This chapter is organised by dealing first with the broader assumptions contained within this thesis, the philosophical approach: what can be studied. It then gradually narrows down to more practical concerns of the methodology: what was actually done in the study. As such, the first section, Section 3.2, outlines the philosophical approach. This section describes the fictive philosophy and also justifies why this novel approach is appropriate here in this study. The next section – Section 3.3 – deals with theory. This section both explains and justifies metaphor theory as a way of structuring this study. The practical considerations, the method, are taken up in the final section, Section 3.4. This section outlines not only the inherent challenges of applying metaphor theory in practice but also how these challenges are overcome. Evidentiary sources, time period and the units of analysis, are also discussed. The application of metaphor theory, how metaphors were uncovered in this study, is also covered. The intention of presenting the philosophical approach, theory and method in such a way is to ensure the worldview, reasonings, and practices adopted and applied in this study are made clear.

## 3.2 Philosophical underpinnings: a Fictive approach

The purpose of this section is to make clear the worldview adopted in this study: the fictive approach. The fictive approach is a blend of both positivism and interpretivism: two of the most typical approaches in Information Systems. This author has argued (Behrens 2008) that this blended approach – most comprehensively developed by Vaihinger (1942) – holds considerable value to the study of Information Systems. In particular, much of what we do in Information Systems can be thought of as thinking and working with fictions. From the abstractive fictions to the aesthetic fictions all fictions are evident to some extent in the Information Systems discipline. So too are they believed to be evident in the topic of investigation in this study: diversity in Information Systems research. Furthermore, while the fictive approach has its challenges it is paradigmatically rich, creative and holistic; all important and arguably necessary characteristics when it comes to understanding diversity in Information Systems research. Use of the blended fictive approach will increase knowledge and understanding of the research topic in a way that would not be possible through interpretivism or positivism alone.

This section proceeds as follows: the sub-section 3.2.1 immediately following this section describes the fictive approach in more detail. This sub-section intends to make clear that the subject matter under investigation in this study can be thought of as fictions. Next, Section 3.2.2 compares the fictive approach with both positivism and interpretivism. This comparison is believed to be important because the fictive approach is new in the area of Information Systems. Secondly, a comparison with both positivism on the one hand and interpretivism on the other hand is helpful because fictism is a blend of these two approaches. The final section, Section 3.2.3 examines the challenges and benefits of the fictive approach. While it certainly has its challenges, it has significant benefits, namely: creativity, holism and richness. It is noted in this section that these benefits are indeed significant in a study such as this. Some final reflections are offered before moving on to the theory section.

### 3.2.1. The philosophy of 'As if' and the fictive approach

> I called this work, The Philosophy of 'As if' because it seemed to me to express more convincingly than any other possible title what I wanted to say, namely that 'As if', i.e. appearance, the consciously-false, plays an enormous part in science, in world-philosophies and in life. (Vaihinger 1924, p. xii)

In justifying the title for his book Vaihinger (1924) concisely summarises his philosophical approach; that fictions are important and necessary constructs for the human endeavour. The principle of fictionalism is that 'an idea whose theoretical untruth or incorrectness, and therewith its falsity, is admitted is not for that reason practically valueless and useless; for such an idea, in spite of its theoretical nullity, may have great practical importance' (Vaihinger 1924, p. ix). At its heart the fictive approach relies on a certain biological understanding of world. Vaihinger maintained that the mind was like any other organ in the human body and had evolved over time to ensure the survival of its species. Vaihinger asserted that in order to make sense of the world the mind uses both rational logical and non-rational logic. Rational logic was important for discovering the laws of nature; its main goal was to be a direct reflection of reality. Rational logic, however, was not – according to Vaihinger – enough to make our way more effectively in the world. We also had to make use of non-rational logic: logic that produces consciously false constructs in an effort to make sense of the world. This fictional world was just as important as the 'so-called real or actual world (in the normal sense of the word)' (Vaihinger 1924, p. xivii).

This recognition of the real world and the fictional world – like Kant before him – was perhaps why Vaihinger named his universal philosophy 'Positivist Idealism' or 'Idealistic Positivism' a compromise between the 'one-sided views' of positivism and idealism. In Vaihinger's comprehensive survey of all the scientific branches existing at the time he revealed that many significant advances in science were fictions; the Linnaean system, Adam Smith's theory, atomic theory and differential calculus. Therefore, according to Vaihinger the consciously false – of which all these theories are – plays a significant part in the human endeavour. Furthermore, we construct these fictions because we must, because life as we know it would not be possible otherwise.

According to Vaihinger (1924), fictions were better understood by examining three of their main aspects: their relation to hypotheses, their linguistic analysis, and their relation to error and truth. These three aspects are examined in more detail in the following sub-sections, relying on examples that Vaihinger himself provided. Additionally, however, the subject matter contained within this study is also inspected in relation to these three aspects. This is done to show how diversity in Information Systems research can be thought of as being composed largely of fictions.

### Hypothesis relation

Vaihinger (1924) presents the statement: *All men are created equal*, as an example of a fiction. He suggests that as a hypothesis it would ultimately fail: it cannot submit itself to the same tests as a hypothesis and be proved true and real. The statement however, as a fiction is justified because it is a useful and necessary idea – one that it is difficult to imagine how we could do without. In comparing the fiction to the hypothesis, fictions are more of an auxiliary construct than the hypothesis. Hypotheses submit their reality to the test and demand verification. They want to 'be proved true, real, and an expression of reality' (Vaihinger 1924, p. 85). Fictions, on the other hand, are temporary scaffoldings to be destroyed if no longer required. Where hypotheses submit themselves to the test of verification, fictions submit themselves to the test of justification; the justification being whether they are useful and necessary.

In relation to this thesis the statement *Information Systems research is diverse* can also be seen as an example of a fiction. In a similar way to the above example by Vaihinger (1924), the statement as a hypothesis cannot be proved true and real. It would fail. It cannot submit its reality to the test and demand verification in the same way one can test the laws of gravity. The statement however, is a useful construct. That is, it allows us to reason and discuss the state of research in Information Systems better than we could do otherwise. It is useful and necessary.

### Linguistic analysis

Vaihinger (1924) asserts that all fictions are a matter of comparative apperception. For example, he asserts, we treat all matter 'as if' it were created of atoms. That is, we treat the real (matter) as if it were the impossible and unreal. All fictions are derivations of this same comparative apperception process. In relation to diversity in Information Systems research we treat all of the research activity in the Information

Systems realm 'as if' it had particular characteristics that can then be compared. We attach labels such as: philosophical approach, paradigm, theory and method to the act of research. We then treat our research 'as if' it were composed of these things; however, we must be aware of the fictional nature of these labels. As Mintzberg (1979) asserts of research theories, 'All theories are false, because all abstract from data and simplify the world they purport to describe' (p. 584). Yet, acting in this way is both useful and necessary. As Lewin (1945) suggested, 'nothing is as practical as a good theory' (p. 129). We treat research in this way, acting in the 'as if' manner because doing so enables us to understand and deal with our research endeavours better than we could do otherwise. Fiction, including notions of research and diversity, is 'merely a conscious, more practical and more fruitful error' (Vaihinger 1924, p. 94).

#### Error and truth

Vaihinger (1924) asserts, 'Truth is merely the most expedient degree of error, and error the least expedient degree of ideation, of fiction' (p. 108). Our conceptual world is true not when it merely coincides with the external world (a typical understanding of truth). Rather our conceptual world is true when it extends beyond such a simple reflection to act effectively in that world: 'to gauge objectivity and to act therein' (Vaihinger 1924, p. 108). Vaihinger (1924) also claims that the limits between error and truth and that of fictions are easily moved. In this study, the objective difference between being diverse and not diverse is merely one of number or degree. Diverse and not diverse are subjective terms. For example, if one considers an ecological niche in the desert, where 10 different animal species are present, one might call this niche diverse; however, an ecological niche in the tropics, where the same number of animal species is found might be described as not diverse. It all depends on the context and the object.

### 3.2.2. Fictism, positivism and interpretivism

Keeping the above explanations of the fictive approach in mind, it might prove useful to compare the fictive approach alongside both positivism and interpretivism – the two philosophical approaches it is a compromise between. The following table compares the fictive approach against the positivistic and interpretivistic approaches. This is done on three typical paradigmatic scales: ontology, epistemology and method. There are of course many who would, and do, disagree with these characterisations. They are presented, however, for the purposes of explanation – as a heuristic – to give the reader a clearer understanding of what a fictive approach is by comparing it with approaches with which they may be more familiar.

Table 3.2, reproduced from the previous work of Behrens (2008), compares the three philosophical approaches along three typical paradigmatic scales: ontology, epistemology and methodology. This table was constructed from explanations and definitions given by: Hirschheim (1985) as well as Klein and Myers (1999) in the area of Information Systems; Guba and Lincoln (2005) as well as Cohen and Manion (1994) in the broader area of research; and Vaihinger (1924) in philosophy. Note that unlike the other references in the table Vaihinger avoids the terms *ontology*, *epistemology* and *method* when presenting his philosophy of fictions. He does, however, provide a comprehensive examination concerning: the nature of reality as well as their basic categories and relations – notably with his hierarchy of fictions; the nature and particularly the limitations of knowledge; and the techniques – specifically those of thought – that can be used to attain knowledge and understanding. Hence, while Vaihinger certainly avoided the terms *ontology*, *epistemology* and *method* they will be used here for the purposes of a comparison.

Table 3.2. *Positivism, interpretivism and fictism compared*

| PARADIGM COMPARISON | | | |
|---|---|---|---|
| | POSITIVISM | INTERPRETIVISM | FICTISM |
| Ontology | Realism: the world exists independently of the observer. (H) | Idealism: the only things that can be known for certain are our ideas. (H) | Relativism: the real world exists as do our ideas. Our ideas may or may not correlate with the real world. (V) |
| Epistemology | Objectivist: discovery of natural laws. (G&L) | Subjectivist: discovery of ideational constructs (K&M) | Dualist/constructivist: development of auxiliary constructs. (V) |
| Methodology | Experimental/ manipulative; verification of hypotheses; chiefly quantitative (G&L) | Field studies; ethnographies (K&M); search for meaningful relationships and their consequences for action (C&M); chiefly qualitative (G&L) | Methodological pluralism; justification of fictions; quantitative and qualitative. |

Source: Hirschheim 1985 (H), Guba and Lincoln 2005 (G&L), Klein and Myers 1999 (K&M), Cohen and Manion 1994 (C&M) and Vaihinger 1924 (V)

In order to make the fictive approach clearer let us highlight the above paradigmatic differences with the research topic at hand: diversity in Information Systems research.

For the strict positivists, diversity in Information System research would be seen as an actual real world thing; research within the Information System realm and the diversity of that research would exist whether there was anyone there to observe it or not. Typically, positivists would approach the study of such a topic with an objectivist epistemology, that is, they would approach it with a strong sense of rationality and would be interested in discovering the natural laws or rules that govern diversity in Information Systems research. Due to the positivists' objective stance they would consequently be interested in the verification of hypotheses. Positivists would want to know the facts; they would want to build particular models that were mirror reflections of research and its diversity as it exists in the real Information Systems world.

Sidorova, Evangelopoulos and Ramakrishnan's (2007) study – described in more detail at the end of Section 2.4.3 – provides a useful example of positivism in relation to diversity in Information Systems research. Self-proclaimed positivists, Sidorova, et al. (2007) approach this phenomenon with an objectivist epistemology. In an effort to explore the key research themes and topics in Information Systems research over the last 22 years they use Latent Semantic Analysis (LSA). LSA represents a very rational approach to exploring diversity in Information Systems research. It is an approach, which relies on the understanding that there are natural rules or laws governing the world – in particular our use of language. As Sidorova, et al. (2007) assert, the main idea behind LSA is that all contexts within which words appear, can be collected to present 'a system of simultaneous equations that establishes the connection between the meaning of words and passages to each other' (p. 3). It is through such equations, typically arrived at via computerised tools, that Information Systems research themes and their relative diversity can be positively identified. Meaning and truth therefore exists whether any human is there to observe it or not. It is independent of the observer. Hence, in their exploratory study of Information Systems research, Sidorova, Evangelopoulos and Ramakrishnan (2007) provide a good, although some might argue not strict, example of positivism.

Although there are no studies from an interpretivists' perspective on diversity in Information Systems research known to this author, interpretivists would likely view the topic in a very different way. For the interpretivist the only thing that can really be known about the world and the things within it are the representations of them in our minds (Hirschheim 1985). As such, interpretivists would likely approach diversity in Information Systems research subjectively; they would be interested in uncovering the meanings associated with Information Systems research and the diversity of that research; they would be interested in the ideational constructs. The notion of diversity, the activity of research and Information Systems themselves would be regarded as constructions of the mind. The methodologies of interpretivist researchers would therefore concentrate on the search for meaningful relationships within Information Systems research and its diversity. As Sidorova, Evangelopoulos and

Ramakrishnan (2007) assert, interpretivists would likely rely on established methods such as hermeneutics, grounded theory, ethnography etc. to construct an explanation of the phenomena under study. Relying on Klein and Hirschheim's (1987) understanding of interpretivism, there would be a strong belief that without the perceiver there would be no such thing as diversity in Information Systems research. Hence, in stark contrast to the positivist view the best an interpretivist researcher could do when researching such a topic would be to rely on his or her own 'socially preconditioned pre-understanding of the subject matter' (Klein & Myers 1999, p. 9) and realise that this will change according to who is involved, that is, in this situation there is no one 'right' way of doing things.

The fictive approach, the philosophic approach relied on in this study is a blend of both positivism and interpretivism. As such it accepts that there are many aspects concerning diversity in Information System research that are real – in the typical sense of the word – but also many that are not. So, the researchers themselves and aspects of information systems they research (users, computers, some but not all facets of the organisation) are viewed as real things that may have a real interaction. There are certain things about such constructs that are immutable and made transparent only by typical positivistic measures; these are the facts. There are also many aspects concerning the diversity of Information Systems research that are regarded as purely ideational or fictional constructs. Relying on the fictive approach, the properties, attributes and characteristics of objects or things involved in the research endeavour would be viewed as fictions, as would the notion of diversity itself. This is because diversity and the properties etc. to which it is usually applied are simply abstractions. As abstractions they are fictions, fictions which allow us to understand and deal more effectively with what we do in the Information Systems discipline better than we could do otherwise. The outcome of conducting this investigation into diversity in Information Systems research is dependent more on the justification of it being necessary and useful (outlined previously in the introduction and literature review sections), rather than judged on the criteria of being an absolute mirror reflection of reality (positivism) or alternatively on its ability to uncover meaningful relationships (interpretivism).

### 3.2.3. Challenges and benefits

Like any approach fictism has its own peculiar set of challenges and benefits. The challenges for this study centre on its novelty: it simply has not been formally pursued as a philosophical approach in Information Systems. It also requires a certain faith and acknowledgement of largely hidden thought processes: fictive thought. Despite these challenges there appear to be several significant advantages: creativity, holism and richness.

Note that much of what is presented below is reproduced from this author's previous work (Behrens 2008) but where appropriate, is tailored to the specific topic of this study: diversity in Information Systems research.

#### Challenges

One challenge of the fictive approach is in acknowledging and trusting to the unknown. As outlined previously, Vaihinger (1924) maintained there were two types of thought: rational thought and fictive thought. Rational thought relies on the logic of rationality while fictive thought relies on fictive activity. Where rational logic has developed linear, step-by-step methods for uncovering natural laws, fictive activity has not done the same for its temporary thought structures; where rational logic is clear and obvious, fictive activity is not; and where one can quite confidently rely on laws in rational logic there are no such sureties with fictive activity. As Vaihinger asserts, fictive activity is irregular, complex and largely hidden. As he states, fictive thought must traverse the hidden by-paths of thought; arriving at its destination of understanding in a rather complicated and seemingly 'wasteful' way. If one is to rely on the fictive approach one must accept the irregular, complex and hidden nature of fictive activity. In many circumstances it would be easier – as Vaihinger suggests – to clothe the subjective in a cloak of objectivity: to treat assumptions falsely as hypotheses. To do so however, would be to ignore the significant benefits of the fictive approach: those of creativity, holism and richness. Such benefits are distinct advantages and even necessary when it comes to the search for knowledge and understanding more broadly in the field of Information Systems as well as more specifically to this thesis topic: diversity in Information Systems research.

Another significant challenge facing this particular study is that of novelty. While the fictive approach has followers in other disciplines – notably psychology (Alfred Adler the founder of Individual Psychology being most profoundly influenced by his work) – it is relatively unknown in Information Systems. There are, as Rogers (1995) attests, many risks to the individual in being the first to use or propose the use of an innovation. This is of course a potential risk that should not be taken lightly, particularly when the overall aim of a thesis is to obtain acceptance, not only of their work but also arguably their inclusion in a social system.

The most significant challenge facing this study, that of novelty, is tempered by evidence of at least some initial acceptance in the Information Systems field. Evidence of this acceptance comes in the form of a published International Conference in Information Systems paper: *Fact or Fiction: Legitimizing the Fictional Realm in IS Research* (Behrens 2008). Additionally, while the pursuit of any new innovation has its challenges, the Information Systems discipline seems, at least on the surface, welcoming of different philosophical approaches. Furthermore, while pursuing a new philosophical approach in a doctoral thesis may be seen as risky, this is perhaps one endeavour where such risk is appropriate and indeed necessary. The doctoral candidate must demonstrate an original contribution to knowledge (Moses 1984). Hence, it is for these reasons that despite the challenge of novelty associated with the philosophic approach, these risks are accepted in this study.

## Benefits

As stated previously there are three main benefits of the fictive approach: 1) Creativity, 2) holism and 3) Richness.

These benefits are explained in further detail in the sub-sections below.

### *Creativity*

Vaihinger (1924) maintained that fictive thought is creative thought. While Vaihinger's conceptualisation of creativity was developed independently of – and much earlier than – current conceptualisations of creativity, the two appear to have strong parallels. Of the most widely accepted and frequently cited definitions (Harrington 1990), creativity is seen to be a fulfilment of at least three conditions: originality, adaptiveness and realisation (MacKinnon 1963). Vaihinger's conceptualisation of creative thought satisfies all three conditions. Vaihinger maintained that in order to make sense of the world, thought had to develop novel structures. Unlike rational thought whose novelty and originality was tightly constrained by the real world – in that it had to develop hypotheses to mirror reality – fictive thought was not so constrained. Fictive thought could divert from reality either partially or completely; being either a small deviation or a complete removal. Vaihinger also asserted that fictive activity was adaptive; fictive thought had developed as a response to real situations and problems. Furthermore, despite the clear untruth of fictions they were a necessary and useful way of making sense of the world. Perhaps because of the biological basis for the philosophy of fictions Vaihinger dealt with the adaptiveness of fictive thought extensively. On the condition of realisation Vaihinger also contended that true fictive thought sustained the original insight – evaluating, elaborating and developing it to the full. Vaihinger however, also maintained that this development of creativity was not a free-for-all. One still has to justify their creations; on an individual level as well as a disciplinary and/or societal level. This conceptualisation of creativity matches well with current theories of creativity in that there is a dimension of creativity that spans from private creativity on the one end to social creativity on the other end (Albert & Runco 1990); therefore, while Vaihinger maintained his own specific reasons for creativity; fictive thought not only satisfies the definitional requirements of creativity but also recognises the importance of bridging the private/public divide.

While the literature on creativity may not be a mainstream concern in the Information Systems field its importance to research and practice cannot be overestimated. As Hevner et al. (2004) assert, a prime distinction between the two paradigms they believed existed in Information Systems – behavioural science and design science – lay in creativity. Hevner et al. (2004) maintain that the behavioural science paradigm is rooted in the natural sciences, whose purpose is to discover natural laws. The design science paradigm, on the other hand, seeks to create and innovate. It is interesting that Vaihinger (1924) also makes this distinction but he goes further in his reasoning for the differences. For Vaihinger the differences lie in the roles of different thought processes required for these different paradigms. Vaihinger maintained that rational thought was necessary and important for acts of discovery; hence its thorough development in the natural sciences. Fictive thought is important for the branches of science where a direct correlation with reality is not possible or desirable; where instead of hypotheses that must and could be proved one invented temporary thought structures. This notion of thought structures is very similar to Weick's (1989) work with disciplined imagination in theory building; with the temporary thought structures of Vaihinger's corresponding well with Weick's thought trials; one builds or creates fictions and then subjects them to a certain discipline, the test of justification. This is perhaps where Vaihinger offers his most important contribution as a philosophical approach applied to the field of Information Systems. That is, he not only recognises the importance of creativity in distinguishing between the two main paradigms Hevner et al. (2004) identified in Information Systems but provides further insight into the creative process. As Schaper (1966) states, Vaihinger was significant for his formulation of a 'systematic appraisal of the trial and error method, with as much emphasis on the fertility of error and conjecture as any disciple of Popper today could wish for' (p. 234). The fictive approach is significant in that it recognises the importance of creativity in thought and provides a systematic appraisal of this type of thought. This strong recognition of creativity as well as its evaluation does not appear to be so well catered for in other more traditional Information Systems paradigms. Perhaps it is in this acknowledgement of creativity as an essential part of human thought and sense-making that the fictive approach might offer the biggest advantage to the field of Information Systems and this study in particular; one that is not so easily captured by other approaches.

### *Holism*

Holism refers to the idea that any one thing, whether it be an object, an idea, or a living entity is not entirely reducible to its parts. It is a rather old concept – one that can be traced back to Aristotle and his Metaphysica – the whole is more than the sum of its parts (Metaphysica 10f-1045a). Holism, however, is a very current concept as well; it is seen as a fundamental building block of many theories we recognise as being important today. For instance, General Systems Theory – an important precursor to other more recent theories such as chaos theory (Gleick 1987; Glendinning 1994) and complex adaptive systems (Simon 1996) – held the concept of holism as a central tenet for the theory. As Von Bertalanffy (1976), the father of General Systems Theory, said of his theory: '[It is a] general theory of wholeness of entire systems in which many variations interact and in which the organization produces a strong interaction'. More recent developments of this theory include complexity theory. In The Sciences of the Artificial, Simon (1996) argues that holism is critical for any understanding of a complex system. Simon (1996), like Von Bertalanffy before him, maintains that any study of a system requires an understanding of holism – an acknowledgement of 'vitalism' (p. 170) that cannot be accounted for in the natural sciences. Vaihinger (1924), also recognised the significance and importance of holism to thought and knowledge; like Simon he also asserted that holism was not a concept that could be accounted for by the natural sciences model. Vaihinger – unlike Simon – went into greater explanation for this difference providing more detail at the logical level. Vaihinger maintained that rational thought – being a linear process – adapted well to the discovery of natural laws, but was not enough to account for the rather elusive *je ne sais qua* we must deal with in everyday life. It is only through fictive activity that we can think holistically and – more importantly – develop theories, knowledge and understanding that are holistic. There certainly appears to be a strong link between Vaihinger and the systems theories of today. Von Bertalanffy (1976) names Vaihinger as one of the three most important influences on his development of general systems theory. Therefore, Vaihinger's philosophy not only recognises the importance of fictive activity in developing holistic understandings, it has been an important contributor to many significant theories we rely on to this day.

The concept of holism is also recognised as an important part in developing knowledge and understanding of Information Systems. Klein and Myers (1999) pay particular attention to holism when they explain the hermeneutic circle: 'the idea of the hermeneutic circle suggests that we come to understand a complex whole from preconceptions about the meanings of its parts and their interrelationships' (p. 71). As Klein and Myers point out, this is a very interpretivistic understanding of holism; it does not readily appear to include the real world as being an important part of developing holistic knowledge and understandings. Likewise, Galliers (1985) asserts the importance of holism in searching for an Information Systems paradigm and also excludes positivistic notions in achieving holism. Galliers (1985) ends up siding with the interpretivists in his search for holism in an Information Systems paradigm. He does, however, raise Checkland (1981) as an important figure when discussing the failure of traditional science and its inability to account for holism; the inevitable problem of reductionist thinking encompassed in the natural sciences model that excludes the possibilities of holism. Interestingly enough, Checkland (1981) is an important lead to Vaihinger (1924) and an approach that is a blend between interpretivism and positivism. Checkland is a significant figure in the area of systems thinking – particularly in his efforts to translate general systems theory to practice. Checkland also relied strongly on the work of Von Bertalanffy (1976), the father of general systems theory. As stated previously, Von Bertalanffy relied on Vaihinger as one of his most important guiding lights. While it may not be openly recognised, many theories that rely on holism as their prime foundation – from general systems theory through to chaos and complexity theory – have had some of their deepest sustaining roots in Vaihinger's work. Although the fictive approach offered by

Vaihinger is holistic, it does not reject reality or ideas, as the ultimate measure of truth.

### *Richness*

Richness refers to the idea that there is a wide variety and diversity of things. If we look at richness from a paradigmatic level then we look at the richness of the ontology, epistemology and method. Vaihinger (1924) points out that it is in this area that interpretivism and positivism start to become problematic. Interpretivism and positivism are by their nature exclusionary paradigms; each denies the existence of the other's position when it comes down to 'what counts'; however, because of their exclusive approach, they necessarily deny richness in their fundamental beliefs. On the other hand the fictive approach is a more accepting and conciliatory approach – a compromise – and it does this at a very fundamental level. As Vaihinger (1924) elaborates, 'In order to attain the purpose of its activity as completely and quickly as possible, namely, to deal with independent events and to render them possible for or dependent on our will, thought or the logical function employs the most diverse means' (p. 6). Vaihinger's approach recognises the importance of the real world as well as the world of ideas; his approach also recognises the various paths thought has to take in order to make sense of these worlds. Vaihinger's approach is one that is paradigmatically rich in ways interpretivism and positivism are not; it recognises the real and the unreal, the subjective and the objective, as well as the many different ways in which we go about our sense-making.

While paradigmatic richness may not be openly recognised as an essential requirement in developing knowledge and understanding of information systems phenomena it should nevertheless prove beneficial – particularly for this study. As Lee (2000) points out, Information Systems is concerned with a technological system as well as a social system and therefore encompasses a wide variety of phenomena. Furthermore, as Ngwenyama and Lee (1997) assert, 'A dimension of the subject matter that social scientists examine, that natural scientists do not examine, is what the field of phenomology calls the "lifeworld". The lifeworld, among other things, is the world of consciousness and humanly created meanings' (p. 149). The fictive approach acknowledges the world of consciousness and humanly created meanings – the so-called 'lifeworld' as well as the real world – the natural world. Instead of focusing on only one of these to the exclusion of the other, however, the fictive approach focuses on the interplay of both. Unlike the interpretivists who reduce everything to sensations or sensational contents or the positivists who reduce everything to matter (Vaihinger 1924), the concept of reality in the fictive approach is not uniform. On the contrary the notion of reality in the fictive approach is more varied and inclusionary; it does not see reality as an either/or proposition, as a choice between mind and matter. The fictive approach recognises the 'two-fold concept of reality' (Vaihinger 1924, p. xlv) as well as the different ways in which we search for knowledge and understanding in this resulting dual world. In bridging the interpretivist and positivist paradigms, the fictive approach offers a hybrid approach to studying various Information Systems phenomena; one that is rich as a consequence.

## 3.3 Metaphor theory

While the fictive approach provides a worldview for this study, more structure is needed in terms of a theory. In this study, the theory relied on for such structure is metaphor theory. A basic introduction to metaphor theory was provided in Chapter 2 – in particular the nature of metaphors and their importance to research. Root metaphors were also uncovered as a key way of investigating diversity in research. In this section the focus will be on how metaphors, including root metaphors, may be used as a foundation for uncovering diversity in the Information Systems discipline. The focus is more on the detailed workings of metaphors: knowledge that is required for conducting a practical study.

### 3.3.1. How do metaphors work?

As highlighted in Chapter 2, metaphors work by way of a mapping construct: an *A* is a *B*. The previous chapter also alluded to the asymmetric and partial way in which metaphors work as highlighted in Organisation Science's use of metaphors. In terms of conducting a practical study, such as the one contained in this thesis, this is an important understanding. The asymmetric way in which the metaphor mapping works refers to the transfer of meaning that occurs in only one direction. That is from *A* to *B* but not from *B* to *A*. The mapping is also asymmetric in the sense that it both highlights and hides aspects of the target domain (Lakoff & Johnson 1980). The metaphor mapping is partial in that not all aspects are transferred, that is, only the things that are most salient are transferred from *A* to *B*. Additionally, what is most salient depends largely on the cultural context within which the metaphor is being used (Lakoff & Johnson 1980). Furthermore, the mapping only occurs in a way that is consistent with the target domain.

In this study, four other aspects concerning metaphors need to be understood: manifestation in language, sub-metaphors, high-level entailments, and reasonings. These four aspects are either key sources of metaphors (where they can be found), and/or are evidence of metaphors (what they look like). These aspects are significant for this study and are discussed further in the following sections.

### Manifestation in language

The first thing to note about metaphors is that they manifest themselves in language. As Lakoff (1993) asserts, metaphorical language is a surface manifestation of conceptual metaphor. Lakoff and Johnson (1980) provide the example of the concept *argument* and the conceptual metaphor *argument is war*. They assert that the metaphor is reflected in everyday language in a wide variety of expressions:

*Argument is war*

- Your claims are *indefensible.*
- He *attacked every weak point* in my argument.
- His criticisms were *right on target.*
- I *demolished* his argument.
- I've never *won* an argument with him.
- You disagree? Okay, *shoot*!
- If you use that *strategy*, he'll *wipe you out.*
- He *shot down* all of my arguments.

(Lakoff & Johnson 1980, p. 4)

Fauconnier and Turner (2002) assert that our underlying concepts and our whole conceptual system, ones, which are largely hidden to us, are made visible through language. Hence, language both written and spoken is an important evidentiary source for uncovering the hidden concepts in our minds. This is a critical understanding in terms of this study. In particular, it highlights that discourse is an important evidentiary source for what our underlying conceptual metaphors look like. Obviously, such an understanding is of great value for this study: one, which essentially seeks to uncover aspects of a larger disciplinary conceptual system.

### Sub-metaphors

Within each metaphor there may also be multiple sub-metaphors. These sub-metaphors each with their own detailed mappings combine to create a rich and complete understanding of the main metaphor. These sub-metaphors are hierarchically arranged which allows them to be understood as a derivative of the one overarching metaphor (Johnson 2005). For example, in a previous paper by the author of this thesis (Behrens 2007) the *organisation-as-machine* metaphor was found to have four sub-metaphors: Purpose, Product, Process and Part. The hierarchy of these sub-metaphors was as follows: A machine is created for a particular *purpose*; this *purpose* is achieved by and through a number of *processes*; the *processes* themselves are performed by various *parts* that work together. This multi-layering of sub-metaphors helps to provide a rich and detailed understanding of the main root metaphor. Sub-metaphors are significant in terms of this study as they give an indication of the relative strength and development of a metaphor, which can then be used as an indicator of diversity.

### High-level entailments

When a metaphor's mapping is activated, so too are certain inference patterns or *entailments* of a metaphor, that is, some of the same conclusions or deductions we make in the source domain are transferred to the target domain. Lakoff (1993) refers to this action as projecting source domain inference patterns onto target domain inference patterns. They are also known as entailments of a metaphor or its logical consequences. In Behrens (2007), three high-level entailments were uncovered for the *organisation-as-machine* metaphor: efficiency, effectiveness and accuracy. These three high-level entailments were found to add considerably to the clarity of the machine metaphor. In terms of this study, high-level entailments are important in the same way that sub-metaphors are important: they are an indicator of the relative strength and development of a metaphor, which can then be used to draw conclusions about notions of diversity.

### Reasoning

Lakoff (1993) asserts that there are a fixed set of ontological correspondences between entities in a source domain and entities in a target domain. The fixed set of ontological correspondences is not limited to entities. They also apply to reasoning about those entities. This was discussed in some detail in the previous chapter on Pepper's categories of reasoning. Examples of different types of reasonings applied to a particular domain were also provided in the Organisation Science section, Section 2.3.3. For instance, in relation to the *organisation-as-machine* metaphor, the similar types of laws that apply to machines are also seen as applying to organisations (Behrens 2007). It is important to realise that the reasonings that are transferred from one domain to another are critical in a metaphor's success, that is, it is a means by which we are able to actually understand one thing in terms of another. Reasonings are another aspect of metaphors that is significant in this study. Like sub-metaphors and high-level entailments, reasonings are important sources of evidence in uncovering how strong or well developed a particular metaphor is.

## 3.4 Method

While the previous two sections covered the world-view and reasonings behind this study this section focuses on the practices behind the study. The first section will consider the broader practical challenges of applying metaphor theory in an empirical study. It will also outline how they were overcome in this thesis, that is, by the synchronic method. The primary evidentiary source, academic journals, will then be discussed. This section highlights the power of journals in disciplines and their ability to enforce singular ways of ways of looking at the world – potentially through a single metaphor. The following section, Section 3.4.3, considers the ideology of a journal and how this may prevent diversity in research particularly within the Information Systems discipline. The source journals relied on in this study – the *European Journal of Information Systems*, *Information Systems Research* and *Management Information Systems Quarterly* – as well as the time period 2000–2008 – are then introduced and justified. This is followed by a similar introduction and justification for the units of analysis: organisation, technology and people. The final sections focus on the step-by-step process of how the comprehensive corpus method was used to answer the prime research question driving this thesis: *How diverse is Information Systems research?*

### 3.4.1. Application of metaphor theory: some common challenges

While metaphor theory is a compelling way of finding an answer to the question of conceptual diversity in Information Systems research, its application presents some challenges. Interestingly enough, the most significant of these is obvious in George Lakoff's own work – the co-author of *Metaphors We Live By* (Lakoff & Johnson 1980). Lakoff not only co-wrote this now classic and influential work in metaphor theory, he was the only one to apply metaphor theory in empirical studies. Although the theory of metaphors – as presented by Lakoff and Johnson (1980) in their book – has been relatively well received (Santa Ana 2002), the same cannot be said (as discussed below) of Lakoff's empirical work.

Indeed, Lakoff's empirical work has met with considerable scepticism. The particular point of criticism lies in Lakoff's self-generated examples of discourse to study metaphors. For instance, in an effort to study cognitive structure in the political sphere Lakoff relies on his own self-elicited examples of rhetoric. Such intuitive explorations are not uncommon in the area of linguistics where Lakoff's expertise centres. Indeed, this type of method dominates much of contemporary linguistic research. As Santa Ana (2002) asserts, however, problems arise when the method is used beyond that which it was intended, that is, to take these self-elicited examples and to use them as a basis for making assertions about a group of people beyond the self (Santa Ana 2002). Busch (2004) refers to this as good theory, bad practice. Perhaps, a large part of the problem is – as Santa Ana (2002) asserts – Lakoff's particular use of the term 'empirical'. To assert, as Lakoff essentially does, that his own self-elicited examples are representative of the culture in which he lives is risky, particularly when the research problem revolves around issues of an ethical and political nature.

In order to overcome the limitations of the intuitional method this study will instead rely on a variation of the comprehensive corpus method (Santa Ana 2002). The comprehensive corpus method relies on the analysis of an independently compiled set of materials. In this thesis, therefore, the metaphor analysis will be done on all the articles that were published in three mainstream Information Systems journals – one European journal and two North American journals – during the period 2000–2008. As Santa Ana (2002) notes, by concentrating on an independently compiled set of materials, the comprehensive corpus method is more resistant to the individual political preferences of the researcher. In the following section the decision to use journals as a basis for this method is outlined in more detail.

### 3.4.2. Journals

Since the appearance of the first two scientific journals in 1655: *Journal des scavans* in France and *The Philosophical Transactions of the Royal Society* in England, journals have become the main vehicle for academic communication; however, they also represent the single most influential source on what members of a given disciplinary community think and do (Weiner 2001). Due to the increasing power of the academic journal as a performance indicator as well as its ability to inform decisions over appointments and promotion, the academic journal has become increasingly influential in the everyday lives of academics. Weiner (2001) asserts that journals are the single most influential source on contemporary academic life. Furthermore, as Weiner (1998) asserts, journals are the single most important mechanism by which the academic community exerts its power; 'Academic journals thus provide a means of legitimating knowledge within the academic community, by conferring the stamp of approval'. Hence, this study will examine the texts of mainstream Information Systems journals to gain insight into how the various key concepts in Information Systems research are conceptualised.

Journals have become increasingly influential not only because they are tied to an academic's livelihood, but also because they have become tied to the livelihood of institutions. Institutions rely on the productivity of their researchers – as measured by publication count or citation – to increase their chances of bringing in revenue and remaining afloat in the increasingly competitive higher education environment (Weiner 2001). At times the economic imperative of both institutions and individuals results in some rather questionable ethical behaviour (Weiner 2001). Institutions frequently invest in research by 'buying in' (Weiner 2001) productive researchers and creating research centres that can at times severely limit individual academic freedom. Academics are also under intense pressure to perform, which has led to a variety of abuses (plagiarism and so on) in the publishing system (Weiner 2001); therefore, not only are journals powerful as traditional disseminators of knowledge but their power has increased tremendously due to their close ties with the economic imperatives of institutions.

Of particular concern to this thesis is the power journals have in shaping what is believed to be 'valid' and 'legitimate' research; that is in terms of manipulating social consensus over aspects of truth (Santa Ana 2002). The power of journals is realised in their ability to not only mould what is considered research but to do so in a particular way. The various stakeholders involved in the production of a journal work together to produce what is considered valid and valuable research. The editors, publishers, reviewers, learned societies, readers, writers, and other government and industry stakeholders work together to shape the production of "certain kinds of knowledge" (Weiner 2001, p. 5); however, in this shaping and constructing of knowledge, the ethos of community members is determined. This shaping and constructing tends toward excluding heterogeneous views. In a recent study, Weiner (2001) found that one of the most significant factors shaping academic journals is disciplinary hegemony. This does not mean that opposing views are never encountered. As Foucault (1980) asserts, differing (but tolerated) views are carefully scripted into the boundaries of what may be said or written. Indeed these careful diversions are essential for the power/knowledge configurations in disciplinary communities (Apple 1982). Therefore, despite the protestations of many journals – including those in Information Systems – that diversity in research is encouraged, Weiner (2001) asserts that encountering truly opposing views of knowledge in any academic journal is the exception rather than the rule.

From the perspective of metaphor theory, it is possible to see how a research community may be drawn toward more singular ways of looking at the world. This may even be to the extent that a single metaphor becomes the dominant way that a given research community comes to make sense of a given phenomena or issue. As Lakoff and Johnson (1999) explain, we 'acquire a large system of primary metaphors automatically and unconsciously simply by functioning in the most ordinary of ways in the everyday world' (p. 47). Moreover, in any given community we become naturalised – as it were – to certain widespread conventional metaphors (Grady 1997). Additionally, as Santa Ana (2002) points out, 'In spite of the fact that all metaphors are contingent, and none is wholly accurate … only one comes to make sense, and no other will be admitted. The dominant way becomes the one and only, hence "natural," way to think about the issue' (p. 53). Indeed journals – like the mass media – have a privileged take (Santa Ana 2002) on what is considered valid and valuable research and this view is promoted and reinforced through their unrivalled power in the disciplinary community. Based on this perspective, it is therefore, very likely that mainstream journals in Information Systems are valuable sources of evidentiary data in the study of how key concepts are structured and understood in Information Systems research.

### 3.4.3. Journals: discourse, ideology and bias

The term discourse has a rather fluid meaning and can refer to anything from a theory to a method. Yet, as Santa Ana (2002) asserts, 'Discourses are quite often referred to as ways of speaking about a topic from a certain point of view. Thus one refers to a capitalist discourse on global warming, or border culture discourse on banda music' (p. 53). So, it follows that one can also refer to 'academic discourse', which is a way of speaking about a topic from an academic point of view. Santa Ana (2002) points out these discourses are themselves embedded strands of a larger encompassing discourse and together they help form part of a larger social order. In the case of this thesis, the various academic discourses that occur within Information Systems are considered a strand of the larger disciplinary social order. There are two difficulties with the term 'social order' that are made explicit by Santa Ana (2002) and which are relevant to this study. The first is that social order is 'frequently used to refer exclusively to the top of the social hierarchy and its attendant prerogatives. Nevertheless, a total system of social organization is involved' (p. 54). The second is that social order is used to talk in more abstract terms about social structure (Santa Ana 2002). In the case of this thesis – as it was with Santa Ana's (2002) study on metaphors of Latinos in contemporary American public discourse – a body of people is implicated. In particular it is the representation of Information Systems researchers that is the object of the present investigation; hence, the discourse typically shared by as large a cross-section of the Information Systems academic community as practicable is considered.

The ideology of a journal – that is, its version of truth – is a particularly significant facet of this study; however, there is reason to believe that the truths fashioned and shaped by journals are more monistic than pluralistic. As Introna (2003) explains about the European Journal of Information Systems, 'its editors and reviewers … exists within a regime of truth … authors submitting work are disciplined by their supervisors, by the reviewers, by tenure and promotion committees and many others, which already have the status of deciding what counts as true' (p. 239).

Relating metaphors to the idea of truth regimes, Lakoff and Johnson (1980) assert that, 'Most of our metaphors have evolved in our culture over a long period, but many are imposed upon us by people in power … [who also] get to define what we consider to be true' (p. 160). Even before an author makes a submission to a journal they have been disciplined into this version of truth (Introna 2003).

It is possible that authors may not be submitting work that relies on alternative metaphors because it conflicts with what they have been disciplined into believing is truth. Alternatively, articles that conflict with accepted notions of truth simply may not make it through the submission process to become final published articles. Either way, there is reason to believe that despite the best intentions and the rhetoric of journals as forums of debate, genuinely different views and opinions on relevant research issues (Weiner 2001) are the exception rather than the rule. There is reason to believe that the ways in which we search for knowledge and understanding in Information Systems research are more uniform than they are diverse.

### 3.4.4. Source journals for this study

The purpose of this study is to investigate the metaphors for key research concepts in Information Systems academic discourse during a period when diversity has been most openly and actively encouraged: 2000–2008. Information Systems journals are the single most influential source of academic influence and debate and, arguably, the journals that have had the greatest influence on the Information Systems research community during this period are *Information Systems Research*, *Management Information Systems Quarterly* and the *European Journal of Information Systems*. *Information Systems Research* and *Management Information Systems Quarterly* – both North American based journals and both critical in establishing the legitimacy and credibility of Information Systems as a field – are widely recognised as the two most prestigious journals in the Information Systems discipline. These journals pride themselves on publishing only the best research articles in the Information Systems field and publication in them is highly prized. Both have also been active and open proponents of diversity in Information Systems research. To capture a more global dimension, the *European Journal of Information Systems* is included too. The *European Journal of Information Systems* prides itself on capturing Information Systems research that has a distinct European feel but also aspires to be more global in its scope. Furthermore, while the *European Journal of Information Systems* may not be at the very top of the Information Systems academic journal ratings ladder, it is still very close in rank to *Information Systems Research* and *Management Information Systems Quarterly* as one of the few A level journals in the field. More importantly for this study however, is that the *European Journal of Information Systems* at least purports to capture a broad section of the Information Systems research community not captured by the more mainstream North American journals of *Information Systems Research* and *Management Information Systems Quarterly*. Hence, the sampling in this analysis focuses on *Information Systems Research*, *Management Information Systems Quarterly* and the *European Journal of Information Systems*: journals that capture a broad cross-section of the Information Systems community.

The following sections provide a little more detail on these three journals and their importance to this study:

### *Management Information Systems Quarterly*

*Management Information Systems Quarterly* is the oldest and one of the most prestigious journals in the field of Information Systems. It has arguably had the greatest influence and impact on shaping the thoughts and actions of individual members of the Information Systems research community for the longest period of time. When *Management Information Systems Quarterly* published its inaugural issue in 1977, this event provided a 'focal point for researchers who were interested in publishing in IS research' (Benbasat & Weber 1996, p. 390). More importantly however, it was a crucial event in establishing Information Systems as a credible and legitimate player in the realm of academia.

Today, *Management Information Systems Quarterly* is widely regarded as one of the two most prestigious journals in the Information Systems field (Ferratt et al. 2007); *Information Systems Research*, the second journal selected for this study, is the other. The impact factor rating for *Management Information Systems Quarterly* was 5.286 in 2007, a rating that is exceptionally high, not only by Information Systems journal standards, but for any journal in the business and economics area. Furthermore, the impact of *Management Information Systems Quarterly* extends beyond its home borders. It is a North American-based journal (Benbasat & Weber 1996) but is frequently cited in journals published outside the United States of America and also in global journals not monitored by official Journal Citation Reports (Saunders 2006).

*Management Information Systems Quarterly*'s global appeal can be further confirmed through studies of its rankings, which in a relatively recent review (Lowry et al. 2004), put *Management Information Systems Quarterly* as one of the highest ranked, and second highest read journals, in all regions of the globe. In short, *Management Information Systems Quarterly* is one of the most influential journals in the Information Systems field in shaping academic's thoughts and actions. Hence, due to *Management Information Systems Quarterly*'s critical role in establishing the Information Systems discipline as a credible player on the broader academic field and of being regarded as one of the field's most prestigious journals for well over 30 years, this North American journal was selected.

As a journal that encourages diversity, Saunders (2006) points out that the senior editors, associate editors and editor-in-chief of *Management Information Systems Quarterly* are representative of great 'national diversity' (p. iv). Furthermore, as Saunders (2006) explains, when a journal article is sent out for review, the editorial team 'try to ensure that it is reviewed from a global perspective' which is an effort to 'rise above regional biases and appreciate the work of diverse colleagues' (p. iv). Moreover, *Management Information Systems Quarterly* is deliberately trying to be more inclusive by broadening the associate editor and reviewer pool and ensuring a global representation. *Management Information Systems Quarterly* appears to be well aware of its own ideology or 'regime' of truth (Introna 2003). Additionally, it seems to be more perceptive to change in this area, which is visible in its liberal and global approach to reviewing. *Management Information Systems Quarterly* has also made significant strides in becoming a target outlet for academics around the world. One of the challenges *Management Information Systems Quarterly* has faced however, is in including the European Information Systems research community (Saunders 2006). This limitation of *Management Information Systems Quarterly* has been addressed in this study by including the *European Journal of Information Systems* – a premier journal for European research – in the data set.

### Information Systems Research

The *Information Systems Research* journal was selected due to its influence in the Information Systems academic community. Along with *Management Information Systems Quarterly* it forms an elite duo whose impact in the Information Systems realm is generally accepted. Now into its twentieth year, *Information Systems Research* certainly has not been established for as long as *Management Information*

*Systems Quarterly*; however, *Information Systems Research* has matured into one of the most influential academic journals in the field. *Information Systems Research* had an impact factor rating of 2.53 for 2006 (the most recently available figure) – which ranks it 3rd of 53 in the Information Science and Library Science category and 6th of 78 in the Management category. *Information Systems Research*, like *Management Information Systems Quarterly*, is also a journal of choice for Information Systems academics in publishing their work. As Sambamurthy (2009) asserts, 'Over the past few years, the journal has witnessed significant growth in submissions and now attracts nearly 300–350 submissions each year' (p. 1). With only 30–32 articles published in a year this puts the acceptance rate for the journal at around 10%. This is comparable to *Management Information Systems Quarterly*, which has a 'low acceptance rate' of 13.6% that arguably only serves to add to their prestige.

In one of only two empirical studies known to this author that investigate the diversity of Information Systems research, Vessey et al. (2002) found *Information Systems Research* was the most diverse. A later study by Sidorova (2007) essentially confirmed Vessey's earlier finding that *Information Systems Research* did indeed publish diverse research. There has been open and active encouragement from the editors at *Information Systems Research* to attract diverse research. From 2000 onward the editors of the journal have particularly encouraged submissions that put forth a wide variety of perspectives (Benbasat 2001, 2002; Kemerer 2003; Sambamurthy 2005). In a recent review of the journal, *Information Systems Research* was perceived by 'numerous stakeholders' to be 'broader in its outlook, more receptive to different methodological and epistemological traditions followed within the Information Systems community and [having] an editorial board that represents the multidisciplinary nature of the field' (p. 367). All of these things have helped contribute to a perception of *Information Systems Research* as a journal that publishes diverse research.

A recent editorial statement of *Information Systems Research* (Information Systems Research 2010) confirms the journal's desire to attract diverse research:

> Information Systems Research (Information Systems Research) seeks to advance knowledge about the effective and efficient utilization of information technology by individuals, groups, organizations, society, and nations for the improvement of economic and social welfare. The journal

is receptive to a wide variety of phenomena and topics related to the design, management, use, valuation, and impacts of information technologies at different levels of analysis (i.e., individuals, groups, firms, networks, societies, and nations). High quality theoretical, empirical, design, and analytical work on any of the above topics are welcomed by the journal. The journal seeks research that examines topics from a wide range of theories including, but not limited to, cognitive psychology, economics, computer science, operations research, design science, organization theory, organization behaviour, sociology, and strategic management. Diverse methods and approaches are welcome. Reviews and syntheses of prior contributions to relevant subjects are also welcome, provided they make significant contributions to ongoing research streams in the information systems research community.

### *European Journal of Information Systems*

While *Information Systems Research* and *Management Information Systems Quarterly* have worked hard on their status as international journals, there is reason to believe that – despite their best efforts – these journals may not capture a global perspective. Galliers and Meadows (2003) assert that the Information Systems community is essentially a discipline divided, marked by notable parochialism at the country or regional level. In particular, they assert that North Americans tend to publish in North American journals – such as *Information Systems Research* and *Management Information Systems Quarterly* – and Europeans tend to publish in European journals. Many other studies confirm the somewhat long-held belief that there are significant differences at the methodological and epistemological level between the North Americans and Europeans: with the North Americans typically favouring positivist research and the Europeans more generally favouring interpretivism (Avgerou et al. 1999; Hirschheim & Chen 2004; Walsham 1995). Hence, in order to capture a more diverse array of perspectives, this study takes the advice of Gallivan and Benbunan-Fich (2007) and includes a European journal.

While the impact rating of the *European Journal of Information Systems*, at 0.712 in 2007, is not as high as *Management Information Systems Quarterly* and *Information Systems Research*, it is still considered one of the top journals in the Information Systems field. As a top-rated journal *European Journal of Information Systems* has been included in the Senior Scholars Basket (AIS 2010), which accords it the status of being one of the six top publishing outlets for the Information Systems community. It also has considerable regional influence, particularly in Europe and Australasia. Mylonopoulos and Theoharakis (2001) found that while the *European Journal of Information Systems* was ranked 13th by North Americans, it was considerably more popular in Europe and Australasia, ranking 3rd and 4th respectively. The *European Journal of Information Systems* therefore, is included for this study as a journal that is not only influential on a global level but that has particular influence and impact at a more regional level, which is arguably not captured quite so well by the North American journals *Management Information Systems Quarterly* and *Information Systems Research*.

While the aim of the *European Journal of Information Systems* is to have a distinctly European feel, it also endeavours to portray itself as a journal that captures a diverse array of research perspectives. As the 2000 Editorial (O'Keefe & Paul 2000) asserts:

> the key aspect of European research into IS, and the first eight volumes of European Journal of Information Systems, is pluralism. … We will not publish papers that focus purely on technology, or interface design, or organizational design, or whatever. … In terms of research methodology, European Journal of Information Systems has been at the forefront of pluralism. It published qualitative (and particularly interpretive) research before such research gained broad acceptance across the Atlantic, but has also published quantitative studies. We continue to welcome all methodologies without prejudice.

Hence, due to the journal's interest in attracting submissions from a wide variety of research perspectives and of actively discouraging submissions that are too uniformly focused on a particular problem area, *European Journal of Information Systems* is a valuable evidentiary source for this study.

### 3.4.5. Time Period

As outlined in the introductory chapter, two sub-questions were developed to answer the broader research question of: How conceptually diverse is Information Systems research? These were:

1. How conceptually diverse is Information Systems research now?

2. Has this diversity changed over time and if so how?

For the first sub-question the time period selected was the most recent year available at the time of commencing the study: 2008. All journals for all three concepts – organisation, technology and people – were sampled during this period. For the second sub-question two time period/journal combinations were selected. The first combination was the time period 2000–2008 for a single journal and a single concept – the organisation. The second combination was the time period 2000/2001 and 2005 for all three journals and all three concepts (concepts are outlined in more detail in the following *Units of analysis* section). All of these periods had strong links to the research question itself. This was mainly due to the active encouragement of *Management Information Systems Quarterly*, *Information Systems Research* and the *European Journal of Information Systems* to submit articles from a diverse array of perspectives during these periods.

During the years 2000–2008 inclusive, all Editors-in-Chief at the *Management Information Systems Quarterly* have encouraged diversity in Information Systems research – each in their own way. For instance, in her position as Editor-in-Chief for the *Management Information Systems Quarterly*, Carol Saunders (2006) called for members of the Information Systems community to be 'open to different perspectives and methodologies' and if there were those that felt there was a bias 'to work with us [the editorial board members] in eliminating it' (p. v). Detmar Straub (2008), Carol Saunders' successor as Editor-in-Chief, carried on her embrace of diversity in Information Systems research by questioning the 'culture of rejection' (p. iii) that he felt was plaguing top journals such as the *Management Information Systems Quarterly*.

Likewise the *European Journal of Information Systems* and *Information Systems Research* have also been strong proponents of diversity. In the March 2000 edition of the *European Journal of Information Systems*, Bob O'Keefe and Ray Paul (O'Keefe & Paul 2000) described the scope of the *European Journal of Information Systems* as truly diverse; one that captured not only the European feel toward Information Systems research but that welcomed all submissions from a variety of different research traditions. Moreover, editors at the *European Journal of Information Systems* have continued to reiterate the importance of diversity in the journal (Baskerville 2004; Rowe 2010). *Information Systems Research* had similar editorial policies which encouraged submissions that were novel and questioned the status quo in Information Systems research (Benbasat 2002; Kemerer 2003; Sambamurthy 2005). Hence, the time period of 2000–2008 seems a particularly rich evidentiary period for which to investigate diversity in Information Systems research.

For the second sub-question about diversity over time, a sampling strategy was adopted to ensure the study was feasible. In an effort to cover as much of the eight-year time period as possible without sampling every year for every journal and every concept (discussed in detail later) two decisions were taken. Firstly, it was decided that the full eight years would be sampled but only for a single journal *Information Systems Research*, and only for a single concept the organisation. *Information Systems Research* was chosen for this purpose due to its prior links with diversity in other studies and also its inclusion as the only journal in the previous exploratory study by the author (Behrens 2007). Secondly, it was decided that two sampling time frames from 2000–2008 would be selected. The beginning and middle of this period were selected: 2000/2001 and 2005; however, all journals and all concepts were examined for these. Adopting these two strategies a comprehensive yet still feasible study resulted.

### 3.4.6. Units of analysis

This research seeks to illuminate through the use of metaphor theory how key Information Systems research concepts are structured and understood; therefore, of particular concern to the empirical conduct of this study is deciding on the target concepts. What are appropriate key concepts in Information Systems research to investigate?

Deciding what the target concepts should be is critical since the results obviously hinge on this decision; however, such a decision is not as clear and straightforward as one might initially believe or even like to be the case. This is due in a large part to there being no widely agreed upon definition for an information system or what should be researched in Information Systems. This is evident in the debate on diversity in Information Systems research as outlined in the previous chapter. The empirical side of this study, however, demands that some key concepts for Information Systems research be decided on.

The key concepts were drawn from the editorial objectives and missives of top journals in the Information Systems field: the senior scholars basket of six journals as presented by the AIS. While there are differences between the journals – and what they will and will not accept – as 'valid' Information Systems research there are certain concepts on which all of these journals tend to agree Information Systems researchers should concentrate. These are the *organisation*, *technology* and *people* concepts.

### The AIS senior scholars basket of journals

The Association for Information Systems (AIS) has developed what they term the senior scholar's basket of journals (AIS 2010). This is a list of journals considered to be top publishing outlets in the field of Information Systems. Formally adopted on 23 April 2007, this listing was developed in response to a need within the Information Systems community to have a way of determining journal quality and one that was more responsive than the typical journal ranking schemes such as the ISI. The basket of six journals was to be used as an alternative way for deans and department heads to judge tenure and promotion cases. It was developed by the Senior Scholars Forum – senior Information Systems academics who had extensive experience in the field, i.e., they had served on prestigious Information Systems journal editorial boards, as ICIS conference chairs and/or been on the board of the AIS.

Of particular value to this study is that these journals provide some indication of what concepts are key in Information Systems research. Additionally, this list of journals recognises 'topical, methodological, and geographic diversity' (AIS 2010) which is useful and necessary for a study on diversity in Information Systems research. The journals on this list are: the *European Journal of Information Systems*, the *Information Systems Journal, Information Systems Research*; the *Journal of AIS*; the *Journal of MIS*; and *Management Information Systems Quarterly* – three of which are the evidentiary sources for this study.

### Key Information Systems concepts: organisations, technology and people

The editorial objectives of the six journals in the senior scholars basket stress the importance of organisations, technology and people. As is highlighted below, these are certainly not the only concepts that are important in Information Systems research, but they do represent critical areas of research when it comes to the search for knowledge and understanding in the Information Systems realm. Provided below are the most recent editorial objectives available at the time of writing this thesis (November 2010) for the senior scholar's basket of top journals:

1. We provide a critical view on *technology*, development, implementation, strategy, *management* and policy (*European Journal of Information Systems* 2010).

2. The ISJ encourages submissions that reflect the wide and interdisciplinary nature of the subject and articles that integrate *technological* disciplines with *social*, contextual and *management* issues, based on research using appropriate research methods (*Information Systems Journal* 2010).

3. *Information Systems Research* is a leading international journal of theory, research, and intellectual development, focused on information systems in *organizations*, institutions, the economy, and *society*. It is dedicated to furthering knowledge in the productive application of information *technologies* to *human organizations* and their *management* and, more broadly, to improved economic and *social* welfare (*Information Systems Research* 2010).

4. *JAIS* particularly welcomes contributions that provide theoretical insights that advance our understanding of information systems and information *technology* in *organizations* and *society* (*Journal of the Association for Information Systems* 2010).

5. The journal is a widely recognised forum for the presentation of research that advances the practice and understanding of *organizational* information systems… The journal accepts empirical and theoretical submissions that make a significant contribution to the field of *management* information systems. Such contributions may present … Information systems for competitive positioning [e.g.] business processes and *management* enabled by information *technology*; business value of information *technology*… (*Journal of Management Information Systems* 2010).

6. The editorial objective of the *MIS Quarterly* is the enhancement and communication of knowledge concerning the development of *IT*-based services, the *management* of *IT* resources, and the use, impact, and economics of IT with *managerial*, *organizational*, and *societal* implications (*Management Information Systems Quarterly* [*MIS*] 2010).

As can be seen in the above editorials there is considerable overlap in the concepts these prominent journals consider important. As highlighted in italics this overlap seems to occur on three concepts: organisation, technology and people. Such pronouncements on key concepts in Information Systems research help shape what is actually done in Information Systems research. Hence, by concentrating on these concepts – in particular how they are structured and understood via metaphors – one should gain some understanding of cognitive diversity in Information Systems research.

### 3.4.7. Method application

The comprehensive corpus method relied on in this study is a form of corpus linguistics. Corpus linguistics studies language as expressed in samples (corpora) or 'real world' text. The comprehensive corpus method places value on annotations as a way of gaining greater linguistic understanding and rigor (Santa Ana 2002; Wallis 2007). The comprehensive corpus method, as outlined by Santa Ana (2002), is the more specific version that is followed in this study. It is relied on to uncover the different root metaphors used for conceptualising the key Information Systems concepts of organisations, technology and people. Although Santa Ana (2002) applies the method using the same theory (metaphor theory) for a similar problem (uncovering bias), the particular worldview he relies on is not entirely clear. Yet, Santa Ana's (2002) method appears to be consistent with the methodological pluralism of fictism: it recognises both qualitative and quantitative measures as a way of obtaining valid answer/answers to a given research question. Hence, this study relies on Santa Ana's (2002) outline of the comprehensive corpus method as a way of applying metaphor theory in this study.

The following sub-sections outline the comprehensive corpus method and how it was applied in this study. Unlike Santa Ana's (2002) outline, the following paragraphs will elucidate what makes the application of this method a fictive one, that is, care will be taken to discuss – at relevant points – the world-view inherent in the application of metaphor theory.

#### Corpora

The first step in the comprehensive corpus method is to gather the required texts (Santa Ana 2002): the corpora. In this study, the corpora consisted of all relevant articles appearing in the *Management Information Systems Quarterly*, *Information*

*Systems Research* and the *European Journal of Information Systems* during the time periods outlined previously. An article was considered relevant and thus included if it reported on or discussed Information Systems research. In particular the units of analysis had to be discussed in enough detail to be coded. In general, research articles, notes and commentaries that discussed or reported on Information Systems research were included. Book reviews and editorials as well as articles, notes and commentaries that were focused more on the discussion of theory, methods or instruments were excluded. The corpora itself consisted of 354 articles encompassing over 5,500 pages of text. The articles that comprise the corpora are detailed in Appendix A and Appendix B.

## Finding evidence of metaphors

Finding evidence of metaphors in each of the articles involved reading and examining the text for instances of linguistic metaphor expressions or what Santa Ana (2002) refers to as metaphor tokens. It is these tokens that are the primary evidence for this study and they are also the material from which secondary evidence – for sub-metaphors, high-level entailments and reasonings – is obtained. The following statement is an example from one of the articles that was identified as a linguistic metaphor expression:

> As demonstrated by entrepreneurial firms such as Amazon.com, E*Trade, and Commerce One, IT is increasingly the *engine* driving the new *business* models. (Sambamurthy & Zmud 2000, p. 105)

In identifying metaphor tokens such as the above it was critical to note the source and target domains – in this case the source is machine and the target is technology. Hence, it is a manifestation of the technology as machine metaphor. In this step it is critical to recognise whether the text is figurative, rather than literal. Immediately on encountering the text its metaphoric use is recognised: we do not actually believe that Sambamurthy and Zmud (2000) think that IT is actually an engine. Being able to interpret text in this way is critical to understanding what the authors actually mean: how they structure and understand a key Information Systems concept.

In the fictive approach, metaphor tokens are viewed as fictions but the text to which they refer as real. Thus the quote by Sambamurthy and Zmud (2000) above has a real existence as black type on the pages of a journal in a particular location. It has an independent existence; however, the ascription of this phrase as a metaphor token is a fiction. A metaphor token does not have a real existence; it is simply a label that has been associated with particular text. Such a label is – like any attribute or property of a real thing – simply an abstractive fiction.

Despite the fictive activity of coding a given phrase as a metaphor token, such activity is both useful and necessary. It is useful in that it provides a means by which metaphoric speech can be identified: a fiction to uncover a fiction. It is necessary in that it allows us to understand and deal more effectively with the notion of metaphor than we could otherwise. Most people are unaware of the metaphors they use and rely on; therefore, coming across cases where people state the metaphors they rely on in their research is both unlikely and, as discussed previously, probably unreliable anyway. Rather, metaphors typically manifest themselves in ways similar to the statement by Sambamurthy and Zmud (2002) above. In this research, such recognition and labelling of metaphors in text is essential to understanding how authors conceptualise key Information Systems concepts in their research as well as the differences between those conceptualisations.

### Coding the corpora

Coding the corpora consisted of: preliminary coding; defining a categorisation scheme; primary coding and deriving secondary evidence. Preliminary coding involved two people: an associate and the author as the principal researcher. Due to the sheer size of the text to be coded and the limited time the associate researcher could spend on the project it was decided that the bulk of the associate researcher's time would be spent in this preliminary coding step. In particular the associate researchers time would be spent in an open coding phase where only a relatively small subset of all articles were coded. The aim of the open coding phase – as will be explained in the section below – was to produce a categorisation scheme that could be used independently for coding the bulk of the texts. This was the primary coding step – so named because this was where most of the coding effort was done. In the primary coding step, while the associate researcher did not actively code, she was available to discuss and reconcile any problems, issues or confusions that arose in the authors independent coding. There was a similar involvement with the associate researcher in the last step – that of deriving secondary evidence from primary evidence.

Although it is certainly possible to approach the coding process with a single coder, the importance of having another coder is significant in terms of the fictive approach. As highlighted previously, the method of the fictionalist is to justify their fictions. It is possible, and certainly at times there may be no other option than to conduct the coding alone and then justify the resulting fictions by publication or presentation to the larger disciplinary community. Having another person involved in the coding process to justify what was being coded and why was a significant improvement in terms of the philosophical approach. Of course, positivists and even interpretivists have their own research justifications for why another coder should be involved: triangulation of the data, confidence in the results, more robust findings, replication of the research etc. Certainly, these reasons apply here too to a greater or lesser extent. The main reason for the use of two coders in this study, however, was its links with the philosophical approach and the justification of fictions.

### *Preliminary coding*

The purpose of the first phase of the coding process was to arrive at a categorisation scheme that could then be used independently on the bulk of the texts. In terms of being open, this meant that the source domains (the domain that is being transferred from) were not pre-determined. To focus the research efforts however, the target domains were narrowed to the organisation and technology concepts – two of three concepts that would be used later in independent coding. The subset of articles that were coded in this phase was the full set of articles published in the *European Journal of Information Systems* during the year 2000. Again, only articles that discussed organisations and people in enough detail to be coded were included. This was important for the step of uncovering metaphor tokens. Metaphor tokens have a source and target domain. As the target domains were predetermined, it had to be obvious that these were being discussed – hence the decision to include only those articles that discussed them in enough depth to make the uncovering of metaphor tokens possible. The corpora in this initial phase of coding represented 16 articles and almost 200 pages of text.

In developing a consensus regarding the classification scheme, both coders started by independently coding the text into metaphor tokens. When such text was identified it was either circled or highlighted in the text. The source and target domains associated with the metaphor token were included in the margins. Also, included in the margins were any problems incurred in deciding on a source domain. At the end of coding each article each coder wrote a summary on the back of each article. This summary included our over-all impressions about the metaphors in use, whether they were dominant, secondary, or occasional – with appropriate justifications – and other issues requiring discussion on the coding of that article.

In the very beginning of this initial coding phase, both coders met to discuss their results after coding each article. The aim of this discussion was to reconcile any differences and to justify the coding to each other. While there were some slight divergences at this stage over what text was highlighted as being a metaphor token, both coders tended to highlight the same excerpts and code them in a similar way. When any differences did exist however, these were discussed and a final consensus on the classification scheme for the coding was reached. After this very beginning phase, we coded more articles before meeting to resolve any discrepancies. Much was gained during this time through informal discussions – stating the different reasonings used in order to come up with our metaphor tokens and also discussing and reflecting on the main metaphors at play. Due to this continual process of discussion, justification and resolution, as well as the almost identical way in which the coders had come to code the text both coders were confident in using the classification scheme independently.

### *Defining a categorisation scheme*

The categorisation scheme was an informal, flexible set of rules for: identifying metaphoric expressions within the text; labelling them as metaphor tokens, and classifying the article as a whole in relation to the metaphors and their various strengths. It is worth stating, however, that text was not always readily identifiable as metaphoric. This is a known problem with identifying metaphors in general (Ortony 1979). It was relieved to a certain extent in this study by the process of justifying the identified metaphor tokens between researchers.

As to the heuristics for classifying an article as a whole, this was a little more complicated. It was known from Behrens (2007) that more than one metaphor could occur in a single article. This makes it difficult to determine just how widespread a particular metaphor is – particularly in terms of depth within articles. In the previous study (Behrens 2008), this author simply applied the rule that an article would be coded as having that metaphor present only if the metaphor was strongly evidenced.

This of course is a very rudimentary method, and while perhaps useful for an exploratory study, was not appropriate for a more comprehensive one.

The rule for classifying an article as a whole according to the metaphors present was similar to that outlined in Santa Ana (2002). An article would be given a particular strength rating for the three different metaphors: dominant, secondary or occasional. An article was categorised as dominant for a given metaphor when there were numerous metaphor tokens associated with that metaphor, occasional when there were only one or two metaphor tokens and secondary when the number of metaphor tokens fell between those associated with dominant and occasional categories. While this rule still had its problems it was a significant improvement on the rather more rudimentary method applied in Behrens (2007). Appendix A and Appendix B lists all of the articles examined along with their categorisations.

In the fictive approach, any categorisation scheme is a fiction and its value stems from being both useful and necessary. In this case it is useful in a heuristic sense: it provides the rules of thumb that can be used to identify, label and compare metaphors to arrive at some conclusions about diversity in Information Systems research. The categorisation scheme is necessary in that it allows better sense to be made of conceptual diversity in Information Systems research than could be done otherwise.

### *Primary coding*

The categorisation scheme outlined above was then used to code the remaining articles. As one could expect, there were occasions when the principal researcher encountered text that could not easily be categorised using the existing scheme. It was at these times that this author met with the associate coder to discuss problems. Such problems were generally solved through short informal discussions. There were, however, no changes required to the categorisation scheme itself; they were issues of metaphor identification and justification. Additionally, while the same type of text was frequently encountered – for example, 'organizational mechanisms' (Choudhury & Sabherwal 2003; Kotlarsky & Oshri 2005; Wang, Ahmed & Rafiq 2008b) – other unique phrases did crop up. It was at these times that discussions between the associate and this author were both useful and necessary. After the first 50 or so articles (roughly equal to a full years worth of articles in each journal); however, such unfamiliar text was rare. Furthermore, despite the sheer number of articles that needed to be coded the initial categorisation scheme worked well for the main coding phase.

In the primary stage, analysis was done to both establish the variation in dependence on metaphors and also quantified that variation: it relied on both quantitative and qualitative methods. The quantitative methods were visible in the initial categorisation scheme explained above – denoting whether an article was dominant, secondary or occasional for a given metaphor. As will be evident in the following three chapters, they were also used in an overall sense to show how many articles were categorised into particular strength categories and also how many articles contained different combinations of metaphors. Such quantitative measures were not only relatively easily achieved at this stage they were also considered useful in the sense that it would help communicate a large amount of information in as concise a manner as possible. It was believed that the reader would be more likely to comprehend the findings at a glance so to speak. It was also believed that including such quantitative measures in the primary stage would provide emphasis or reinforcement to what was found in terms of the variation in dependence on the three different metaphors.

### *Deriving secondary evidence*

In the final step of applying metaphor theory in this study the primary evidence – metaphor tokens – were examined for secondary evidence: sub-metaphors, high-level entailments and logical reasonings. In relation to the sub-metaphors each main metaphor token was first sorted into their constituent primary source metaphor. Free judgments were then made concerning possible sub-metaphor source and target domains. The goal at this stage of the analysis was to arrive at a classification that was not prejudiced or predetermined. Judgments had to be made not only as to possible sub-domain mappings, the sub-metaphor source and target domains, but also as to the actual inheritance hierarchies of those sub-metaphors: how these sub-metaphors were believed to fit in with one another and how they were thought to support the main over-arching metaphor.

In relation to the high-level entailments of each metaphor, the same general process was followed. A similar process was followed for ascertaining evidence of the logical reasonings associated with each root metaphor. Note that it was Pepper's (1942) reasonings that were relied on in this study as presented in the previous chapter, Section 2.3.2. The process followed for the reasonings was slightly different; however, these were pre-determined where the sub-metaphors and entailments were not.

Unlike the primary stage, analysis in the secondary stage was done to establish the variation in dependence on metaphors. It did not quantify that variation. The ability to arrive at specific quantities is certainly more difficult, if not impossible, to achieve at this stage due to the secondary stage being essentially an analysis of an analysis, or perhaps to be more precise, a meta-analysis. Such quantitative measures are also believed to be – at this stage – less useful and necessary. This is because the broader motivation for this study is to explore how conceptually diverse Information Systems research is; not to quantify the precise magnitude of that conceptual diversity. Quantification is, however, – at least in the initial stages – a useful way of exploring that question (hence its inclusion in the primary coding).

## 3.5 Conclusion

In this chapter, the philosophical approach, theory and methods adopted in this study have been explained and justified. It explains how this thesis makes use of the fictive philosophical approach to provide a richer, more holistic and creative understanding of diversity in Information Systems research: both past and present. Relying as it does on metaphor theory it provides a more detailed understanding of how researchers conceptualise their key concepts of interest with respect to three principal metaphors. Furthermore, it provides an idea of those metaphors that are relied on the most in thinking about and conducting research in the Information Systems discipline. By using the comprehensive corpus method Information Systems research and its relative diversity can be examined. The next three chapters will present the results of this analysis.

# Chapter 4 - CURRENT CONCEPTUALISATIONS FOR ORGANISATIONS, TECHNOLOGY AND PEOPLE

## 4.1 Introduction

As outlined in Chapter 3, this thesis uses a combination of the fictive approach, metaphor theory and the comprehensive corpus method as a way of exploring diversity in Information Systems research. This chapter presents the results of applying this unique approach to the most recent (as of conducting this thesis) academic literature in Information Systems: that of 2008. Three premier journals in the Information Systems field – *Information Systems Research*, *Management Information Systems Quarterly* and the *European Journal of Information Systems* – formed the evidentiary data source for the analysis. A total of 87 articles representing over 1000 pages of text published in these journals were examined for evidence of three root metaphors – machine, organism and culture – in discussions of three key Information Systems concepts: organisations, technology and people. Rather than a balanced distribution of all three root metaphors the results reveal a skewing toward the machine metaphor. That is, contemporary academic discourse – as represented in three premier publishing outlets in Information Systems during 2008 – is skewed toward mechanistic conceptualisations of key Information Systems research concepts.

This chapter begins with an overview of the findings (Section 4.2). The following sections then examine the results associated with each concept – organisation (Section 0), technology (Section 4.4) and people (Section 4.5) – in more detail. In the presentation of each concept a general overview of how the concept was discussed in the articles is provided. Primary evidence, which comes in the form of metaphor tokens (outlined in Chapter 3), associated with each of the different metaphors for that concept is then given. Note that with this chapter and the following two chapters the secondary forms of evidence (sub-metaphors and high-level entailments), derived from the primary evidence (metaphor tokens) is left to a separate chapter: Chapter 7. The ways in which each of the root metaphors occurred – either in isolation or combination – in the articles are then presented in Section 4.6. They too will be presented in order of concept: organisation (Section 4.6.1); technology (Section 4.6.2); and finally people (Section 4.6.3). The chapter finishes with a final conclusion reflecting briefly on the results before moving on to the next chapter: Chapter 5 – *Changing Images for Organisations*.

## 4.2 Results overview

Table 4.1 presents the results of the fictive metaphor analysis on over 1000 pages of text from a total of 87 articles appearing in *Management Information Systems Quarterly*, the *European Journal of Information Systems* and *Information Systems Research*, during the year 2008. This table format is common throughout the thesis so a little more explanation on the format and how to read it will be provided here. In the first column the source domains of the three root metaphors are listed: machine, organism and culture. Note that a metaphor – as explained in Chapter 2 (Section 2.3) and Chapter 3 (Section 3.3) – is made up of a source domain and a target domain. In this case the source domains – machine, organism and culture – match the names of the root metaphors. In the top row the three target domains are listed: organisations, technology and people. These are the three key Information Systems research concepts examined in this thesis. The second row beneath the key Information Systems research concepts denotes the journal in which an article appeared: *Management Information Systems Quarterly* (MISQ), the *European Journal of Information Systems* (EJIS) or *Information Systems Research* (ISR). In the process of analysis – as explained in Chapter 3 – each article was examined for evidence of a root metaphor in relation to a key Information Systems concept e.g. *organisation as machine*. Each article was then categorised – according to the categorisation scheme outlined in Chapter 3 – as being dominant, secondary or occasional for that metaphor based on how heavily the metaphor was used throughout the article. These strengths are listed in the second column of Table 4.1.

An additional point that should be taken into consideration when reading Table 4.1, is that the total coded articles are different for each concept. In relation to the organisation concept there are a total of 81 coded articles whereas there are 85 for the technology concept and 86 for the people concept. These differences exist because not all articles examined contained evidence of a root metaphor in relation to all key Information Systems concepts examined – most of them did but not all of them. This appeared to be due – in a large part – to the focus of the articles: more articles had a focus on the people concept than the organisational concept. To explain this further, when the focus was on a given concept it resulted in more discourse on that concept. This in turn provided more opportunity for concepts to be discussed via metaphoric discourse. In the cases where there was no focus on a given concept there was in turn little discourse on the concept. This left little opportunity for that concept to be discussed via metaphoric discourse. For more information Appendix A and Appendix B contain the full details of whether an article contained evidence of a root metaphor in relation to each of the key concepts examined.

The most important findings from the stage of the analysis is that there is more evidence of the machine metaphor – regardless of concept – than any other root metaphor. As shown in Table 4.1 all coded articles – essentially those that contained evidence of a root metaphor – contained evidence of the machine metaphor. For instance, as shown in Table 4.1, of the 81 articles that contained evidence of a root metaphor in relation to the organisation concept, all articles – 100% – contained some evidence of the *organisation-as-machine* metaphor. Compare this to the *organisation-as-culture* metaphor. Of the 81 articles that contained evidence of a root metaphor in relation to the organisation concept only 64 articles (79%) contained some evidence of the *organisation-as-culture* metaphor. This occurs to a greater or lesser extent with all concepts in all journals.

Another important finding highlighted in Table 4.1 is that not only do more articles contain evidence of the machine metaphor than any other metaphor but more articles are categorised as dominant for this metaphor. For instance, of the 81 articles that contained evidence of a metaphor, in relation to the organisation concept all of them contained evidence of the machine metaphor. In addition however, note that of these 81 articles, 47 of them (58%) were categorised as dominant for this metaphor. In contrast only 64 articles (79%) contained any evidence of the *organisation-as-culture* metaphor and only 23 of these articles (28%) – less than one third of all articles – were categorised as dominant for this metaphor. Table 4.1 highlights that the strength of the machine metaphor is higher than any other metaphor regardless of concept or journal.

Table 4.1. *Overall results of metaphor analysis for 2008*

| **Source** | **Strength** | **Organisation** | | | | **Technology** | | | | **People** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | n | MISQ | EJIS | ISR | n | MISQ | EJIS | ISR | n |
| Machine | Dominant | 11 | 16 | 20 | 47 | 14 | 16 | 14 | 44 | 17 | 15 | 18 | 50 |
| | Secondary | 15 | 11 | 4 | 30 | 13 | 13 | 11 | 37 | 10 | 14 | 5 | 29 |
| | Occasional | 0 | 4 | 0 | 4 | 0 | 4 | 0 | 4 | 1 | 4 | 2 | 7 |
| *Total Articles* | | *26 (32%)* | *31 (38%)* | *24 (30%)* | *81 (100%)* | *27 (32%)* | *33 (39%)* | *25 (29%)* | *85 (100%)* | *28 (33%)* | *33 (38%)* | *25 (29%)* | *86 (100%)* |
| Organism | Dominant | 11 | 12 | 10 | 33 | 1 | 4 | 2 | 7 | 14 | 14 | 16 | 44 |
| | Secondary | 9 | 16 | 6 | 31 | 10 | 19 | 15 | 44 | 12 | 16 | 8 | 36 |
| | Occasional | 1 | 3 | 4 | 8 | 13 | 8 | 6 | 27 | 1 | 0 | 1 | 2 |
| *Total Articles* | | *21 (26%)* | *31 (38%)* | *20 (25%)* | *72 (89%)* | *24 (28%)* | *31 (36%)* | *23 (27%)* | *78 (92%)* | *27 (31%)* | *30 (35%)* | *25 (29%)* | *82 (95%)* |
| Culture | Dominant | 9 | 11 | 3 | 23 | 3 | 6 | 0 | 9 | 9 | 16 | 6 | 31 |
| | Secondary | 4 | 12 | 4 | 20 | 5 | 12 | 3 | 20 | 6 | 9 | 4 | 19 |
| | Occasional | 7 | 6 | 8 | 21 | 4 | 7 | 5 | 16 | 10 | 5 | 13 | 28 |
| *Total Articles* | | *20 (25%)* | *29 (36%)* | *15 (19%)* | *64 (79%)* | *12 (14%)* | *25 (29%)* | *8 (9%)* | *45 (53%)* | *25 (29%)* | *29 (34%)* | *23 (27%)* | *78 (91%)* |
| TOTAL CODED ARTICLES | | **26** | **31** | **24** | **81** | **27** | **33** | **25** | **85** | **28** | **33** | **25** | **86** |

Legend – MISQ: *Management Information Systems Quarterly*, EJIS: *European Journal of Information Systems*, ISR: *Information Systems Research*, n: number of articles

Note: % shown is rounded to the nearest per cent.

Two other aspects – not shown in Table 4.1 but discussed later – further reinforce the overall strength of imagery produced by the machine metaphor in these results. The first concerns the different ways in which the machine metaphor appears: its forms and types. Regardless of key Information Systems concept (organisation, technology or people), the machine metaphor appears in a wide variety of forms and types that are typically very specific e.g. the *organisation-as-generator* (a specific type of machine). The organism and culture metaphors in contrast, appear in a limited number of ways that are typically general rather than specific e.g. the *organisation-as-culture*. This results in more powerful images of key Information Systems concepts as machines – ones that are more transparent and detailed than those images associated with the organism and culture metaphors.

The second aspect concerns the frequency and variety of mechanistic discourse. Mechanistic discourse – again regardless of key Information Systems concept – is frequent and varied both within and across articles. In comparison organic and cultural discourse is not. Organic discourse in particular – while categorised as more dominant overall – typically appears in only the beginning and ending parts of articles. That is, in the problem conceptualisation and conclusions sections of articles. This second aspect considerably increases the salience and power of the machine metaphor in these results.

Before examining the results for each concept in more detail it is important to note (as discussed in Chapter 3), that the strength of an article for a given metaphor – as presented in Table 4.1 – is a relative measure of strength for a given concept. That is, an article is categorised as: *occasional* if it only contains one or two metaphor tokens in relation to a given concept; *dominant* if it contains numerous metaphor tokens (which depending on the focus of the article may be as little as six); and *secondary* when the number of metaphor tokens falls between those associated with the dominant and occasional categories. From these tables it is not possible to interpret – even if the articles were dominant for a given metaphor – how heavily focused the article was on a given concept. It is a relative rating between the concept and a root metaphor.

The following sections of this chapter will present the results found in Table 4.1 in more detail. As explained in the introduction the results will be presented by concept starting with an overview of the most significant findings. It is after this overview that a general examination of how that concept was discussed in the articles – information not available from Table 4.1 – will be covered. The primary evidence associated with each root metaphor – machine, organism and culture – will then be presented in the following format:

- *General examples of the metaphor* – this section is intended to give the reader an understanding of how the metaphor was evidenced in the articles.

- *Forms and type of metaphor* – this section aims to provide a sense of the metaphors range, the variety of ways in which it was evidenced across articles.

- *Frequency and variety of the metaphor* – this section intends to give some idea of the metaphor's depth – the penetration of the metaphor within and across articles.

In presenting the results by concept, any notable differences between journals will be discussed where relevant. Care will be taken to select evidence from all journals wherever possible. Moreover, while there is considerable overlap in the discourse on organisations, technology and people as well as their metaphors the results for these concepts will be presented separately.

## 4.3 Organisation

This section expands upon the results concerning the organisation concept: information presented in Table 4.1. Table 4.2 is a sub-set of Table 4.1 limited to the results of the organisation. It is presented here for ease of reference. As shown in Table 4.2 the most significant finding concerning the organisational concept is that articles are more likely to structure and understand the concept using the machine metaphor than any other metaphor. Indeed all articles contain some evidence of the machine metaphor and the majority of articles – more than half – are categorised as dominant for this metaphor. In contrast the *organisation-as-organism* metaphor (89%) and the *organisation-as-culture* metaphor (79%) are evident in fewer articles and also categorised as dominant in a smaller percentage of articles (organism – 41%, culture – 28%).

This section begins with an outline of how the organisation concept was discussed in the articles. This outline is then followed with further detail on the results for each of the three root metaphors.

Table 4.2. *Results of metaphor analysis for organisation in 2008*

| Source | Strength | Organisation | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 11 *(14%)* | 16 *(20%)* | 20 *(25%)* | 47 *(58%)* |
| | Secondary | 15 *(19%)* | 11 *(14%)* | 4 *(5%)* | 30 *(37%)* |
| | Occasional | 0 *(0%)* | 4 *(5%)* | 0 *(0%)* | 4 *(5%)* |
| Machine percentages | | *26 (32%)* | *31 (38%)* | *24 (30%)* | *81 (100%)* |
| Organism | Dominant | 11 *(14%)* | 12 *(15%)* | 10 *(12%)* | 33 *(41%)* |
| | Secondary | 9 *(11%)* | 16 *(20%)* | 6 *(7%)* | 31 *(38%)* |
| | Occasional | 1 *(1%)* | 3 *(4%)* | 4 *(5%)* | 8 *(10%)* |
| Organism percentages | | *21 (26%)* | *31 (38%)* | *20 (25%)* | *72 (89%)* |
| Culture | Dominant | 9 *(11%)* | 11 *(14%)* | 3 *(4%)* | 23 *(28%)* |
| | Secondary | 4 *(5%)* | 12 *(15%)* | 4 *(5%)* | 20 *(25%)* |
| | Occasional | 7 *(9%)* | 6 *(7%)* | 8 *(10%)* | 21 *(26%)* |
| Culture percentages | | *20 (25%)* | *29 (36%)* | *15 (19%)* | *64 (79%)* |
| TOTAL CODED ARTICLES | | **26** | **31** | **24** | **81** |

Note: % shown is rounded to the nearest per cent

### 4.3.1. Discourse on organisations

The organisation was not as popular a focus in the articles as that of technology or people. Yet, there was still a strong focus on the organisational concept in the articles of *Management Information Systems Quarterly*, the *European Journal of Information Systems* and *Information Systems Research* during the 2008 period: both at an organisational and inter-organisational level. Almost half of all articles – 38 articles – had quite a heavy focus on some aspect of organisations. At the organisational level, some examples of different topics covered include: the investment (Wang, Chaudhury & Rao 2008a) and economic analysis (August & Tunca 2008) of information security in the organisation; purchasing (Kuruzovich et al. 2008); support services positioning (Cenfetelli, Benbasat & Al-Natour 2008); and auction bidding (Hinz and Spann 2008) of the organisation. At the inter-organisational level the topic of most concern was that of off-shoring which focused its attention directly on the interactions between one organisation and another in the offshore context.

In the various discussions of organisations in the articles published during the year 2008 metaphoric language was frequently used. Evidence of the three root metaphors of interest in this study was found. The following sections will present the evidence associated with each of these metaphors in order of most frequently evidenced to least frequently evidenced i.e. machine (Section 4.3.2), organism (Section 4.3.3) and culture (Section 4.3.4).

### 4.3.2. Organisation as machine

The organisational machine metaphor occurs both when organisations are the sole focus of discussion and also when they are an important situating or backgrounding concept in discussions. As shown in Table 4.3, the metaphor is dominant in around 58% of all articles, secondary in around 37% and occasional in only 5% of these articles. The accompanying graph – Figure 4.1 – highlights that articles appearing in the journal *Information Systems Research* are more likely to be categorised as dominant for the machine metaphor (83%) than those appearing in *Management Information Systems Quarterly* and the *European Journal of Information Systems*.

A few instances of how mechanistic discourse was evidenced across the articles of each journal are provided in Table 4.4.

Table 4.3. *Results of* organisation-as-machine *metaphor in 2008 (sub-set of Table 4.2)*

| Source | Strength | Organisation | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 11 *(42%) | 16 (52%) | 20 (83%) | 47 (58%) |
| | Secondary | 15 (58%) | 11 (35%) | 4 (17%) | 30 (37%) |
| | Occasional | 0 (0%) | 4 (13%) | 0 (0%) | 4 (5%) |
| Machine percentages | | ***26 (32%)*** | ***31 (38%)*** | ***24 (30%)*** | ***81 (100%)*** |

* Percentage shown is the percentage of papers for that particular journal.

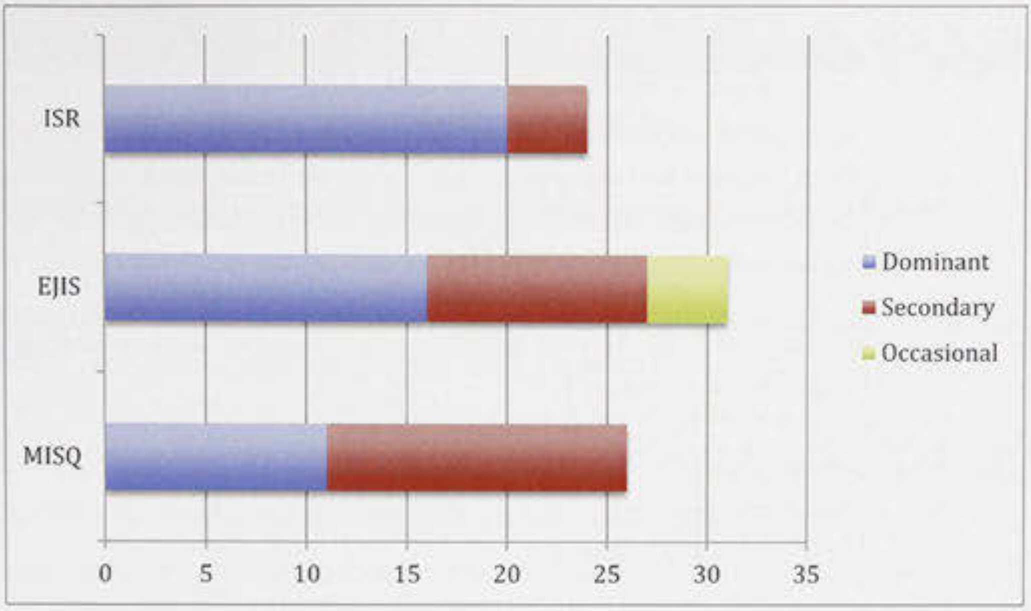


*Figure 4.1.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *organisation-as-machine* metaphor in 2008 (derived from *Table 4.3*)

Table 4.4. *Sample metaphor excerpts for the* organisation-as-machine *metaphor from each journal in 2008*

| JOURNAL | ORGANISATION AS MACHINE EXCERPTS |
|---|---|
| ISR | Internet-based electronic markets, such as eBay, exemplify how information technology (IT) can propel long-standing business processes, such as auctions, to an unprecedented scale and scope. (Bapna, Jank & Shmueli 2008, p. 400) |
| | The physical and information components of the value chain have been decoupled (Kuruzovich et al. 2008, p. 182) |
| | This issue cannot be addressed if we were to assume that the effects of various profit drivers are equal across the two contract types (Gopal & Sivaramakrishnan 2008, p. 203) |
| MISQ | Although the category of needs with IS use will remain the same for individuals it is likely that fine-tuning may be required for certain industries where specific inputs are needed. (Au, Ngai & Cheng 2008, p. 56) |

| JOURNAL | ORGANISATION AS MACHINE EXCERPTS |
|---|---|
| | Potential cost savings, reduced cycle time arising from "follow-the-sun" software development, and access to a larger labor pool have helped <u>fuel</u> the amount of work being offshored from high-cost locations such as the United States, United Kingdom, and Scandinavia to lower cost economies such as India, China, Russia, and Malaysia. (Holmström Olsson et al. 2008, p. 258) |
| | Our analysis found that even when the world is flat, this market is not <u>frictionless</u>. (Gefen & Carmel 2008, p. 379) |
| EJIS | Organizational memory is an organizational <u>mechanism</u> that captures, stores, and disseminates knowledge learned from previous experience that can be brought to bear on decisions (Wang 2008b, p. 222) |
| | There are many and frequent interactions among nurses because of tight <u>linkage</u> of our work. It is like a <u>gear</u>. We need to collaborate closely to prevent any trouble, which is related to patient safety. (Chu & Robey 2008, p. 89) |
| | When the characteristics of buyers and sellers are unobservable, intermediaries <u>generate</u> market information and provide guaranties for product quality to address adverse selection. (Datta & Chatterjee 2008, p. 15) |

### Forms and types of organisations as machines

The instances presented in Table 4.4 cover some of the many different forms in which the organisational machine metaphor appears. For instance, it is readily recognisable in specific forms (eg. as a *generator*) but also as a particular form that has different mechanical *components* (eg. *mechanisms, gears, links, chains* and *propellers*). Across articles, *mechanisms* and *levers* are the most commonly evidenced forms and components of the organisational machine metaphor. Levers exist between organisations and individuals: for instance, in Gal, Lyytinen and Yoo (2008), where the distinct knowledge between companies and customers is *leveraged*. Mechanisms also exist more broadly as market *mechanisms* (Datta & Chatterjee 2008). The most common focus across all journals and articles however, is on the mechanisms and levers that exist within and between organisations: from organisational learning and memory (Ramasubbu et al. 2008) to the inter-organisational *mechanisms* that govern off-shoring relationships (Mithas, Jones & Mitchell 2008). Papers also commonly use the term *control mechanism* in discussions of organisations (Rustagi, King & Kirsch

2008). Such easily recognisable forms and types of machinery that were used in describing organisations were critical in establishing a clear and detailed image of the organisational machine metaphor in this phase of the study.

#### Frequency and variety of mechanistic discourse within articles

While mechanistic discourse was evidenced frequently and in a wide variety of ways across articles, such frequency and variety was also reflected within articles. Indeed there were articles (see Dawande et al. 2008; Olivera, Goodman & Tan 2008; Au, Ngai & Cheng 2008; Kamis, Koufaris & Stern 2008; Choudhury and Karahanna 2008; Trier 2008; Hinz & Spann 2008; Bapna, Jank & Shmueli 2008; Lee, Wyner & Pentland 2008) in which machine discourse was the only discourse that was relied on when discussing the organisational concept. Regardless of whether articles relied solely on mechanistic discourse or not, such discourse typically occurred in all significant aspects of the research discussed: problem formulation, theories relied on and methods used.

### 4.3.3. Organisation as organism

As shown in Table 4.5 of all coded articles from 2008, around 89% of all articles show some evidence of organic discourse in discussions of organisations. Only approximately 41% of all articles, however, were categorised as dominant for the organism metaphor whereas approximately 38% were categorised as secondary and approximately 10% were categorised as occasional. As shown in the accompanying graph to Table 4.5 – Figure 4.2 – articles appearing in the *European Journal of Information Systems* are more likely to show evidence of the organism metaphor with more articles being categorised as secondary (52% of all articles published in the *European Journal of Information Systems* are categorised this way) and all articles in this journal (100%) show at least some evidence of the organism metaphor. Yet, apart from this result there are no other significant differences between the journals that impact on the overall results.

A few instances of how organic discourse was evidenced across articles of each journal are provided in Table 4.6.

Table 4.5. *Results of* organisation-as-organism *metaphor in 2008 (sub-set of Table 4.2)*

| Source | Strength | Organisation | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Organism | Dominant | 11 *(52%) | 12 (39%) | 10 (50%) | 33 (41%) |
| | Secondary | 9 (43%) | 16 (52%) | 6 (30%) | 31 (38%) |
| | Occasional | 1 (5%) | 3 (10%) | 4 (20%) | 8 (10%) |
| Organism percentages | | *21 (26%)* | *31 (26%)* | *20 (30%)* | *72 (89%)* |

* Percentage shown is the percentage of papers for that particular journal.

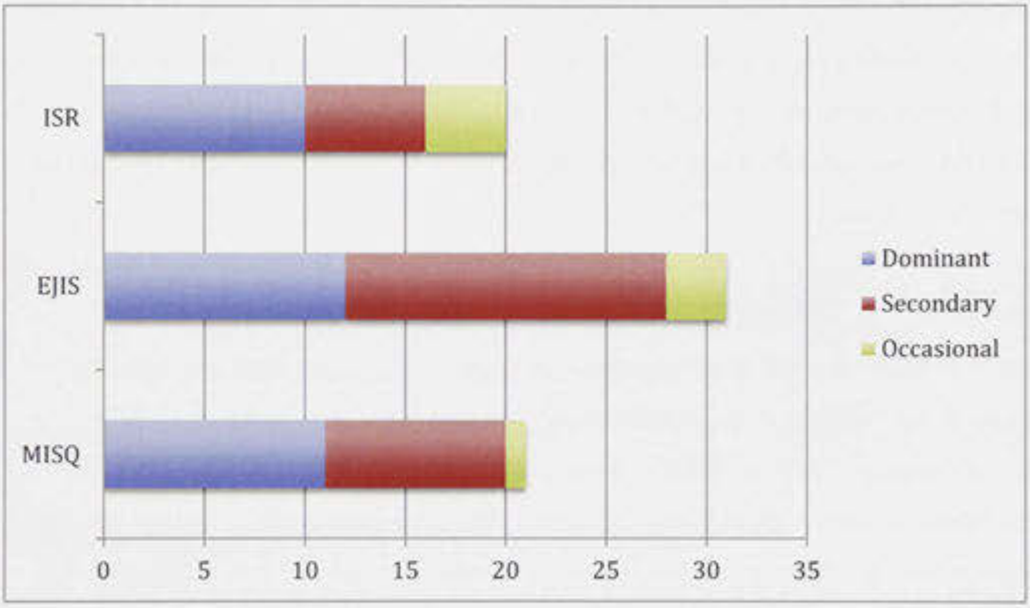


Figure 4.2. *Categorisation strength of articles appearing in* Information Systems Research, *the* European Journal of Information Systems *and* Management Information Systems Quarterly *that show evidence of the* organisation-as-organism *metaphor in 2008 (derived from* Table 4.5*)*

Table 4.6. *Sample metaphor excerpts for* organisation-as-organism *metaphor from each journal in 2008*

| JOURNAL | ORGANISATION AS ORGANISM EXCERPTS |
|---|---|
| ISR | As a result, in addition to facing public pressure for selfish *behavior*, the value of Microsoft's product is reduced, which also ultimately *hurts* the company. (August & Tunca 2008, p. 49) |
| | The growth of the Internet has *spawned* an increasing number of online information sources (Kuruzovich et al. 2008, p. 182) |

| | |
|---|---|
| | Whenever you have a commons, somebody is going to be the *shark* and try to hijack the commons... And you can fight back in the courts, but that takes a lot of time; companies are *dead* before you get *remedied* (Feller et al. 2008, p. 475) |
| MISQ | *Spurred* by the growth of information technology outsourcing, offshore software development firms are now playing a key role in the strategic information technology projects ... (Ramasubbu et al. 2008, p. 438) |
| | Importantly these distant providers are said to overcome the *crippling* cost of distance and the higher transaction costs. (Gefen & Carmel 2008, p. 368) |
| | Investment in, and implementation of, enterprise-level systems,... have become the hallmark of organizational strategies for *survival* and competitive advantage. (Venkatesh et al. 2008, p. 484) |
| EJIS | During a longer horizon, one vendor might produce a new IT, and shortly afterward, another might *leapfrog* ahead. (Newkirk, Lederer & Johnson 2008, p. 203) |
| | In the IT arena, there simply is no analogue to the FAA and NTSB that serve as *watchdog* and investigator in the case of plane crashes and air traffic control failures. (Kasi et al. 2008, p. 76) |
| | A company's ability to *survive* partly depends on its ability to anticipate external change and take it into account when defining the strategic targets it would like to pursue (Lesca & Caron-Fasan 2008, p. 371) |

### Forms and types of organisations as organisms

There were four types of the *organisation-as-organism* metaphor found in the articles: *organisation-as-shark*, *organisation-as-dog*, *organisation-as-frog* and *organisation-as-horse*. These types are more specific categories or instances of the *organisation-as-organism* metaphor i.e. shark is a more specific category or instance of an organism. These four types were evidenced only once each. The first three – *shark*, *dog* and *frog* – were direct references with the last type – that of the *horse* – being an indirect reference. All of these references are included in Table 4.6 (*see* Feller et al. 2008; Kasi et al. 2008; Newkirk, Lederer & Johnson 2008; Ramasubbu et al. 2008). In relation to Newkirk's reference it is worth noting that what is being referred to might be a game. Nevertheless, it does refer to a specific action or behaviour of a particular organism. Additionally, in Ramasubbu et al. (2008), it is the use of the term *spurred* that indirectly refers to an image of the organisation as a horse.

The forms and types associated with the *organisation-as-organism* metaphor are significantly less than those associated with the *organisation-as-machine* metaphor. Somewhat mitigating this considerable gap between the two is that in relation to the *organisation-as-organism* metaphor there is evidence of broader indeterminate forms and/or types. This occurs through references to anatomy and sense aspects of the organism or clearly recognisable organic relationships.

As shown in Table 4.7, there was evidence of a broader indeterminate form or type made through references to various anatomy and sense aspects. Evidence such as this was more frequent than the references to determinate categories of the *organisation-as-organism* (ie. *shark*, *dog*, *frog* and *horse*). As shown in the table, the excerpts all reference an indeterminate category of organism by discussing anatomy and sense aspects of the organism. Newkirk, Lederer and Johnson (2008) for instance use the term *visions*. This term produces an image of the organisation as organism through the specific sense of sight; a sense that some – but not all – organisms have. This is the same for Levina and Vaast's (2008) reference to *brain* and so on for the remaining sample excerpts in the table. It is these references that while not specific to a particular organism do create an image of the organisation as an organism.

Table 4.7. *Sample metaphor excerpts for the anatomy and sense aspects of* organisation-as-organism *metaphor from each journal in 2008*

| JOURNAL | ORGANISM ANATOMY AND SENSE EXCERPTS FOR ORGANISATION |
|---|---|
| ISR | First the vendor *faces* distinctly different incentives under the two contractual regimes. (Gopal & Sivaramakrishnan 2008, p. 204) |
| | Russian providers... felt they could do the work with fewer onsite resources by relying on their raw "*brain* power" (Levina & Vaast 2008, p. 317) |
| | "over the long run, the invisible *hand* [market mechanism] deletes actors who are habitually opportunistic" (Hill 1990 p.503) from (Dibbern, Winkler & Heinzl 2008, p. 340) |

| | |
|---|---|
| MISQ | In contrast, in FP projects the client needs to add some *bite* to its contracts to make sure the vendor delivers on time and of the quality specified. (Gefen, Wyss & Lichtenstein 2008, p. 539) |
| | Nye (1999) explains that U.K. local authorities are criticised for being inaccessible, unresponsive and essentially out of *touch* with citizen demands (Irani & Elliman 2008, p. 336) |
| | Given low barriers to entry in EM, there is a constant proliferation of sellers from around the world, their '*faceless*' presence warranted merely by a uniform resource locator (Datta & Chatterjee 2008, p. 17) |
| EJIS | The selection of such systems does not happen by chance. Instead, it requires *visions* of various possible futures (Newkirk, Lederer & Johnson 2008, p. 198) |
| | The proactive mode in which the organization explores or scans ... its environment, on the *lookout* for potential problems (Lesca & Caron-Fasan 2008, p. 372) |
| | Indeed, IT professionals and the organizations they work for must *embrace* failures as an opportunity for both individual and organizational learning (Kasi et al. 2008, p. 62) |

Paralleling the references made in Table 4.7, references to a broader indeterminate form or type of the organisation as an organism is made through references to readily recognisable organic relationships. For instance, Ashurst, Doherty and Peppard (2008) refer to the '*host* organization' of technology and Datta and Chatterjee (2008) refer to how consumers may feel as though they are '*prey*' to organisation's 'inaccurate representations' (p. 17). In *Management Information Systems Quarterly*, Ågerfalk and Fitzgerald (2008) continue the analogy of the *organisation-as-hunter* with the following references: 'users... are still vulnerable to '*poaching*' by competitors' (p. 176) and 'opensourcing provides ample opportunity for companies to *headhunt* top developers' (p. 385). While these references do point to a broader indeterminate form or type of the *organisation-as-organism* there are only three articles in the whole evidentiary set that contain such references.

In this phase of the analysis the *organisation-as-organism* form and type was general rather than specific. In comparison the forms and types associated with the *organisation-as-machine* metaphor were more specific. The indirect references to a more general organism type helped decrease the gap between the number of mechanistic forms and types and its own forms and types. Even when one takes this decrease into account there is still a considerable gap between those forms and types that were evidenced in relation to the *organisation-as-machine* metaphor and those associated with the *organisation-as-organism* metaphor. This was a common occurrence throughout the results and this chapter as well as the other results chapters produce similar occurrences.

#### Frequency and variety of organic discourse within articles

Overall reliance on the organism metaphor – as evidenced through the frequency and variety of organic discourse within and across articles – was limited. There are however, examples of articles that contain frequent and relatively varied organic discourse. Dibbern, Winkler and Heinzl (2008) – in their discussion of off-shored software project costs – are one of the better examples of how organic discourse occurs in many of the significant parts of the article: from initial problem conceptualisation, through to the results and discussion. Yet, what is evidenced in many articles – regardless of the strength of categorisation – is that organic discourse typically occurs only in the beginning and concluding parts of the paper: in the problem conceptualisation and conclusions sections respectively. Although articles categorised as dominant for the organism metaphor are more likely to show evidence of organic discourse in the background/theory sections (see Dibbern, Winkler & Heinzl 2008; Gefen, Wyss & Lichtenstein 2008; Pries-Heje & Baskerville 2008) organic discourse is still scarce in the method and results sections (where such sections are included) where mechanistic discourse tends to take over.

### 4.3.4. Organisation as culture

As shown in Table 4.8 the organisational culture metaphor was evident in approximately 79% of all articles that discussed the organisational concept. This metaphor was dominant in approximately 28% of all articles, secondary in approximately 25%, and occasional in approximately 26%. The accompanying graph – Figure 4.3 – provides a visual representation of the results presented in Table 4.8 by journal. As shown in the graph, articles appearing in the *European Journal of Information Systems* are more likely than those in *Information Systems Research* and *Management Information Systems Quarterly* to show evidence of the culture metaphor. Furthermore, significantly more articles were categorised as secondary

(41% of all articles published in the *European Journal of Information Systems*) for the culture metaphor and the vast majority of all the *European Journal of Information Systems* articles (94%) show at least some evidence of the culture metaphor.

A few instances of how organic discourse was evidenced across articles of each journal are provided in Table 4.9.

Table 4.8. *Results of* organisation-as-culture *metaphor in 2008 (sub-set of Table 4.2)*

| Source | Strength | Organisation | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Organism | Dominant | 9 *(45%) | 11 (38%) | 3 (20%) | 23 (28%) |
| | Secondary | 4 (20%) | 12 (41%) | 4 (27%) | 20 (25%) |
| | Occasional | 7 (35%) | 6 (21%) | 8 (53%) | 21 (26%) |
| Organism percentages | | ***20 (26%)*** | ***29 (26%)*** | ***15 (30%)*** | ***64 (79%)*** |

* Percentage shown is the percentage of papers for that particular journal.

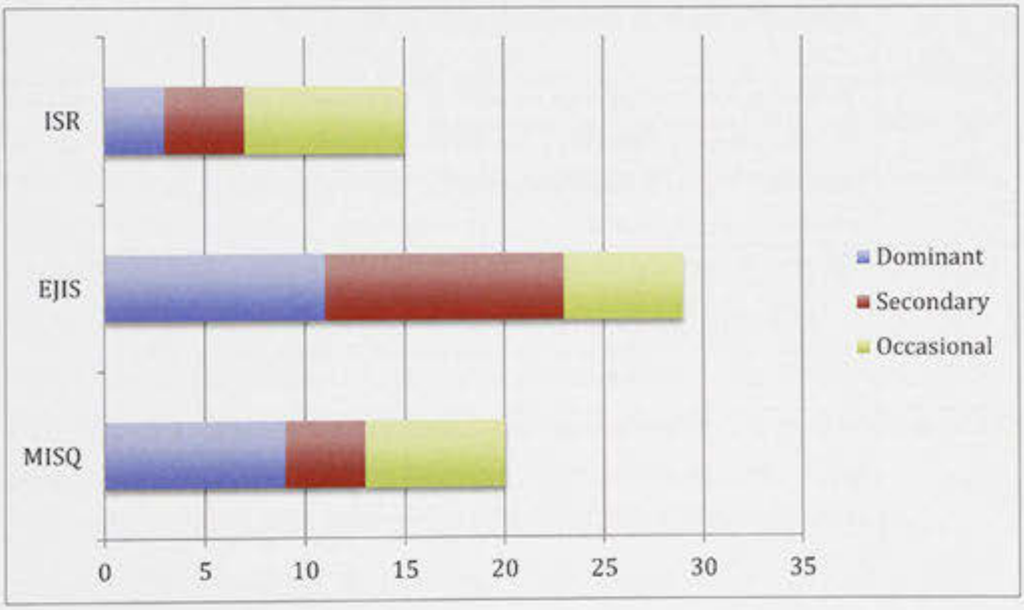


*Figure 4.3.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *organisation-as-culture* metaphor in 2008 (derived from *Table 4.8*)

Table 4.9. *Sample metaphor excerpts for* organisation-as-culture *metaphor from each journal in 2008*

| JOURNAL | ORGANISATION AS CULTURE EXCERPTS |
|---|---|
| ISR | Knowledge integration [of digitally enabled teams in organizations] is not a deterministic process of mechanically assembling discrete pieces of information but is instead a "*dance*" of communication and exchange (Robert, Dennis & Ahuja 2008, p. 316) |
| | Specifically, we illustrate the primary importance of a shared *macroculture* (*goals* and *norms*) and *collective* *sanctions* for *punishing* firms who *violate* these *goals/norms*. (Feller et al. 2008, p. 475) |
| | In addition, while we focus on a set of project-level variables that address risk in the offshoring domain, other factors such as *cultural* differences between client and vendor organizations could also influence vendor preferences over contracts. (Gopal & Sivaramakrishnan 2008, p. 218) |
| MISQ | *Culture* plays an increasingly important role in information systems initiatives, and it receives considerable attention form researchers who have studied a variety of aspects of its role in IS initiatives. (Kappos & Rivard 2008, p. 601) |
| | "Generally, commitment wasn't a problem. Both sites were of the same division in the same company. Both sites had the same *culture* - that was a help." (Direct Quote from Project Manager in Holmström Olsson et al. 2008, p. 267) |
| | This process [multiparty collaboration between firms] is facilitated by the existence of *shared* *identity* and *practices*... but is impeded by *status* differences among participants which inhibit open dialogue (Levina & Vaast 2008, p. 308) |
| EJIS | To cooperate effectively across boundaries requires organisations to overcome the tension between their distinct backgrounds and the need to create *shared* *understandings* with their partners for collaboration. (Gal, Lyytinen & Yoo 2008, p. 290) |
| | The proposed model seeks to serve as a process that threatens the *conservative* and *risk-averse* *culture* endemic in the public sector. (Irani & Elliman 2008, p. 336) |

| | |
|---|---|
| | Our research aims to address this potential gap in the IS and HIS literature through a proposed framework that can account for the existence of computer workarounds as *situated practices* (Orlikowski, 2000, 2002). Within this framework, we conceptualize such *practices* as being enabled via a distinct social dynamic characteristic of professionally oriented organizational environments, that is, a *negotiated order* (Azad & King 2008 p. 265) |

### Forms and types of organisations as culture

The *organisation-as-culture* metaphor was evidenced in a single form: the *dance*. This single cultural form is evidenced in Robert, Dennis and Ahuja (2008) provided in Table 4.9. Not only is this reference the only piece of evidence that refers to a specific cultural form it is an indirect rather than direct reference. Note here that *cultural forms* here are used in the same sense that Billington et al. (1991) uses them – to refer to such things as 'soap operas, …films, …music, and …sport' (p.119). What is more typical, are references to general forms of culture as shown in Table 4.9 e.g. Kappos and Rivard (2008). Yet, there are only four articles in total that refer to a specific or general cultural form.

Levels and dimensions of culture – in the sense that Hofstede (1991) uses them – are more commonly referenced in these results. In particular, articles reference *national* culture – a level of culture – and differences in *individualism/collectivism*, *haves/have-nots* and *developed/developing* – dimensions of culture. These levels and dimensions are particularly evident in the articles by: Dibbern, Winkler and Heinzl (2008); Leonardi and Bailey (2008); and Holmström Olsson et al. (2008) – all of which appear in *Management Information Systems Quarterly*'s special issue on off-shoring. Other articles such as Feller et al. (2008) refer to the *macroculture* that exists at a level above organisations. Articles such as these show that aspects of culture are important. They also add in their own way to the imagery of the *organisation-as-culture* metaphor. For the purposes of this thesis however, levels and dimensions of culture are different from a cultural form.

### Frequency and variety of cultural discourse within articles

Like the organism metaphor overall reliance on the culture metaphor – as evidenced through frequency and variety of discourse within and across articles – was limited. Again though, there are exceptions. Ågerfalk and Fitzgerald (2008), Holmström

Olsson et al. (2008) as well as Gefen, Wyss and Lichtenstein (2008) all rely quite heavily on cultural discourse in their articles. Dibbern, Winkler and Heinzl (2008), Leonardi and Bailey (2008), Holmström Olsson et al. (2008), and Feller et al. (2008) are notable for their discussion of different levels and dimensions of culture. As with the organism metaphor however, the relative lack of frequent and varied culture discourse occurs across articles as well as within articles. This in turn contributes to a weaker image of the *organisation-as-culture* metaphor in these results.

## 4.4 Technology

In this section results concerning the technology concept are presented. As shown in Table 4.10 – a sub-set of Table 4.1 – the skew toward the machine metaphor appears to be slightly more exaggerated with the technology concept than the organisational concept. In terms of saturation – the number of articles containing some evidence of the machine metaphor – both the organisation and technology concept are at 100%. Both the organisation and technology concept contain almost the same amount of articles that have been categorised as dominant for the machine metaphor (both are at around 58%). With the technology concept however, there is a distinct reduction in the number of articles that have been categorised as dominant for the organism and culture metaphors. Only around 8% of articles are categorised as dominant for the organism metaphor in relation to the technology concept as opposed to around 41% for the organisation concept. In relation to the technology concept, only slightly more articles – around 11% – were categorised as dominant for the culture metaphor. This is significantly less than the 28% for the organisation concept. This section provides further detail on these results. As with the organisation concept section – Section 0 – this section starts with an outline of how the technology concept was discussed in the articles before moving on to the results concerning each of the three root metaphors.

Table 4.10. *Results of metaphor analysis for technology in 2008*

| Source | Strength | Technology | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 14 *(16%)* | 16 *(19%)* | 14 *(16%)* | 44 *(52%)* |
| | Secondary | 13 *(15%)* | 13 *(15%)* | 11 *(13%)* | 37 *(44%)* |
| | Occasional | 0 *(0%)* | 4 *(5%)* | 0 *(0%)* | 4 *(5%)* |
| Machine percentages | | *27* *(32%)* | *33* *(39%)* | *25* *(29%)* | *85* *(100%)* |
| Organism | Dominant | 1 *(1%)* | 4 *(5%)* | 2 *(2%)* | 7 *(8%)* |
| | Secondary | 10 *(12%)* | 19 *(23%)* | 15 *(19%)* | 44 *(58%)* |
| | Occasional | 13 *(15%)* | 8 *(10%)* | 6 *(7%)* | 27 *(52%)* |
| Organism percentages | | *24* *(28%)* | *31* *(36%)* | *23* *(27%)* | *78* *(92%)* |
| Culture | Dominant | 3 *(11%)* | 6 *(14%)* | 0 *(4%)* | 9 *(11%)* |
| | Secondary | 5 *(5%)* | 12 *(15%)* | 3 *(5%)* | 20 *(24%)* |
| | Occasional | 4 *(9%)* | 7 *(7%)* | 5 *(10%)* | 16 *(19%)* |
| Culture percentages | | *12* *(14%)* | *25* *(29%)* | *8* *(9%)* | *45* *(53%)* |
| TOTAL CODED ARTICLES | | **27** | **33** | **25** | **85** |

Note: % shown is rounded to the nearest per cent

## 4.4.1. Discourse on technology

As shown in Table 4.10 evidence of a root metaphor in relation to the technology concept is slightly more common than with the organisational concept. It is however, rare for the concept to be the main focus of discussion. There are two notable exceptions to this: Storey et al.'s (2008) article published in *Information Systems Research* on a methodology and its prototype for context-aware query processing; and Adomavicius, Bockstedt and Gupta's (2008) article published in *Management Information Systems Quarterly* on technology trends in the IT landscape. Technology is more commonly discussed in terms of its various interactions with organisations and people. Of special concern is how technology shapes and is shaped by organisations and people. For example, the different ways in which technology enables organisations to conduct their business has resulted in many structural and functional changes in organisations (Du et al. 2008) but has also resulted in new risks for organisations that in turn result in changes in the technology (Wang, Chaudhury & Rao 2008a). Hence, while discussions of technology are slightly more common than the organisational concept, the focus is typically shared with either or both of the organisational and people concepts.

In the discussions of technology, evidence of the three root metaphors was found. This evidence will be presented in the following sections in order of most frequently to least frequently evidenced: machine (Section 4.4.2), organism (Section 4.4.3) and culture (Section 4.4.4).

### 4.4.2. Technology as machine

As shown in Table 4.11 around 52% of all articles that show evidence of a root metaphor in relation to the technology concept were categorised as dominant for the metaphor. It is secondary in around 43% and occasional in only 5% of those articles. The only significant difference that exists between the journals is that the *European Journal of Information Systems* is the only journal that is likely to contain occasional references to the machine metaphor when discussing the technology concept. A few instances of how mechanistic discourse was evidenced across the articles of each journal are provided in Table 4.12.

Table 4.11. *Results of* technology-as-machine *metaphor in 2008 (sub-set of Table 4.10)*

| Source | Strength | Technology | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 14 *(52%) | 16 (48%) | 14 (56%) | 44 (52%) |
| | Secondary | 13 (48%) | 13 (39%) | 11 (44%) | 37 (44%) |
| | Occasional | 0 (0%) | 4 (12%) | 0 (0%) | 4 (5%) |
| Machine percentages | | 27 (32%) | 33 (39%) | 25 (29%) | 85 (100%) |

* Percentage shown is the percentage of papers for that particular journal.

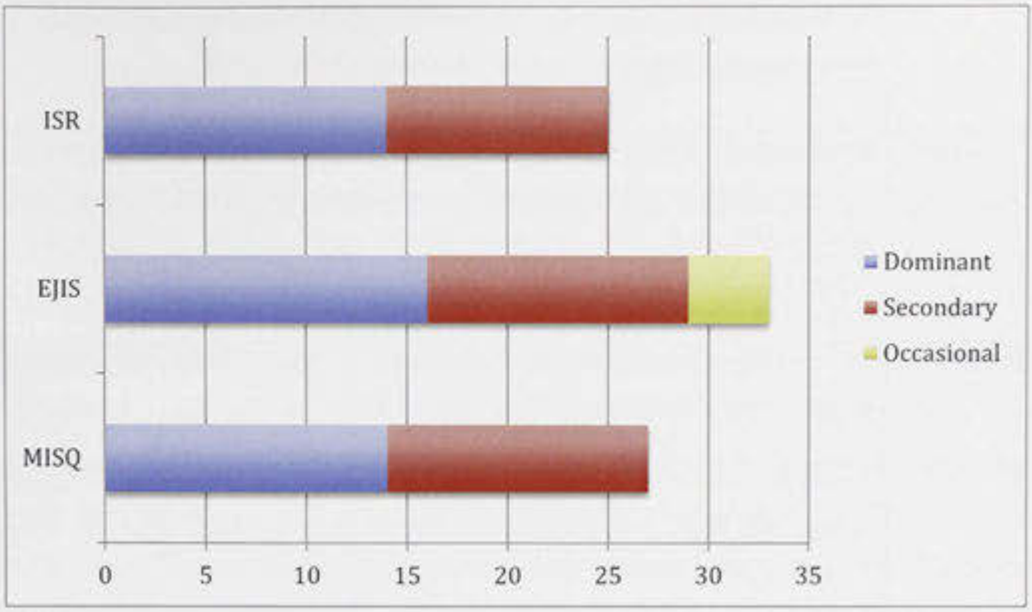


*Figure 4.4.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *technology-as-machine* metaphor in 2008 (derived from *Table 4.11*)

Table 4.12. *Sample metaphor excerpts for* technology-as-machine *metaphor from each journal in 2008*

| JOURNAL | TECHNOLOGY AS MACHINE EXCERPTS |
|---|---|
| ISR | A CPN is a network of SPs coordinated through an allocation hub. (Du et al. 2008, p. 144) |
| | A major impediment to accurate information retrieval from the World Wide Web is the inability of search engines to incorporate semantics in the search process (Storey et al. 2008, p. 3) |
| | Despite the growing research interest in Internet auctions, particularly those on eBay, little is known about quantifiable surplus levels in such mechanisms (Bapna, Jank & Shmueli 2008, p.400) |
| MISQ | But whereas communication technologies may serve as the transport mechanism for task products and storage technologies may serve as their repositories, transformational technologies provided the mechanisms for creating, viewing, modifying, and analyzing a large range of knowledge artifacts. (Leonardi & Bailey 2008, p. 412) |

| | |
|---|---|
| | For example, <u>components</u> of a software application development project form a knowledge supply <u>chain</u>. (Cha, Pingry & Thatcher 2008, p. 282) |
| | Pentland and Feldman (2007) argue that the *"<u>Lego-like</u>"* quality of modern information and communication technologies allows participants to <u>design</u> their own business processes (or at least significant aspects of those processes). (Lee, Wyner & Pentland 2008, p. 758) |
| EJIS | The solutions [enterprise integration] often take the form of connecting <u>stovepipe</u> legacy applications (Umapathy, Purao & Barton 2008, p. 518) |
| | To use the emerging technologies in their present work, the earth scientists needed '<u>grease</u> and <u>glue'</u> – small-scale, sometimes temporary, <u>fixes</u> along the way. (Weedman 2008, p. 482) |
| | These explanations close-box the [IS] change process and mask its <u>dynamics</u> and <u>generative</u> <u>mechanisms</u>. (Lyytinen & Newman 2008, p. 589) |

### Forms and types of technology as machine

The instances in Table 4.12 cover some of the many different forms and types in which the technological machine appears. Some of the other forms evidenced in the papers include: *levers* (Cenfetelli, Benbasat & Al-Natour 2008), 'decision system' *generators* (Pries-Heje & Baskerville 2008, p. 737) and even *radars* (Lesca & Caron-Fasan 2008). *Technology-as-tool* is one of the most frequently evidenced mechanistic forms. Examples include – but are not limited to – technology as a:

- 'productivity *tool'*, 'a real-time business and connectivity *tool'* (Robert, Dennis & Ahuja 2008, p. 317);
- '*tool* for getting the best price on a vehicle' (Kuruzovich et al. 2008, p. 196);
- 'powerful *tool* that can effectively manage and integrate huge amount of existing information' (Irani & Elliman 2008, p. 337).

Indirect references to forms and types of the technological machine include:

- technology as train e.g. systems are *rolled out* (Bartis & Mitev 2008, p. 118; Karrupan & Karrupan 2008, p. 29) and implementations are '*derailed*' (Cho, Mathiassen & Nilsson 2008, p.624);

- technology as some form of *mobile machine* e.g. something that can be '*launched*', '*piloted*' and '*steered*' (Bartis and Mitev 2008, p. 117).

Technologies as general types of machines are '*geared*' (Abbasi and Chen 2008, p. 814) and '*steered*' (Cho, Mathiassen & Nilsson 2008, p. 623) toward particular goals. Additionally, as with any machine, technologies are seen as becoming '*overloaded*' (Bartis & Mitev 2008, p. 118) and even '*break[ing] down*' (Cho, Mathiassen & Nilsson 2008, p. 623). When the organisational machine metaphor is apparent, technology is often viewed as one of the *mechanisms*, both general (Bampo et al. 2008) and more specific e.g. the 'filtering *mechanism*' (Irani & Elliman 2008, p. 340); *links* (Newkirk, Lederer & Johnson 2008, p. 201) and even '*stovepipes*' (Umapathy, Purao & Barton 2008, p. 518). While discussions on technology itself are more limited than organisations, the types and forms that the technological machine appeared in were not. Such appearances were critical in establishing rich and varied images of technology as a machine.

Further increasing the overall clarity of the technological machine metaphor was the focus on the physical structure of technology. This did not occur to the same extent with the conceptualisations of the organisation as machine. Technology is *designed* (Hinz & Spann 2008; Umapathy, Purao & Barton 2008) and *built*, it has associated '*blueprints*' (Smolander, Rossi & Purao 2008; Whitley & Hosein 2008), '*platforms*' (Santhanam, Sasidharan & Webster 2008, p. 27) and '*architectures*' (Smolander, Rossi & Purao 2008, p. 581).

### Frequency and variety of mechanistic discourse within articles

As highlighted in Table 4.12, when the technology concept was discussed in articles mechanistic discourse was more frequent than any other root metaphor discourse type. So much so many articles (eg. Olivera, Goodman & Tan 2008; Rustagi, King & Kirsch 2008; Bapna, Jank & Shmueli 2008; Lee, Wyner & Pentland 2008; Parsons & Wand 2008) relied solely on mechanistic discourse when discussing technology. Regardless of whether articles relied solely on the technological machine metaphor in their discussions, mechanistic discourse occurred in all significant parts of the papers: problem conceptualisation, theory, method, findings and conclusions.

### 4.4.3. Technology as organism

As shown previously in Table 4.10, the majority of articles – 92% – that contain evidence of a root metaphor contain some evidence of the *technology-as-organism* metaphor. As is highlighted in Table 4.13, however only around 8% of these articles were categorised as dominant for the organism metaphor. Most of the articles were categorised as secondary – around 52% – or occasional – around 32%. This skewing away from the dominant categorisation in all journals examined is particularly noticeable in Figure 4.5. Note that while *Management Information Systems Quarterly* contains the largest relative number of articles categorised as occasional for the *technology-as-organism* metaphor all three journals have relatively few articles categorised as dominant for this metaphor.

A few instances of how organic discourse was evidenced for technology across the articles of each journal are provided in Table 4.8.

Table 4.13. *Results of* technology-as-organism *metaphor in 2008 (sub-set of* Table 4.10*)*

| Source | Strength | Organisation | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Organism | Dominant | 1 *(52%) | 4 (48%) | 2 (56%) | 7 (8%) |
| | Secondary | 10 (48%) | 19 (39%) | 15 (44%) | 44 (52%) |
| | Occasional | 13 (0%) | 8 (12%) | 6 (0%) | 27 (32%) |
| Organism percentages | | 24 (28%) | 31 (36%) | 23 (27%) | 78 (92%) |

* Percentage shown is the percentage of papers for that particular journal.

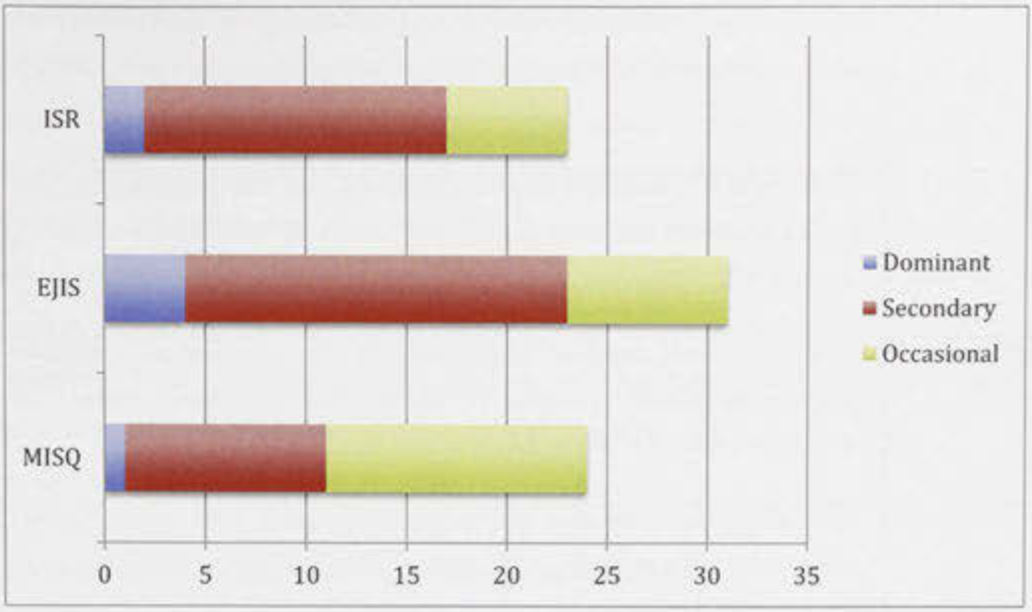


*Figure 4.5.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *technology-as-organism* metaphor in 2008 (derived from *Table 4.13*)

Table 4.14. *Sample metaphor excerpts for* technology-as-organism *metaphor from each journal in 2008*

| JOURNAL | ORGANISM METAPHOR EXCERPTS FOR TECHNOLOGY |
|---|---|
| ISR | The *growth* of the Internet has *spawned* an increasing number of online information sources (OISs). (Kuruzovich et al. 2008, p. 182) |
| | The viral process can be broadly modelled in terms of three components: the social structure of the digital network through which the message is *propagated*, the behavioral characteristics of its members that facilitate the *propagation* of the message, and a *seeding* strategy that initiates the process. (Bampo et al. 2008, p. 274) |
| | On the one hand, opponents of the decision point out that such a restriction would significantly compromise the security of the network by creating a large *population* of "unpatched *hosts*" on the Internet, which are susceptible to "*infection*" and can spread malicious code such as *worms* and *viruses*. (August & Tunca 2008, p. 49) |
| MISQ | We address this problem by defining a new set of constructs and methodologies upon which we develop an IT *ecosystem* model. (Adomavicius, Bockstedt & Gupta 2008, p. 779) |

| | |
|---|---|
| | This effort was reported separately from the other software *lifecycle* activities because it was not billable to the customer accounts. (Ramasubbu et al. 2008, p. 445) |
| | A firm that fails to realize the costs associated with such a disruption soon enough in the project *life* may find itself locked into a disadvantageous offshoring agreement without any recourse. (Cha, Pingry & Thatcher 2008, p. 281) |
| EJIS | While *post mortem* evaluation (PME) has long been advocated as a means of improving development practices by learning from IT project failures, few organizations conduct PMEs. (Kasi et al. 2008, p. 62) |
| | Philosophically this view dates back to Hegel's dialectics, which recognized that systems *evolve* through stages, which follow alternative behavioral laws (Lyytinen & Newman 2008, p. 593) |
| | To illustrate her feelings about the project: 'now I could describe it, they sold me a project like a little *ladybird* which later turned in to a huge *hundred-armed monster*.' (Bartis & Mitev 2008, p. 120) |

## Forms and types of technologies as organisms

The *technology-as-organism* metaphor appears in five specific forms: *worms*, *viruses*, *ladybirds*, *bugs* and *weeds*. The first three forms appear in Table 4.14. August and Tunca (2008) make use of the *technology-as-worm* and *technology-as-virus* metaphors. Bartis and Mitev (2008) quote from an informant that makes use of the *technology-as-ladybird* metaphor. Note the informant also makes use of the *technology-as-monster* metaphor, which references a mythical organic entity. It is an interesting quote, which adds in a certain way to the *technology-as-organism* metaphor. The *technology-as-monster* metaphor however, is not recognised here as a specific organic form. The final two organic forms, *bugs* and *weeds*, are not included in Table 4.14. The *technology-as-bugs* metaphor appears in two articles – that of Dabbish and Kraut (2008) and Gefen and Carmel (2008) – who refer to faulty code as *bugs*. The *technology-as-weeds* metaphor appears in the single article by Irani and Elliman (2008) who refer to unattractive IT projects as *weeds*.

As was evident in the organisation concept, the organic forms and types associated with the technology concept are considerably less than that associated with the mechanistic forms and types. This gap is not mitigated to the same extent as it was with the organisation concept for two reasons. Firstly there are few references to the same anatomy and sense aspects of the organism. Some noticeable exceptions include Bartis and Mitev's (2008) reference to technology as a hundred-*armed* monster and Bampo et al's (2008) reference to technology as having a *seeding* strategy. Secondly, clearly recognisable organic relationships are evident with the technology concept – such as August and Tunca's (2008) reference in Table 4.14 to the *technology-as-host* metaphor. These references however, do little to mitigate the gap between the number of forms and types evidenced with the machine metaphor and that, which is evidenced with the organism metaphor.

### Frequency and variety of organic discourse within articles

As shown in Table 4.10 organic discourse was evident in a large number of articles (around 92%) that discussed technology. There were few instances (around 4%) however, where such discussions contained frequent and relatively varied organic discourse. These instances were Adomavicius, Bockstedt and Gupta (2008) in *Management Information Systems Quarterly*, Bampo et al. (2008) in *Information Systems Research* and Aaen (2008) in the *European Journal of Information Systems*. The Adomavicius, Bockstedt and Gupta (2008) paper, which concentrates on the development of an IT *ecosystems* model, is particularly rich in organic discourse throughout. Yet, even in these three articles mechanistic discourse was still a significant part of discussions on technology.

## 4.4.4. Technology as culture

As shown in Table 4.10 previously, the *technology-as-culture* metaphor is the least evidenced of all root metaphors for the technology concept. As is highlighted in Table 4.15 however, the proportion of articles in the different categories are not as heavily skewed as that evidenced with the organisation concept. As is shown in Figure 4.6, the *European Journal of Information Systems* not only has the most articles showing any evidence of the *technology-as-culture* metaphor, it is also the journal that highlights this even distribution between the categories. The North American journals – *Management Information Systems Quarterly* and *Information Systems Research* – have the fewest total articles showing evidence of the *technology-as-culture* metaphor; *Information Systems Research* has no articles at all, which are categorised as dominant for this metaphor.

A few instances of cultural discourse used in discussions of technology are provided in Table 4.16.

Table 4.15. *Results of technology-as-culture metaphor in 2008 (sub-set of* Table 4.10*)*

| **Source** | **Strength** | **Organisation** | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Culture | Dominant | 3 **(25%)* | 6 *(24%)* | 0 *(0%)* | 9 *(11%)* |
| | Secondary | 5 *(42%)* | 12 *(48%)* | 3 *(38%)* | 20 *(24%)* |
| | Occasional | 4 *(33%)* | 7 *(28%)* | 5 *(63%)* | 16 *(19%)* |
| Culture percentages | | *12 (14%)* | *25 (29%)* | *8 (9%)* | *45 (53%)* |

* Percentage shown is the percentage of papers for that particular journal.

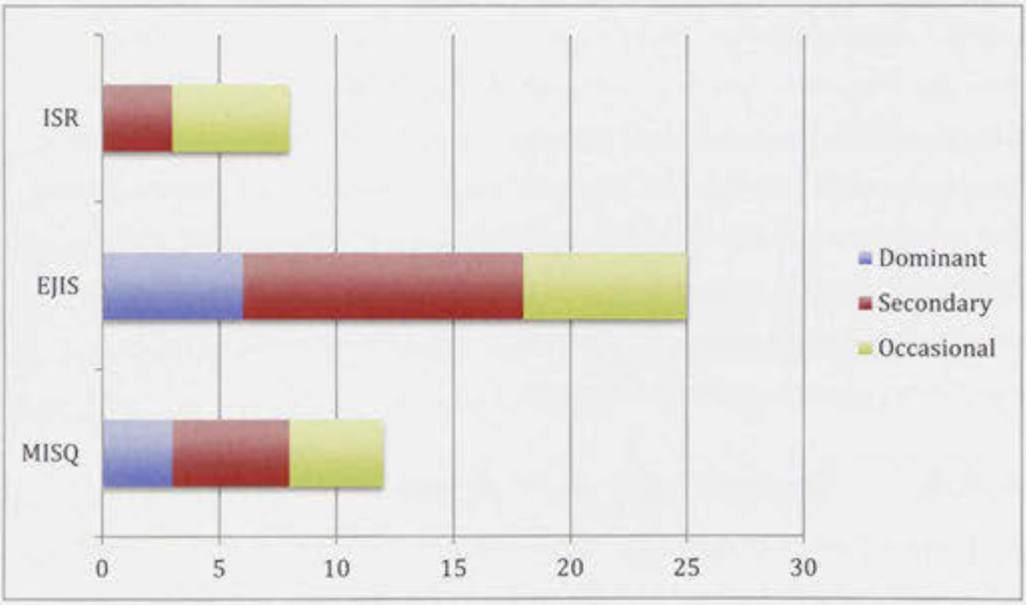


*Figure 4.6.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *technology-as-culture* metaphor in 2008 (derived from *Table 4.15*)

Table 4.16. *Sample metaphor excerpts for* technology-as-culture *metaphor from each journal in 2008*

| JOURNAL | CULTURE METAPHOR EXCERPTS FOR TECHNOLOGY |
|---|---|
| ISR | Digitally enabled teams are often composed of members from diverse *cultural* background: Will the use of digital networks help or retard the development of cognitive capital within these teams? (Robert, Dennis & Ahuja 2008, p. 330) |
| | The network's *macroculture* is typical of values associated with OSS communities; the involvement of users (customers) as equal partners, the visibility of actions, etc. (Feller et al. 2008, p. 484) |
| | Users pick valuable system features (called user *stories*) that describe the path through the system. (Dawande et al. 2008, p. 72) |
| MISQ | The implicit knowledge embodied by transformational technologies is helpful because *artifacts* are often created, viewed, and manipulated within these technologies absent clear documentation of how they were created, what assumptions they reflect, or their individual use. (Leonardi & Bailey 2008, p. 414) |
| | These CMC [Computer Mediated Communication] modes have changed the fabric of organizational *culture* and interaction. (Abbasi & Chen 2008, p. 811) |
| | The findings are (1) *culture* influences the development process; (2) *culture* moderates the relationship between the characteristics of the IS and acceptance and resistance; (4) *culture* moderates the relationship between the characteristics of the IS and use processes; and (5) IS use influences *culture*. (Kappos & Rivard 2008, p. 620) |
| EJIS | On the one hand, the development of information infrastructures involves multiple narratives and groups struggling to shape the standards and classification systems embedded in the infrastructure to reflect their *values* and *interests* (Gal, Lyytinen & Yoo 2008, p. 291) |
| | They therefore miss the *drama* that characterizes most IS change processes, which Drummond (1996a) referred to vividly as '*Mad Hatter's Parties*' and where a success turns into a failure overnight. (Lyytinen & Newman 2008, p. 589) |

| | |
|---|---|
| | The conflict gave rise to ... existing IS planning processes that we identified as a form of institutional *ritual* that kept the main focus on the primary boundary, privileging the concerns around internationalization and frustrating attempts to wide participation to poorer sections of the community. (Cordoba & Midgley 2008, p. 136) |

### Forms and types of technology as culture

There is a single specific form evidenced for the *technology-as-culture* metaphor: the *cultural artefact*. Note that the use of the term *artefact* alone is not enough to qualify an article as showing evidence of this specific form. Many articles use the term artefact simply as a synonym for a thing. For instance, Parsons and Wand (2008) refer to the Information Systems artefact. There are however, no cultural overtones in their usage. It simply refers to the information system as a 'thing'. This usage is indeed quite common. For the purposes of this thesis an article qualifies as showing evidence of the cultural artefact as a specific form if there are clear cultural overtones. There are only two examples of where such clear and obvious usage occurs: Boonstra, Boddy and Bell (2008) and Bartis and Mitev (2008). Both these articles refer to the *technology as cultural artefact* reflecting or having embedded in it certain *meanings*, *interests* and *taken-for-granted assumptions*.

### Frequency and variety of cultural discourse within articles

Overall reliance on the culture metaphor – as evidenced through the frequent and varied use of associated discourse within and across articles – was extremely limited. As highlighted in Table 4.15, only nine articles have been categorised as being dominant for the culture metaphor. This is however, a relative measure that takes into account how much the concept itself was discussed. In these nine articles the technology concept is simply not discussed enough to state that the cultural discourse is frequent in terms of the article as a whole. The two articles that come closest to this both appear in the *European Journal of Information Systems*. These are the articles listed previously by Boonstra, Boddy and Bell (2008) and Bartis and Mitev (2008). Both these articles contain the only evidence of the technology as cultural artefact metaphor. Nevertheless, discourse around this metaphor – as well as other cultural discourse relating to the technology concept – in these articles is on the whole far more infrequent than that which is evidenced with the machine metaphor. This is again, mainly due to the focus of the papers being shared between the technology concept, the people concept and the organisational concept. Hence discourse on technology as a whole is diluted and there is simply less opportunity to have frequent cultural discourse in relation to the same concept. This same issue concerning infrequent cultural discourse also helps explain the lack of varied cultural discourse evidenced within and across articles.

## 4.5 People

In this section the results concerning people – the last of three concepts examined in this study – will be expanded upon. Table 4.17 is a subset of Table 4.1 limited to the results relating to the people concept. As is shown in Table 4.1 the people concept is the most likely concept to show evidence of a root metaphor. Eighty-six articles in total show some evidence of the machine, organism or culture metaphors. This is one more article than the technology concept (85 articles) and five more articles than the organisation concept (81 articles). As with the organisation and technology concepts the machine metaphor is again the most salient metaphor. There is also a greater percentage of articles (58%) that are categorised as dominant for this metaphor in relation to the people concept than for the organism (51%) or culture (36%) metaphors. It should be noted however that the skew toward the machine metaphor is not as acute with the people concept as it was with the organisation and technology concepts. There are other reasons though, which will become clearer in the remaining sections, that ensure the machine metaphor is the leading metaphor for conceptualising people in these results. This section now moves on to outline how the people concept was discussed and to examine in further detail the results for each of the three metaphors.

Table 4.17. *Results of metaphor analysis for people in 2008*

| Source | Strength | People | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 17 *(20%)* | 15 *(17%)* | 18 *(21%)* | 50 *(58%)* |
| | Secondary | 10 *(12%)* | 14 *(16%)* | 5 *(6%)* | 29 *(34%)* |
| | Occasional | 1 *(1%)* | 4 *(5%)* | 2 *(2%)* | 7 *(8%)* |
| Machine percentages | | *28 (33%)* | *33 (38%)* | *25 (29%)* | *86 (100%)* |
| Organism | Dominant | 14 *(16%)* | 14 *(16%)* | 16 *(19%)* | 44 *(51%)* |
| | Secondary | 12 *(14%)* | 16 *(19%)* | 8 *(9%)* | 36 *(42%)* |
| | Occasional | 1 *(1%)* | 0 *(0%)* | 1 *(1%)* | 2 *(2%)* |
| Organism percentages | | *27 (31%)* | *30 (35%)* | *25 (29%)* | *82 (95%)* |
| Culture | Dominant | 9 *(10%)* | 16 *(19%)* | 6 *(7%)* | 31 *(36%)* |
| | Secondary | 6 *(7%)* | 9 *(10%)* | 4 *(5%)* | 19 *(22%)* |
| | Occasional | 10 *(12%)* | 5 *(6%)* | 13 *(15%)* | 28 *(33%)* |
| Culture percentages | | *25 (29%)* | *29 (33%)* | *23 (27%)* | *78 (91%)* |
| TOTAL CODED ARTICLES | | **28** | **33** | **25** | **86** |

Note: % shown is rounded to the nearest per cent

## 4.5.1. Discourse on people

The people concept was the most popular of all concepts discussed in the articles of *Management Information Systems Quarterly*, the *European Journal of Information Systems* and *Information Systems Research*. Approximately 40% of all articles that showed some evidence of a root metaphor had a very strong or almost exclusive focus on the people concept. These included articles such as Deveraj, Easley and Crant's (2008) research note *How Does Personality Matter? Relating the Five-Factor Model to Technology Acceptance and Use* published in *Information Systems Research* and Karrupan and Karrupan's (2008) article the *Resilience of super users' mental models of enterprise-wide systems* in the *European Journal of Information Systems*. Both in these articles and the remaining 45% (approximately) of articles, which were not so heavily focused on the people concept there is a particular interest in the nexus between people and technology in an organisational context. Many times this is on how each concept – people, technology and organisations – impacts on the other. For example, issues such as how information systems are developed (Dawande et al. 2008), used (Leonardi & Bailey 2008) and misused (August & Tunca 2008) within and across organisations are addressed.

As with previous concepts, in discussions of the people concept evidence associated with all three root metaphors was found. As with previous concepts, the following sections will present this evidence in order of most frequently evidenced to least frequently evidenced. Again, the order is the same: machine, organism and culture.

## 4.5.2. People as machines

As shown in Table 4.18 all articles that showed evidence of a root metaphor showed evidence of the machine metaphor. Furthermore, more than half – approximately 58% – were categorised as dominant for the *people-as-machine* metaphor. As is highlighted in Figure 4.7 *Information Systems Research* contains the highest percentage (72%) of articles that are categorised as dominant for the machine metaphor. The *European Journal of Information Systems* contains the smallest percentage – approximately 45% – of articles categorised in this way. Yet, even in the *European Journal of Information Systems* the percentage of articles categorised as dominant still exceeds the percentage that are categorised as secondary (42%) and occasional (12%).

Excerpts showing how mechanistic discourse was evidenced in relation to the people concept across the articles of each journal are provided in Table 4.19.

Table 4.18. *Results of* people-as-machine *metaphor in 2008 (sub-set of* Table 4.17*)*

| **Source** | **Strength** | **Technology** | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 17 *(61%) | 15 (45%) | 18 (72%) | 50 (58%) |
| | Secondary | 10 (36%) | 14 (42%) | 5 (20%) | 29 (34%) |
| | Occasional | 1 (4%) | 4 (12%) | 2 (8%) | 7 (8%) |
| Machine percentages | | 28 (33%) | 33 (38%) | 25 (29%) | 86 (100%) |

* Percentage shown is the percentage of papers for that particular journal.

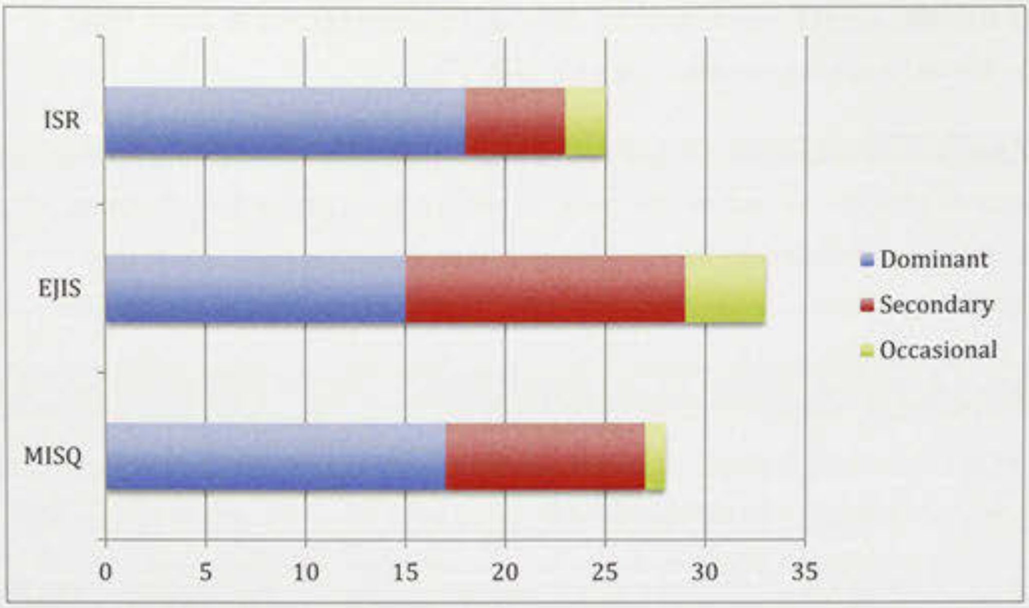


*Figure 4.7.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *people-as-machine* metaphor in 2008 (derived from Table 4.18)

Table 4.19. *Sample metaphor excerpts for* people-as-machine *metaphor from each journal in 2008*

| JOURNAL | MACHINE METAPHOR EXCERPTS FOR PEOPLE |
|---|---|
| ISR | We conclude that a display with an abstract representation of a collaborator's workload is optimal; it leads to better timing of interruptions without overwhelming the person viewing the display (Dabbish & Kraut 2008, p .221) |
| | This has resulted in communication and information overload - individuals are exposed to more information than they can efficiently handle and effectively use (Ragu-Nathan et al. 2008, p. 421) |
| | However, a net higher development effort associated with pair development (referred to here as the pair development overhead) has been consistently observed in experimental studies. (Dawande et al. 2008, p. 75) |
| MISQ | This research also seeks to explicate the mechanisms by which behavioral expectation influences different conceptualizations of use, which we will argue and demonstrate differ from how and why behavioral intention drives system use (Venkatesh et al. 2008, p. 485) |

| | |
|---|---|
| | We develop a model of contribution behaviors that delineates three mediating mechanisms: (1) awareness; (2) searching and matching; and (3) formulation and deliver. (Olivera, Goodman & Tan 2008, p. 23) |
| | A byproduct of these demands may be increased levels of exhaustion and burnout (Moore 2000a). Work exhaustion, defined as the depletion of one's emotional, mental, and physical resources (Moore 2000a), often leads IT professionals to such outcomes as reduced job satisfaction (Burke and Greenglass 1995), employee withdrawal (Deery et al. 2002), and increased turnover (Moore 2000a). (Rutner, Hardgrave & McKnight 2008, p. 636) |
| EJIS | Ausubel (1968) suggested the use of appropriate external aids or conceptual models of the target system (Mayer, 1983) to lay the foundation for knowledge construction. (Karuppan & Karuppan 2008, p. 32) |
| | An individual mental model is an information processing mechanism that helps describe, explain, and forecast our environments (Yang, Kang & Mason 2008, p. 48) |
| | ANT is viewed as a guide to study how things, people, and ideas become connected and assembled in larger units. (Cho, Mathiassen & Nilsson 2008, p. 616) |

### Forms and types of people as machines

From the instances presented in Table 4.19 it is clear that people are described in generally mechanistic terms and also talked about as particular forms of machines. For instance, individuals are termed 'ideas *generators'* (Irani & Elliman 2008, p. 338) and teams are referred to as '*pump[s]*' for *outputting* software (Weedman 2008, p. 483). People also act as *links* in the *gears* of the organisation (Chu & Robey 2008) as well as being *part* of its knowledge supply *chain* (Cho, Mathiassen & Nilsson 2008). Yet, as with the organisational concept, the most commonly evidenced form and component of the *people-as-machine* metaphor is the *mechanism*.

As shown in the samples of Table 4.19, mechanisms range from information processing in individuals to mechanisms that explain use and contribution behaviours. Other types of mechanisms evidenced include feedback *mechanisms* in communication (Moon & Sproull 2008), needs/fulfilment *mechanisms* (Kuruzovich et al. 2008) and team/group formation *mechanisms* (Hahn, Moon & Zhang 2008). Regardless of whether people are seen as machines in their own right or whether they are simply a *part* of the larger organisational machinery, they are evidenced in a wide variety of forms and types.

**Frequency and variety of mechanistic discourse within articles**

On the whole, mechanistic discourse surrounding people is frequent and varied. An interesting example of frequency within an article is Dabbish and Kraut's (2008) article on awareness displays and social motivation for coordinating communication. While this particular article relies on both organic and cultural discourse when discussing people, mechanistic discourse is more frequent and more varied in the article. For example, particular stress is placed on the 'collaborator's *workload'* and finding an '*optimal'* awareness display. Moreover, collaborators interruptions are '*timed'* better, which leads to better performance, since, as they state: 'we may be able to *optimize* human decision-makers' (p. 224) by doing so. Much like one optimises an engine through perfecting it's timing, so too can people be optimised within the organisation. Articles that display such frequent and varied mechanistic discourse are common.

## 4.5.3. People as organism

As already highlighted previously, the *people-as-organism* metaphor was the only metaphor that came close to matching the machine metaphor's salience in these results. As shown in Table 4.20 there was also a significant percentage (51%) of articles categorised as dominant for the *people-as-organism* metaphor. This is higher than any other concept. Figure 4.8 shows that *Information Systems Research* is the most likely to contain articles that are in the dominant category. Furthermore, while *Information Systems Research* and *Management Information Systems Quarterly* contain some articles that are in the occasional category – where organic discourse is evidenced only one or two times – the *European Journal of Information Systems* contains none. Articles in the *European Journal of Information Systems* are either in the dominant or secondary categories.

A few examples of how the *people-as-organism* metaphor manifested itself in the journals is provided in Table 4.21.

Table 4.20. *Results of* people-as-organism *metaphor in 2008 (sub-set of Table 4.17)*

| Source | Strength | People | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Organism | Dominant | 14 *(52%) | 14 (47%) | 16 (64%) | 44 (51%) |
| | Secondary | 12 (44%) | 16 (53%) | 8 (32%) | 36 (42%) |
| | Occasional | 1 (4%) | 0 (0%) | 1 (4%) | 2 (2%) |
| Organism percentages | | 27 (31%) | 30 (35%) | 25 (29%) | 82 (95%) |

* Percentage shown is the percentage of papers for that particular journal.

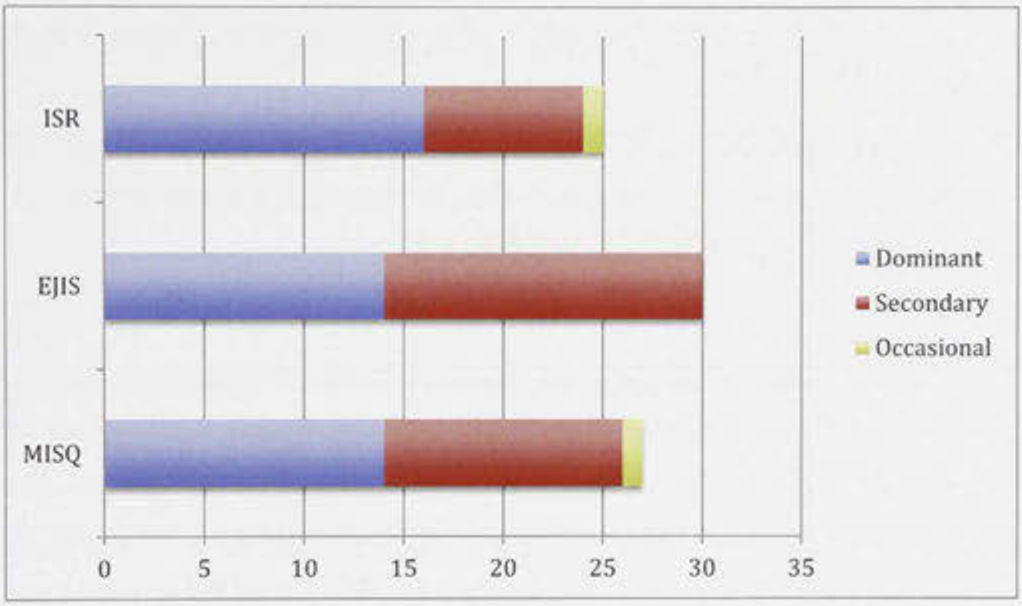


*Figure 4.8.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *people-as-organism* metaphor (derived from Table 4.20)

Table 4.21. *Sample metaphor excerpts for* people-as-organism *metaphor from each journal in 2008*

| JOURNAL | ORGANISM METAPHOR EXCERPTS FOR PEOPLE |
|---|---|
| ISR | Employees must constantly *adapt* to new applications, functionalities, and workflows. (Ragu-Nathan 2008, p. 417) |
| | Further, the retrieval of price versus product information online has important implications for whether consumers *consummate* their online search through |

| | |
|---|---|
| | referred purchase or extend their search into the physical marketplace. (Kuruzovich et al. 2008, p. 182) |
| | The observation that people tend to follow the decisions of others has been extensively discussed in the *herding* literature, which has attributed this behavior to network externalities (Katz and Shapiro 1985), social sanctioning of deviants (Akerlof 1980), and *taste* for conformity (Becker 1991) (Li & Hitt 2008, p. 458) |
| MISQ | More recently, Kock's (2004) *psychobiological* model, based on Darwin's theory of *evolution*, argues that humans have *evolved* to favor face-to-face communication, and the lower the "*naturalness*" of a medium (i.e., colocation, synchronous communication, facial cues, body language, and especially spoken words), the greater the cognitive effort required to use it. (Dennis, Fuller & Valacich 2008, p. 578) |
| | In addition, emotional *contagion* theory suggests that individuals will tend to mimic one another's affective displays, thereby influencing partners' felt emotions (Rutner, Hardgrave & McKnight 2008, p. 637) |
| | The attention paid to these two types of IT has revealed problems of knowledge transfer that *plague* individuals working across time and space. (Leonardi & Bailey 2008, p. 412) |
| EJIS | A '*trauma*' provoked by the failure of a previous project (factor 11) This occurs when some of the stakeholders were at some time involved in other projects that failed. The memory of this failure can *stimulate* fears and frustrations likely to influence stakeholders attitude toward the new project (factor 11). (Lesca & Caron-Fasan 2008, p. 381) |
| | These processes [cognitive] result in responses [from people] that are either *adaptive* or not *adaptive*. (Junglas, Johnson & Spitzmuller 2008, p. 390) |
| | Consistent with Catharsis theory (Bushman 2002), an individual can become angry and *behave aggressively* toward aspects of the negotiation context (Johnson, Cooper & Chin 2008, p. 422) |

It is important to note here that it is not always clear when an organisation or a person is being discussed. That is, at times a placeholder name such as 'client', which can mean either an organisation or a person, is used. Hence, many of the forms and types introduced in the earlier section on the organisation as an organism might also be included in the conceptualisation of people.

## Forms and types of people as organisms

The *people-as-organism* metaphor only appeared in two specific forms: *bees* and *guinea-pigs*. Levina and Vaast (2008) refer to offshore participants as 'low quality *worker-bees*' (p. 316) and in Weedman (2008) participants act as '*guinea-pigs*' (p. 483). These two specific forms create rich images of the *people-as-organism* metaphor yet they are not nearly numerous enough to compete with the number of mechanistic forms and types.

As evidenced with the organisation concept, references to a broader indeterminate form and/or type can mitigate the gap between the number of mechanistic forms and types and the number of organic forms and types. These are references to anatomy and sense aspects of the organism as well as clearly organic relationships. Certainly in relation to the people concept – as with the organisation and technology concepts – there is evidence of both.

There are four clearly metaphorical references to anatomy and sense aspects of organisms: *brains*, *shoulders, gut* and *taste*. Vlaar, van Fenema and Tiwari (2008) suggest that people as 'individuals may hold a single thought and form a single *brain'* (p. 232), in Rutner, Hardgrave and McKnight (2008) IT professionals '*shoulder* a heavy load' (p. 635) and in Karuppan and Karuppan (2008) people act on '*gut' feelings* (p. 33). Li and Hitt (2008) in Table 4.21 refer to peoples '*taste'* for conformity. In terms of clearly organic relationships Li and Hitt (2008) in Table 4.21 also refer (indirectly through other researchers) to people *herding*. Bampo et al. (2008) refer to the process of passing promotional messages between people '*viral* marketing' (p. 273).

Again, as was noted with the organisation and technology concepts, these types of references add considerably to the imagery of the *people-as-organism* metaphor. Yet, these references do little to close the gap on the sheer number of mechanistic forms and types associated with the people concept and the number of organic forms and types associated with the same concept.

### Frequency and variety of organic discourse within articles

As shown in Table 4.17 a significant number of articles (51%) were categorised as dominant for the organism metaphor in relation to the people concept. This was significantly more than any other concept. The organisation concept had around 41% and the technology concept around 8%. Additionally, the people concept had the most frequent and varied usage of organic discourse within articles. There are many good examples of such usage but some of the better ones are: Venkatesh et al. (2008); Olivera, Goodman and Tan (2008); and Rutner, Hardgrave and McKnight (2008) – all appearing in *Management Information Systems Quarterly*; Ragu-Nathan et al. (2008) in *Information Systems Research*; and Karuppan and Karuppan (2008) and Johnson, Cooper and Chin (2008) and Junglas, Johnson and Spitzmuller (2008) – appearing in the *European Journal of Information Systems*.

As was evidenced with the organisation and technology concept, even in the articles above which are some of the best examples of frequent and varied organic discourse, mechanistic discourse is always present. Furthermore, organic discourse is not typically found with the same frequency in all parts of the paper. As noticed with other concepts, organic discourse occurs mostly at the beginning and end of a paper: in the initial introduction of the problem and in the final conclusion. Furthermore, even in those articles that were categorised as dominant for the organism metaphor there is still a general lack of variation in discourse found across articles as was reflected within articles. Where articles do discuss a certain form or type of people as organisms multiple references to more than one form or type are not made.

## 4.5.4. People as cultural beings

As already highlighted in Table 4.17 the *people-as-culture* metaphor was evidenced in around 91% of articles that contained any evidence of a root metaphor. This was the highest saturation percentage for the culture metaphor in relation to all concepts. Furthermore, as is also shown in Table 4.22, 36% of all articles that showed some evidence of a root metaphor in relation to people were categorised as dominant for the *people-as-culture* metaphor. Again, this was the highest strength categorisation percentage for the culture metaphor in relation to all concepts. As can be seen in Figure 4.9 however, this skew in the results is largely attributed to the significant number of articles categorised as dominant in the *European Journal of Information*

*Systems*. Where *Information Systems Research* and *Management Information Systems Quarterly* certainly have articles categorised as dominant for the *people-as-culture* metaphor, these two journals have more articles (combined) in the secondary and occasional categories.

Table 4.23 provides some samples of the *people-as-culture* metaphor as they appear in the articles of *Management Information Systems Quarterly*, the *European Journal of Information Systems* and *Information Systems Research*.

Table 4.22. *Results of* people-as-culture *metaphor in 2008 (sub-set of* Table 4.17*)*

| **Source** | **Strength** | **People** | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 9 *(36%) | 16 (55%) | 6 (26%) | 31 (36%) |
| | Secondary | 6 (24%) | 9 (31%) | 4 (17%) | 19 (22%) |
| | Occasional | 10 (40%) | 5 (17%) | 13 (57%) | 28 (33%) |
| Machine percentages | | 25 (29%) | 29 (34%) | 23 (27%) | 78 (91%) |

* Percentage shown is the percentage of papers for that particular journal.

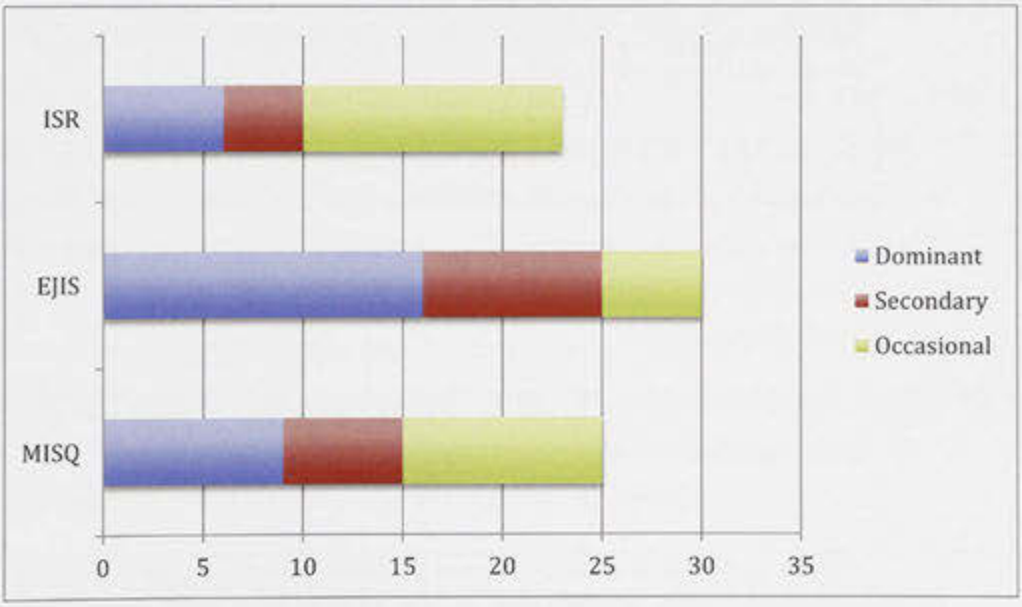


Figure 4.9. *Categorisation strength of articles appearing in* Information Systems Research, *the* European Journal of Information Systems *and* Management Information Systems Quarterly *showing evidence of the* people-as-culture *metaphor in 2008 (derived from Table 4.22)*

Table 4.23. *Sample metaphor excerpts for the* people-as-culture *metaphor from each journal in 2008*

| JOURNAL | CULTURE METAPHOR EXCERPTS FOR PEOPLE |
|---|---|
| ISR | Offering volunteers *meaningful* work opportunities may increase their *loyalty* and *commitment* to the organization (Moon & Sproull 2008, p. 495) |
| | OSSNs are, thus, particularly noteworthy as commercial business networks in that they are shaped by the *informal* *ethos* and operational style of the OSS communities from which they originated, and with which they continue to interact. (Feller et al. 2008, p. 476) |
| | In summary, the more team members *identify* with the team, *trust* the team, perceive an *obligation* to the team, and are willing to abide by the team *norms*, the more they will share information. (Robert, Dennis & Ahuja 2008, p. 320) |
| MISQ | This group is differentiated from the previous two by its underlying assumptions that there are shared *norms* and a *harmony* of *interests* between parties that go beyond the formal contract. (Holmström Olsson et al. 2008, p. 259) |
| | Throughout the cases, the team members perceived obvious differences in the German and Indian working *culture*. (Dibbern, Winkler & Heinzl 2008, p. 355) |
| | Cramton and Hinds (2005, p.236), for example, argue that differences in demographic attributes and individual backgrounds may result in people having different *worldviews*, values, *beliefs*, goal priorities and behavioral *norms*, and being accorded different amounts of *power* and *status*. (Vlaar, van Fenema & Tiwari 2008, p. 230) |
| EJIS | Participatory Design, ..., focuses on an *emancipatory* element that is guided by conflicts and concerns as perceived by the user. (Kietzmann 2008, p.308) |
| | Since then, discussions about privacy and its associated concerns have extended to social, *cultural*, and psychological issues. (Junglas, Johnson & Spitzmuller 2008, p. 388) |
| | Flaming is generally defined as the *anti-normative* hostile communication (Johnson, Cooper & Chin 2008, p. 418) |

### Forms and types of people as cultural beings

Like the technology concept, there was no evidence of a specific cultural form for the people concept. Again, as noted with the organisation and technology concepts, there are references to levels and dimensions of culture as shown in Table 4.23 that add to the imagery of the *people-as-culture* metaphor. For the purposes of this thesis though they are not a specific cultural form. Note that there are references, which initially appear to be evidence of a specific form. For example in Table 4.16, Lyytinen and Newman (2008) refer to the *drama* or *Mad Hatter Party* that characterises most information systems change processes. The information systems change process is discussed as involving people so one can infer that drama characterises some aspect of people. This is not however, a direct reference to a person as a specific cultural form. In this thesis it would only be considered evidence of a specific cultural form if, for example, Lyytinen and Newman (2008) asserted that a person *is* a drama or people *are* a Mad Hatter's Party. Lyytinen and Newman (2008), however, do not; nor are there any other similar assertions throughout the articles published in this period. Hence, there is no evidence of the *people-as-culture* metaphor in a specific form.

### Frequency and variety of cultural discourse within articles

As was noted with the organisation concept, displays of frequent and varied cultural discourse are limited. Again, there are certainly exceptions. Some of the better examples of this include: Weedman (2008); Bartis and Mitev (2008); Vlaar, van Fenema and Tiwari (2008); Holmström Olsson et al. (2008); Hsieh, Rai and Keil (2008) and Kappos and Rivard (2008). Yet, even in these articles, cultural discourse is more or less confined to the problem conceptualisation and conclusions sections of the article rather than being widespread throughout. As with the organisation concept this weakens the image of the *people-as-culture* metaphor in these articles. This in turn contributes to a diluted image of the metaphor overall.

## 4.6 Metaphor occurrences: isolated and combined

Metaphors for a given concept occur in two forms: in combination with one or two other metaphors or in an isolated form where no other metaphors are evidenced. An example of a combined occurrence is the article by Kuruzovich et al. (2008) shown previously in Table 4.4. Here Kuruzovich et al. (2008) refer to the value *chain* of organisations, which is a manifestation of the *organisation-as-machine* metaphor. As is shown in Table 4.6 however, Kuruzovich et al. (2008) also refer to new types of organisations being *spawned* by the Internet. This is a manifestation of the *organisation-as-organism* metaphor. Kuruzovich et al. (2008) therefore rely on both the *organisation-as-machine* metaphor and the *organisation-as-organism* metaphor. This is an example of a combined occurrence of metaphors and is the most common way in which the root metaphors are evidenced – as is already highlighted in Table 4.1.

In addition to occurring in a combined form, metaphors also occur in isolation. An example of an isolated metaphor form is the article by Au, Ngai and Cheng (2008) in Table 4.4. By referencing the *fine-tuning* required for certain industries, Au, Ngai and Cheng (2008) display evidence of the *organisation-as-machine* metaphor. In this article, the *organisation-as-machine* metaphor is the only metaphor evidenced in relation to the organisation concept. Articles such as Au, Ngai and Cheng (2008) that display evidence of metaphors in isolation are not as common as those that display evidence of metaphors in combination.

This section describes what was found in terms of isolated and combined occurrences of metaphors concerning the three key Information Systems concepts. The most significant finding uncovered in this section is that the machine metaphor is the only metaphor that occurs in isolation. That is, the machine metaphor is the only stand-alone metaphor of all root metaphors examined. It is the only metaphor by which certain key Information Systems concepts – organisations and technology – can be structured and understood without reference to another root metaphor. This adds considerably to the power of the machine metaphor in these results. In addition however, when the machine metaphor does occur in combination with the other root metaphors – organism and culture – as a way of structuring and understanding organisations, technology or people it typically appears in a higher strength category. That is, reliance on the machine metaphor is stronger than the two other root metaphors with which it may appear. Both of these results help contribute further to the machine metaphors position as the main way in which key Information Systems concepts are structured and understood.

In this section the isolated and combined metaphor occurrences in relation to each of the key Information Systems concepts examined will be presented. When presenting these occurrences the total number of articles and their breakdown by strength category for each metaphor will be shown. Relevant excerpts from articles highlighting the different occurrences will also be provided.

### 4.6.1. Organisation

As shown in Table 4.24, in relation to the organisational concept, the machine, organism and culture metaphors are manifested in three main ways:

1. Isolated – machine

   Only the machine metaphor is evidenced in discussions of organisations. This isolated occurrence accounts for around 11% of all articles that contain evidence of a root metaphor.

2. Combined – machine and organism

   The machine and organism metaphors are evidenced in combination in discussions of organisations. This combined occurrence is the least frequent manifestation evident in 10% of articles that contain evidence of a root metaphor.

3. Combined – machine, organism and culture

   A combination of all three root metaphors is used to discuss the organisational concept. This is the most frequent way in which metaphors occur in articles, being evident in around 79% of articles that contain evidence of a root metaphor.

Table 4.24. *Articles showing different metaphor manifestations in discussions of organisations in 2008*

| METAPHOR MANIFESTATIONS | | |
|---|---|---|
| TYPE | METAPHORS EVIDENCED | n |
| Isolated | Machine | 9 *(11%)* |
| Combined | Machine, Organism | 8 *(10%)* |
| | Machine, Organism, Culture | 64 *(79%)* |
| *Total Articles* | | *81* *(100%)* |

The different ways in which the three different root metaphors manifest themselves in relation to the organisation concept reinforce the power and saliency of the machine metaphor in these results. Firstly, the machine metaphor is the only stand-alone metaphor for organisations. The organism and culture metaphors always appear with the machine metaphor. Secondly, when the organism and culture metaphors appear with the machine metaphor, the machine metaphor is typically in a stronger categorisation strength. The sections following will provide further detail on the ways in which the root metaphors were evidenced in discussions on organisations.

### Isolated occurrence - machine

The *organisation-as-machine* metaphor was evidenced on its own in around 11% of articles. This equated to nine articles published in *Management Information Systems Quarterly* and *Information Systems Research* during the year 2008. Interestingly none of these articles appeared in the *European Journal of Information Systems*. In five of these articles – two from *Management Information Systems Quarterly* (Olivera, Goodman & Tan 2008; Au, Ngai & Cheng 2008) and three from *Information Systems Research* (Dawande et al. 2008; Hinz & Spann 2008; Bapna, Jank & Shmueli 2008) – the organisation was a prime focus and metaphoric discourse from the machine domain was frequently encountered. In the other four articles – three from *Management Information Systems Quarterly* (Kamis, Koufaris & Stern 2008; Choudhury & Karahanna 2008; Lee, Wyner & Pentland 2008) and one from *Information Systems Research* (Trier 2008) – the focus was not primarily on the organisational concept and associated metaphoric discourse was considerably less frequent. Yet, all metaphoric discourse was again based solely in the machine domain.

A couple of instances of how mechanistic discourse was evidenced in isolation has been provided in Table 4.4 (*see* Bapna, Jank & Shmueli 2008; Au, Ngai & Cheng 2008).

Table 4.25 shows the relative strength of the machine metaphor in those articles that relied only on this metaphor (isolated occurrence) when discussing the organisational concept.

Table 4.25. *Relative strength of machine metaphor in articles relying solely on the* organisation-as-machine *metaphor in 2008*

| Strength | MISQ | ISR | EJIS | N |
|---|---|---|---|---|
| DOMINANT | 2 *(22%)* | 3 *(33%)* | 0 *(0%)* | *5* *(56%)* |
| SECONDARY | 3 *(33%)* | 1 *(11%)* | 0 *(0%)* | *4* *(44%)* |
| OCCASSIONAL | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | *0* *(0%)* |
| *Total Articles* | 5 *(56%)* | 4 *(44%)* | 0 *(0%)* | *9* *(100%)* |

## Combined occurrence – machine and organism

A shown in Table 4.26 a total of eight articles contained evidence of the machine metaphor as well as the organism metaphor in their discussions of organisations. Yet, there is a marked difference in the strength to which each of these metaphors is evidenced. It was more common for the machine metaphor to be categorised as dominant. In the three articles that were categorised as dominant for the *organisation-as-organism* metaphor these same articles were also categorised as dominant for the *organisation-as-machine* metaphor. Furthermore, almost all of the articles that contained evidence of both the machine and organism metaphors in relation to the organisation concept were categorised as being dominant for the machine metaphor.

Table 4.27 presents a sample of excerpts from all eight articles showing how both the *organisation-as-machine* and *organisation-as-organism* metaphors occur. Mechanistic discourse is underlined and organic discourse italicised. As shown in the table mechanistic discourse has a close proximity to organic discourse. Mechanistic discourse typically appears directly beside organic discourse – either within the same sentence or within one or two sentences of the same paragraph – when discussing organisations. Less frequently, mechanistic discourse occurs in more isolated pieces of text within the same article, separated by a number of paragraphs or pages.

Table 4.26. *Relative strength of machine and organism metaphors in articles relying on both these metaphors in discussions of organisations in 2008*

| ARTICLES SHOWING EVIDENCE OF THE MACHINE AND ORGANISM METAPHORS AND THEIR RELATIVE STRENGTHS | | | | | |
|---|---|---|---|---|---|
| | | ORGANISM | | | |
| | | DOMINANT | SECONDARY | OCCASIONAL | n |
| MACHINE | DOMINANT | 3 *(38%)* | 3 *(38%)* | 1 *(13%)* | *7* *(88%)* |
| | SECONDARY | 0 *(0%)* | 1 *(13%)* | 0 *(0%)* | *1* *(13%)* |
| | OCCASIONAL | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | *0* *(0%)* |
| *Total Articles* | | 3 *(38%)* | 3 *(38%)* | 2 *(25%)* | *8* *(100%)* |

Table 4.27. *Sample metaphor excerpts from* Information Systems Research, Management Information Systems Quarterly *and the* European Journal of Information Systems *that show evidence of machine (underlined) and organism (italicised) metaphors when discussing organisations in 2008*

| JOURNAL | MACHINE AND ORGANISM EXCERPTS CULTURE METAPHOR EXCERPTS FOR ORGANISATIONS |
|---|---|
| ISR | The physical and information components of the value <u>chain</u> have been decoupled (Kambil and van Heck 1998), and there has been a rapid *growth* of online firms serving as information intermediaries (Kuruzovich et al. 2008, p. 182) |
| | Consequently, there is a need to study the role of TML as an effective IT training delivery <u>mechanism</u> [skip paragraph]... In the next section, we describe how the social cognitive perspective on self-regulation can help <u>design</u> interventions that modify instructional strategies in e-learning-based training *environments*. (Santhanam, Sasidharan & Webster 2008, p. 27) |

| | |
|---|---|
| | The company could look for these traits as part of a broader selection process, ...[skip 3 paragraphs] Nowhere is the organizational inertia to change more visible than in the context of technologies. The implication from this study is that it is unlikely that "one size fits all" in terms of technology -related change management policies or initiatives. One of the factors that affect the equation is the personality of the individual users. (Devaraj, Easley & Crant 2008, p. 103) |
| MISQ | We consider the scenario of *threat* in a firm (p.106) Kannan and Telang (2005) considered whether movement toward a market-based mechanism for vulnerability disclosure leads to a better social outcome ...(Wang, Chaudhury & Rao 2008a, p. 108) |
| | SSF provides a means of supplying the missing "*human touch*" by leveraging IT ... (Cenfetelli, Benbasat & Al-Natour 2008, p. 175) |
| | Investment in, and implementation of, enterprise-level systems, such as enterprise resource planning (ERP) systems, supply chain management systems, customer relationship management (CRM) systems, and business *intelligence* systems, have become the hallmark of organizational strategies for *survival* and *competitive* advantage (p.484)... The mechanisms [including organizational] through which these three predictors influence the three conceptualizations of system use were theorized (Venkatesh et al. 2008, p. 499) |
| EJIS | Enterprise integration, sometimes referred to as systems integration, is the journey that an organization undertakes to interconnect its siloed business functions and work practices to streamline organizational processes. The solutions often take the form of connecting stovepipe legacy applications… Such support has been shown to be an important pre-requisite for effective participation in a *competitive* global market, where organizations need to be *agile* and *flexible* (Umapathy, Purao & Barton 2008, p. 518) |
| | The lack of appropriate security controls on information exchanged among business activities in a business process can leave organizations *vulnerable* to information assurance *threats* (p.529) Business processes require coordination mechanisms... (D'Auberterre, Singh & Iyer 2008, p. 530) |

As can be seen in the excerpts of Table 4.27, talking about the organisation as an organism also involves talking about the organisation as a machine. There was no evidence of the organisational organism metaphor in pure form without any mechanistic influences at all. In all cases, the metaphor of the *organisation-as-organism* was in some way bolstered or reinforced by the metaphor of the organisation as a machine.

### Combined occurrence – machine, organism and culture

When the machine, organism and culture metaphors appear in discussions of organisations, they most commonly do so with each other. The combined occurrence of machine, organism and culture accounts for around 79% of all articles that show any evidence of a metaphor when discussing organisations. As shown in Table 4.28, articles are slightly more likely to be categorised as dominant or secondary for the machine metaphor than for the organism metaphor. Approximately 55% of these articles were categorised as dominant and approximately 39% secondary for the machine metaphor as opposed to approximately 47% and 42% respectively for the organism metaphor. Although many articles were also categorised as dominant for the culture metaphor there were similar numbers of articles appearing in the secondary and occasional categories.

Table 4.29 presents a breakdown of the first row of articles presented in Table 4.28. That is, it shows the breakdown for all articles that were categorised as dominant for any of the three root metaphors in terms of the two other metaphors with which it appeared. For example, in Table 4.28, of the 64 articles showing evidence of all three root metaphors in relation to the organisation concept, 23 were categorised as dominant for the culture metaphor. Table 4.29 shows that, of these 23 articles categorised as dominant for the culture metaphor, nine were categorised as dominant for the machine metaphor and seven were categorised as dominant for the organism metaphor.

What is highlighted in Table 4.29 is the pervasiveness of the machine metaphor. Although many articles categorised as dominant for the machine metaphor were also categorised as dominant or secondary for the organism metaphor, this occurrence was more pronounced in reverse. All articles that are categorised as dominant for the organism metaphor are categorised as either dominant – in 60% of cases, or secondary, in 40% of cases – for the machine metaphor. As with the articles categorised as dominant for the machine metaphor, those articles categorised as dominant for the organism metaphor have a much weaker relationship with the culture metaphor than they do with each other. Although articles categorised as dominant for the machine metaphor show evidence of the culture metaphor this is typically in a secondary or occasional form. Furthermore, while articles categorised as dominant for the culture metaphor are often categorised as dominant or secondary for the organism metaphor, this is more pronounced for the machine metaphor.

The excerpts in Table 4.30 are extracted from articles that show evidence of all three root metaphors when discussing the organisational concept. The table highlights the different ways in which mechanistic and organic discourse appear alongside culture discourse. Mechanistic discourse is underlined, organic discourse is both underlined and italicised and culture discourse is italicised.

Table 4.28. *Relative strength of machine, organism and culture metaphors in articles relying on all of these metaphors when discussing organisations in 2008*

| MACHINE,ORGANISM AND CULTURE COMBINATION ARTICLES | | | |
|---|---|---|---|
| | MACHINE | ORGANISM | CULTURE |
| DOMINANT | 35 *(55%)* | 30 *(47%)* | 23 *(36%)* |
| SECONDARY | 25 *(39%)* | 27 *(42%)* | 20 *(31%)* |
| OCCASIONAL | 4 *(6%)* | 7 *(11%)* | 21 *(33%)* |
| TOTAL | 64 | 64 | 64 |

Table 4.29. *Articles relying on all three root metaphors that are categorised as dominant for the machine, organism or culture root metaphors when discussing organisations and the relative strength of their co-occurring metaphors for 2008*

| ARTICLES THAT ARE DOMINANT FOR THE MACHINE, ORGANISM AND CULTURE METAPHORS AND THE STRENGTH OF THEIR CO-OCCURING METAPHORS | | | | | |
|---|---|---|---|---|---|
| | | MACHINE | ORGANISM | CULTURE | N |
| MACHINE | DOMINANT | - | 18 * (60%) | 9 (39%) | 27 (42%) |
| | SECONDARY | - | 12 (40%) | 12 (52%) | 23 (36%) |
| | OCCASIONAL | - | 0 (0%) | 2 (9%) | 2 (3%) |
| ORGANISM | DOMINANT | 18 (53%) | - | 7 (30%) | 25 (39%) |
| | SECONDARY | 15 (44%) | - | 14 (61%) | 29 (45%) |
| | OCCASIONAL | 2 (6%) | - | 2 (9%) | 4 (6%) |
| CULTURE | DOMINANT | 9 (26%) | 7 (23%) | - | 16 (25%) |
| | SECONDARY | 11 (32%) | 12 (40%) | - | 23 (36%) |
| | OCCASIONAL | 15 (44%) | 11 (37%) | - | 26 (41%) |
| *Total Articles* | | 34 (53%) | 30 (47%) | 23 (36%) | 64 (100%) |

* Percentage shown is the percentage of papers for that particular metaphor.

Table 4.30. *Sample metaphor excerpts from* Information Systems Research, Management Information Systems Quarterly *and the* European Journal of Information Systems *that show evidence of machine (underlined), organism (italicised and underlined), and culture (italicised) metaphors when discussing organisations in 2008*

| JOURNAL | MACHINE, ORGANISM AND CULTURE COMBINATION EXCERPTS |
|---|---|
| ISR | This paper reveals the manifestation of social mechanisms in OSSNs and how these are used for coordinating and safeguarding exchanges between firms. Specifically, we illustrate the primary importance of a shared *macroculture* (goals and norms) and collective sanctions for punishing firms who violate these goals/norms. [skip 2 sentences] ... companies are *dead* before you get remedied... (Feller et al. 2008, p. 475) |
| | Organizations use teams to make decisions...[skip paragraph] In teams, knowledge is inherently *rooted* in individual member's experience... (p.314) Relational capital is a joint resource available to team members and reflects the *goodwill*, *collective bonds*, and *expectations* of prosocial behavior that characterize relations..Relational social capital generates group solidarity (Robert, Dennis & Ahuja 2008, p. 319) |
| | The rapid *growth* of offshore software development has triggered considerable research on important managerial issues in offshore development, such as the effect of prior ties between clients and vendors (Ethiraj etal. 2005), the impact of *cross-cultural* problems (Krishnan et al. 2004), and the role of communication mechanisms (Gopal & Sivaramakrishnan 2008, p. 202) |
| MISQ | Achieving *shared*, common, or mutual *understandings* among geographically dispersed workers is a central concern in the distributed work literature. [skip 5 sentences to end of abstract] Acts of *sense*giving, *sense*demanding, and *sense*breaking allow distributed team members to jointly explore and generate value, thereby amplifying the performance of distributed workers. (Vlaar, van Fenema & Tiwari 2008, p. 227) |
| | Relative bid price, often very low already, also determines the winning bid, as does the ratio of purchasing power parity (PPP) between the country of the client and the country of the provider. Nonetheless, the strongest determinant of the winning bid is client *loyalty* (p.367) Importantly, these distant providers are said to overcome the *crippling* cost of distance ... (Gefen & Carmel 2008, p. 367) |

| | |
|---|---|
| | It also reveals that opensourcing provides ample opportunity for companies to *headhunt* top developers, (p.385) Neither of these assumptions is intuitively valid in an OSS context given the voluntary nature of typical OSS communities and the tension between economic value that drives commercial organizations and the *community values* that drive OSS (Ågerfalk & Fitzgerald 2008, p. 386) |
| EJIS | Nye (1999) explains that U.K. local authorities are criticised for being inaccessible, *unresponsive* and essentially out of *touch* with citizen demands. [skip paragraph] This enabler of public sector reform is increasingly seen as a manifestation of an *environment* where innovation can *flourish*, within a *culture* of continuous improvement (Irani & Elliman 2008, p. 336) |
| | In recent years, more organisations engage in *collaborative distributed practices* that span across multiple locations, heterogeneous perspectives, and organisational contexts. Companies from multiple industries *cultivate* their relationships with their customers, suppliers, and other partners to leverage each others distinct knowledge... (Gal, Lyytinen & Yoo 2008, p. 292) |
| | Within this framework, we conceptualize such practices as being enabled via a distinct social dynamic characteristic of professionally oriented organizational *environments*, that is, a *negotiated order* (p.265) ... By taking a more theoretical approach, the present study produces a deeper understanding of the underlying dynamics of workaround *practices*.(Azad & King 2008, p. 275) |

As observed with the *organisation-as-organism* metaphor, the excerpts in Table 4.30 show that talking about the *organisation-as-culture* also involves talking about the organisation as a machine and also to a lesser extent as an organism. In all cases the metaphor of the *organisation-as-culture* was bolstered by the metaphor of the *organisation-as-machine* and to a lesser extent by the *organisation-as-organism* metaphor. That is, as with the *organisation-as-organism* metaphor, the organisational culture metaphor did not appear in a pure untainted form.

### 4.6.2. Technology

As shown in Table 4.31, in relation to the technology concept there were four ways in which the machine, organism and culture metaphors manifested themselves in the articles:

1. Isolated – machine metaphor

   Accounts for around 6% of all articles that discussed the technology concept in enough detail to be coded. All using only the machine metaphor.

2. Combined - machine and organism metaphors

   Accounting for around 42% or articles.

3. Combined - machine and culture metaphors

   The least frequently evidenced manifestation accounting for only around 2% of articles.

4. Combined – machine, organism and culture metaphors.

   Accounting for around 49% of all articles.

Table 4.31. *Articles showing different metaphor manifestations in discussions of technology concept for 2008*

| **METAPHOR MANIFESTATIONS** | | |
|---|---|---|
| TYPE | METAPHORS EVIDENCED | n |
| Isolated | Machine | 5 *(6%)* |
| Combined | Machine, Organism | 35 *(42%)* |
| | Machine, Culture | 2 *(2%)* |
| | Machine, Organism, Culture | 43 *(49%)* |
| *Total Articles* | | *85 (100%)* |

As with the organisation concept, the ways in which the machine, organism and culture metaphors manifest themselves in relation to the technology concept highlight the emphasis on the machine metaphor. Again the machine metaphor is the only stand-alone metaphor for the technology concept. Furthermore, when the metaphors appear in a combined form it is the machine metaphor – as will be explained in the following sections – that is typically placed in a higher categorisation strength. The sections following expand on the four different ways in which the root metaphors were evidenced in the discourse surrounding technology.

### Isolated occurrence – machine

Only the machine metaphor appeared on its own without any of the other root metaphors when discussing technology. This metaphor was evidenced on its own in five articles or approximately 6% of all articles showing evidence of a root metaphor in relation to technology. Again, all of these articles appeared in the North American journals *Information Systems Research* (Bapna, Jank & Shmueli 2008) and *Management Information Systems Quarterly* (Olivera, Goodman & Tan 2008; Parsons & Wand 2008; Rustagi, King & Kirsch 2008; Lee, Wyner & Pentland 2008). Three of these articles (Olivera, Goodman & Tan 2008; Bapna, Jank & Shmueli 2008; Lee, Wyner & Pentland 2008) also displayed the isolated occurrence of a root metaphor in relation to organisations: the *organisation-as-machine* metaphor. Likewise in their discussions of technology, which were frequently talked about in metaphoric terms, it was only the machine metaphor that was evidenced. The two remaining articles (Parsons & Wand 2008; Rustagi, King & Kirsch 2008) - published in *Management Information Systems Quarterly,* showed the same isolated occurrence of the *technology-as-machine* metaphor.

A couple of instances – Bapna, Jank and Shmueli (2008); and Lee, Wyner and Pentland (2008) – of how the *technology-as-machine* metaphor was evidenced in isolation has already been provided in Table 4.12.

Table 4.32 shows the relative strength of the machine metaphor in these articles.

Table 4.32. *Relative strength of machine metaphor in articles relying solely on the* technology-as-machine *metaphor in 2008*

| Strength | MISQ | ISR | EJIS | N |
|---|---|---|---|---|
| DOMINANT | 3 *(60%)* | 1 *(20%)* | 0 *(0%)* | *4* *(80%)* |
| SECONDARY | 0 *(0%)* | 1 *(20%)* | 0 *(0%)* | *1* *(20%)* |
| OCCASSIONAL | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | *0* *(0%)* |
| *Total Articles* | 3 *(60%)* | 2 *(40%)* | 0 *(0%)* | *5* *(100%)* |

### Combined occurrence – machine and organism

A total of 35 articles, approximately 41%, contained evidence of the machine metaphor as well as the organism metaphor in their discussions of technology. As shown in Table 4.33 there is a marked difference in the strength to which each of these metaphors was evidenced. Specifically, the machine metaphor is more frequently categorised as dominant than the organism metaphor. This is the same finding as was observed with the organisational concept. There are however, some notable differences between the technology and organisation concepts. In relation to the organisational concept more articles were categorised as dominant for both metaphors and the overall proportion of articles categorised as dominant was larger. In relation to the technology concept there was one article, that of Junglas, Johnson and Spitzmuller (2008), where the organism metaphor was categorised more strongly than the machine metaphor. Yet, in this article the technology concept was not frequently discussed and metaphoric language was also not frequent. Furthermore, in relation to the technology concept the overall number of articles with both the machine and organism metaphors was much greater than was evident with the organisational concept. Overall, the results between the organisational concept and the technology concept are consistent in that articles which show evidence of both the machine and organism metaphors are more likely to be categorised as dominant for the machine metaphor.

Consistent with the results of the organisational concept, mechanistic discourse typically appears directly beside organic discourse either within the same sentence or within one or two sentences of the same paragraph when discussing organisations. Although it is less frequent, mechanistic discourse also appears in more isolated pieces of text within the same article, separated by a number of paragraphs or pages.

Table 4.34 presents a sample of excerpts showing how both mechanistic and organic discourse appears in discussions of technology. Mechanistic discourse is underlined and organic discourse italicised.

Table 4.33. *Relative strength of machine and organism metaphors in articles relying on both these metaphors in discussions of technology for 2008*

| ARTICLES SHOWING EVIDENCE OF THE MACHINE AND ORGANISM METAPHORS AND THEIR RELATIVE STRENGTHS | | | | | |
|---|---|---|---|---|---|
| | | ORGANISM | | | |
| | | DOMINANT | SECONDARY | OCCASIONAL | n |
| MACHINE | DOMINANT | 2 *(6%)* | 11 *(31%)* | 6 *(17%)* | *19* *(54%)* |
| | SECONDARY | 0 *(0%)* | 9 *(26%)* | 6 *(17%)* | *15* *(43%)* |
| | OCCASIONAL | 0 *(0%)* | 1 *(3%)* | 0 *(0%)* | *1* *(3%)* |
| *Total Articles* | | 2 *(6%)* | 21 *(60%)* | 12 *(34%)* | *35* *(100%)* |

Table 4.34. *Sample metaphor excerpts from* Information Systems Research, Management Information Systems Quarterly *and the* European Journal of Information Systems *that show evidence of machine (underlined) and organism (italicised) metaphors when discussing technology in 2008*

| JOURNAL | MACHINE AND ORGANISM EXCRPTS CULTURE METAPHOR EXCERPTS FOR TECHNOLOGY |
|---|---|
| ISR | Future research should consider <u>mechanisms</u> for managing areas with poor spread by reinforcement *seeding*. (Bampo et al. 2008, p. 286) |
| | Computational environments ... have *emerged* as flexible computing infrastructures that *adaptively* share distributed resources. The objective offlexible infrastructures is to <u>leverage</u> the topography of distributed resources to attain desired levels of performance within resource and cost constraints (Du et al. 2008, p. 144) |
| | To ensure that the work complements existing search technology, the methodology produces an enhanced query with the help of operators such as "and," "or," or "not" that can be executed with established search *engines*. (skip paragraph)... Technologies for query processing and information retrieval from the Web include: (a) *crawlers* that locate and *read* Web pages (Storey et al. 2008, p. 4) |

| | |
|---|---|
| MISQ | What we need are more formal frameworks and <u>tools</u> to help see more clearly the current and potential future technology *landscapes*. (quote from consultant in Adomavicius, Bockstedt & Gupta 2008, p. 780) |
| | Consumers who generally perceive the web as a useful <u>tool</u> for shopping and research are also likely to perceive relative advantage... (p.185) The use of artificial *intelligence* (e.g., *expert* systems) may help consumers configure products (Choudhury & Karahanna 2008, p. 194) |
| | Alternatively, when knowledge transfers are not sufficiently large, some *short-lived* offshoring [IT] projects may <u>generate</u> substantial cost savings to the domestic firm (Cha, Pingry & Thatcher 2008, p. 281) |
| EJIS | Therefore, a most desirable quality of digital services is clearly the ability to be <u>malleable</u> or to be able to *adapt* to changing market *needs* or requirements. (Williams, Chatterjee & Rossi 2008, p. 510) |
| | Rapid business and IT change: <u>drivers</u> for strategic information systems planning? (p.198) ...New IT might be rushed into commercial markets before being fully *debugged* (Thibodeau, 2002), and might either cause its adopters exorbitant *debugging* costs or even be unusable. Managers cannot be experts on all emerging IT... (Newkirk, Lederer & Johnson 2008, p. 201) |
| | Unfortunately, in large enterprise-wide system rollout scenarios, training sessions start months before the anticipated '*go-live*' date to cover a large number of users' educational needs. IS practitioners know that the *go-live* date is usually a moving target, especially in a <u>crash</u> conversion situation. (Karuppan & Karuppan 2008, p. 43). |

Table 4.34 highlights that discussing technologies as organisms also means discussing technologies as machines. There is no evidence of the *technology-as-organism* metaphor without the *technology-as-machine* metaphor.

### Combined occurrence – machine and culture

There were only two articles: Chu and Robey (2008); and Azad and King (2008), both appearing in the *European Journal of Information Systems*, that contained evidence of the machine and culture metaphors but no evidence of the organism metaphor in their discussions of technology. In Chu and Robey's (2008) article concerning changes in learning and practice following the adoption of online learning, the technology concept was frequently discussed in metaphorical terms. In this article, the most common domain for the metaphor excerpts was in the machine domain followed by the culture domain. There was no evidence of organic discourse. Likewise, the article by Azad and King (2008) followed a similar pattern in their discussion of computer workarounds. Yet, the technology concept was not as frequently discussed in metaphorical terms. Nevertheless, as with Chu and Robey's (2008) article, Azad and King (2008) relied solely on mechanistic discourse in their discussion of the technology concept.

Table 4.35 presents a sample of excerpts from these two articles, the only two that show evidence of both the machine and culture metaphors when discussing the technology concept. Mechanistic discourse is underlined and culture discourse underlined and italicised.

Table 4.35. *Sample metaphor excerpts from the only two articles published in the* European Journal of Information Systems *that show evidence of both machine (underlined) and culture (underlined and italicised) metaphors when discussing technology in 2008*

| JOURNAL | MACHINE AND CULTURE EXCERPTS CULTURE METAPHOR EXCERPTS FOR TECHNOLOGY |
|---|---|
| EJIS | It is our contention that some computer workarounds often have an important social <u>component</u> alongside their IT <u>component</u>, and that they therefore entail spontaneous <u>*collective*</u> <u>*action*</u> (i.e., lack organizational <u>*sanction*</u>).(Azad & King 2008, p. 266) |
| | For example, Richardson & Howcraft (2006) employ Bourdieu's concepts to support a critical interpretation of call centers, showing how work practices are tightly constrained by <u>*oppressive*</u> technologies and managerial practices. (p.81) Administrative staff desire information but the indirect contents make LearnNet an information collection <u>tool</u> rather than a learning <u>platform</u> (p.93) (Chu & Robey 2008, p. 93) |

As can be seen in the excerpts of Table 4.35, talking about technology as a culture also involves talking about technology as a machine. There was no evidence of the technological culture metaphor in isolation. In both cases the culture metaphor is reinforced (to a greater or lesser extent) by the machine metaphor in discussions of technology.

### Combined occurrence – machine, organism and culture

The metaphorical combination machine, organism and culture is the most common way in which the root metaphors manifest themselves in relation to the technology concept. This combination accounted for around 49% of all articles that showed some evidence of a root metaphor when discussing the technology concept. This proportion is significantly less than was evidenced with the organisational concept. Yet, articles are much more likely to be categorised as dominant for the machine metaphor than for the organism or culture metaphors in relation to the technology concept. As shown in Table 4.36, approximately 47% of all articles that showed evidence of all three root metaphors were categorised as dominant for the machine metaphor. This was significantly higher than the 12% (approx.) and 21% (approx.) respectively for the organism and culture metaphors. Unlike the machine metaphor, which was most likely in a dominant or secondary form in these articles, the organism and culture metaphors were most likely to be in a secondary or occasional form. Hence, the machine metaphor emerged as the leading way in which technology was conceptualised – even when the articles relied on the two alternative root metaphors.

Table 4.37 offers a more fine-grained analysis of the first row in Table 4.36 – articles that are dominant for each of the three root metaphors. In Table 4.37 the number of articles categorised as dominant for each of the three root metaphors and the strengths of the other two metaphors with which they appeared are shown. The overall proportion of articles that showed evidence of all three metaphors in discussions of technology is approximately 49%. This is much lower than that which was uncovered for the organisational concept at approximately 79%. The overall pervasiveness of the machine metaphor with the technology concept however, is even more pronounced. Although some articles categorised as dominant for the machine metaphor were also categorised as dominant (5 articles) or secondary (10 articles) for the organism metaphor this occurrence was more pronounced in reverse. Four out of five articles that were categorised as dominant for the organism metaphor were categorised as dominant for the machine metaphor. Although not as pronounced with the culture metaphor the majority of articles categorised as dominant for the culture metaphor were categorised as either dominant (3 articles) or secondary (2 articles) for the machine metaphor. This all helped reinforce the machine metaphor as a salient and pervasive way of conceptualising technology – even when the two other metaphors were relied on.

The excerpts in Table 4.38 are from the articles that show evidence of all three root metaphors when discussing the organisational concept. The table highlights the different ways in which mechanistic and organic discourse appear alongside culture discourse. Mechanistic discourse is underlined, organic discourse is italicised and culture discourse is both underlined and italicised.

Table 4.36. *Relative strength of machine, organism and culture metaphors in articles relying on all of these metaphors when discussing technology in 2008*

| MACHINE, ORGANISM AND CULTURE COMBINATION ARTICLES | | | |
|---|---|---|---|
| | MACHINE | ORGANISM | CULTURE |
| DOMINANT | 20 *(47%)* | 5 *(12%)* | 9 *(21%)* |
| SECONDARY | 20 *(47%)* | 24 *(56%)* | 19 *(44%)* |
| OCCASIONAL | 3 *(7%)* | 14 *(33%)* | 15 *(35%)* |
| TOTAL | 43 | 43 | 43 |

Table 4.37. *Articles relying on all three root metaphors that are categorised as dominant for the machine, organism or culture root metaphors when discussing technology and the relative strength of their co-occurring metaphors in 2008*

| ARTICLES THAT ARE DOMINANT FOR THE MACHINE, ORGANISM AND CULTURE METAPHORS AND THE STRENGTH OF THEIR CO-OCCURING METAPHORS | | | | | |
|---|---|---|---|---|---|
| | | MACHINE | ORGANISM | CULTURE | N |
| MACHINE | DOMINANT | - | 4<br>* *(60%)* | 3<br>*(39%)* | 7<br>*(21%)* |
| | SECONDARY | - | 1<br>*(40%)* | 5<br>*(52%)* | 6<br>*(18%)* |
| | OCCASIONAL | - | 0<br>*(0%)* | 1<br>*(9%)* | 1<br>*(3%)* |
| ORGANISM | DOMINANT | 5<br>*(53%)* | - | 0<br>*(30%)* | 5<br>*(15%)* |
| | SECONDARY | 10<br>*(44%)* | - | 6<br>*(61%)* | 16<br>*(47%)* |
| | OCCASIONAL | 5<br>*(6%)* | - | 3<br>*(9%)* | 8<br>*(24%)* |
| CULTURE | DOMINANT | 3<br>*(26%)* | 0<br>*(23%)* | - | 3<br>*(9%)* |
| | SECONDARY | 9<br>*(32%)* | 3<br>*(40%)* | - | 12<br>*(35%)* |
| | OCCASIONAL | 8<br>*(44%)* | 2<br>*(37%)* | - | 10<br>*(29%)* |
| *Total Articles* | | 20<br>*(59%)* | 5<br>*(15%)* | 9<br>*(26%)* | 34<br>*(100%)* |

* Percentage shown is the percentage of papers for that particular metaphor.

Table 4.38. *Sample metaphor excerpts from* Information Systems Research, Management Information Systems Quarterly *and the* European Journal of Information Systems *that show evidence of machine (underlined), organism (italicised), and culture (italicised and underlined) metaphors when discussing technology in 2008*

| JOURNAL | MACHINE, ORGANISM AND CULTURE COMBINATION EXCERPTS |
|---|---|
| ISR | This paper reveals the manifestation of social mechanisms in OSSNs and how these are used for coordinating and safeguarding exchanges between firms. Specifically, we illustrate the primary importance of a shared *macroculture* (p.475) ... Infrastructure builds on the collaborative development *environment* of open source "*in the wild*"(Feller et al. 2008, p. 477) |
| | As nodes interact [humans and non-humans] more frequently with one another, higher tie strength allows two nodes to develop a *shared* *language* that results in more efficient interactions. (p.256) ...Information can be transferred from a system to those who need it through mechanisms other than direct use. (p.257)...The network structures will likely *evolve* over time as employees are added or removed from the network or as the networks *respond* to different *environmental* conditions. (Kane and Alavi 2008, p. 268) |
| | The capabilities offered by digital communication are leading to the *evolution* of new network structures that are grounded in communication patterns. As these structures are sigrficant for organizations, much research has been devoted to understanding network dynamics in ongoing processes of electronic communication.[skip paragraph] They are defined as groups of people interacting in a virtual environment with a purpose, supported by technology, and guided by *norms* and policies. (Trier 2008, p. 335) |
| MISQ | There was a lot of business knowledge required to understand the *grown* system with a fair amount of complexity, understand the project requirements, and translate them. They were unable to do it....It would take 8 weeks to do the *migration* here...[skip 2 paragraphs]...We had to teach Russian developers how a bank's IT functions...to make sure controls are in place, to fix build and deployment procedures, etc [skip 2 paragraphs] Thus, again, Global Bank's software development *practices* dominated how joint work would be conducted. (Levina & Vaast 2008, p. 315) |

| | |
|---|---|
| | These CMC [Computer Mediated Communication] modes have redefined the fabric of organizational *culture*. (p.811)...Newsgroups and knowledge exchange communities suffer from *lurkers* and agitators that decrease the signal to noise ratio in CMC, casting doubts onto the reliability of information exchanged (Abassi & Chen 2008, p. 812) |
| | The implicit knowledge *embodied* by transformational technologies is helpful because *artifacts* are often created, viewed, and manipulated within these technologies absent a clear documentation of how they were created, what assumptions they reflect, or their intended use. (p.411) Before transformational technologies became commonplace in many occupations, it was difficult or impossible for individuals in different places to work together on the same task because there were few mechanisms for sharing task *artifacts*. (Leonardi & Bailey 2008, p. 413) |
| EJIS | Such infrastructures [information systems infrastructures] are conceived as large conglomerations of technological components and human skills that combine to *serve* the corporate needs of an organization [skip paragraph]. On the one hand, the development of information infrastructures involves multiple *narratives* and groups struggling to shape the standards and classification systems embedded in the infrastructure to reflect their *values* and *interests* (p.291). These areas depend on reciprocal recognition and *evolution* of *practices*, discourses, and *artefacts* across interacting organizations. (Gal, Lyytinen & Yoo 2008, p. 292) |
| | These explanations close-box the change process and mask its dynamics and generative mechanisms. [skip sentence]. They therefore miss the *drama* that characterizes most IS change processes, which Drummond (1996a) referred to vividly as 'Mad Hatter's Parties' and where a success turns into a failure overnight. (p.589) Analytically, the work system can thus be located before the building system, although in actual change analysis they need to be viewed as *co-evolving* (Lyytinen & Newman 2008, p. 592) |

| | |
|---|---|
| | ...if the focus were broader than competitive advantage for the organization, then it is reasonable to expect that organizational strategy would be viewed as just one of several important drivers of IS planning. [skip to next paragraph]... Given a systems approach, it might be possible to aspire to be as comprehensive as possible by considering the *environment* of the system in focus (p.126)...The conflict [between different stakeholders] gave rise to ... existing IS planning processes that we identified as a form of institutional *ritual* that kept the main focus on the primary boundary, *privileging* the concerns around internationalization and frustrating attempts to wide participation to poorer sections of the community. (Cordoba & Midgley 2008, p. 136) |

Excerpts in Table 4.38 highlight that talking about technology as a culture also involves talking about technology as a machine and also, although to a lesser extent, an organism. There is no evidence of the technological culture metaphor in an isolated form. As with the organisational concept, the metaphor of *technology-as-culture* was bolstered or reinforced by the two other alternative metaphors: in particular *technology-as-machine* but also *technology-as-organism*.

### 4.6.3. People

In relation to the people concept, there are two ways in which the root metaphors appeared in the articles:

1. Combined – machine and organism metaphors
   Accounting for around 9% or articles.

2. Combined – machine, organism and culture metaphors.
   Accounting for around 91% of all articles.

Table 4.39. *Articles showing different metaphor manifestations in discussions of people in 2008*

| METAPHOR MANIFESTATIONS | | |
|---|---|---|
| TYPE | METAPHORS EVIDENCED | n |
| Combined | Machine, Organism | 8 *(9%)* |
| | Machine, Organism, Culture | 78 *(91%)* |
| *Total Articles* | | *86* *(100%)* |

This was the most restricted way in which the root metaphors appeared in relation to the three key Information Systems concepts examined. Yet, as with the organisation and technology concept, there was still an emphasis on the machine metaphor. In both the combined forms presented in Table 4.39 the machine metaphor was typically categorised in a higher strength than the organism and/or culture metaphors. The following sections expand on these two different ways in which the root metaphors were evidenced in relation to the people concept.

### Combined occurrence – machine and organism

A total of eight articles, approximately 9%, of all articles that contained evidence of a root metaphor in relation to the people concept contained evidence of both the machine and organism metaphors. As shown in Table 4.40 the same marked difference in the strength to which each of these metaphors is evidenced noted with the organisational and technology concepts is also noted here with the people concept. Articles are more likely to be categorised as dominant for the machine metaphor in their discussions of people than the organism metaphor. As with the organisational concept, while two articles were categorised as dominant for the organism metaphor, both of these articles were categorised as dominant for the machine metaphor. Unlike the organisational and technology concepts however, articles that showed evidence of both metaphors in discussions of people did so in either a secondary or dominant form. Only one article each displayed occasional evidence of the machine and organism metaphors respectively.

Table 4.41 presents a sample of excerpts from all eight articles showing how both mechanistic and organic discourse appears in discussions of people. Mechanistic discourse is underlined and organic discourse italicised.

Table 4.40. *Relative strength of machine and organism metaphors in articles relying on both these metaphors in discussions of people for 2008*

| ARTICLES SHOWING EVIDENCE OF THE MACHINE AND ORGANISM METAPHORS AND THEIR RELATIVE STRENGTHS | | | | | |
|---|---|---|---|---|---|
| | | ORGANISM | | | |
| | | DOMINANT | SECONDARY | OCCASIONAL | n |
| MACHINE | DOMINANT | 2 *(25%)* | 4 *(50%)* | 0 *(0%)* | *6* *(75%)* |
| | SECONDARY | 0 *(0%)* | 0 *(0%)* | 1 *(13%)* | *1* *(13%)* |
| | OCCASIONAL | 0 *(0%)* | 1 *(13%)* | 0 *(0%)* | *1* *(13%)* |
| *Total Articles* | | 2 *(25%)* | 5 *(63%)* | 1 *(13%)* | *8* *(100%)* |

Table 4.41. *Sample metaphor excerpts from* Information Systems Research, Management Information Systems Quarterly *and the* European Journal of Information Systems *that show evidence of machine (underlined) and organism (italicised) metaphors when discussing people in 2008*

| JOURNAL | MACHINE AND ORGANISM EXCRPTS CULTURE METAPHOR EXCERPTS FOR ORGANISATIONS |
|---|---|
| ISR | Straub et al. (2002) note that there is a greater need to understand the <u>dynamics</u> as well as the real nature of the interdependency between online and offline search, and recent empirical studies highlight the importance of consumer search and purchase *behavior* in contexts in which consumers can interact with more than one channel. (Kuruzovich et al. 2008, p. 185) |
| | We use the core postulates of these theories with a semantic net representation that includes the original user query as a *seed*, refined by two knowledge sources (p.4) Traditional and Web-based query expansion techniques augment queries with additional mandatory or <u>weighted</u>-terms but rarely <u>filter</u> out terms of an incorrect sense (Storey et al. 2008, p. 11) |
| MISQ | It proposes and demonstrates the potential of grammar as a <u>tool</u> for business process <u>design</u> by making use of its ability to systematically <u>generate</u> and explain process <u>design</u> alternatives while providing support to assist designers in <u>navigating</u> and making *sense* of the <u>design</u> space which these alternatives populate. (Lee, Wyner & Pentland 2008, p. 776) |

| | |
|---|---|
| | The ability to classify phenomena encountered in daily life in useful ways is essential to human *survival* and *adaptation*. Not surprisingly, then, classification-oriented activities are widespread in the information systems field. (p.839) Classes constitute a primary mechanism for imposing a structure on the data requirements for an information system. (Parsons and Wand 2008, p. 840) |
| | Note that *recognition* and representation theories, and thus Wand and Weber's (1993) theory of ontological clarity, are rooted in computational and algorithmic theories rather than *neurophysiological* theories of *human* visual object *recognition* systems. (Shanks et al. 2008, p. 557) |
| EJIS | Business processes require coordination mechanisms to manage the inter-dependencies of their constituent activities (Malone, 1987). Coordination theory explains activity coordination in business processes. Actors, activities, and resources are identified, and processes are decomposed into activities so that dependencies among activities and resources can be identified and analyzed.[skip 4 sentences]... While an activity may *consume* or produce a resource, it cannot produce or *consume* another activity. (D'Aubeterre, Singh & Iyer 2008, p. 530) |
| | They [BPM's] represent different tasks that must be performed, and actors such as individuals and legacy systems that perform these tasks. The tasks are logically interlinked to form the end-to-end process (Zhu et al., 2004). The compiled process represents a number of constructs including the business tasks, their sequencing, decision points, and events...Because of the scale and complexity of large-scale enterprise integration efforts and their potential impact, such *expertise* [from the enterprise integration professional] (whether acquired as experience or codified as design knowledge) remains an important input to the process. (Umapathy, Purao & Barton 2008, p. 519) |
| | Several experiments have shown that *learning* modes (Sein & Bostrom, 1989; Bostrom et al., 1990) influence the accuracy of a mental model of the system thereby leading to the user's better performance. A *learning* style refers to the way individuals acquire and use information (Sadler-Smith, 1996). Some individuals prefer to learn from *hands-on* experience whereas others favour theory-based knowledge acquisition. In the same vein, some individuals excel at brainstorming and generating new ideas whereas others are more apt at synthesising diverse sources of information and organising it into a concise, logical form. (Karuppan & Karuppan 2008, p. 30) |

As was highlighted with the organisational and technology concepts, Table 4.41 highlights that talking about people as organisms also means talking about them as machines. There is no evidence of people being discussed as organisms without also being discussed as machines.

### Combined occurrence – machine, organism and culture

The metaphorical combination of machine, organism and culture is by far the most common way in which the root metaphors were evidenced in relation to the people concept. This combination accounted for around 91% of all articles. As shown in Table 4.42, the organism and to a lesser extent the culture metaphors are dominant in a significant proportion of these articles. This is considerably more than is evidenced with the organisation and culture concepts. Yet, articles are still more likely to be categorised as dominant for the machine metaphor than the alternative root metaphors of organism or culture.

Table 4.43, is a more detailed examination of the first row in Table 4.42. Table 4.43 shows the number of articles categorised as dominant for each of the three root metaphors (row 1) and the strengths of the other two metaphors with which they appeared (column 1 and column 2). The most significant finding revealed in this table is the pervasiveness of the machine metaphor. As shown in Table 4.43, of the articles that were categorised as dominant for the machine metaphor (44 articles) a significant number of them were also categorised as dominant (25 articles – approximately 57%) or secondary (19 articles – approximately 43%) for the organism metaphor. As with the organisational and technology concepts however, this occurrence was more pronounced in reverse. It was more likely that an article categorised as dominant for the organism (42 articles) or culture (31 articles) metaphors would be categorised as dominant for the machine metaphor (25 articles – approximately 60% for the organism metaphor and 11 articles – approximately 35% for the culture metaphor). Hence the machine metaphor emerges as a stronger metaphor in articles where all three metaphors are in evidence.

Excerpts in Table 4.44 are extracted from articles showing evidence of all three root metaphors when discussing people. Mechanistic discourse is underlined, organic discourse is italicised and culture discourse is both underlined and italicised.

Table 4.42. *Relative strength of machine, organism and culture metaphors in articles relying on all these metaphors when discussing people for 2008*

| MACHINE,ORGANISM AND CULTURE COMBINATION ARTICLES | | | |
|---|---|---|---|
| | MACHINE | ORGANISM | CULTURE |
| DOMINANT | 44 *(56%)* | 42 *(54%)* | 31 *(40%)* |
| SECONDARY | 29 *(37%)* | 33 *(42%)* | 19 *(24%)* |
| OCCASIONAL | 5 *(6%)* | 3 *(4%)* | 28 *(36%)* |
| TOTAL | 78 | 78 | 78 |

Table 4.43. *Articles relying on all three root metaphors that are categorised as dominant for the machine, organism or culture root metaphors when discussing people and the relative strength of their co-occurring metaphors for 2008*

| ARTICLES THAT ARE DOMINANT FOR THE MACHINE, ORGANISM AND CULTURE METAPHORS AND THE STRENGTH OF THEIR CO-OCCURING METAPHORS | | | | | |
|---|---|---|---|---|---|
| | | MACHINE | ORGANISM | CULTURE | N |
| MACHINE | DOMINANT | - | 25 * *(60%)* | 11 *(35%)* | 36 *(46%)* |
| | SECONDARY | - | 15 *(36%)* | 16 *(52%)* | 31 *(40%)* |
| | OCCASIONAL | - | 2 *(5%)* | 4 *(13%)* | 6 *(8%)* |
| ORGANISM | DOMINANT | 25 *(57%)* | - | 8 *(26%)* | 33 *(42%)* |
| | SECONDARY | 19 *(43%)* | - | 22 *(71%)* | 41 *(53%)* |
| | OCCASIONAL | 0 *(0%)* | - | 1 *(3%)* | 1 *(1%)* |
| CULTURE | DOMINANT | 11 *(25%)* | 8 *(19%)* | - | 19 *(24%)* |
| | SECONDARY | 11 *(25%)* | 17 *(40%)* | - | 28 *(36%)* |
| | OCCASIONAL | 22 *(50%)* | 17 *(40%)* | - | 39 *(50%)* |
| *Total Articles* | | 44 *(56%)* | 42 *(54%)* | 31 *(40%)* | 78 *(100%)* |

* Percentage shown is the percentage of papers for that particular metaphor.

Table 4.44. *Sample metaphor excerpts from* Information Systems Research, Management Information Systems Quarterly *and the* European Journal of Information Systems *that show evidence of machine (underlined), organism (italicised), and culture (italicised and underlined) metaphors when discussing people in 2008*

| JOURNAL | MACHINE, ORGANISM AND CULTURE COMBINATION EXCERPTS |
|---|---|
| ISR | Offering volunteers *meaningful* work opportunities may increase their *loyalty* and *commitment* to the organization [skip paragraph] The second challenge - managing the work done by Internet-based volunteers - entails work design... work must be designed (or a work design must be chosen) so that the basic unit of work contribution is both small and *meaningful* (p.409)...In this paper, we examined how managers interested in *cultivating* their online communities as a virtual extension of their organizational work force might more effectively retain volunteers and ensure high-quality contributions. (Moon & Sproull 2008, p. 495) |
| | OSSNs have *inherited* much of their IT infrastructure from OSS communities; thus enabling the use of social mechanisms to overcome exchange problems. OSSNs are, thus, particularly noteworthy as commercial business networks in that they are shaped by the *informal ethos* and operational style of the OSS communities from which they originated, and with which they continue to interact. (Feller et al. 2008, p. 476) |
| | Digitally enabled teams are *hybrid* teams (p.315) ...Social interactions through the network ties are the mechanisms by which teams exchange information to integrate knowledge successfully (Patrashkova-Volzdoska et al. 2003) and are directly related to performance for knowledge integration tasks (Baldwin et al. 1997) (p.318)...In summary, the more team members *identify* with the team, *trust* the team, perceive an *obligation* to the team, and are willing to abide by the team *norms*, the more they will share information. (Robert, Dennis & Ahuja 2008, p. 320) |
| MISQ | In reviewing the research on offshore sourcing, Levina and Ross (2003), suggest that the primary reason behind offshore sourcing is the need to reduce and control IT operating costs. [skip paragraph] This group is differentiated from the previous two by its underlying assumptions that there are shared *norms* and a harmony of *interests* between parties that go beyond the formal contract. (p.259)... We have sent several engineers to *hand-hold* at other sites, if the deliverable was new to the other site. (Holmström Olsson et al. 2008, p. 273) |

| | |
|---|---|
| | *Cultural* Distance - Throughout the cases, the team members perceived obvious differences in the German and Indian working *culture*. [skip 3 sentences] *Feed*back mechanisms were established in order to recognize misunderstandings at an early stage (Dibbern, Winkler & Heinzl 2008, p. 355) |
| | It [distributed work] is characterized by geographic dispersion, reliance on electronic media, and national diversity... which form "a centrifugal force that propels team members apart from each other," causing breakdowns in communication, coordination, control and cohesion. [skip paragraph] Cramton and Hinds (2005, p.236), for example, argue that differences in demographic attributes and individual backgrounds may result in people having different *worldviews*, values, *beliefs*, goal priorities and *behavioral norms*, and being accorded different amounts of *power* and *status*. (Vlaar, van Fenema & Tiwari 2008, p. 230) |
| EJIS | Participatory Design, with the underlying assumption that design is mostly concerned with determining details to meet a particular purpose, focuses on an *emancipatory* element that is guided by conflicts and concerns as perceived by the user. (p.308) [skip paragraph] Such a struggle emphasises that *learning* occurs when these two parties try to align their respective activities, which then informs the actual innovation process and the resulting product itself.[skip 4 paragraphs]... In recognition of the impact of the supra-individual influences on activities, even when a subject is apparently working alone, the community component gives weight to the social and *cultural* context of the work *environment* and to *neighbouring* activities. (Kietzmann 2008, p. 308) |
| | Since then, discussions about privacy and its associated concerns have extended to social, *cultural*, and psychological issues. In fact, it is believed that privacy is not an inert concept that exists in a vacuum, but instead is strongly influenced by *environmental* forces (Junglas, Johnson & Spitzmuller 2008, p. 388) |
| | Flaming is generally defined as the anti-*normative* hostile communication (p.418)...Furthermore, flaming is the hostile communication of emotions (Selfe & Meyer, 1991; Lea et al., 1992), and such communication is likely to evoke feelings of anger in the recipient because of *emotional contagion*, in which one individual unconsciously *mimics emotions* displayed by another (p.418) ...This trend [social interaction over computer mediated channels] is being driven by the increase in online transactions enabled by the internet. (Johnson, Cooper & Chin 2008, p. 430) |

As with the organisational and technology concepts, excerpts in Table 4.44 highlight that talking about people as cultural beings also involves talking about people as machines and, to a lesser extent, organisms. The cultural metaphor for people always occurred in combination with the two other alternative metaphors: in particular *people-as-machine* but also *people-as-organism*.

## 4.7 Conclusions

In this chapter the results of the fictive metaphor analysis as applied to the most recent year of published articles in *Management Information Systems Quarterly*, *Information Systems Research* and the *European Journal of Information Systems* were provided. Results were presented by key Information Systems concept and focused on three aspects of discourse: how strongly discourse associated with each of the three root metaphors was evidenced along with specific examples, forms and types of each root metaphor, frequency and variety of associated metaphoric discourse within articles. It was shown that while there were differences between journals and concepts the discourse surrounding organisations, technology and people is primarily sourced from the machine domain. Mechanistic discourse is more frequent and varied both within and across articles. Key Information Systems concepts as machines also come in a wide variety of forms. Furthermore, mechanistic discourse is apparent in all significant aspects of the research that is reported: in the problems that are discussed, in the theories that are relied on, and in the methods that are used. Moreover, while evidence of both the organism and culture metaphors were found in current conceptualisations of key Information Systems concepts they only ever occurred in combination with mechanistic discourse. This is not however, the case in reverse: mechanistic discourse is evidenced on its own. While this chapter has focused on current conceptualisations in Information Systems research, attention now turns to how these conceptualisations may have changed over time with the results of the following two chapters.

# Chapter 5 - CHANGING IMAGES FOR ORGANISATIONS

## 5.1 Introduction

This chapter follows on from the previous chapter, Chapter 4, by exploring diversity in Information Systems research over time. As with the previous chapter, this chapter relies on the same philosophical approach, theory and method outlined in Chapter 3 to do so: the fictive approach, metaphor theory and comprehensive corpus method. This chapter presents the results of applying this unique approach to academic literature in Information Systems published during an eight-year period: 2000–2007 inclusive. A single premier journal – *Information Systems Research* – was selected as the evidentiary data source for the analysis. The evidentiary data set totalled 152 articles, representing almost 3000 pages of text – almost double the number of articles in the previous chapter and almost three times the number of pages. These articles were examined for evidence of three root metaphors – machine, organism and culture – in relation to a single key Information Systems concept: the organisation. Due to the considerable size of the data set only a single concept was chosen in this stage of the analysis. This was part of the original sampling strategy as outlined in Chapter 3 Section 3.4.5. The results reveal some fluctuations with regards to how much articles have relied on these metaphors and also the ways in which they have done so. Nevertheless, the results tend to support those of the previous chapter: there is an overall tendency to conceptualise a key Information Systems concept via the machine metaphor.

In keeping with the presentation style of the previous chapter, this chapter begins with an overview of the findings (Section 5.2). This chapter outlines how the key Information Systems concept – that of the organisation – explored in this phase of the study was discussed (Section 5.3). Unlike the outline in the previous chapter however, the outline in this chapter includes how the focus of discussions has changed over the eight-year period. The following subsections (Sections 0 – 5.6) present the results for each of the metaphors examined in order of most prevalent to least prevalent: *organisation-as-machine* (Section 0), *organisation-as-organism* (Section 5.5) and *organisation-as-culture* (Section 5.6). In the presentation of these metaphors, the primary evidence – metaphor tokens – associated with that metaphor is detailed. This is followed by a discussion of the forms and types in which the metaphor manifests. The frequency and variety of discourse associated with the metaphors is also detailed. The next major section (Section 5.7) outlines the different ways in which each of the root metaphors occurred – either in isolation or combination – in the articles. The chapter concludes with some final reflections before moving on to the last results chapter: Chapter 6.

## 5.2 Results overview

Table 5.1 presents the results of the fictive metaphor analysis on the full set of articles published in *Information Systems Research* over an eight-year period: 2000-2007 inclusive. The most significant finding from this stage of the analysis is that there is more evidence associated with the machine metaphor in relation to the organisational concept – regardless of year – than any other metaphor. Consistent with the results of the previous chapter, not only is the machine metaphor evident in all articles, it is also categorised as dominant in the vast majority of articles – regardless of year. Hence, consistent with the results of Chapter 4, the machine metaphor emerges as the most salient and powerful metaphor in these results.

The particular skew toward the machine metaphor uncovered in these results is even more pronounced than those uncovered in the previous chapter. As can be seen in Table 5.1, the skew toward the machine metaphor is greater on average over time than it is in the most recent results of 2008 (see Table 4.2). For instance, as shown in Table 4.2, the *organisation-as-machine* metaphor is evident in all articles published in *Management Information Systems Quarterly*, the *European Journal of Information Systems* and *Information Systems Research* during the 2008 period – just as it is in all articles published in *Information Systems Research* over the eight-year period 2000-2007 inclusive. Yet, the *organisation-as-machine* metaphor is dominant in more articles on average over time (89%) than it is in these three journals during the most current publishing year 2008 (58%). It is also dominant in slightly more articles on average over time (89%) than it has been in the same journal in its most current year (83%). Hence, regardless of whether one takes the total average of all journals and compares it with the average of *Information Systems Research* over time or if one simply compares the current results of *Information Systems Research* with its own average over time, the skew toward the machine metaphor is greater in these results than those of the previous chapter.

The following sections will discuss these results in further detail.

Table 5.1. *Results of metaphor analysis for organisation over the period 2000-2007 inclusive*

| **Source** | **Strength** | **Organisation** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Total |
| Machine | Dominant | 16 | 20 | 18 | 13 | 17 | 18 | 13 | 19 | 134 |
| | Secondary | 6 | 1 | 2 | 0 | 0 | 3 | 3 | 0 | 15 |
| | Occasional | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 3 |
| *Total Articles* | | *23 (100%)* | *21 (100%)* | *20 (100%)* | *13 (100%)* | *18 (100%)* | *21 (100%)* | *16 (100%)* | *20 (100%)* | *152 (100%)* |
| Organism | Dominant | 9 | 2 | 9 | 3 | 3 | 6 | 3 | 8 | 43 |
| | Secondary | 7 | 10 | 2 | 2 | 7 | 7 | 5 | 2 | 42 |
| | Occasional | 5 | 9 | 7 | 5 | 5 | 4 | 4 | 4 | 43 |
| *Total Articles* | | *21 (91%)* | *21 (100%)* | *18 (90%)* | *10 (77%)* | *15 (83%)* | *17 (81%)* | *12 (75%)* | *14 (74%)* | *128 (84%)* |
| Culture | Dominant | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | Secondary | 2 | 4 | 0 | 3 | 0 | 2 | 2 | 1 | 14 |
| | Occasional | 4 | 5 | 4 | 2 | 8 | 7 | 0 | 6 | 36 |
| *Total Articles* | | *6 (26%)* | *9 (43%)* | *4 (20%)* | *5 (39%)* | *8 (44%)* | *10 (48%)* | *2 (13%)* | *7 (37%)* | *51 (34%)* |
| TOTAL CODED ARTICLES | | 23 | 21 | 20 | 13 | 18 | 21 | 16 | 20 | 152 |
| TOTAL PUBLISHED ARTICLES | | 24 | 23 | 27 | 17 | 20 | 21 | 23 | 25 | 180 |

Note: % shown is rounded to the nearest per cent.

## 5.3 Discourse on organisations

The organisation as a concept is a popular focus of discussion in the published articles of *Information Systems Research* during the period 2000-2007 inclusive. As shown in Table 5.1, approximately 84% of articles contained evidence of a root metaphor when discussing organisations. In the remaining 16% of articles there was very little or no discussion of organisations at all. In the 84% of articles that contained some evidence of a root metaphor when discussing organisations over half of these articles – 88 articles – had a very strong or almost exclusive focus on organisations. It is interesting, however, to note how the focus of discussion concerning organisations has changed over the years from more of an internal focus to that of a more external focus.

At the beginning of the analysis period, in 2000, the focus was still very firmly at the internal organisational level with topics such as workflow analysis (Basu & Blanning 2000) and firm-level production of information services (Gurbaxani, Melville & Kraemer 2000). Although this focus was maintained over the years, other articles began to appear with a more pluralistic and external focus. For instance, Chwelos, Benbasat and Dexter (2001) and Raghunathan and Yeh (2001) examine the use of EDI technologies, and Devaraj, Fan and Kohli (2002) and Zhu and Kraemer (2002) deal with the phenomena of e-commerce enabled by these technologies. In 2003/2004 articles examining the supply chain organisation (Fan, Stallaert & Whinston 2003) and the IT outsourcing phenomenon (Lee, Miranda & Kim 2004) began to appear. In 2005, 2006 and 2007 articles continued the exploration of relationships and phenomena such as inter-organisational supply chains (Ghose, Mukhopadhyay & Rajan 2007) and e-commerce (Dinev & Hart 2006; Malhotra, Gosain & El Sawy 2007; Zhu & Kraemer 2005). New relationships and phenomena such as global service disaggregation (Mithas & Whittaker 2007) also appeared in discussions, which helped gradually to stretch the focus well beyond the single organisational boundary.

Regardless of whether the focus was at the intra-organisational or inter-organisational level, or even whether organisations were the prime focus of discussion at all, metaphoric language was often used to discuss organisations. Such metaphoric language was frequently based in the source domains of the three metaphors explored in this study: machine, organism and culture. The following sections present the evidence associated with each of these three metaphors.

## 5.4 Organisation as machine

As noted in the previous chapter, the *organisation-as-machine* metaphor is evidenced both when organisations are a strong focus of discussion as well as when they form an important situating or background concept. As is highlighted in Table 5.2 this metaphor was pervasive across all articles in all years. So much so, that all articles displayed some evidence of the machine metaphor and – more often than not – articles were categorised as dominant in 89% of articles on average for this metaphor. As discussed previously this is significantly more than the most recent results revealed in the previous chapter. The average result for all journals in 2008 was 58% and the average result for *Information Systems Research* – the same journal that the results in this chapter are based on – was 83%. Hence, these results show that the machine metaphor has been an even more popular way of structuring and understanding organisations in the past than more recent results reveal.

Figure 5.1 shows how the popularity of the machine metaphor has changed over time in relation to the organisational concept – there have been peaks and troughs. As shown in the figure, the only time at which the number of articles categorised as dominant for the organisational machine metaphor waned was in 2000. Yet, even during this time, a clear majority – around 68% of all articles – were categorised as dominant for this metaphor. In contrast to the year 2000, Figure 5.1 shows that the year 2003 was when articles categorised as dominant for the organisational machine metaphor peaked, with 100% of articles being categorised in this way. It should be noted that during this year there were a relatively low number of articles available for coding – approximately seven fewer articles than the yearly average. Yet, if one compares the results against all other years the result is not outstanding. Even if one includes the year 2000 the chances of *not* encountering an article that is likely to be categorised as dominant for the organisational machine metaphor is low with a ratio of approximately 1:10.

A few instances of how mechanistic discourse was evidenced over the years are provided in Table 5.3.

Table 5.2. *Results of* organisation-as-machine *metaphor over the period 2000-2007 inclusive (sub-set of Table 5.1)*

| Source | Strength | Organisation | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Total |
| Machine | Dominant | 16 *(70%)* | 20 *(95%)* | 18 *(90%)* | 13 *(100%)* | 17 *(94%)* | 18 *(86%)* | 13 *(81%)* | 19 *(95%)* | 134 *(89%)* |
| | Secondary | 6 *(26%)* | 1 *(5%)* | 2 *(10%)* | 0 | 0 | 3 *(14%)* | 3 *(19%)* | 0 | 15 *(10%)* |
| | Occasional | 1 *(4%)* | 0 | 0 | 0 | 1 *(56%)* | 0 | 0 | 1 *(5%)* | 3 *(2%)* |
| *Total Articles* | | *23* | *21* | *20* | *13* | *18* | *21* | *16* | *20* | *152* |
| TOTAL CODED ARTICLES | | 23 | 21 | 20 | 13 | 18 | 21 | 16 | 19 | 152 |

*Note*: Percentages in year columns show percentages of articles for that year.

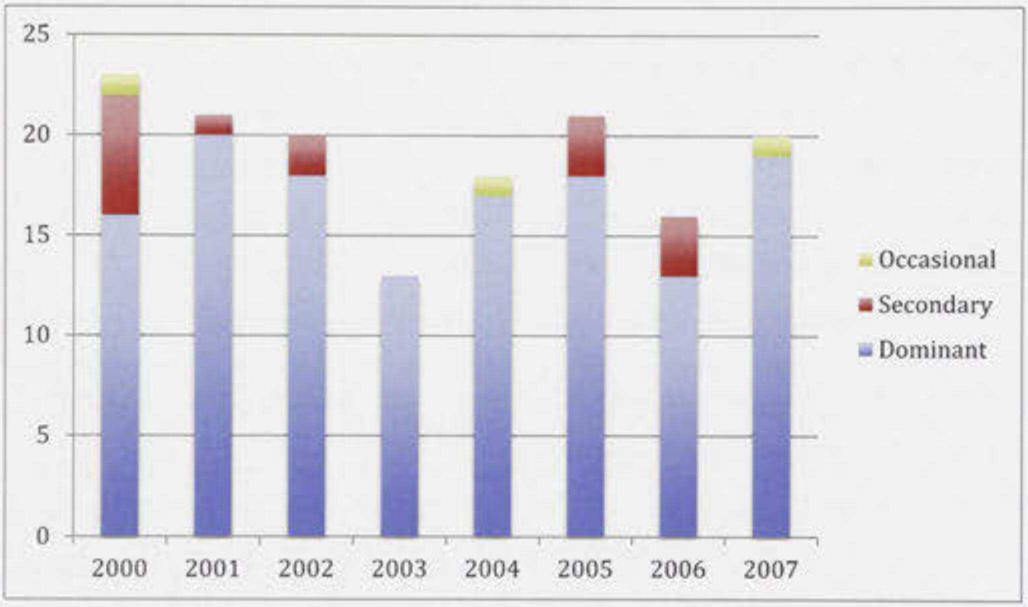


*Figure 5.1.* Categorisation strength of articles appearing in *Information Systems Research* showing evidence of the *organisation-as-machine* metaphor over the period 2000-2007 inclusive (derived from Table 5.2)

Table 5.3. *Sample metaphor excerpts for the* organisation-as-machine *metaphor from the* Information Systems Research *journal over the period 2000-2007 inclusive*

| YEAR | ORGANISATION AS MACHINE EXCEPRTS |
|---|---|
| 2000 | As demonstrated by entrepreneurial firms such as Amazon.com, E*Trade, and Commerce One, IT is increasingly the engine driving the new business models ... (Sambamurthy & Zmud 2000, p. 105) |

| | |
|---|---|
| 2001 | The clockspeed of the firm (Yoffie and Cusumano 1999) may be fundamentally different in conventional and e-commerce environments. (Subramani & Walden 2001, p. 138) |
| 2002 | Others refer to similar market dynamism as "high velocity markets" where successful business models and industry structure are unclear (Eisenhardt and Martin 2000). These competitive conditions fuel a demand for innovation and speed while digital networks offer both speed and an opportunity for innovating [in firms]. (Wheeler 2002, p. 126) |
| 2003 | Commerce on the Internet is still far from being "friction free," because business partners cannot exchange information about their business processes in an automated manner. (van der Aalst & Kumar 2003, p. 23) |
| 2004 | Here I focus on the former, as the posited model is concerned with economic drivers of investment in new technology. (Fichman 2004, p. 145) |
| 2005 | Organisations put these diverse professionals on ISD project teams as a means of addressing market necessities or in hopes of igniting creative sparks to discover new market opportunities. (Levina 2005, p. 109) |
| 2006 | Prior research suggests that a portfolio of different mechanisms, employed frequently, can be required for effective knowledge transfer [across individuals in different organisational units]. (Slaughter & Kirsch 2006, p. 301) |
| 2007 | As an example, for a name-your-own-price retailer Hann and Terwiesch (2003) find a "frictional" cost of about $5 per e-business transaction. (Weber & Zheng 2007, p. 418) |

### 5.4.1. Forms and types of organisations as machines

Table 5.3 highlights some of the many different forms in which the organisational machine appeared in over the years. In particular, it highlights the propensity to conceptualise the organisational machine in particular forms and with different mechanical components (eg. *engines, clocks, mechanisms*). Consistent with the results of the previous chapter, levers and mechanisms were the most commonly evidenced forms and components of the organisational machine metaphor exhibited over time. In addition to levers and mechanisms the generator component was also frequently evidenced.

The following sub-sections discuss these three forms in more detail. Specifically the discussion focuses on how these forms were realised in the published articles of *Information Systems Research* during the eight-year period 2000–2007 inclusive.

### Lever

The lever occurs metaphorically not only within organisations but also between organisations and customers as well as inter-organisationally. Within organisations, technologies that act as levers include Distributed Learning (DL) technologies (Alavi, Marakas & Yoo 2002) and integrated information systems (Bharadwaj, Bharadwaj & Bendoly 2007). Other levers within organisations include:

- strategic business *levers* (assets and competencies, processes, relationships, and knowledge) (Sambamurthy & Zmud 2001);
- economic and financial *levers* (Dewan & Ren 2007; Levina 2005); and
- operational *levers* (Dewan & Ren 2007).

Inter-organisationally, technological levers include the Internet (Zhu & Kraemer 2005) and proprietary technology (Lee & Mendelson 2007). Between organisations and people, Tam and Ho (2005) refer to the *lever* of web personalisation technologies (Tam & Ho 2005).

There are several different types of things that are leveraged within organisations, inter-organisationally or between organisations and people through technologies. Within organisations these include such things as:

- learning and resources (Subramani & Walden 2001);
- intellectual assets (Ba, Stallaert & Whinston 2001);
- strategic and marketing analysis (Levina 2005);
- economies of scale, learning and the knowledge of employees (Lee, Miranda & Kim 2004);

- distributed teams (Majchrzak, Malhotra & John 2005);
- employee expertise (Kirsch 2004); and
- knowledge (Bala & Venkatesh 2007).

Inter-organisationally these include:

- monopoly position (Bakos et al. 2005),
- associated assets, competencies and knowledge (Sambamurthy & Zmud 2000),
- combined assets (Malhotra, Gosain & El Sawy 2007) and
- partner interface processes (Bala & Venkatesh 2007).

Between organisations and individuals these include resources and IT assets (Saraf, Langdon & Gosain 2007).

In terms of what is gained by the leverage, authors typically focus on fiscal advantages – regardless of whether the lever is conceived to exist within the organisation, inter-organisationally or between organisations and people. For instance within the organisation, authors make clear the importance of increasing revenues (Dewan & Ren 2007), lowering costs (Mithas & Whitaker 2007), *generating* value (Ba, Stallaert & Whinston 2001) and making positive excess returns (Im, Dow & Grover 2001) through various technological and non-technological *levers*. Likewise, inter-organisationally 'technology-led revenues' (Kauffman, McAndrews & Wang 2000, p. 77), avoiding losses (Gal-Or & Ghose 2005), increasing high margins (Bakos et al. 2005) as well as profit (Lee & Mendelson 2007) through the use of similar *levers* is the main aim. Other non-fiscal advantages or purposes of *levers* within organisations include innovation (Levina 2005; Sambamurthy & Zmud 2000), 'significant benefit streams' (Subramani & Walden 2001, p. 149), outstanding business results (Bassellier, Benbasat, & Reich 2003), competitive value (Zhu & Kraemer 2002), business performance (Zhu & Kraemer 2005), and superior performance (Bharadwaj, Bharadwaj & Bendoly 2007). Inter-organisational advantages or goals include control (Kirsch 2004), B-2-B capabilities (Ranganathan

& Brown 2006), services (Kumar & Benbasat 2006) and managing relationships (Saraf, Langdon & Gosain 2007).

## Mechanism

Organisational mechanisms, like levers, make their metaphorical appearance at the same three levels: intra-organisational, inter-organisational and between organisations and people (such as customers).

The types of mechanisms that are conceived to exist within organisations include:

- coupling and coordination *mechanisms* for interconnecting different IT professionals within an IT organisation (Sambamurthy & Zmud 2000);

- control *mechanisms* in the context of IS projects (Kirsch 2004) as well as in the context of process synthesis and decomposition (Basu & Blanning 2003);

- work distribution and allocation *mechanisms* (Basu & Kumar 2002; Nadiminti, Mukhopadhyay & Kriebel 2002); sourcing *mechanisms* for gaining access to specialised skills and capabilities globally (Tanriverdi, Konana & Ge 2007);

- motivational and incentive *mechanisms* (Banker & Slaughter 2000; Raghu, Jayaraman & Rao 2004) for personnel - or what Raghu, Jayaraman and Rao (2004) refer to as the 'human *component*' (p.316);

- knowledge and learning based *mechanisms* in 'high-*velocity* and traditional markets' (Wheeler 2002, p. 126); as well as

- knowledge transfer *mechanisms* across individuals in organisational units involved in software production (Slaughter & Kirsch 2006).

Inter-organisational mechanisms include:

- views of institutional structures as trust-building and not risk-reducing *mechanisms* (Pavlou & Gefen 2005);

- contractual *mechanisms* related to CRP (Raghunathan & Yeh 2001);

- control *mechanisms* under a client-contractor relationship (Cavusoglu, Mishra & Raghunathan 2005) as well as external control *mechanisms* which deter IT related crimes (Ho, Ang & Straub 2003);

- coordination *mechanisms* that help '*drive* manufacturing performance' (Bharadwaj, Bharadwaj & Bendoly 2007, p. 437);

- referral selling *mechanisms* in an intermediated search market (Weber & Zheng 2007);

- decentralized *mechanism* design for 'supply *chain* organisations' (Fan, Stallaert & Whinston 2003, p. 1); and

- reputation *mechanism* design in trading environments (Dellarocas 2005).

Organisational/people mechanisms include:

- feedback *mechanisms* (Hu et al. 2004; Kim & Benbasat 2006; Pavlou & Dimoka 2006; Raghu, Jayaraman & Rao 2001; ) in the context of online marketplaces;

- deterrence *mechanisms* in the context of digital piracy (Chellappa & Shivendu 2005); and

- functional *mechanisms* (Jiang & Benbasat 2007) underlying the online presentation of a firm's products.

As with the lever component, conceptualisations of mechanisms are typically realised through technology or are themselves technological instantiations.

### Generator

Generators appear frequently either as a conceptualisation of an organisation as a whole or as a component of the organisation. While this term is not evident in the years 2003 and 2004, it is frequently present in other years, particularly 2000, 2001 and 2005. The most common use is in relation to increasing profits (Gal-Or & Ghose 2005; Nault & Vandenbosch 2000; Straub & Watson 2001), sales (Wu, Cook & Strong 2005; Zhu & Kraemer 2005) or revenue (Subramani & Walden 2001). Generating value, whether it be general business value (Ba, Stallaert & Whinston 2001; Raghunathan & Yeh 2001) or more specific value such as customer value

(Sambamurthy & Zmud 2000) or option values (Ranganathan & Brown 2006) are also common. Other outputs of organisational generation, which are not fiscally related include 'effective network size' (Kauffman, McAndrews & Wang 2000, p. 61) decision solutions (Sabherwal & Chan 2001) and information services (Gurbaxani, Melville & Kraemer 2000). When an organisational component is referred to as a generator it is usually a general or specific type of IT or IT related service. In 2001, such specific IT related services included online auctions and electronic mail hosting services, so-called information products (Subramani & Walden 2001). In 2005 it included websites (Wu, Cook & Strong 2005) and in 2007 Internet referral services, what Ghose, Mukhopadhyay and Rajan (2007) terms 'digitally enabled lead *generators*' (p. 300).

Other forms and types of machinery commonly evidenced – although not as frequently as levers, mechanisms and generators – included *chains* (Tam & Ho 2005; West & Dedrick 2000), *locks* (Lee & Mendelson 2007; Straub & Watson 2001) and *links* (Menon, Sarkar & Mukherjee 2005; Sabherwal & Chan 2001). Several other forms and types of machinery not so commonly evidenced over the years were *propellers* (Straub & Watson 2001; Zhu & Kraemer 2002); *gears* (Jarvenpaa, Shaw & Staples 2004); *hubs* (Wheeler 2002); *stovepipes* (Basu & Blanning 2000) and *rudders* (Wheeler 2002).

In addition to direct references to different forms and types of metaphorical organisational machine, many indirect references were made to both internal and external operational aspects of machines. For example, external organisational operations as well as certain internal processes are *accelerated* (Kudyba & Diwan 2002; Zhu & Kraemer 2005), *launched* (Zhu & Kraemer 2002), *piloted* and *steered* (Wheeler 2002), gain or lose *traction* (Wheeler 2002), and are even *wound-up* (Moore 2001). Internal (Sambamurthy & Zmud 2000) and external (Wheeler 2002) processes must also be able to be *switched* accurately and precisely. Additionally, organisations must also be able to *lock*, *lock-in* or *unlock* customers (Straub et al. 2002), business partners (Malhotra, Gosain & El Sawy 2007), products and services (Kauffman, McAndrews & Wang 2000) as well as systems (Straub & Watson 2001). In relation to internal operations, organisations are described as needing *fuel* (Subramani & Walden 2001; West & Dedrick 2000) that *sparks* (Garfield et al. 2001) or *ignites* (Levina 2005) certain internal processes. Moreover, internal and external operations need *fine-tuning* (Sambamurthy & Zmud 2000) and are subject to *overload*

(Fan, Stallaert & Whinston 2003), *breakdowns* (Saraf, Langdon & Gosain 2007), *burnouts* (Wheeler 2002), *turnover* (Ma & Agarwal 2007), *friction* (van der Aalst & Kumar 2003) and may need *fixing* (Mishra, Konana & Barua 2007).

Organisations, like technologies, are *designed* (Tanriverdi, Konana & Ge 2007), *assembled* (Zhu & Kraemer 2002) and construct their own internalized *factories* (Garfield et al. 2001). They come with *blueprints* (Slaughter & Kirsch 2006; Straub et al. 2002) and have *platforms* (Zhu & Kraemer 2005).

### 5.4.2. Frequency and variety of mechanistic discourse within articles

As highlighted in Table 5.3, mechanistic discourse was frequently in evidence and in a wide variety of ways across articles, when discussing organisations. This same frequency and variety was also evident within many articles. Indeed, a significant number of articles over the years (24 in total) relied solely on mechanistic discourse when discussing the organisational concept. Furthermore, as was noted in the previous chapter, mechanistic discourse typically occurred in all significant aspects of the research discussed: problem formulation, theories relied on and methods used. This was the case whether an article relied solely on mechanistic discourse or not.

One example of the frequency and variety of mechanistic discourse within an article is Straub and Watson's (2001) research commentary on net-enabled organisations (NEOs). This focuses on future NEO-IS research: what it is, what it isn't and the types of problems that should be investigated. In doing this, it provides a definition for NEOs as well as a rather comprehensive examination of the two primary net-enabled relationships they form in the marketplace: B2C and B2B. In these discussions metaphoric discourse from all three root source domains is evident, although to varying degrees, and the categorisation for the paper turns out to be dominant, secondary and secondary for the machine, organism and culture metaphors respectively. The metaphoric discourse associated with the machine domain is not only more frequent but also more varied.

To elaborate on this point a little further, Straub and Watson (2001) rely on various culture-related discourse and organic discourse to discuss NEOs. For instance, they use the term '*revolution*' (p. 337; p. 338; p. 340) several times when discussing net-enablement as well as the term '*verboten*' (p. 341) to discuss forbidden firm practices.

They also discuss carriers as being '*wedded* to the firm' (p. 341) as well as the ability of NEOs to 'build *trust* and *loyalty*' (p. 342) of their customers. This discourse stems from the cultural domain. Likewise, metaphoric discourse from the organism domain is relied on to discuss NEOs and their relationships, with terms such as 'IS-enabled *environments*' (p. 338), 'organisational *survival*' (p. 339), 'best-of-*breed* firms' (p. 341) and the '*evolution* of NE' (p. 344).

Nevertheless, metaphoric discourse from the machine domain is much more frequent and varied. Machine metaphoric discourse is evident on every page and also in every major section of this article. For instance, Straub and Watson (2001) open their introduction with 'the *explosion* of the Internet' (p. 337) before moving on to consider 'which other factors might be *driving* NE' (p. 338). Terms such as *links*, *linkage*, *generating*, *mechanisms*, *chains*, *acceleration*, *propel* and *locked* are frequently relied on in their discussion of NEOs and their relationships. Straub and Watson (2001) also discuss how organisations 'deconstruct their businesses... into *component* pieces and *reassembl*[e] them again' (p. 341). These instances, all from the machine domain, are not only more frequent but also more varied than those from the organism and culture domains.

Straub and Watson (2001) was categorised as dominant, secondary and secondary for the machine, organism and culture metaphors respectively, but the frequency and variety of machine discourse in this article is typical of other articles, even those that were categorised as dominant for two or all of the root metaphors examined.

## 5.5 Organisation as organism

Table 5.4 shows that the *organisation-as-organism* metaphor was evident in the majority of articles in the majority of years. Over the time period examined around 84% on average of all articles showed evidence of this metaphor. Yet, this is still less than the *organisation-as-machine* metaphor, which is evident in all – 100% – articles. Furthermore, as is apparent in Figure 5.2 the *organisation-as-organism* metaphor is categorised as dominant in fewer articles than the *organisation-as-machine* metaphor – regardless of year. As highlighted in Figure 5.2 the year at which articles categorised as dominant peaked was in 2002 with 45% of all articles being categorised in this way. Yet compared with the results presented in Figure 5.1 this peak is still considerably less than the percentage of articles categorised as dominant for the machine metaphor regardless of the year examined. Hence, as was revealed in the previous chapter, these results confirm that the organism metaphor is a less favoured way of conceptualising organisations.

Table 5.5 provides some samples of how organic discourse was evidenced in articles across all 8 years examined.

Table 5.4. *Results of* organisation-as-organism *metaphor over the period 2000-2007 inclusive (sub-set of Table 5.1)*

| **Source** | **Strength** | **Organisation** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Total |
| Organism | Dominant | 9 *(39%)* | 2 *(10%)* | 9 *(45%)* | 3 *(23%)* | 3 *(17%)* | 6 *(29%)* | 3 *(19%)* | 8 *(40%)* | 43 *(28%)* |
| | Secondary | 7 *(30%)* | 10 *(48%)* | 2 *(10%)* | 2 *(15%)* | 7 *(39%)* | 7 *(33%)* | 5 *(31%)* | 2 *(10%)* | 42 *(28%)* |
| | Occasional | 5 *(22%)* | 9 *(43%)* | 7 *(35%)* | 5 *(38%)* | 5 *(28%)* | 4 *(19%)* | 4 *(25%)* | 4 *(20%)* | 43 *(28%)* |
| *Total Articles* | | *21 (91%)* | *21 (100%)* | *18 (90%)* | *10 (77%)* | *15 (83%)* | *17 (81%)* | *12 (75%)* | *14 (74%)* | *128 (84%)* |
| TOTAL CODED ARTICLES | | 23 | 21 | 20 | 13 | 18 | 21 | 16 | 19 | 152 |

*Note*: Percentages in year columns show percentages of articles for that year.

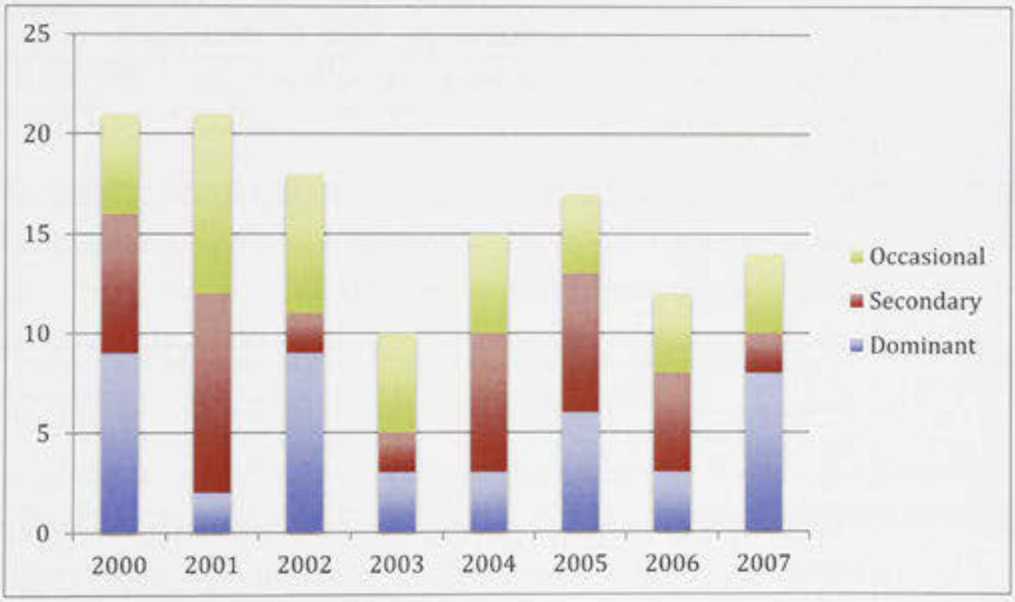


*Figure 5.2.* Categorisation strength of articles appearing in *Information Systems Research* showing evidence of the *organisation-as-organism* metaphor over the period 2000-2007 inclusive (derived from Table 5.4)

Table 5.5. *Sample metaphor excerpts for the* organisation-as-organism *metaphor from the* Information Systems Research *journal over the period 2000-2007 inclusive*

| YEAR | ORGANISATION AS ORGANISM EXCERPTS |
|---|---|
| 2000 | Firms such as Intel, Hewlett Packard, and Motorola have maintained their lead over several product generations by "*eating* their own lunch": launching products, which *cannibalize* their current leading products … (Nault & Vandenbosch 2000, p. 304) |
| 2001 | With the current *stampede* toward electronic commerce, businesses no longer have the luxury of setting up trading-partner-specific communication systems (Moore 2001, p. 34) |
| 2002 | Firms that have *embraced* these digital networks-net-enabled organisations (Straub and Watson 2001)-can execute transactions, rapidly exchange information, and innovate through new business processes at an unprecedented pace … (Wheeler 2002, p.125) |
| 2003 | In this form of outsourcing, an IT department (including the employees, systems, and operations) within an organisation gets "spun-off" into a separate external entity, becoming empowered to *behave* as an external vendor … (Ho, Ang & Straub 2003, p. 66) |
| 2004 | The pace of change in the information technology (IT) field has been rapid over the past decade, with a *host* of promising new platform technologies confronting forward-*looking* organisations … (Fichman 2004, p. 132) |
| 2005 | By using the out-of-the-box configuration, firms may be taking the easy way out, but they may be *hurting* themselves. (Cavusoglu, Mishra & Raghunathan 2005, p. 40) |
| 2006 | This bond between company and customer can be examined along two distinct relationship orientations – transactional and social... the social focuses on the relational nature that is exemplified by *feelings* of intimacy and warmth … (Kumar & Benbasat 2006, p. 425) |
| 2007 | New organisational forms *spawned* by developments in information technologies (IT) continue to intrigue researchers and practitioners. (Ma & Agerwal 2007, p. 42) |

### 5.5.1. Forms and types of organisations as organisms

Five types of the *organisation-as-organism* metaphor were identified in these results. Two of these forms were also found in the results of the previous chapter: *organisation as frog* and *organisation as horse*. Nault and Vandenbosch (2000), like Newkirk, Lederer and Johnson (2008) in the previous chapter, refer to an organisation's 'leap*frogging*' (p. 312) behaviour. Wheeler (2002), Ghose, Mukhopadhyay and Rajan (2006) as well as Mithas and Whitaker (2007) use the term *spur*, which was also used by Ramasubbu et al. (2008) in the previous chapter. As identified in the previous chapter both these forms are indirect references. Two other forms of the *organisation-as-organism* metaphor are also indirect references: *organisation as slug* and *organisation as bull*. Subramani and Walden (2001) refer to a '*bull* market' (p. 135) and a '*bullish* phase' (p. 151). Nault and Vandenbosch (2000) refer to '*sluggish'* (p. 305) development processes. The *organisation as apple* is the only form that is a direct reference and occurs in Pavlou and Gefen (2004) who discuss organisations as 'bad *apples*' (p. 383). These five types – *frog*, *horse*, *slug*, *bull* and *apple* – are the only specific forms of the *organisation-as-organism* metaphor uncovered in these results.

As with the previous chapter, somewhat mitigating the vast gulf between the forms and types uncovered for the organism metaphor and that of the machine metaphor are the references made to a broader indeterminate form/and or type of organism. As in the previous chapter this occurs through references to anatomy and sense aspects of the organism or clearly recognisable organic relationships.

In relation to anatomy, references are made to organisations having a *face* (Marcolin et al. 2000) and *feet* (Kauffman, McAndrews & Wang 2000). References are also made to the *arms* of an organisation (Raghunathan & Yeh 2001; Schultze & Orlikowski 2004). This is most typically done to denote distance or closeness of relationships between firms. The *hands* of an organisation are also referred to when denoting similar arrangements or ease/competence in a task as, for example, 'single-*handedly'* (Pavlou & Gefen 2004, p. 40).

Sensing and responding were basic physiological aspects of organisations commonly evidenced across the years. For example, Sambamurthy and Zmud (2000) use '*sense* and *respond'* in reference to 'a new paradigm of business strategy' (p. 106). In relation to sensing this was used in a general way (Lerch & Harter 2001) as well as more specifically in relation to the well-known senses of *sight* and *touch*. For example, Pavlou and El Sawy (2006) talk of organisational '*vision*' (p. 203) and Ghose, Mukhopadhyay and Rajan (2007) describe organisations as experiencing '*hurt*' (p. 312). Organic responses typically focus on some aspect of movement such as *grabbing*, *scrambling* (West & Dedrick 2000) and *fleeing* (Dhar & Sundararajan 2007).

Growth was one of the physiological functions most frequently referred to across all years. Yet, other physiological functions referred to included *digestion* (Malhotra, Gosain & El Sawy 2007) and *reproduction* through terms such as '*spawned*' (Ma & Agarwal 2007, p. 42) and '*birth*' (West & Dedrick 2000, p. 199).

References are also made to organisations behaving in certain organic ways, ranging from basic to more complex. Some of the more basic *behaviours* include *mimicry* (Weber & Zheng 2007) and *aggression*. *Aggression*, *fierce behaviour* and *fighting* were typically used to discuss interactions between firms competing for (Chen & Hitt 2002) or trying to attract customers (Wu, Cook & Strong 2005). *Cannibalisation* was another interesting term used in relation to organisations releasing new products (Ghose, Smith & Telang 2006; Nault & Vandenbosch 2000) or services (Bhargava & Choudhury 2004) that essentially *consume* their own existing products, typically in an attempt to remain profitable. Moore (2001) uses the term '*stampede*' (p. 34) to describe the general movement of businesses toward e-commerce. Other complex organic behaviours commonly evidenced over the years include *learning* (Im, Dow & Grover 2001) and even '*unlearning*' (Subramani & Walden 2001 p.138), *communicating* (Moore 2001) and *memorising* (Bordetsky & Mark 2000).

There are certainly more references occurring to anatomy and sense aspects as well as clearly recognisable organic relationships in this set of data than was revealed in the previous chapter. Yet, there are simply not enough references to mitigate the considerable gap that exists between the forms and types uncovered for the machine metaphor and the forms and types uncovered for the organism metaphor. This helps contribute to a less powerful image of the *organisation-as-organism* in comparison to the *organisation-as-machine*.

Table 5.6 presents some of the different anatomy and sense excerpts for the *organisation-as-organism* metaphor.

Table 5.6. *Sample excerpts for the anatomy and sense aspects of* organisation-as-organism *metaphor from* Information Systems Research *over the period 2000-2007 inclusive*

| YEAR | ORGANISM ANATOMY AND SENSE EXCERPTS FOR ORGANISATION |
|---|---|
| 2000 | We see this "*foot*-dragging" occurring in many places in the financial services industry as traditional players mull over how to get their timing right for a costly commitment to electronic commerce … (Kauffman, McAndrews & Wang 2000, p. 77) |
| 2001 | With current technologies, information is generated faster than individuals and organisations can make *sense* of it. (Lerch & Harter 2001, p. 63) |
| 2002 | Given these unique characteristics of the Internet, many organisations have *embraced* e-commerce. (Zhu & Kraemer 2002, p. 278) |
| 2003 | They concluded that outsourced ISD projects exhibit mutual organisational *learning* as the client and the vendor adjust and negotiate over time. (Choudhury & Sabherwal 2003, p. 298) |
| 2004 | It is important to note that these online marketplaces lack the legal power of traditional marketplaces to single-*hand*edly safeguard transactions. (Pavlou & Gefen 2004, p. 40) |
| 2005 | For example, online stock-trading firms like etrade.com, ameritrade.com, and datek.com advertise *aggressively* to attract visitors to their websites. (Wu, Cook & Strong 2005, p. 337) |
| 2006 | The literature suggests that IT capability has three key dimensions: ... and business-IT *vision* … (Pavlou & El Sawy 2006, p. 203) |
| 2007 | So privileged information goes beyond the collection and reporting of standard information that is symbolic of *arm's-length* partnerships … (Malhotra, Gosain & El Sawy 2007, p. 265) |

### 5.5.2. Frequency and variety of organic discourse within articles

Reliance on the *organisation-as-organism* metaphor, as evidenced through frequent and varied use of organic discourse, during the eight year period examined was limited. West and Dedrick (2000) however, are a good example of frequent and varied use of organic discourse. Terms such as *growth*, *struggle*, *fighting*, *aggression*, *cannibalisation*, and *evolution* appear in all critical parts of their examination into the Japanese PC industry standards competition: from the introduction and background through to their analysis and conclusion. Yet, as was noted in the previous chapter, regardless of the strength of categorisation, organic discourse typically appears only in the beginning and concluding parts of a paper, in the problem conceptualisation, and conclusions sections respectively. Although articles such as West and Dedrick (2000), which were categorised as dominant for the organism metaphor, are more likely to show evidence of organic discourse in the middle sections of the paper, organic discourse is typically passed over in favour of mechanistic discourse in the method and results sections (where such sections apply).

## 5.6 Organisation as culture

The culture metaphor was rarely evidenced over time – even less so than in the most recent year examined. Over time there was only a single article, by Levina (2004), which was categorised as dominant. This resulted in a total of 1% of all articles during the period of 2000-2007 inclusive being categorised as dominant for the culture metaphor. This is only a fraction of the already low percentage of articles categorised in *Information Systems Research* alone (13%) or for all journals (29%) in the year 2008. Furthermore, as highlighted in Figure 5.3, the skew of *Information Systems Research* articles away from the dominant categorisation toward secondary and occasional categorisations uncovered in the previous chapter is even more pronounced in these results.

Table 5.8 provides a sample of how the culture metaphor was evidenced over the eight years examined.

Table 5.7. *Results of* organisation-as-culture *metaphor over the period 2000-2007 inclusive (sub-set of Table 5.1)*

| Source | Strength | Organisation | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Total |
| Culture | Dominant | 0 | 0 | 0 | 0 | 0 | 1 *(5%)* | 0 | 0 | 1 *(1%)* |
| | Secondary | 2 *(9%)* | 4 *(19%)* | 0 | 3 *(23%)* | 0 | 2 *(10%)* | 2 *(13%)* | 1 *(5%)* | 14 *(9%)* |
| | Occasional | 4 *(17%)* | 5 *(24%)* | 4 *(20%)* | 2 *(15%)* | 8 *(44%)* | 7 *(33%)* | 0 | 6 *(32%)* | 36 *(24%)* |
| *Total Articles* | | *6 (26%)* | *9 (43%)* | *4 (20%)* | *5 (38%)* | *8 (44%)* | *10 (48%)* | *2 (13%)* | *7 (37%)* | *51 (34%)* |
| TOTAL CODED ARTICLES | | 23 | 21 | 20 | 13 | 18 | 21 | 16 | 19 | 152 |

*Note*: Percentages in year columns show percentages of articles for that year.

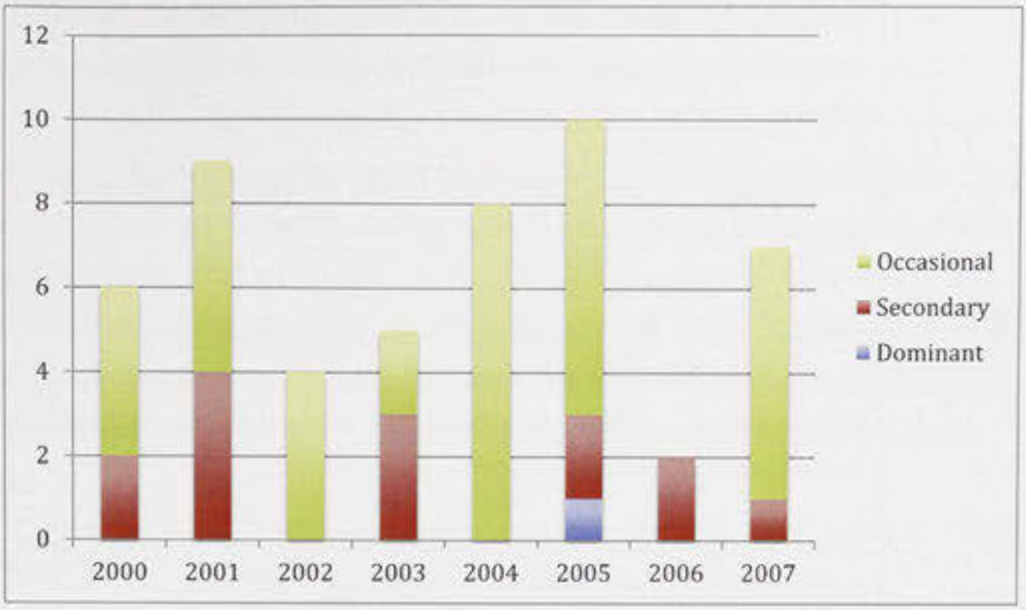


*Figure 5.3.* Categorisation strength of articles appearing in *Information Systems Research* showing evidence of the *organisation-as-culture* metaphor over the period 2000-2007 inclusive (derived from Table 5.7)

Table 5.8. *Sample metaphor excerpts for the* organisation-as-culture *metaphor from the* Information Systems Research *journal over the period 2000-2007 inclusive*

| YEAR | ORGANISATION AS CULTURE EXCERPTS |
|---|---|
| 2000 | Traditionally, programmers have operated in a politically charged atmosphere in which software errors "*must be their fault*". (Westland 2000, p. 324) |
| 2001 | It has been recognized that knowledge *altruism* may be constrained by increasing demands on the time and energy of employees, or that it may not be part of a companies *culture*... therefore it does not cultivate knowledge sharing in a systematic way. (Ba et al. 2001, p. 231) |
| 2002 | Institution-based *trust* comes from sociology, which deals with the structures (e.g., legal protections) that make an environment feel *trustworthy* (e.g., the United States immigrant *culture* of the 1800s, Zucker 1986) ... (McKnight, Choudhury & Kacmar 2002, p. 339) |
| 2003 | C4 also tried to introduce *clan control* by requiring that at the beginning of P4 the vendor team visit it to understand its *culture* and *norms*. (Choudhury & Sabherwal 2003, p. 133) |

| | |
|---|---|
| 2004 | Organisational processes are influenced by the complex interrelationships among organisational *culture*, *trust*, and *relationships* ... (Raghu, Jayaraman & Rao 2004, p. 316) |
| 2005 | To build digital business....*Culture* is the key – *collaboration*, *sharing*, *mutual respect* ... (excerpt from a public speech in Levina 2005, p. 113) |
| 2006 | Yet an association with a market organisation could dampen enthusiasm among some volunteer developers because certain *tenets* of the open source *culture* seem to *value* independence from organisational constraints and, in some cases, disdain of profit motives ... (Stewart, Ammeter & Maruping 2006, p. 133) |
| 2007 | eBay and Amazon rely on a strong customer community base to increase *loyalty* and satisfaction. (Ma & Agerwal 2007, p. 61) |

### 5.6.1. Forms and types of organisations as culture

Unlike the previous chapter the *organisation-as-culture* metaphor was not evidenced in even a single specific form. As revealed in Table 5.8 and consistent with the results outlined in the previous chapter references to organisations as having culture – either general or specific – are evidenced. Over the years references were made to the *corporate* (Belanger, Collins & Cheney 2001; West & Dedrick 2000), *company* (Ba, Stallaert & Whinston 2001), *organisational* (Levina 2005; Raghu, Jayaraman & Rao 2004), and *firm cultures* (Kirsch 2004). The more specific cultural types noted were: *entrepreneurial* (Subramani & Walden 2001), *innovation-oriented* (Fichman 2004), *collectivist* (Wakefield, Leidner & Garrison 2008), *mutual respect* (Feller et al. 2008) and *egalitarian* (Levina 2005) *cultures*. Yet, these references do not specifically discuss the organisation *as* culture. Hence, they are not regarded as evidence of the *organisation-as-culture* metaphor in a specific or general form.

As in the previous chapter various characteristics, levels and dimensions of culture are discussed. Various characteristics of cultures in organisations included *centralised* (West & Dedrick 2000), *uniform* (Fan, Stallaert & Whinston 2003) and *common* (Feller et al. 2008) *cultures*. Different levels of culture occurring both within and outside the organisation were also discussed to varying degrees. Within the organisation the different levels were the *individual* (Wakefield, Leidner & Garrison 2008), *group* (Moon & Sproull 2008) and *team* (Wakefield, Leidner & Garrison 2008) *levels*. Outside the organisation were the *community* and *macro-culture levels* (Feller et al. 2008) as well as *national culture levels* (Kirsch 2004). Additionally, articles talked of *creating* (Ba, Stallaert & Whinston 2001) and *fostering* (Feller et al. 2008) organisational culture. These articles highlight the importance of cultural matters in an organisational context. Furthermore, as revealed in the previous chapter they add in their own way to the organisation as culture image. Yet, this contribution is made in an indirect way and is not regarded as evidence of a cultural form in this thesis.

### 5.6.2. Frequency and variety of culture discourse within articles

The same limited reliance on the culture metaphor revealed in the previous chapter was uncovered in these results. It is more common however, in these results for an article to be categorised as occasional for the *organisation-as-culture* metaphor. An example of such an article is that of Zhu and Kraemer (2005). These authors assert that '*cultural norms'* (p. 71) are one of a variety of factors affecting the differences between e-business uses across countries. In the space of a 21-page research article cultural discourse only occurs in two other places: once to '*cultural* and economic barriers in management science research' (p. 62) and another to '*culture* and *politics*' as a factor that accounts for differences in the use of Information Technology between developed and developing countries. Yet, there is an abundance of mechanistic discourse throughout this article:

- *leveraging* Internet-enabled two-way connectivity (p. 63)
- market *friction* (p. 65)
- e-business can achieve *lock-in* by *leveraging* various interactive applications (p. 65)

and some secondary organic discourse:

- the *migration* toward the internet ...require ... *coevolutionary* changes (p. 63).

Such scarcity and overall diminution of cultural compared to other metaphoric excerpts is common.

Even in Levina (2005), the only article that contains dominant cultural discourse in the years preceding 2008, the relative abundance of culture discourse exists alongside correspondingly high levels of discourse from the organism domain and also some secondary discourse from the machine domain. Other articles such as Hunter and Beck (2000), Ba, Stallaert and Whinston (2001) and Miranda and Saunders (2003) have, over the years, provided a more comprehensive discussion of specific aspects of the *organisation-as-culture* metaphor than is apparent in Levina (2005). Yet they too show similarly high levels of mechanistic and organic discourse throughout. This in turn contributes to a relatively weak image of the culture metaphor both within and across articles.

## 5.7 Metaphor occurrences: isolated and combined

Consistent with the results of the previous chapter (see Section 4.6.1) and as shown in Table 5.9, the three root metaphors manifested themselves in three main ways over the eight years examined:

1. Isolated – machine

   Only the machine metaphor is evident in discussions of organisations. This is the least frequent manifestation being evident in around 33% of articles over all years examined. Note that in 2001 there were no articles that displayed evidence of the *organisation-as-machine* metaphor on its own.

2. Combined – machine and organism

   Both the machine and organism metaphors are present in discussions of organisations. This was the most common manifestation of all, being evident in all years and accounting for around 51% of all coded articles over all years examined.

3. Combined – machine, organism and culture

All three metaphors were present in discussions of organisations. Overall this accounted for around 33% of all articles over all years and was visible in all eight years.

Table 5.9. *Articles showing different metaphor manifestations in discussions of organisations over the period 2000-2007 inclusive*

| METAPHOR MANIFESTATIONS OVER TIME | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TYPE | METAPHORS EVIDENCED | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | n |
| Isolated | Machine | 2 *(9%)* | 0 | 2 *(10%)* | 3 *(23%)* | 3 *(17%)* | 4 *(19%)* | 4 *(25%)* | 6 *(30%)* | 24 *(16%)* |
| Combined | Machine, Organism | 15 *(65%)* | 12 *(57%)* | 14 *(70%)* | 5 *(38%)* | 7 *(39%)* | 7 *(33%)* | 10 *(63%)* | 7 *(35%)* | 77 *(51%)* |
| | Machine, Organism, Culture | 6 *(26%)* | 9 *(43%)* | 4 *(20%)* | 5 *(39%)* | 8 *(44%)* | 10 *(48%)* | 2 *(13%)* | 7 *(35%)* | 51 *(34%)* |
| *Total Articles* | | *23 (100%)* | *21 (100%)* | *20 (100%)* | *13 (100%)* | *18 (100%)* | *21 (100%)* | *16 (100%)* | *20 (100%)* | *152 (100%)* |

As with the previous chapter, these three different ways in which the three root metaphors manifested themselves in the articles only served to reinforce the power and saliency of the machine metaphor. First, the machine metaphor is the only metaphor that is relied on as a stand-alone metaphor. Second, as will be discussed in the following sections, when the organism and culture metaphors are evidenced with the machine metaphor, the machine metaphor is typically in a stronger categorisation. The following sections discuss these manifestations in more detail.

## 5.7.1. Isolated occurrence - machine

Although the machine metaphor was evident in all articles that discussed the organisational concept in enough detail to be coded, it was present on its own in around 16% of articles. In each and every year – excluding the year 2001 when no such articles existed – there were at least two articles that displayed evidence of the *organisation-as-machine* metaphor in isolation. Furthermore, in all articles – except Levina and Xin (2007) that was categorised as occasional for this metaphor – the machine metaphor was categorised as dominant. A couple of instances showing how mechanistic discourse was present in isolation have already been provided in Table 5.3 (Slaughter & Kirsch 2006; Weber & Zheng 2007).

Table 5.10 shows the relative strength of the machine metaphor in those articles that relied on this metaphor in isolation.

Table 5.10. *Relative strength of machine metaphor in articles relying solely on the* organisation-as-machine *metaphor over the period 2000-2007 inclusive*

| STRENGTH | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | n |
|---|---|---|---|---|---|---|---|---|---|
| DOMINANT | 2 *(8%)* | 0 *(0%)* | 2 *(8%)* | 3 *(13%)* | 3 *(13%)* | 4 *(17%)* | 4 *(17%)* | 5 *(21%)* | 23 *(96%)* |
| SECONDARY | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* |
| OCCASSIONAL | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | 1 *(4%)* | 1 *(4%)* |
| *Total Articles* | 2 *(8%)* | 0 *(0%)* | 2 *(8%)* | 3 *(13%)* | 3 *(13%)* | 4 *(17%)* | 4 *(17%)* | 6 *(25%)* | 24 *(100%)* |

## 5.7.2. Combined occurrence – machine and organism

Table 5.11 shows that, over the eight years examined, a total of 76 articles contained evidence of the machine metaphor as well as the organism metaphor in their discussions of organisations. As noted with the current conceptualisations of organisations in the previous chapter (Section 4.6.1), there is a marked difference in the strength with which each of these metaphors is present. While both metaphors may have been evident, it was much more common – almost three times more common – for the machine rather than the organism metaphor to be categorised as dominant. Furthermore, while around one third of all articles displaying evidence of both the machine and organism metaphors were categorised as dominant for the organism metaphor only around 24% did so without also being categorised as dominant for the machine metaphor.

The year 2000 was the only time in which a significant number of articles (four) were dominant for the organism metaphor without also being dominant for the machine metaphor. Yet, even in these four articles (Kauffman, McAndrews & Wang 2000; Nault & Vandenbosch 2000; Palmer & Markus 2000; Sambamurthy & Zmud 2000), the machine metaphor was categorised as secondary. Furthermore, the vast majority of articles – nearly 91% overall – that contained evidence of both machine and organism metaphors were categorised as being dominant for the machine metaphor. This further contributed to the power of the machine metaphor in these results.

Table 5.11. *Relative strength of machine and organism metaphors in articles relying on both these metaphors in discussions of organisations over the period 2000-2007 inclusive*

| ARTICLES SHOWING EVIDENCE OF THE MACHINE AND ORGANISM METAPHORS AND THEIR RELATIVE STRENGTHS: 2000-2007 | | | | | |
|---|---|---|---|---|---|
| | | ORGANISM | | | |
| | | DOMINANT | SECONDARY | OCCASIONAL | n |
| MACHINE | DOMINANT | 20 *(26%)* | 21 *(27%)* | 29 *(38%)* | 70 *(91%)* |
| | SECONDARY | 5 *(6%)* | 0 *(0%)* | 1 *(1%)* | 6 *(8%)* |
| | OCCASIONAL | 1 *(1%)* | 0 *(0%)* | 0 *(0%)* | 1 *(1%)* |
| *Total Articles* | | 26 *(34%)* | 21 *(27%)* | 31 *(40%)* | 77 *(100%)* |

As noted in the previous chapter, mechanistic discourse typically appears directly beside organic discourse when discussing organisations. Less frequently, mechanistic discourse occurs in more isolated pieces of text within the same article, separated by a number of paragraphs or pages.

Table 5.12 presents a sample excerpt, from each of the eight years examined, showing how both mechanistic and organic discourse appears in discussions of organisations. Mechanistic discourse is underlined and organic discourse italicised.

Table 5.12. *Sample metaphor excerpts from* Information Systems Research *that show evidence of machine (underlined) and organism (italicised) metaphors when discussing organisations over the period 2000-2007 inclusive*

| YEAR | MACHINE AND ORGANISM METAPHOR EXCERPTS FOR ORGANISATION |
|---|---|
| 2000 | In contrast to such a static view, others propose that competition between standards (or architectures of related standards) is an ongoing process in which control of a standard is used to <u>drive</u> its *evolution* and maintain competitive advantage … (West & Dedrick 2000, p. 211) |
| 2001 | This suggests that firms that enter into B2B e-commerce in the present period are likely to be positioned advantageously in the future to <u>leverage</u> the *learning* from early experience. (Subramani & Walden 2001, p. 139) |
| 2002 | In both <u>high-velocity</u> and traditional markets, *knowledge*- and *learning*-based <u>mechanisms</u> guide the *evolution* of <u>dynamic</u> capabilities and underlie path dependence in acquiring, <u>reconfiguring</u>, and integrating resources. (Wheeler 2002, p. 128) |
| 2003 | Process synthesis and decomposition also raise issues of timing, scheduling, capacity planning for resources, and redesign of *coordination* and control <u>mechanisms</u>. (Basu & Blanning 2003, p. 352) |
| 2004 | Organisations *respond* to *environmental* uncertainty by processing and exchanging information (p.318)...We demonstrate that it is important to alter incentive <u>mechanisms</u> to take advantage of changed information structures in an organisational process to derive any improvement in <u>performance</u>. (Raghu, Jayaraman & Rao 2004, p. 333) |
| 2005 | ... a seller with superior efficiencies of production can, over time, price its competitor out of the market by <u>ratcheting</u> up production capacity. Such *behavior* is seen in real *life*... (Bandyopadhyay, Barron & Chaturvedi 2005, p. 57) |
| 2006 | *Knowledge* [organisational] is transferred via <u>mechanisms</u> such as technology, personnel movement, and <u>blueprints</u>. (Slaughter & Kirsch 2006, p. 302) |

| | |
|---|---|
| 2007 | In industries that are more turbulent (or which have a higher clock-speed in the terminology of Mendelson and Pillai 1998), executives are more likely to focus attention on the implications of IT-related transformation, because understanding impending shifts in business models can be central to a firm's *survival*. (Dhar & Sundararajan 2007, p. 132) |

As can be seen in the excerpts of Table 5.12, when the *organisation-as-organism* metaphor is invoked so too is the *organisation-as-machine* metaphor. No instances of the *organisation-as-organism* metaphor were found occurring in isolation.

### 5.7.3. Combined occurrence – machine, organism and culture

While the metaphorical combination machine, organism and culture was not as common over the years as the machine and organism combination it still managed to account for one third of all articles in all years. As shown in Table 5.13, there were differences in how each of the metaphors was evidenced in these articles. As with the machine and organism combination, articles showing evidence of all three metaphors are more likely to be categorised as dominant for the machine rather than the organism or culture metaphors. Approximately 83% were categorised as dominant for the machine metaphor as opposed to approximately 33% and 3% for the organism and culture metaphors respectively.

Table 5.14 presents the totals for the articles that were categorised as dominant for a particular root metaphor as well as showing the strength of the other metaphors with which they appeared. What is highlighted in the table is the pervasiveness over time of the machine metaphor. These results are consistent with those of the previous chapter in that while a number of articles categorised as dominant for the machine metaphor were also categorised as dominant or secondary for the organism metaphor, this was more pronounced in reverse. In fact, those articles that were categorised as dominant for the organism metaphor were also typically categorised as either dominant, in 55% of cases, or secondary, in 36% of cases, for the machine metaphor as well. While the number of articles falling in this machine, organism and culture combination was relatively low in any one year the findings within any single year are consistent with the overall findings.

Table 5.15 presents excerpts, for each year examined, from articles that show evidence of all three root metaphors when discussing the organisational concept.

Table 5.13. *Relative strength of machine, organism and culture metaphors in articles relying on all of these metaphors when discussing organisations over the period 2000-2007 inclusive*

| MACHINE, ORGANISM AND CULTURE COMBINATION ARTICLES | | | |
|---|---|---|---|
| | MACHINE | ORGANISM | CULTURE |
| DOMINANT | 41 *(80%)* | 17 *(33%)* | 1 *(2%)* |
| SECONDARY | 9 *(18%)* | 21 *(41%)* | 14 *(27%)* |
| OCCASSIONAL | 1 *(2%)* | 13 *(25%)* | 36 *(71%)* |
| TOTAL ARTICLES | 51 | 51 | 51 |

Table 5.14. *Articles relying on all three root metaphors that are categorised as dominant for the machine, organism or culture root metaphors when discussing organisations and the relative strength of their co-occurring metaphors over the period 2000-2007 inclusive*

| ARTICLES THAT ARE DOMINANT FOR THE MACHINE, ORGANISM AND CULTURE METAPHORS AND THE STRENGTH OF THEIR CO-OCCURING METAPHORS | | | | | |
|---|---|---|---|---|---|
| | | MACHINE | ORGANISM | CULTURE | N |
| MACHINE | DOMINANT | - | 10 *(59%)* | 0 *(0%)* | 10 *(20%)* |
| | SECONDARY | - | 6 *(35%)* | 1 *(100%)* | 7 *(14%)* |
| | OCCASSIONAL | - | 1 *(6%)* | 0 *(0%)* | 1 *(2%)* |
| ORGANISM | DOMINANT | 10 *(24%)* | - | 1 *(100%)* | 11 *(22%)* |

| | | | | | |
|---|---|---|---|---|---|
| | SECONDARY | 18 (44%) | - | 0 (0%) | 17 (33%) |
| | OCCASSIONAL | 13 (32%) | - | 0 (0%) | 13 (25%) |
| CULTURE | DOMINANT | 0 (0%) | 1 (6%) | - | 1 (2%) |
| | SECONDARY | 8 (20%) | 6 (35%) | - | 14 (27%) |
| | OCCASSIONAL | 33 (80%) | 4 (24%) | - | 36 (71%) |
| TOTAL ARTICLES | | 41 (80%) | 17 (33%) | 1 (2%) | 51 (100%) |

* Percentage shown is the percentage of papers for that particular metaphor.

Table 5.15. *Sample metaphor excerpts from* Information Systems Research *that show evidence of machine (underlined), organism (italicised), and culture (italicised and underlined) metaphors when discussing organisations over the period 2000-2007 inclusive*

| YEAR | MACHINE, ORGANISM AND CULTURE COMBINATION EXCERPTS |
|---|---|
| 2000 | These incompatible PC standards were developed and maintained by a few vertically integrated firms who consequently failed to leverage the horizontally segmented supply chain that was developing all around it in Asia. (p.201) However, as the smallest of the top mainframe vendors, NEC was less concerned about *cannibalization* …(p.202) The Japanese computer industry will never admit it, but the *tradition* of closed architectures and high hardware and software prices has been a disaster for Japan. (West & Dedrick 2000, p. 211) |
| 2001 | It has been recognized that knowledge *altruism* may be constrained by increasing demands on the time and energy of employees, or that it may not be part of a company's *culture*... therefore it does not *cultivate* knowledge *sharing* in a systematic way. [Skip 4 sentences] Hence, it is extremely unlikely that in organisations with competing members, *gift* economies would be the driving force for the exchange of information. (Ba, Stallaert & Whinston 2001, p. 231) |

| | |
|---|---|
| 2002 | Institution-based *trust* comes from sociology, which deals with the structures (e.g., legal protections) that make an *environment* feel *trustworthy* (e.g., the United States immigrant *culture* of the 1800s, Zucker 1986) (p.339)... In an industry where the audience is likely to be more technology savvy (e.g., in the digital imaging industry) and Web-based interaction is common, a vendor should probably focus more on building *beliefs* about its own competence through such mechanisms as endorsements from respected customers, seals of approval from professional associations, or a very high-quality Web site. (McKnight, Choudhury & Kacmar 2002, p. 354) |
| 2003 | As stated above, our focus here was on mechanisms used by the client to assist the vendor 's self-control efforts [skip paragraph]...This allowed C2 to leave many details unspecified, confident that V2 would *adapt* to later changes. This is typical in *clan*-control situations where specfic goals are usually not known at the start of an activity, but rather *evolve* over time. [skip paragraph]C4 also tried to introduce *clan* control by requiring that at the beginning of P4 the vendor team visit it to understand its *culture* and *norms*. (Choudhury & Sabherwal 2003, p. 133) |
| 2004 | Process models enable understanding of the complex interactions between various aspects of a process and the resultant impact on performance. [skip paragraph] Organisational processes are influenced by the complex interrelationships among organisational *culture*, *trust*, and relationships. (p.316) Organisations respond to *environmental* uncertainty by processing and exchanging information. (Raghu, Jayaraman & Rao 2004, p. 318) |
| 2005 | In the late 1990s, Eserve was a *young*, rapidly *growing*, professional services firm engaged in end-to-end production of Web-based applications. [skip paragraph] To build digital businesses,...*Culture* is the key--*collaboration*, *sharing*, *mutual respect*. (Levina 2005, p. 113) |
| 2006 | According to Pavlou and Gefen (2004, p. 37), perceived effectiveness of information technology-enabled institutional mechanisms, such as customer *feedback* mechanism, escrow service, and credit card guarantees, engenders buyer *trust*, "not only in a few *reputable* sellers, but also in the *community* of online auction sellers." (p.288) They argue that customers *trust* a store when customers can predict its future *behavior*, based on an assessment of information regarding the store's *promises* and past *behavior*. (Kim & Benbasat 2006, p. 290) |

| | |
|---|---|
| 2007 | New organisational forms *spawned* by developments in information technologies (IT) continue to intrigue researchers and practitioners. (p.42) From a pragmatic perspective, organisations invest significant resources in developing the infrastructure for customer or employee online *communities*, with a goal of generating value. eBay and Amazon rely on a strong customer community base to increase *loyalty* and satisfaction. (Ma & Agerwal 2007, p. 61) |

The excerpts presented in Table 5.15 show that over time, talking about organisations as cultures also involves talking about them as machines and to a lesser extent as organisms. As was observed in the previous chapter, the organisational culture metaphor did not appear on its own. All articles made use of the *organisation-as-machine* and to a lesser extent the *organisation-as-organism* metaphors to bolster the *organisation-as-culture* metaphor. Consistent with the results presented in the previous chapter this occurrence served to further increase the power and saliency of the machine metaphor.

## 5.8 Conclusions

This chapter was motivated by the question of how diversity in Information Systems research has changed over time. By using a fictive metaphor analysis it explored the evidence for three root metaphors when discussing organisations in a single journal over a period of eight years. The results are consistent with the previous chapter in that although there have been subtle variations over time the machine metaphor is the most pervasive way of structuring and understanding the organisational concept. Not only is mechanistic organisational discourse more frequent, it also comes in a greater variety of forms and types. Additionally, while the metaphors occur together in a variety of ways, it is the machine metaphor that is always present. The organism and culture metaphors always appear with the machine metaphor. This has important implications, which will be discussed in the final chapter. While this chapter has provided results in relation to how diversity in IS research has changed in relation to a single concept, it has not shown how it may have changed over time in relation to the technology or people concepts. Furthermore, it has concentrated on a single journal only. The next chapter endeavours to overcome this limitation by presenting the results in relation to how diversity in Information Systems research has changed over time taking into consideration all three concepts: organisations, technology and people in all three journals: *Information Systems Research*, *Management Information Systems Quarterly* and the *European Journal of Information Systems* in two previous time frames 2000/2001 and 2005.

# Chapter 6 - CHANGING IMAGES FOR KEY INFORMATION SYSTEMS CONCEPTS OVER TIME

## 6.1 Introduction

Following on from Chapter 5, this chapter examines the past profiles of Information Systems research. Specifically, this chapter examines the full set of articles published in two historic time periods: 2000/2001 and 2005. Unlike Chapter 5, however, this chapter expands its evidentiary data sources to include the same three journals focused on in Chapter 4: *Information Systems Research (ISR), Management Information Systems Quarterly (MISQ)* and the *European Journal of Information Systems (EJIS)*. As such the evidentiary data set in this phase of analysis was the largest of all phases totalling 188 separate articles and over 3,500 pages of text.

This chapter also expands the concepts examined to include the same three Information Systems concepts examined in Chapter 4: organisations, technology and people. As in Chapter 4 and Chapter 5, each of the articles published during these two time periods was examined for evidence of three root metaphors: machine, organism and culture in discussions of these three key Information Systems concepts. The results of this chapter are consistent with the previous two chapters, that is, while the results differ subtly by time periods, concepts and journals, more evidence was found for the machine metaphor than for the organism or culture metaphors. Indeed, in these two time periods there has typically been more evidence associated with the machine metaphor than in more recent conceptualisations of Information Systems research. This tendency to structure key Information Systems concepts via the machine metaphor was observed regardless of historical time period, concept or journal.

This chapter is organised in a very similar way to Chapter 4. The only difference being that there are two time periods to account for rather than one. As such this chapter begins with an overview of the findings (Section 6.2). The following sections move on to examine the results associated with each concept in more detail: organisation (Section 6.3), technology (Section 6.4) and people (Section 6.5). As in the previous two chapters, a general overview of how each concept was discussed in the articles is provided. Similar to Chapter 5, this overview will make note of any changes that occurred in the historical periods examined 2000/2001 and 2005. Again, primary evidence that comes in the form of metaphor tokens (outlined in Chapter 3) associated with each of the different metaphors for that concept is then presented. This presentation includes the forms and types that each metaphor manifests itself in as well as the frequency and variety of discourse associated with that metaphor. The next major section (Section 4.6) covers the different ways in which each of the root metaphors occurred – in isolation or combination – in the articles. As in Chapter 4, these metaphor occurrences will be presented in order of concept: organisation (Section 6.6.1), technology (Section 6.6.2) and people (Section 6.6.3). Some final conclusions are offered before moving on to the analysis chapter: Chapter 7.

## 6.2 Results overview

Table 6.1 and Table 6.2, present the results of the fictive metaphor analysis conducted for the 2000/2001 and 2005 periods. Table 6.1 presents the results for the analysis done on 116 articles appearing in *Management Information Systems Quarterly,* the *European Journal of Information Systems* and *Information Systems Research* during the period 2000/2001. Table 6.2 presents the results for the analysis done on 72 articles appearing in the same three journals but for the 2005 period. As was noted in Chapter 4, there were different levels of metaphoric evidence associated with each of the three key Information Systems concepts examined. As can be seen in Table 6.1, during the period 2000/2001 it is the technology concept that is associated with the largest amount of metaphoric evidence and the people concept that is associated with the smallest amount of metaphoric evidence. During the period 2005 however, this changes. As presented in Table 6.2 the organisation is the concept associated with the largest amount of metaphoric evidence and technology the concept associated with the least amount of metaphoric evidence.

The most significant finding from this stage of the study – consistent with the findings of the previous two chapters – is that there is more evidence of the machine metaphor than any other metaphor. This is the case for all concepts and both time periods examined. The only case where this is not true is for the people concept in the period 2005. As shown in Table 6.2, the same number of articles (71) contains evidence of both the machine and organism metaphors in relation to the people concept. Yet, even for the people concept in the period 2005 more articles have been categorised as dominant for machine metaphor than for the organism metaphor. For all other concepts in both periods examined there are not only more articles that contain evidence of the machine metaphor but more articles were categorised as dominant for the machine metaphor. This overall skewing toward the machine metaphor revealed in this phase of the results is consistent with the results of the previous two chapters.

The following sections will discuss these results in further detail starting with the results relating to the organisation concept.

Before proceeding to the next sections that discuss these results further detail, it should be noted that several articles examined in this phase of the analysis made explicit references to the metaphors explored in this study – in particular to the organism and machine metaphors. This was typically done in relation to the organisational concept by explicitly referring to organic and mechanistic organisations (see Fichman 2001; Orlikowski & Barley 2001; Porra, Hirschheim & Parks 2005; Ravichandran & Rai 2000; Sabherwal & Chan 2000). Yet, Jones and Hughes (2001) also made use of the machine metaphor in relation to the technology and people concepts in their discussion of Information Systems evaluation principles. In addition, they also appeared to make an implicit reference to the culture metaphor.

While most papers tend to make only a passing reference to the metaphors examined in this study, Jones and Hughes (2001) as well as Porra, Hirschheim and Parks (2005) are the notable exceptions. Porra, Hirschheim and Parks (2005) provide the most comprehensive discussion of two of the metaphors explored in this study. In their study they use three metaphors: 'organic', 'mechanistic' as well as 'colonial' (based itself on the organic metaphor), to interpret Texaco's IT function. Papers such as these are notable for their explicit reference to the metaphors relied on in this study to explore diversity in Information Systems research. The bulk of this chapter will however, not concentrate on articles where such direct and explicit references are made. Rather, attention will now turn to the general ways in which these metaphors are evidenced, not directly or explicitly but as an indirect, implicit part of the academic discourse in Information Systems research.

Table 6.1. *Overall results of metaphor analysis for 2000/2001*

| **Source** | **Strength** | **Organisation** | | | | **Technology** | | | | **People** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | n | MISQ | EJIS | ISR | n | MISQ | EJIS | ISR | n |
| Machine | Dominant | 17 | 6 | 36 | 59 | 22 | 10 | 34 | 66 | 8 | 1 | 21 | 30 |
| | Secondary | 13 | 15 | 7 | 35 | 11 | 22 | 6 | 39 | 17 | 12 | 8 | 37 |
| | Occasional | 6 | 12 | 1 | 19 | 4 | 2 | 5 | 11 | 12 | 18 | 11 | 41 |
| *Total Articles* | | *36 (32%)* | *33 (29%)* | *44 (39%)* | *113 (100%)* | *37 (32%)* | *34 (29%)* | *45 (39%)* | *116 (100%)* | *37 (34%)* | *31 (29%)* | *40 (37%)* | *108 (100%)* |
| Organism | Dominant | 19 | 23 | 11 | 53 | 6 | 11 | 3 | 20 | 20 | 10 | 2 | 32 |
| | Secondary | 12 | 7 | 17 | 36 | 15 | 14 | 11 | 40 | 14 | 18 | 20 | 52 |
| | Occasional | 4 | 2 | 14 | 20 | 9 | 6 | 22 | 34 | 3 | 3 | 17 | 23 |
| *Total Articles* | | *35 (31%)* | *32 (28%)* | *42 (37%)* | *109 (96%)* | *30 (26%)* | *31 (27%)* | *36 (31%)* | *97 (81%)* | *37 (34%)* | *31 (29%)* | *39 (36%)* | *107 (99%)* |
| Culture | Dominant | 4 | 9 | 0 | 13 | 1 | 5 | 0 | 6 | 10 | 14 | 3 | 27 |
| | Secondary | 12 | 9 | 6 | 27 | 2 | 9 | 0 | 11 | 13 | 8 | 4 | 25 |
| | Occasional | 12 | 12 | 8 | 32 | 16 | 9 | 5 | 30 | 8 | 6 | 12 | 26 |
| *Total Articles* | | *28 (25%)* | *30 (27%)* | *14 (12%)* | *72 (64%)* | *19 (16%)* | *23 (20%)* | *5 (4%)* | *47 (41%)* | *31 (29%)* | *28 (26%)* | *19 (18%)* | *78 (72%)* |
| TOTAL CODED ARTICLES | | **36** | **33** | **44** | **113** | **37** | **34** | **44** | **116** | **37** | **30** | **40** | **107** |

Legend – MISQ: *Management Information Systems Quarterly*, EJIS: *European Journal of Information Systems*, ISR: *Information Systems Research*, n: number of articles

Note: % shown is rounded to the nearest per cent.

Table 6.2. *Overall results of metaphor analysis for 2005*

| **Source** | **Strength** | **Organisation** | | | | **Technology** | | | | **People** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | n | MISQ | EJIS | ISR | n | MISQ | EJIS | ISR | n |
| Machine | Dominant | 19 | 12 | 18 | 49 | 13 | 14 | 18 | 45 | 18 | 5 | 17 | 40 |
| | Secondary | 1 | 8 | 2 | 11 | 10 | 10 | 2 | 22 | 5 | 16 | 3 | 24 |
| | Occasional | 5 | 6 | 1 | 12 | 2 | 1 | 0 | 3 | 2 | 5 | 0 | 7 |
| *Total Articles* | | *25 (35%)* | *26 (36%)* | *21 (29%)* | *72 (100%)* | *25 (36%)* | *25 (36%)* | *20 (29%)* | *70 (100%)* | *25 (33%)* | *26 (38%)* | *20 (29%)* | *71 (100%)* |
| Organism | Dominant | 6 | 5 | 6 | 17 | 2 | 6 | 1 | 9 | 15 | 11 | 9 | 35 |
| | Secondary | 17 | 16 | 7 | 40 | 6 | 9 | 9 | 24 | 10 | 12 | 9 | 31 |
| | Occasional | 2 | 5 | 4 | 11 | 12 | 8 | 9 | 29 | 0 | 3 | 2 | 5 |
| *Total Articles* | | *25 (35%)* | *26 (36%)* | *17 (24%)* | *68 (94%)* | *20 (29%)* | *23 (33%)* | *19 (27%)* | *62 (89%)* | *25 (35%)* | *26 (37%)* | *20 (28%)* | *71 (100%)* |
| Culture | Dominant | 5 | 12 | 1 | 18 | 2 | 4 | 1 | 7 | 7 | 15 | 2 | 24 |
| | Secondary | 3 | 4 | 2 | 9 | 3 | 8 | 0 | 11 | 7 | 1 | 1 | 9 |
| | Occasional | 15 | 4 | 7 | 26 | 5 | 7 | 5 | 17 | 10 | 5 | 11 | 26 |
| *Total Articles* | | *23 (32%)* | *20 (28%)* | *10 (14%)* | *53 (74%)* | *10 (14%)* | *19 (27%)* | *6 (9%)* | *35 (50%)* | *24 (34%)* | *21 (30%)* | *14 (20%)* | *59 (83%)* |
| TOTAL CODED ARTICLES | | **25** | **26** | **21** | **72** | **25** | **25** | **20** | **70** | **25** | **26** | **20** | **71** |

Legend – MISQ: *Management Information Systems Quarterly*, EJIS: *European Journal of Information Systems*, ISR: *Information Systems Research*, n: number of articles

Note: % shown is rounded to the nearest per cent

# 6.3 Organisation

In this section the results of the fictive metaphor analysis on the articles published in *Management Information Systems Quarterly,* the *European Journal of Information Systems* and *Information Systems Research* during the period 2000/2001 are presented. Table 6.3 and Table 6.4 are sub-sets of Table 6.1 and Table 6.2 respectively. They are limited to the organisation concept and as in the two previous chapters are presented here for ease of reference. The most significant finding concerning the organisational concept in this phase of the study echoes those of the previous two chapters, that is, articles are more likely to rely on the machine metaphor to structure and understand the organisational concept than any other metaphor. All articles contain some evidence of the machine metaphor regardless of historic period and the majority of articles are categorised as dominant for the machine metaphor.

This section begins with a discussion of how the organisational concept was discussed over the two sampling periods 2000/2001 and 2005. The results of the fictive metaphor analysis for each of the three root metaphors are then presented.

Table 6.3. *Results of metaphor analysis for organisation in sampling period 2000/2001*

| **Source** | **Strength** | **Organisation** | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 17 *(15%)* | 6 *(5%)* | 36 *(32%)* | 59 *(52%)* |
| | Secondary | 13 *(12%)* | 15 *(13%)* | 7 *(6%)* | 35 *(31%)* |
| | Occasional | 6 *(5%)* | 12 *(11%)* | 1 *(1%)* | 19 *(17%)* |
| Machine percentages | | *36 (32%)* | *33 (29%)* | *44 (39%)* | *113 (100%)* |
| Organism | Dominant | 19 *(17%)* | 23 *(20%)* | 11 *(10%)* | 53 *(47%)* |
| | Secondary | 12 *(11%)* | 7 *(6%)* | 17 *(15%)* | 36 *(32%)* |
| | Occasional | 4 *(4%)* | 2 *(2%)* | 14 *(12%)* | 20 *(18%)* |
| Organism percentages | | *35 (31%)* | *32 (28%)* | *42 (37%)* | *109 (96%)* |
| Culture | Dominant | 4 *(4%)* | 9 *(8%)* | 0 *(0%)* | 13 *(12%)* |
| | Secondary | 12 *(11%)* | 9 *(8%)* | 6 *(5%)* | 27 *(24%)* |
| | Occasional | 12 *(11%)* | 12 *(11%)* | 8 *(7%)* | 32 *(28%)* |
| Culture percentages | | *28 (24%)* | *30 (27%)* | *14 (12%)* | *72 (63%)* |

| TOTAL CODED ARTICLES | 36 | 33 | 44 | 113 |
|---|---|---|---|---|

Note: % shown is rounded to the nearest per cent

Table 6.4. *Results of metaphor analysis for organisation in sampling period 2005*

| Source | Strength | Organisation | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 19 *(26%)* | 12 *(17%)* | 18 *(25%)* | 49 *(68%)* |
| | Secondary | 1 *(1%)* | 8 *(11%)* | 2 *(3%)* | 11 *(15%)* |
| | Occasional | 5 *(7%)* | 6 *(8%)* | 1 *(1%)* | 12 *(17%)* |
| Machine percentages | | *25 (35%)* | *26 (36%)* | *21 (29%)* | *72 (100%)* |
| Organism | Dominant | 6 *(8%)* | 5 *(7%)* | 6 *(8%)* | 17 *(24%)* |
| | Secondary | 17 *(24%)* | 16 *(22%)* | 7 *(10%)* | 40 *(56%)* |
| | Occasional | 2 *(3%)* | 5 *(7%)* | 4 *(6%)* | 11 *(15%)* |
| Organism percentages | | *25 (35%)* | *26 (36%)* | *17 (24%)* | *68 (94%)* |
| Culture | Dominant | 5 *(7%)* | 12 *(17%)* | 1 *(1%)* | 18 *(25%)* |
| | Secondary | 3 *(4%)* | 4 *(6%)* | 2 *(3%)* | 9 *(13%)* |
| | Occasional | 15 *(21%)* | 4 *(6%)* | 7 *(10%)* | 26 *(36%)* |
| Culture percentages | | *23 (32%)* | *20 (28%)* | *10 (14%)* | *53 (74%)* |
| TOTAL CODED ARTICLES | | **25** | **26** | **21** | **72** |

Note: % shown is rounded to the nearest per cent

## 6.3.1. Discourse on organisations

Consistent with the results of the previous chapters, and as is evident in Table 6.3 and Table 6.4, the vast majority of articles (all but three) discussed the organisational concept in enough detail to contain evidence of a root metaphor. Furthermore, while most articles concentrated on the organisational concept either as a backgrounding or situating concept, the proportion of articles with a strong focus on organisations increased in all journals from the period 2000/2001 to 2005. In 2000/2001 this encompassed approximately 52% (59 articles), which increased in 2005 to approximately 64% (46 articles). Topics of interest over the years ranged from investigations into different aspects associated with operating or being online, what Straub and Watson (2001) refer to as the 'net-enabled organization' or 'NEO' (p. 337) to organisational knowledge and its management (popular in *Management Information Systems Quarterly* during the year 2005).

Regardless of the specific organisational topics focused on, and consistent with the results of the previous two chapters, organisations were frequently discussed in metaphorical terms. The remainder of this section will present the evidence associated with each of the three metaphors in relation to the organisational concept. Mirroring the presentation style of the previous two chapters this will be done in order of most prevalent to least prevalent metaphor: *organisation-as-machine* (Section 6.3.2), *organisation-as-organism* (Section 6.3.3) and *organisation-as-culture* (Section 6.3.4).

### 6.3.2. Organisation as machine

As highlighted previously in Table 6.3 and Table 6.4, the organisational machine metaphor is the most salient metaphor occurring in all articles regardless of sample period or journal. The metaphor is also dominant in more articles than any other metaphor. This equated to around 52% of all articles published in the 2000/2001 period (refer Table 6.5) and rose to around 68% of all articles in the period 2005 (refer Table 6.6). Consistent with the results of Chapter 4 and which is highlighted in Figure 6.1 and Figure 6.2, articles appearing in the journal *Information Systems Research* during the sample periods 2000/2001 and 2005 are more likely to be categorised as dominant for the machine metaphor (82% – 2000/2001 and 86% – 2005) than those appearing in *Management Information Systems Quarterly* and the *European Journal of Information Systems.*

Also highlighted in Figure 6.1 and Figure 6.2 is that articles appearing in the *European Journal of Information Systems* during the sample periods 2000/2001 and 2005 are the least likely to be categorised as dominant for the machine metaphor in relation to the organisational concept. Approximately 18% do so in the period 2000/2001 and 46% in the period 2005. Yet even in the *European Journal of Information Systems* in the period 2000/2001, all articles display some evidence of the machine metaphor. Additionally, in the period 2005 in the *European Journal of Information Systems* the percentage of articles being categorised as dominant for the machine metaphor appears relatively low in comparison with the two other journals. Even so, there are still more articles in the *European Journal of Information Systems* displaying evidence of the machine metaphor than the culture or organism metaphors. Furthermore, the number of articles being categorised as dominant for the machine metaphor in the *European Journal of Information Systems* during the period 2005 is significantly higher than those articles being categorised as dominant for the organism metaphor. Hence, while there is some difference between sample periods and journals, the machine metaphor is the most pervasive way of structuring and understanding organisations.

A few instances of how mechanistic discourse was evidenced across the articles of each journal during each of the historic sample periods are provided in Table 6.7. Note that samples for the journal *Information Systems Research* for the years 2000, 2001 and 2005 (the historic sample periods report on here in this chapter) have already been provided in the previous chapter.

Table 6.5. *Results of* organisation-as-machine *metaphor in sampling period 2000/2001 (sub-set of Table 6.3)*

| Source | Strength | Organisation | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 17 *(47%)* | 6 *(18%)* | 36 *(82%)* | 59 *(52%)* |
| | Secondary | 13 *(36%)* | 15 *(45%)* | 7 *(16%)* | 35 *(31%)* |
| | Occasional | 6 *(17%)* | 12 *(36%)* | 1 *(2%)* | 19 *(17%)* |
| Machine percentages | | ***36 (32%)*** | ***33 (29%)*** | ***44 (39%)*** | ***113 (100%)*** |

* Percentage shown is the percentage of papers for that particular journal.

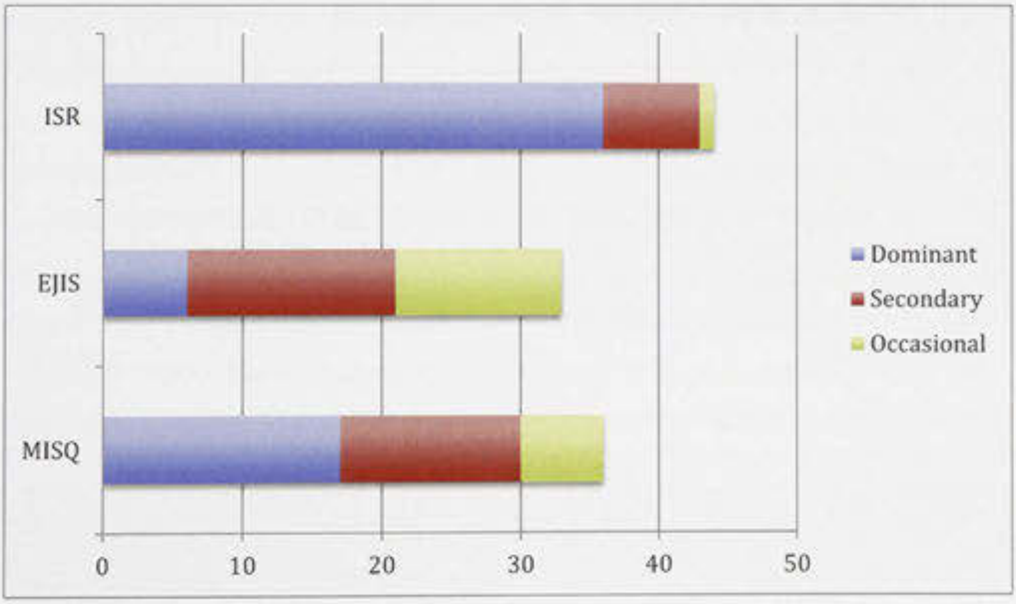


*Figure 6.1.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *organisation-as-machine* metaphor in sampling period 2000/2001 (derived from Table 6.5)

Table 6.6. *Results of* organisation-as-machine *metaphor in sampling period 2005 (sub-set of Table 6.4)*

| Source | Strength | Organisation | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 19 *(76%) | 12 (46%) | 18 (86%) | 49 (68%) |
| | Secondary | 1 (4%) | 8 (31%) | 2 (10%) | 11 (15%) |
| | Occasional | 5 (20%) | 6 (23%) | 1 (5%) | 12 (17%) |
| Machine percentages | | ***25 (35%)*** | ***26 (36%)*** | ***21 (29%)*** | ***72 (100%)*** |

* Percentage shown is the percentage of papers for that particular journal.

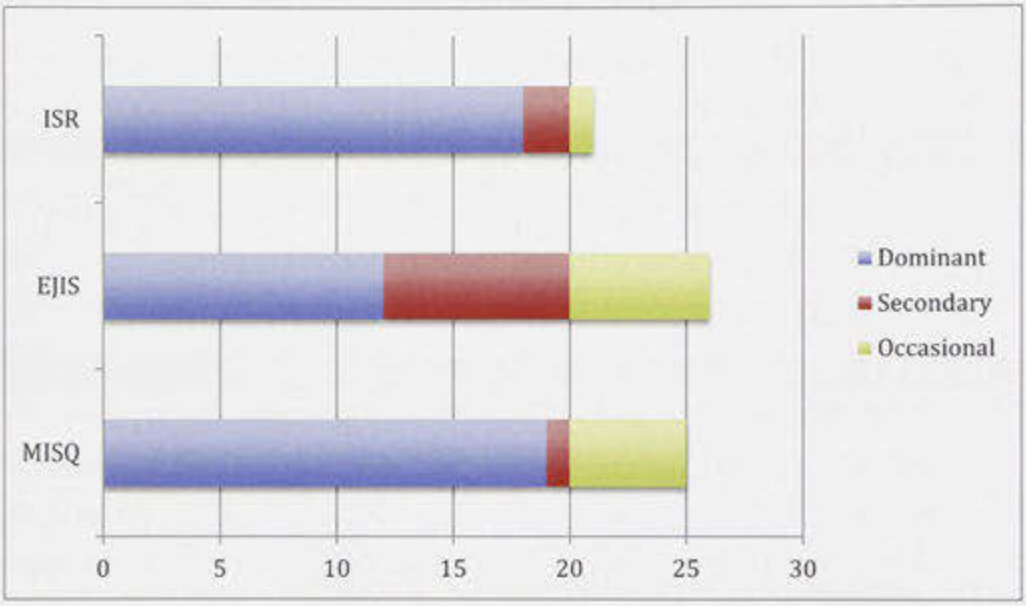


*Figure 6.2.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *organisation-as-machine* metaphor in sampling period 2005 (derived from Table 6.6)

Table 6.7. *Sample metaphor excerpts for* the organisation-as-machine *metaphor from each journal in sampling periods 2000/2001 and 2005.*

| JOURNAL | YEAR | MACHINE METAPHOR EXCERPTS FOR ORGANISATION |
|---|---|---|
| MISQ | 2000 | Bottorff and his management team started by "fixing the broken things in the company" ... (Cooper 2000, p. 549) |
| | 2001 | Communication processes and information flows drive knowledge transfer in organizations. (Alavi & Leidner 2001, p. 119) |

| | | |
|---|---|---|
| | 2005 | Prior works (Barley 1986; Orlikowski 1992, 2002; Schultze and Boland 2000) have demonstrated how practice theory can be used in data analysis to understand the dynamics of organizational life. (Levina & Vaast 2005, p. 341) |
| EJIS | 2000 | The DOJ's condemnation is based on the 'leverage theory', which says that bundling provides a mechanism whereby afirm with monopoly power in one market can use the leverage to monopolise a second market. (Lee 2000, p. 217) |
| | 2001 | For example, the responses to the 'additional comments' question on the original survey had alerted the researchers to the importance of re-engineering as an element of the organisational change associated with IT projects. Consequently, a new organisational issue, associated with the re-engineering of business processes was included in the revised questionnaire. (Doherty & King 2001, p. 151) |
| | 2005 | Organisations embarking on EAI projects alone should ask if they really have the necessary EAI skills onboard, and whether it would be advisable to source for external expertise. (Lam 2005, p. 185) |

## Forms and types of organisations as machines

Some of the most powerful and readily recognisable forms that the *organisation-as-machine* came in was as a *ship, train* and *vehicle.* Although no articles published in *Information Systems Research*, *Management Information Systems Quarterly* or the *European Journal of Information Systems* during the periods 2000/2001 and 2005 explicitly referenced the organisation in any of these particular forms it was nevertheless obvious via indirect terms. In relation to the organisation as *ship* a vivid image of this organisational form was produced through terms such as *embark*, *onboard*, *drifted* and *turned around* as highlighted in Lam (2005) in Table 6.7 and is also noted in Malhotra et al. (2001), Kotlarsky and Oshri (2005) as well as Fitzgerald and Russo (2005). There are also implicit references to the organisation as *train* with terms such as *roll out* and *roll back* (Madon 2005), while the organisation as *vehicle* is relied on in many different articles (e.g. Marshall & Brady 2001; Ravichandran & Rai 2000) through terms such as *steer* and *drive.* Garud and Kumaraswamy (2005) provide one of the most complete and vivid examples of an organisation as vehicle in their article, *Vicious and Virtuous Circles in the Management of Knowledge*, with their metaphorical scenario:

> We offer steering (4) as a processual way for knowledge managers to address these dynamics. Just as experienced drivers switch from cruise control to active

> steering at busy intersections or congested roadways, knowledge managers need to proactively anticipate emerging pathologies within the knowledge system and steer around them. Steering also implies an ability to extricate an organization that inadvertently finds itself mired in a vicious circle. (p. 27)

Even when the organisational form or type is not referenced directly the organisational machine is still vividly produced through discussions on organisational *operations*. Consistent with previous chapters, organisations, just like machines are conceived as operational or working entities. Discussing organisations in this way is not only evident in the author's own discourse, but is also frequently evidenced in the language practitioners use to talk about organisations. For example, in Randall et al. (2001) an excerpt from an informant includes the following statements: 'we talk to them about how the company *works*... how it *operates*...' (p. 118).

Organisations, just like machines, must overcome *inertia* (Cooper 2000; Santosa, Wei & Chan 2005) and suffer complications in correct operation. Associated services '*crash*' (Fitzgerald & Russo 2005, p. 244) or the organisation as a whole *breaks down* (Gosain, Lee & Kim 2005). Just as in a machine that breaks down, both the internal (Newman & Westrup 2005) and external *faults* have to be identified and *fixed* (Gengatharen & Standing 2005) in order to become operational again. As is highlighted in Table 6.7, Cooper (2000) provides an excellent example of an organisation being discussed in these terms. That is, as being '*broken*' and needing '*fixing*'. Hence, even when the organisational form or type of the machine is not referenced directly it is nevertheless clearly visible through its operational aspects.

Organisations and their various constituent components, just like machines, are *designed* (Alavi & Leidner 2001; Luna-Reyes et al. 2005), *redesigned* (Cooper 2000), *engineered* (Santosa, Wei & Chan 2005) and *reengineered* (Panagiotidis & Edwards 2001), *built* (Duhan, Levy & Powell 2001) and *assembled* (Straub & Watson 2001) according to various business *blueprints* (Gosain, Lee & Kim 2005). Furthermore, they are *automated* (Lin & Silva 2005; Peristeras & Tarabanis 2000), *run* (Newman & Westrup 2005), *mobilised* (Madon 2005), *launched* (Gengatharen & Standing 2005), *driven* (Madon 2005) and *geared* (Ravichandran & Rai 2000) toward their desired goals. Various aspects of the organisation are *calibrated* and *fine-tuned* (Ravichandran & Rai 2000), *streamlined* (Santosa, Wei & Chan 2005), *calculated* (Cooper 2000), *configured* and *reconfigured* (Huang, Newell & Pan 2001) to make the attainment of their goals more certain and their operations more efficient and effective.

As seen in Table 6.7, many of the same mechanistic parts encountered in previous chapters are also encountered here in the 2000/2001 and 2005 sampling periods, in particular references to *propellers*, *chains*, *levers* and *mechanisms*. Other mechanistic components of organisations are provided in the following excerpts:

- 'both organizational and technical *components* change frequently during an ISDP'. (Lee & Xia 2005, p. 75)

- 'KM [Knowledge Management]/OM [Organizational Memory], then, to the extent that it is a management *device* predicated on new and sophisticated forms of computer support, depends on the possibility that knowledge and memory can be operationalised and rendered in a statistical fashion' (Randall et al. 2001, p. 119)

- 'Since these organizations survive on their ability to produce software, software developers are their main production *engine*.' (Sawyer 2000, p. 53)

- 'Instead, management should focus attention on creation and perpetuation of an organizational system *geared* to achieve superior quality performance.' (Ravichandran & Rai 2000, p. 382)

- 'I think we need to view the world of organisations as a *generator* of many "natural experiments",' (Huber 2001, p. 78)

- '... the potential for new information and communication technologies (ICTs) to un*lock* and optimise the knowledge assets of organizations ...' (Marshall & Brady 2001, p. 100)

- 'how enterprises *switch* (or drift) from one configuration to another' (Malhotra, Gosain & El Sawy 2005 p. 172)

Such easily recognisable forms and types of machinery that were used in describing organisations were critical in establishing a clear and detailed image of the organisational machine metaphor during the two time periods sampled.

### Frequency and variety of mechanistic discourse within articles

The same mechanistic discourse that was evidenced frequently and in a wide variety of ways across articles was reflected within articles. Consistent with previous chapters there were articles (see Dennis, Wixom & Vandenberg 2001; Dey & Sarkar 2000; Kim, Hahn & Hahn 2000; Korn 2001) where mechanistic discourse alone was relied on in discussions of the organisational concept. Furthermore, consistent with the results of previous chapters, mechanistic rhetoric typically occurred in all significant aspects of the research discussed: problem formulation, theories relied on and methods used.

Malhotra, Gosain and El Sawy's article (2005) is a good example of how mechanistic rhetoric is used frequently and in a variety of ways within a single article. While this article also shows evidence of all three metaphors in discussions of organisations mechanistic discourse is evidenced frequently and in a wide variety of ways. In this article, which is entitled *Absorptive capacity configurations in supply chains: gearing for parter-enabled market knowledge creation,* evidence of the machine metaphor is immediately obvious through the mechanistic terms *chains* and *gearing*. These particular terms are used frequently throughout the article, typically appearing numerous times in all major sections of the article: from the abstract through to the theory development and the conclusion. Other mechanistic terms, which are frequently evidenced in the paper when discussing organisations and their structure as well as actions include: *leveraging* (p. 145) and *leverage* (p. 151, 156); *linkages* (p. 147); *mechanisms* (p. 150, 153, 157); *driven* (p. 151); un*lock* (p. 158); *gauge* (p. 157). Additionally, employees and teams within organisations are discussed as '*conduits* for knowledge creation' (p. 156) and organisations themselves are said to undergo 'information *overload*' (p. 157) when exchanging coordination information. Hence, while organic as well as cultural terminology is relied on in this article mechanistic discourse is frequently relied on in a variety of ways in discussions of organisations.

## 6.3.3. Organisation as organism

Consistent with the results of previous chapters most articles, approximately 96% in the 2000/2001 period and 94% in the 2005 period, show some evidence of organic discourse when discussing organisations. Yet, as was also noted in previous chapters, the overall number of articles categorised as dominant for the organism metaphor is less than those categorised as dominant for the machine metaphor. As shown in Table

6.8 in the period 2000/2001, approximately 47% of all articles were categorised as dominant for the organism metaphor. Table 6.9 shows this percentage falls to 24% in the 2005 period. Furthermore, not all articles show evidence of the organism metaphor as they do with the machine metaphor. Figure 6.3 illustrates that articles appearing in the *European Journal of Information Systems* during the year 2000/2001 are the most likely of all articles to be categorised as dominant for the organism metaphor – at around 72% of articles being categorised in this way. Yet even in the *European Journal of Information Systems* during this sample time period, not all articles show evidence of the organism metaphor as they did with the machine metaphor in the same period. Furthermore, this high number of articles being categorised as dominant for the organism metaphor drops off rather dramatically in 2005 as shown in Figure 6.4 with only around 19% of articles being categorised in this way.

A few instances of how organic discourse was evidenced across articles from *Management Information Systems Quarterly* and the *European Journal of Information Systems* during each of the years examined are provided in Table 6.10. Instances for *Information Systems Research* have already been provided in the previous chapter.

Table 6.8. *Results of* organisation-as-organism *metaphor in sampling period 2000/2001 (sub-set of Table 6.3)*

| **Source** | **Strength** | **Organisation** | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Organism | Dominant | 19 **(54%)* | 23 *(72%)* | 11 *(26%)* | 53 *(47%)* |
| | Secondary | 12 *(34%)* | 7 *(22%)* | 17 *(40%)* | 36 *(32%)* |
| | Occasional | 4 *(11%)* | 2 *(6%)* | 14 *(33%)* | 20 *(18%)* |
| Organism percentages | | *35 (31%)* | *32 (28%)* | *42 (37%)* | *109 (96%)* |

* Percentage shown is the percentage of papers for that particular journal.

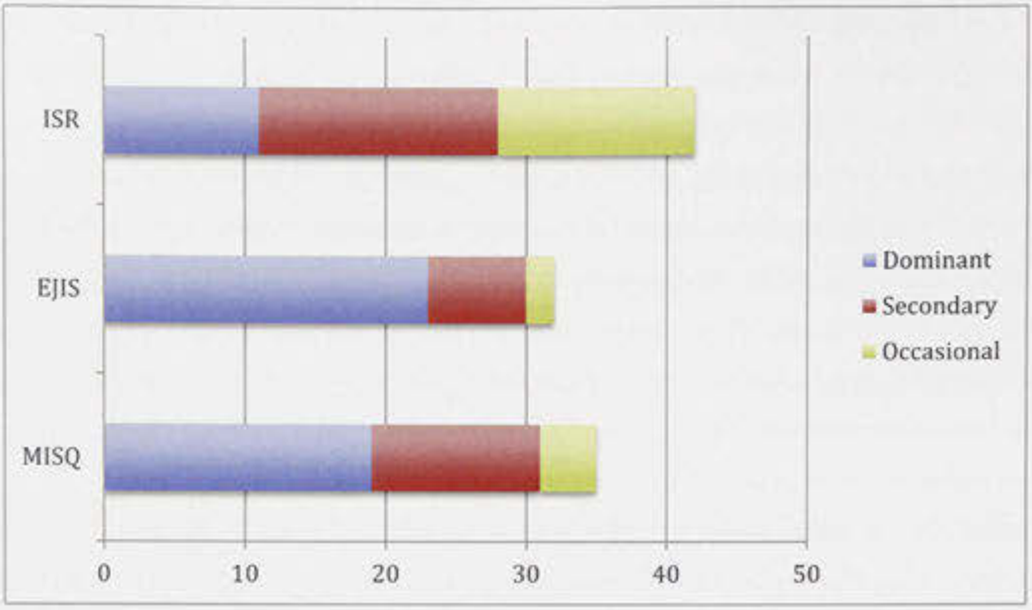


*Figure 6.3.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *organisation-as-organism* metaphor in sampling period 2000/2001 (derived from Table 6.8)

Table 6.9. *Results of* organisation-as-organism *metaphor in sampling period 2005 (sub-set of Table 6.4)*

| Source | Strength | Organisation | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Organism | Dominant | 6 *(24%) | 5 (19%) | 6 (35%) | 17 (24%) |
| | Secondary | 17 (68%) | 16 (62%) | 7 (41%) | 40 (56%) |
| | Occasional | 2 (8%) | 5 (19%) | 4 (24%) | 11 (15%) |
| Organism percentages | | *25 (35%)* | *26 (36%)* | *17 (24%)* | *68 (94%)* |

* Percentage shown is the percentage of papers for that particular journal.

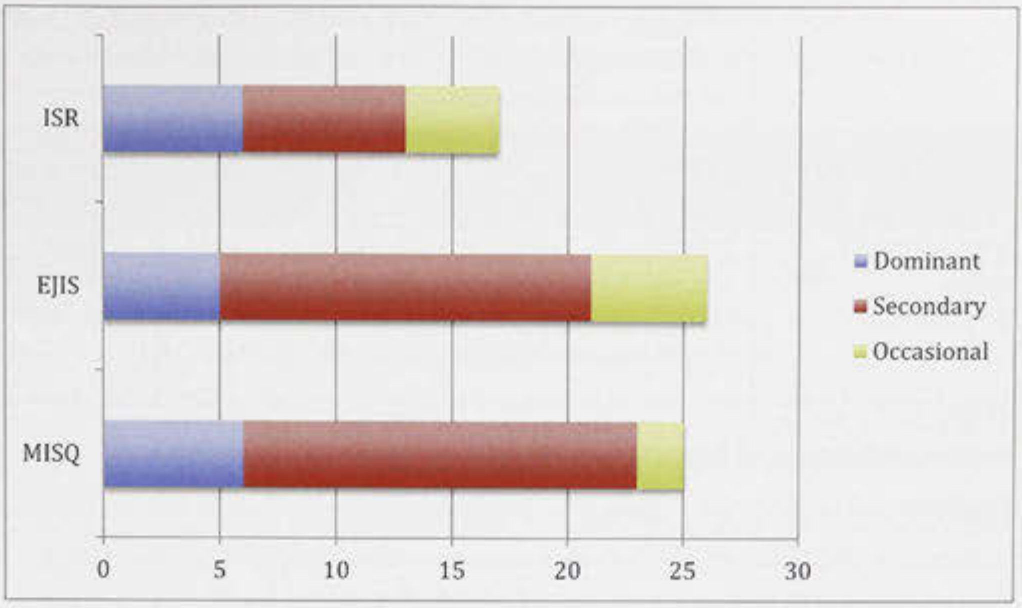


*Figure 6.4.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *organisation-as-organism* metaphor in sampling period 2005 (derived from Table 6.9)

Table 6.10. *Sample metaphor excerpts for the* organisation-as-organism *metaphor from each journal in sampling periods 2000/2001 and 2005.*

| JOURNAL | YEAR | ORGANISM METAPHOR EXCERPTS FOR ORGANISATION |
|---|---|---|
| MISQ | 2000 | ...however, they [management] realized that FAC [a bank] needed a long-term strategy if it were to *survive* in the increasingly competitive banking industry. (Cooper 2000, p. 549) |
| | 2001 | Empirical studies have shown that while organizations create knowledge and *learn*, they also *forget* (Alavi & Leidner 2001, p. 118) |
| | 2005 | An examination of the partners indicates that they are asymmetrical pairs in terms of size: a very large enterprise (focal enterprise responding to the survey) with much power in the supply chain (a powerful proverbial "800 pound *gorilla*") and a much smaller enterprise ("weak *monkey*"). (Malhotra, Gosain & El Sawy 2005, p. 170) |
| EJIS | 2000 | If the virtual value chain can effectively support transaction, information sharing and exchange and joint work, it will improve the bottom line of a smallfirm and for many small firms this is important for their *survival*. (Poon 2000, p. 79) |

| | | |
|---|---|---|
| | 2001 | Davenport (1998a) argues that the logic of an ERP system could conflict with the logic of the business, and either the implementation will fail, wasting large sums of money and causing a great deal of disruption, or the system will weaken important sources of competitive advantage, *hobbling* the company. (Al-Mudimigh, Zairi & Al-Mashari 2001, p. 221) |
| | 2005 | This allowed managers get a *pulse* of the business with simple views and generate insights into issues such as 'why increasing orders do not result in rising profits?' (Gosain, Lee & Kim 2005, p. 376) |

## Forms and types of organisations as organisms

The forms and types of the *organisation-as-organism* metaphor are even more limited in the period 2000/2001 and 2005 than those uncovered in the previous two chapters. The only direct reference to an organisation as an organism occurs in the article by Malhotra, Gosain & El Sawy (2005) published in *Management Information Systems Quarterly* as shown in Table 6.10 with the *organisation as gorilla* and *organisation as monkey* references. There are only four other indirect references to a particular type of organisation as organism: either to the *organisation as horse* or the *organisation as plant*. All of these indirect references occur in the published articles of the *European Journal of Information Systems*. The first indirect reference occurs in Al-Mudimigh, Zairi and Al-Mashari (2001) as shown in Table 6.10 through the use of the term *hobbled*. The second and third indirect references are in Lim, Pan and Tan (2005) and Sawyer (2000) who use the term *spurred*. Both the term *hobbled* and *spurred* are actions, which are typically conducted on a horse – the first to restrain it and the second to urge it on in the act of riding. The only other indirect reference occurs with Madon's (2005) use of the term *seed* to discuss the creation of a telecentre: 'the *seeds* of Akshaya were sown in a proposal' (p. 407). Apart from these references, however, there are no other metaphoric instances that discuss organisations either directly or indirectly as particular types of organisms.

References are also made to the anatomical aspects of organisms, as well as to some of their different senses, namely sight and touch. Table 6.11 presents all of the excerpts that highlight this particular use.

Table 6.11. *Sample metaphor excerpts for the anatomy and sense aspects of* organisation-as-organism *metaphor from each journal in sampling periods 2000/2001 and 2005.*

| JOURNAL | YEAR | ORGANISM ANATOMY AND PHYSIOLOGY EXCERPTS FOR ORGANISATION |
|---|---|---|
| MISQ | 2000 | It is through the design of the management infrastructure that top management establishes the context to *suffocate* or promote improvements to the design of the process and participation of stakeholders (Ravichandran & Rai 2000, p. 393) |
| | 2001 | ... databases and management systems, can be effective tools in enhancing organizational *memory*. (Alavi & Leidner 2001, p. 119) |
| | 2005 | We propose two types of information systems: one that enhances the ability of an enterprise to absorb (through capture and retention) and another that enables an enterprise to *digest* (through processing) information received from supply chain partners to create new knowledge. (Malhotra, Gosain & El Sawy 2005, p. 156) |
| EJIS | 2000 | it is much more dificult to assert that any player's intentions and *visions* stand for those of the industry group as a whole (Johnston & Gregor 2000, p. 243) |
| | 2001 | Clearly, this can cause a dichotomy in how organisations operate and *embrace* IT-enabled change. (Irani, Sharif & Love 2001, p. 55) |
| | 2005 | ERP has traditionally been seen as being the *backbone* of an automated and efficient organisation, (Santosa, Wei & Chan 2005, p. 162) |

In addition to the explicit reference to the *backbone* in Santosa, Wei and Chan (2005), the *eyes*, *hands*, *heart* and *minds* of the organisation are also explicitly referenced as is shown in the below excerpts:

- 'They fully understand the financial aspect of running a factory and can follow up the variances - they don't need somebody to hold their *hand* anymore.' (Newman & Westrup 2005, p. 266)
- 'I think American businesses have had a bad *eye* about overhead being so high.' (Porra, Hirschheim & Parks 2001, p. 731)
- 'The integration of an ERP system into the *heart* of an enterprise's business' … (Lim, Pan & Tan 2005, p. 135)

- 'organizations still retain the *mind*-sets associated with the experiences of their business processes and in-house information systems' (Wei, Wang & Ju 2005, p. 331)

Some of the explicit references to physiology in addition to respiration, digestion and movement include circulation, growth and development and various senses such as *touch*, *taste*, *smell* and particularly *pain*. Some examples are included below:

- 'This allowed managers "get a *pulse* of the business" … ' (Gosain, Lee & Kim 2005, p. 376)

- 'we will not *spoon feed* entrepreneurs – they must be willing to work hard.' (Madon 2005, p. 408)

- ' … it did *smell* of local government.' (Gengatharen & Standing 2005, p. 426)

- 'Many companies had gone through a *bruising* experience as they came to terms to using commodity systems such as ERPs instead of in-house-developed systems.' (Newman & Westrup 2005, p. 262)

- 'companies have tended to incur increased costs (direct and indirect), as well as a degree of organisational *pain*' (Santosa, Wei & Chan 2005, p. 163)

Paralleling the references made in Table 4.4, references are also made to readily recognisable organic relationships and behaviour. Both relationships and behaviour are most commonly contextualised very broadly within the business environment (terms such as *climate*, *landscape* and *ecology* are also popular) but relationships and behaviour that occurs intra-organisationally as well as inter-organisationally are popular as well.

In terms of the environment most articles discuss the flexibility (Lee & Xia 2005) to respond both externally through behaviour such as *migration* (Gengatharen & Standing 2005) or internally particularly through *adaptation* (Wei, Wang & Ju 2005). These behaviours are viewed as critical for an organisations survival. Changes in the business environment are strongly correlated with those in the organic environment, in particular the relative bounty or scarcity of food and resources. For example, Siponen (2005) refer to the ISS market being '*glutted* with an array of traditional ISS methods' (p. 304).

Intra-organisationally there is some concentration on aspects of a hunt. In particular, the spearheading by IT functions of IT projects within an organisation. For example, Gosain, Lee and Kim (2005) assert the 'ERP project was *spearheaded* by the IT function' (p. 379). Other aspects of the hunt, which are concentrated on is the notion of *trapping* or being *trapped* in particular situations or circumstances (Garud and Kumaraswamy 2005; Lim, Pan & Tan 2005).

In regards to the relationships and behaviour between organisations there is a strong focus on the parent/child relationship – particularly in the *European Journal of Information Systems*. Organisations are commonly referred to as *parents* (Luna-Reyes et al. 2005). Additionally, aspects of the nurture required in this relationship are also highlighted. The following excerpt from an informant in Madon (2005) is an example of this: 'we will not *spoon feed* entrepreneurs - they must be willing to work hard.' (p. 408). Other types of behaviour commonly focused on between organisations are competitive behaviour, particularly that which is *fierce* (Suh & Lee 2005), or *aggressive* (Chatterjee, Richardson & Zmud 2001). Typically, it is a very Darwinian notion of the strongest or fittest survive highlighted in these articles.

In relation to relationships and behaviour between an organisation and technology, as in previous chapters, the organisation is referred to as the '*host*' (Sawyer 2005, p. 55) of technology. In addition to this however, authors discuss the '*coping* mechanisms' (Lee & Xia 2005, p. 76) and '*syndromes*' (Gosain, Lee & Kim 2005, p. 379) that are developed or arise in response to technology.

Articles also explore organic relationships developed between organisations and government (Gengatharen & Standing 2005) and between organisations and customers (Lee & Xia 2005).

As in previous chapters, while these references certainly do much to add to the imagery of the organisation as organism, the form and type is general rather than specific. They are not specific as is the machine metaphor.

## Frequency and variety of organic discourse within articles

As with the previous two chapters, overall reliance on the organism metaphor – as evidenced through the frequency and variety of organic discourse within and across articles – was limited. Yet there are examples of articles that contain frequent and relatively varied organic discourse. Van de Ven (2005) is one of these examples. On first reading this article, one is immediately impressed with a powerful image of the organism through the title *Running in Packs to Develop Knowledge-Intensive Technologies*. This image is further added to with various references throughout the article. Organisations 'must '*run* in *packs*' with other cooperating and competing firms' (p. 366), competition takes place among '*spiders' webs*' of organisations (p. 367), and they 'co*evolve*' (p. 369) with new technologies. Relying on the works of Hannan and Freeman (1989) Van de Ven also points out that the argument for running in packs depends on 'population *ecology* studies' which have found that as competitors in a 'new organizational *niche*' increases so too does that of the organisational members until resource scarcity limits the '*growth* of all members of a population' (2005, p. 371). Although Van de Ven's (2005) article is also interspersed with both cultural and mechanistic discourse, it is a good example of an article with frequent and relatively varied use of organic discourse.

Consistent with other chapters, while there are examples such as Van de Ven (2005) that rely on relatively frequent and varied organic discourse within an article, such discourse typically appears only in the beginning and concluding parts of the paper – in the problem conceptualisation, and conclusions sections respectively. While articles categorised as dominant for the organism metaphor are more likely to show evidence of organic rhetoric in the background/theory sections such discourse is still much scarcer in the method and results sections, (where such sections are included) where mechanistic discourse tends to take over.

### 6.3.4. Organisation as culture

Mirroring the results of the previous chapters, the organisational culture metaphor is the least evidenced of all the metaphors for the organisation concept. Yet more articles overall were categorised as dominant for the culture metaphor in these past two sampling periods than was evident in the previous two chapters. As presented in Table 6.12 for the period 2000/2001 this metaphor was evident in approximately 64% of all articles. As shown in Table 6.13 this rises to around 73% of all articles in 2005. The organisational culture metaphor was dominant in only around 12% of all articles in the 2000/2001 period (refer Table 6.12) and around 25% in 2005 (refer Table 6.13).

Consistent with the findings of Chapter 4, it was the *European Journal of Information Systems* that was the journal most likely to publish articles containing evidence of the culture metaphor. Furthermore, as illustrated in both Figure 6.5 and Figure 6.6, articles appearing in the *European Journal of Information Systems* are – yet again – more likely than articles published in the two other journals to be categorised as dominant for the culture metaphor. Interestingly, in the 2005 period it is the first time that the number of articles categorised as dominant for the culture metaphor was greater than the number categorised as dominant for the organism metaphor. Additionally, consistent with the results outlined in the previous two chapters, there are a number of articles published in the two other journals – most notably *Management Information Systems Quarterly* – that are categorised as dominant for the culture metaphor. Yet, as was also revealed in the previous two chapters it is the articles published in the *European Journal of Information Systems* that contribute most to the overall percentage of articles categorised as dominant for the culture metaphor.

A few instances of how the *organisation-as-culture* metaphor was evidenced through discourse across the articles of each journal in each year are provided in Table 6.14. Samples from the *Information Systems Research* journal have already been provided in the previous chapter.

Table 6.12. *Results of* organisation-as-culture *metaphor in sampling period 2000/2001 (sub-set of Table 6.3)*

| **Source** | **Strength** | **Organisation** | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Culture | Dominant | 4 **(14%)* | 9 *(30%)* | 0 *(0%)* | 13 *(12%)* |
| | Secondary | 12 *(43%)* | 9 *(30%)* | 6 *(43%)* | 27 *(24%)* |
| | Occasional | 12 *(43%)* | 12 *(40%)* | 8 *(57%)* | 32 *(27%)* |
| Culture percentages | | ***28 (25%)*** | ***30 (27%)*** | ***14 (12%)*** | ***72 (64%)*** |

* Percentage shown is the percentage of papers for that particular journal.

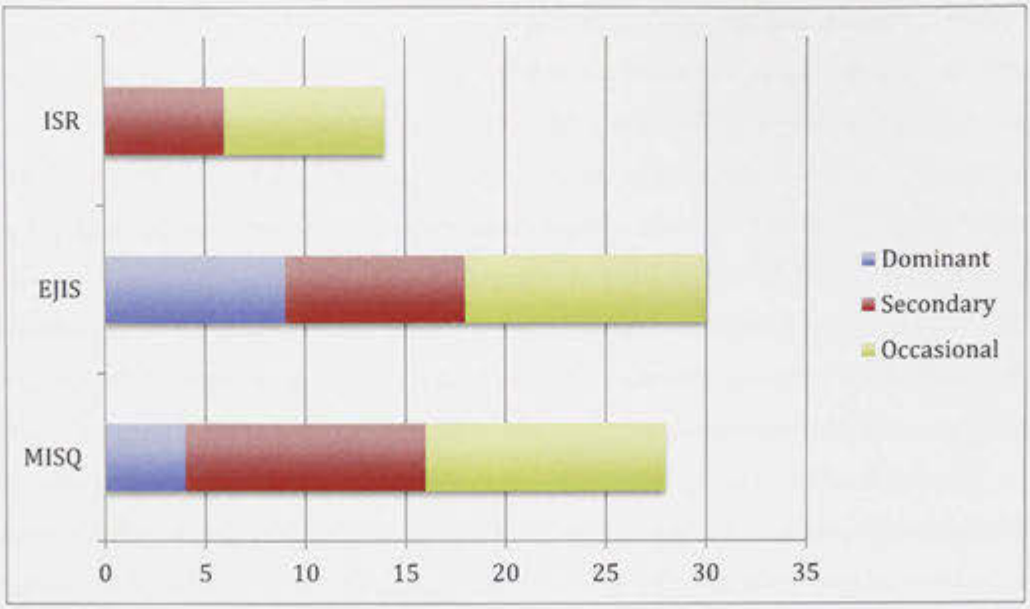


*Figure 6.5.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *organisation-as-culture* metaphor in sampling period 2000/2001 (derived from Table 6.12)

Table 6.13. *Results of* organisation-as-culture *metaphor in sampling period 2005 (sub-set of Table 6.4)*

| Source | Strength | Organisation | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Culture | Dominant | 5 *(22%) | 12 (60%) | 1 (10%) | 18 (28%) |
| | Secondary | 3 (13%) | 4 (20%) | 2 (20%) | 9 (25%) |
| | Occasional | 15 (65%) | 4 (20%) | 7 (70%) | 26 (26%) |
| Culture percentages | | ***23 (32%)*** | ***20 (28%)*** | ***10 (14%)*** | ***53 (74%)*** |

* Percentage shown is the percentage of papers for that particular journal.

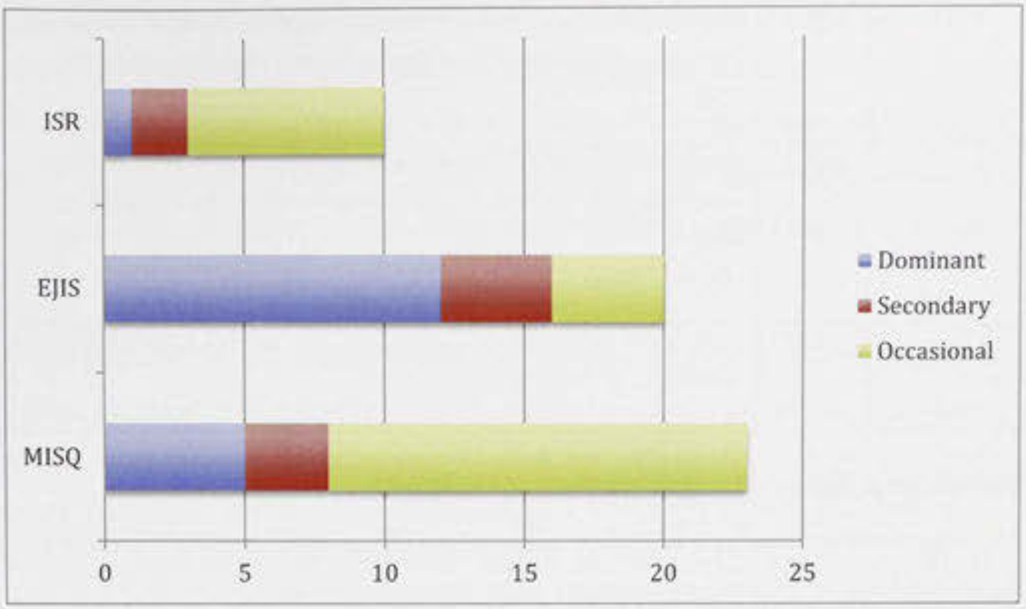


*Figure 6.6.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *organisation-as-culture* metaphor in sampling period 2005 (derived from Table 6.13)

Table 6.14. *Sample metaphor excerpts for the* organisation-as-culture *metaphor from each journal in sampling period 2000/2001 and 2005.*

| JOURNAL | YEAR | CULTURE METAPHOR EXCERPTS FOR ORGANISATION |
|---|---|---|
| MISQ | 2000 | FAC went beyond these changes and even changed its organizational *culture*, its "pattern of shared basic assumptions... that worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" (Schein 1992, p.12) … (Cooper 2000, p. 562) |
| | 2001 | This view of organizational systems as knowledge systems represents both the cognitive and *social* nature of organizational knowledge and its embodiment in the individuals cognition and *practices* as well as the *collective* (i.e., organizational) *practices* and *culture* (Alavi & Leidner 2001, p. 116) |
| | 2005 | The *story* of Texaco's IT function is typical of many centralized IT organizations (Willcocks and Lacity 1998) that have lost their *status* and had their functions transferred to business units, third-party enterprise solutions, and outsourcing firms. (Porra, Hirschheim & Parks 2005, p. 722) |

| | | |
|---|---|---|
| EJIS | 2000 | Neither does the mentioned research include the idealistic or non-commercial dimension of the <u>*bazaar*</u> organization (Ljungberg 2000, p. 214) |
| | 2001 | Others, in the context of arguing or studying the b[illegible] of desktop computing and Decision Support Systems, addressed the <u>*reluctance*</u> of Electronic Data Processing departments to <u>*share 'their'*</u> information. (Huber 2001, p. 72) |
| | 2005 | …"it is the <u>*culture*</u> in the Bank that if you are not a banker, you are nothing"… (Lin & Silva 2005, p. 54) |

### Forms and types of organisations as culture

The *organisation-as-culture* metaphor in this phase of analysis was not evidenced in a specific form. It is however, discussed as having culture – both general and specific. As revealed in previous chapters, typically articles make reference to only the broadest form of culture e.g. organisational or institutional culture. Indeed, it is mention of organisational or institutional culture, as highlighted in Cooper (2000), Alavi and Leidner (2001) as well as Lin and Silva (2005) in Table 6.14, which is the most common reference to organisations and culture.

Organisations are also discussed as having specific cultures. In the 2000/2001 period these include references to *conservative* (Cooper 2000), *decision making* (Cooper 2000), *egalitarian* (Trauth & Jessup 2000), *gift* (Ljungberg 2000), *knowledge-intensive* (Alavi & Leidner 2001), *no-blame* (Marshall & Brady 2001), *risk-averse* (Baldwin, Irani & Love 2001), *selling* (Randall et al. 2001) and *uncertainty avoidance* (Keil et al. 2000) cultures. Similar references to *blame* (Irani, Sharif & Love 2005), *conservative* (Levina & Vaast 2005), *uncertainty avoidance* (Hwang 2005), and *knowledge sharing* (Bock, Zmud & Kim 2005) cultures are made in 2005. In addition, references are also made to *asking* (Garud & Kumaraswamy 2005), *autonomous* (Lim, Pan & Tan 2005), *collaborative* (Gosain, Lee & Kim 2005), *learning* (Hatzakis et al. 2005), *open, proactive* (Irani, Sharif & Love 2005), *secretive* (Siponen 2005) and *service* cultures (Hatzakis et al. 2005) in this same period. Levina and Vaast (2005) also discuss *cultural capital* and its different 'sub-species'. Overall, while there are more references made to organisations as having specific cultures than was evident in previous chapters, the references made to organisations as having general cultures are more common i.e. to organisational or institutional culture.

Echoing the results of the previous two chapters, various levels and dimensions of culture are referenced. As in previous chapters, articles also focus on national (Keil et al. 2000; Malhotra et al. 2001; Tai & Phelps 2000) and economic forms of culture and the differences in individualism/collectivism (Sawyer 2000), haves/have-nots (Levina & Vaast 2005), us and them (Irani, Sharif & Love 2005) and developed/developing (Madon 2005) dimensions of culture.

In this phase of the results there appeared to be more of a focus on shared attitudes, values, goals and practices of and within organisations that highlight the importance of cultural matters in the organisation. In relation to attitudes, Lin and Silva's (2005) quote in Table 6.7 is particularly illuminating i.e. 'if you are not a banker, you are nothing' (p. 54). Other attitudes of note include whether an organisation perceives or is perceived to be *trustworthy*, (Klecun & Cornford 2005), *legitimate* and *credible* (Klecun & Cornford 2005). In terms of what an organisation values either as a whole or as collectives within the organisation, there are two main groupings here that are split along ethical and religious/spiritual lines. In terms of ethical lines references to the '*good'* of the organisation (Newman & Westrup 2005) are common. In terms of religious/spiritual lines organisations are talked about as being '*god given'* (Madon 2005, p. 408). Additionally, they commit an '*act of faith'* (Irani, Sharif & Love 2005 p.219) and have a '*community spirit'* (Gengatharen & Standing 2005, p. 430). Goals include status, as highlighted by Porra, Hirschheim and Parks (2005) in Table 6.7, *reputation*, *prestige* (Siponen 2005) and *power* (Madon 2005). Practices include the telling of *stories* (Fitzgerald & Russo 2005), *fighting a battle* (Fitzgerald & Russo 2005), or *playing* a *game* (Madon 2005). Engaging in rituals such as *sacrifice* (Al-Mudimigh, Zairi & Al-Mashari 2001; Cooper 2000; Gattiker & Goodhue 2005) are also aspects of practice focused on when structuring the organisation via the culture metaphor.

References to the general and specific forms of organisational culture, the levels and dimensions of organisational culture, as well as aspects such as attitudes and values that highlight the importance of cultural matters in the organisation add in their own way to the organisation as culture image. Yet, as discussed in the previous two chapters they are not taken as evidence of the *organisation-as-culture* metaphor in this thesis. Their contribution to the metaphor is by indirectly supporting it rather than directly relying on it.

### Frequency and variety of cultural discourse within articles

More articles overall were categorised as dominant for the culture metaphor in this phase of the analysis than any other phase. Yet, as was also noted in the previous two chapters, the organisational culture metaphor as evidenced through the frequency and variety of cultural discourse was limited.

Lam (2005) provides a little more discussion on aspects of culture than is encountered typically, yet this article is still a good example of the limited way in which culture is typically discussed. In his study of success factors in enterprise application integration he states that prior literature emphasises the importance of '*cultural* issues' (p. 177) and the alignment of technology and 'organizational *culture*' (p. 177). Additionally, in one of his findings Lam (2005) states that in one particular group he investigated they indicated that they 'would not be afraid to change the existing *culture* of the organisation if it was for the *good* of the organisation' (p. 181). There are articles that rely more heavily on culture-like discourse such as Torvinen and Jalonen (2000), Schultze (2000), and Levina and Vaast (2005) and hence show more frequency and variety in such discourse use. Yet, Lam (2005) is typical of the limited frequency and variety in which culture-like discourse is relied on in the discussion of organisations.

## 6.4 Technology

The results of the fictive metaphor analysis concerning the technology concept are presented in this section. Both Table 4.10 and Table 6.16 – sub-sets of Table 6.1 and Table 6.2 respectively – show the marked skew toward the machine metaphor. This is a skew that is essentially replicated from the results revealed in Chapter 4. As was the case in Chapter 4, the saturation of the machine metaphor in articles that contain any evidence of a root metaphor in relation to the technology concept is 100%. This is the case in both sampling periods. The skew toward the machine metaphor is greater with the technology concept than with the organisational concept. In the sample period 2000/2001 both the organisation and technology concepts contain comparable percentages of articles that have been categorised as dominant for the machine metaphor – 52% for organisation and 56% for technology. Yet, in this same period the technology concept has a significant reduction in the number of articles that have been categorised as dominant for the organism metaphor. Only around 17% of articles in the sample period 2000/2001 have been categorised as dominant for the organism metaphor in relation to the technology concept. In the same sample period, 47% were categorised as dominant for the same metaphor in relation to the organisation concept.

The number of articles categorised as dominant for the culture metaphor is almost half that revealed in Chapter 4 in the sample period 2000/2001. In Chapter 4 the number of articles categorised as dominant for the culture metaphor was around 11%. It is around half this figure – 5% – in the 2000/2001 sample period. The 2005 sample period is on a par with the results of Chapter 4. As shown in Table 6.16, approximately 10% of articles were categorised as dominant for the machine metaphor.

This section discusses these results in further detail starting with an outline of how the technology concept was discussed in the two sample periods 2000/2001 and 2005.

Table 6.15. *Results of metaphor analysis for technology in sampling period 2000/2001*

| **Source** | **Strength** | **Technology** | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 22 *(19%)* | 10 *(9%)* | 34 *(29%)* | 66 *(57%)* |
| | Secondary | 11 *(9%)* | 22 *(19%)* | 6 *(5%)* | 39 *(34%)* |
| | Occasional | 4 *(3%)* | 2 *(2%)* | 5 *(4%)* | 11 *(9%)* |
| Machine percentages | | *37* *(32%)* | *34* *(29%)* | *45* *(39%)* | *116* *(100%)* |
| Organism | Dominant | 6 *(5%)* | 11 *(9%)* | 3 *(3%)* | 20 *(17%)* |
| | Secondary | 15 *(13%)* | 14 *(12%)* | 11 *(9%)* | 40 *(34%)* |
| | Occasional | 9 *(8%)* | 6 *(5%)* | 22 *(19%)* | 37 *(32%)* |
| Organism percentages | | *30* *(26%)* | *31* *(27%)* | *36* *(31%)* | *97* *(84%)* |
| Culture | Dominant | 1 *(1%)* | 5 *(4%)* | 0 *(0%)* | 6 *(5%)* |
| | Secondary | 2 *(2%)* | 9 *(8%)* | 0 *(0%)* | 11 *(9%)* |
| | Occasional | 16 *(14%)* | 9 *(8%)* | 5 *(4%)* | 30 *(26%)* |
| Culture percentages | | *19* *(16%)* | *23* *(20%)* | *5* *(4%)* | *47* *(41%)* |
| TOTAL CODED ARTICLES | | **27** | **33** | **25** | **85** |

Note: % shown is rounded to the nearest per cent

Table 6.16. *Results of metaphor analysis for technology in sampling period 2005*

| Source | Strength | Technology | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 13 *(19%)* | 14 *(20%)* | 18 *(26%)* | 45 *(64%)* |
| | Secondary | 10 *(14%)* | 10 *(14%)* | 2 *(3%)* | 22 *(31%)* |
| | Occasional | 2 *(3%)* | 1 *(1%)* | 0 *(0%)* | 3 *(4%)* |
| Machine percentages | | *25 (36%)* | *25 (36%)* | *20 (29%)* | *70 (100%)* |
| Organism | Dominant | 2 *(3%)* | 6 *(9%)* | 1 *(1%)* | 9 *(13%)* |
| | Secondary | 6 *(9%)* | 9 *(13%)* | 9 *(13%)* | 24 *(34%)* |
| | Occasional | 12 *(16%)* | 8 *(11%)* | 9 *(13%)* | 29 *(40%)* |
| Organism percentages | | *20 (29%)* | *23 (33%)* | *19 (27%)* | *62 (89%)* |
| Culture | Dominant | 2 *(3%)* | 4 *(6%)* | 1 *(1%)* | 7 *(10%)* |
| | Secondary | 3 *(4%)* | 8 *(11%)* | 0 *(0%)* | 11 *(16%)* |
| | Occasional | 5 *(7%)* | 7 *(10%)* | 5 *(7%)* | 17 *(24%)* |
| Culture percentages | | *10 (14%)* | *19 (27%)* | *6 (9%)* | *35 (50%)* |
| TOTAL CODED ARTICLES | | **25** | **25** | **20** | **70** |

Note: % shown is rounded to the nearest per cent

### 6.4.1. Discourse on technology

Technology is generally not the sole focus of discussion. Apart from the article by Sarkar and Ramaswamy (2000) there are no other articles that focus solely on the technology concept. There are articles though, in both 2000/2001 and 2005 that approach this. For example, in the 2000/2001 period Westland's (2000) modelling of post-release errors in software concentrates largely on technology and so too do Nault and Vandenbosch's (2000) explanatory article on disruptive technologies in next generation information technology markets. So too in the 2005 period a couple of examples include Puschmann and Alt's (2005) article on an integration architecture for process portals and Wells, Fuerst and Palmer's (2005) article on the design of interfaces in the context of B2C e-commerce. None of these articles though, focus solely on the technology concept without reference to the importance of people and organisational factors. In both sampling periods 2000/2001 and 2005 it is rare for articles to focus solely on technology.

Discussions of technology in articles examined in this phase of the study contain evidence of the three root metaphors: machine, organism and culture. The evidence associated with each metaphor is presented in the order of most prevalent to least prevalent: machine (Section 6.4.2), organism (Section 6.4.3) and culture (Section 6.4.4).

## 6.4.2. Technology as machine

Once again the machine metaphor for technology is the most salient metaphor. As shown in Table 6.17 and Table 6.18, this metaphor was evident in all articles that contained evidence of a root metaphor in discussions of technology during the two sample periods 2000/2001 and 2005. The *technology-as-machine* metaphor was categorised as dominant in around 57% of articles published during the 2000/2001 sample period (refer Table 6.17) and 52% of articles published during the 2005 sample period (refer Table 6.18). Figure 6.7 and Figure 6.8 highlight that the main differences between journals – regardless of sample period – is that *Information Systems Research* is the most likely to contain articles that are categorised as dominant for the machine metaphor. The *European Journal of Information Systems* on the other hand is the least likely to contain articles categorised as dominant for the machine metaphor in the 2000/2001 period. For the 2005 period although the percentages are close between the *European Journal of Information Systems* and *Management Information Systems Quarterly, Management Information Systems Quarterly* is the journal that is least likely to contain articles categorised as dominant for the machine metaphor. Regardless of journal or sample period though, the machine metaphor is not only the most pervasive but also the most likely to be categorised as dominant in relation to the technology concept.

A few instances of how mechanistic rhetoric was evidenced across the articles of each journal in each publishing year sampled are provided in Table 6.19.

Table 6.17. *Results of* technology-as-machine *metaphor in sampling period 2000/2001 (sub-set of Table 6.15)*

| Source | Strength | Technology | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 22 *(59%) | 10 (29%) | 34 (76%) | 66 (57%) |
| | Secondary | 11 (30%) | 22 (65%) | 6 (13%) | 39 (34%) |
| | Occasional | 4 (11%) | 2 (6%) | 5 (11%) | 11 (9%) |
| Machine percentages | | 37 (32%) | 34 (29%) | 45 (39%) | 116 (100%) |

* Percentage shown is the percentage of papers for that particular journal.

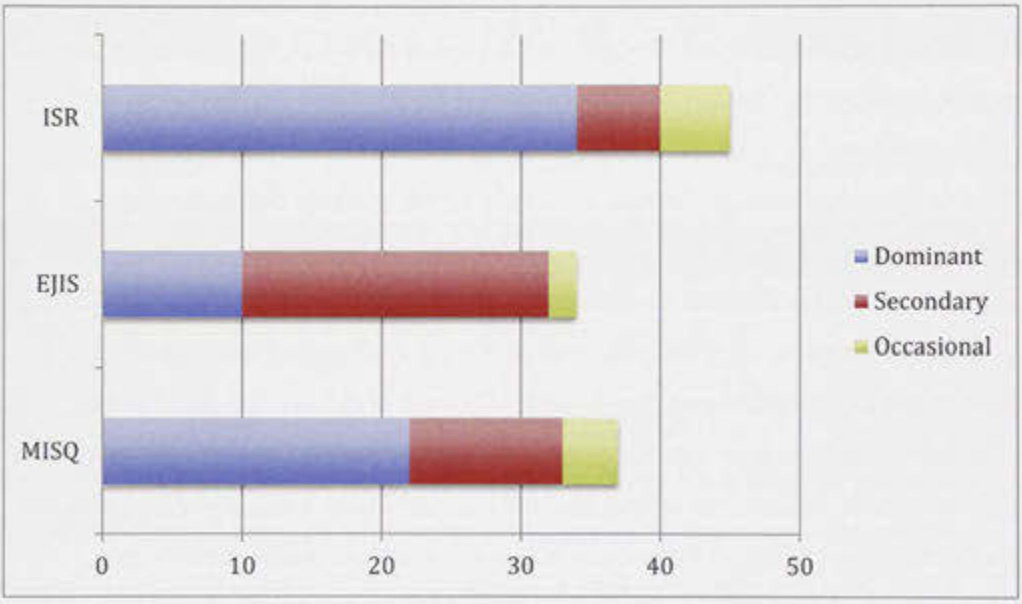


*Figure 6.7.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *technology-as-machine* metaphor in sampling period 2000/2001 (derived from Table 6.17)

Table 6.18. *Results of* technology-as-machine *metaphor in sampling period 2005 (sub-set of Table 6.16)*

| Source | Strength | Technology | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 13 *(52%) | 14 (56%) | 18 (90%) | 45 (52%) |
| | Secondary | 10 (40%) | 10 (40%) | 2 (10%) | 22 (44%) |
| | Occasional | 2 (8%) | 1 (4%) | 0 (0%) | 3 (5%) |
| Machine percentages | | 25 (36%) | 25 (36%) | 20 (29%) | 70 (100%) |

* Percentage shown is the percentage of papers for that particular journal.

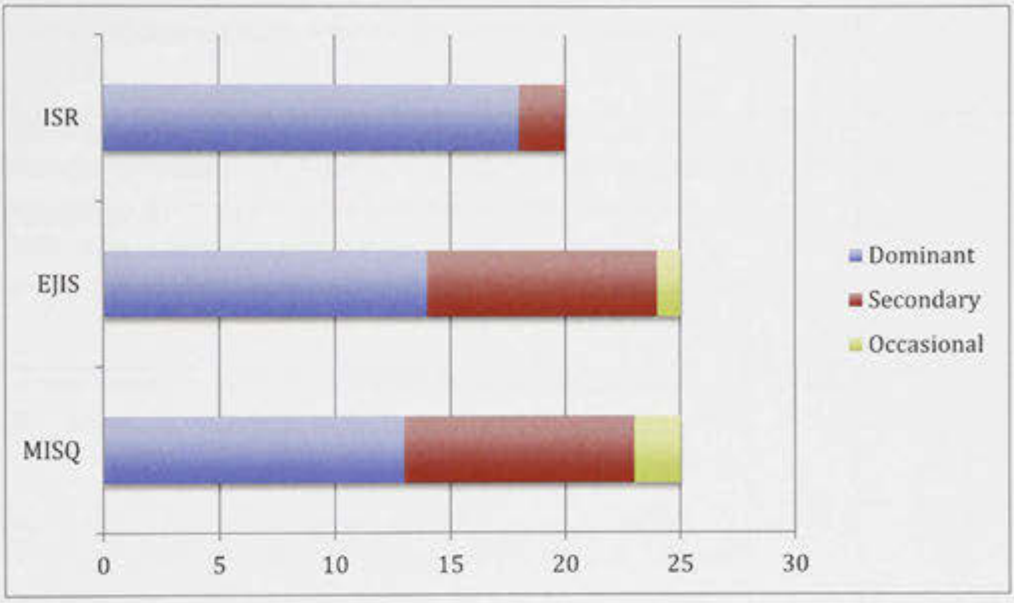


*Figure 6.8.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *technology-as-machine* metaphor in sampling period 2005 (derived from Table 6.18)

Table 6.19. *Sample metaphor excerpts for* technology-as-machine *metaphor from each journal in sampling periods 2000/2001 and 2005.*

| JOURNAL | YEAR | MACHINE METAPHOR EXCERPTS FOR TECHNOLOGY |
|---|---|---|
| ISR | 2000 | Some of the technologies and applications in the program would support a strategy of supplier partnering or of "customer intimacy," whereas others are most heavily geared toward a strategy of transaction efficiency. (Palmer & Markus 2000, p. 242) |

| | | |
|---|---|---|
| | 2001 | A major criticism with the applications of neural networks to real-world problems is the need to <u>tune</u> the network for each data set to achieve better performance. (Kiang & Kumar 2001, p. 189) |
| | 2005 | The sharing of databases either within or across organizations raises the possibility of unintentionally revealing sensitive relationships contained in them. Recent advances in data-<u>mining</u> technology have increased the chances of such disclosure. (Menon, Sarkar & Mukherjee 2005, p. 256) |
| MISQ | 2000 | Cases in which software projects go wildly over budget or drag on long past their originally scheduled completion date have been labeled "<u>runaway</u> systems" in the trade press (Mehler 1991; Willbern 1989). Like a runaway <u>train</u>, these are projects that are <u>hurtling</u> out of control; difficult to stop, yet in need of redirection or <u>termination</u>. (Keil et al. 2000, p. 632) |
| | 2001 | Another important implication of this definition of knowledge is that systems designed to support knowledge in organizations may not appear radically different from other forms of information systems, but will be <u>geared</u> toward enabling users to assign meaning to information and to capture some of their knowledge in information and/or data. (Alavi & Leidner 2001, p. 109) |
| | 2005 | Link was perceived by most account managers as an improvement to their <u>tool</u> <u>kit</u>. (Quote from IS Vice President in Beaudry & Pinsonneault 2005, p. 508) |
| EJIS | 2000 | COTS-Based Systems (CBS) development focuses on building large software systems by integrating previously existing software <u>components</u>. CBS success depends on successful evaluation and selection of Commercial-Off-The-Shelf (COTS) software <u>components</u> to fit customer requirements. (Kunda & Brooks 2000, p. 226) |
| | 2001 | Furthermore, management attributed this lack of education and training towards the system not receiving the <u>operational</u> support necessary for its successful implementation and <u>operation</u>, for example, resulting in unreliable data reflected in the form of '<u>noise</u>' in the Master Production Schedule (MPS). The consequence of '<u>noise</u>' in the MPS led to additional operational costs, decreases in productivity, and loss of customer base following inaccurate delivery lead-times being quoted. (Irani, Sharif & Love 2001, p. 53) |
| | 2005 | The importance of integration has <u>fuelled</u> a growing market for EAI <u>tools</u>. EAI <u>tools</u> generally comprise of an integration broker, messaging middleware and <u>pre-built 'adapters'</u> that connect applications to the messaging middleware. (Lam 2005, p. 176) |

### Forms and types of technology as machine

Table 6.19 covers some of the different forms and types in which the *technology-as-machine* metaphor appears in during the sampling periods 2000/2001 and 2005. Keil et al.'s (2000) reference to technology projects as a train is one of the more illustrative examples. The *technology-as-machine* metaphor also came in many of the same forms that were revealed in Chapter 4. Namely as:

- *engines* (Santosa, Wei & Chan 2005; Sarkar & Ramaswamy 2000);
- *levers* (Poon 2000); and
- *generators* (Banker & Slaughter 2000; Piccoli & Ives 2005).

Consistent with results of Chapter 4, technology as tool is one of the most frequently evidenced mechanistic form in the 2000/2001 and 2005 periods. For example, technology as:

- 'data-extraction *tools'* (Lim, Pan & Tan 2005 p.142);
- 'data mining *tools*' (Kiang & Kumar 2001, p. 177);
- 'Enterprise Application Integration *tools*' (Lam 2005, p. 175);
- 'collaboration *tools*' (Daniel & White 2005, p. 191); and
- 'behavioral control *tools*' (Hwang 2005, p. 151).

Other forms and types referenced in these two time periods include technology as: *equipment* (Lee & Xia 2005), a *weapon* (Lim, Pan & Tan 2005), a *battering ram* (Fitzgerald & Russo 2005) and a *hub* (Lim, Pan & Tan 2005)/*hub* and *spokes* model (Damsgaard & Truex 2000). Other mechanistic forms and types include: *warehouses* for data, information *silos* (Wixom & Watson 2001), delivery *vehicle* for introductory courses (Piccoli, Ahmed & Ives 2001), *drill* capabilities (Thomas & Datta 2001).

As revealed in Chapter 4 there are also many indirect references to forms and types of the technological machine. These include:

- technology as *train* e.g. systems are *rolled out* (Lam 2005) and projects are *derailed* (Reich & Benbasat 2000); and

- also as a general form of mobile machinery eg. something that can be *launched* (Fan, Stallaert & Whinston 2000; Nault & Vandenbosch 2000), *piloted* (Peristeras & Tarabanis 2000) and *steered* (Sawyer 2000).

There are also instances of technology being conceptualised as a road on which mechanistic forms travel, for example, in Dutta (2001) where 'customers *generate traffic*' (p. 262) on networks. These are all examples of how technology as machines was indirectly referenced in the two sampling periods of 2000/2001 and 2005.

As revealed in the two previous chapters, there is a significant focus on the operation of the technological machine. Getting the technology to *work* (Newman & Westrup 2005) and knowing it does *work* (Fitzgerald & Russo 2005) are important. Articles also focus not only on how technology *works* but also the importance of getting a system '*running* in the first place' (Santosa, Wei & Chan 2005, p. 168). Technological solutions are *installed* and then *configured* (Lam 2005), *calibrated* (Dutta 2001). They are '*plug* and *play* in nature' (Lam 2005, p. 185). Operationally they can be '*switched off… shut down…* ' (Fitzgerald & Russo 2005, p. 253), '*geared*' toward a strategy of transaction efficiency (Palmer & Markus 2000, p. 242).

Once technologies are up and running various things are done to ensure their correct and 'relentless operation' (Lim, Pan & Tan 2005, p. 135) and to meet various requirements like *throughput* (Lee & Xia 2005). For example, their data are '*cleaned/scrubbed*' (Wixom & Watson 2001, p. 18) before being placed in the system. Additionally, very similar to many machines they go through a *break-in* phase (Gattiker & Goodhue 2005) where they are put through such things as '*performance tuning*' (Wixom & Watson 2001, p. 25) and stress testing. Fitzgerald and Russo (2005) highlight this particular operational aspect well:

> We did a lot of *stress* related *testing* on the system... we *loaded* the system up with 3000 jobs in an hour and at that time the busiest days were about 3000 jobs in the whole day. We let the users see this happen and they took heart, they saw the system *working* much much harder than it would ever need to, and surviving. (p. 250)

Additionally, as with any machine, technologies suffer from problems in operation. These problems include: being '*out-of-sync*' (Gosain, Lee & Kim 2005, p. 379) and '*thrashing*' (Konana, Gupta & Whinston 2000, p. 179). Problems in operation result in either full or partial system failures or *faults* (March, Hevner & Ram 2000, p. 329). The system becomes '*overloaded*' (Konana, Gupta & Whinston 2000, p. 179), and there are '*failing component[s]*' (Kotlarsky & Oshri 2005, p. 42) which in turn may result in system '*crashes*' (Lin & Silva 2005, p. 52), '*break down*' (Sarkar & Ramaswamy 2000, p. 262) and a system that has '*fall[en] apart*' (Lin & Silva 2005, p. 54). These cases need '*repair*' (Siponen 2005, p. 309), '*fixing*' (Wei, Wang & Ju 2005, p. 330) or a complete '*overhaul*' (Krishnan et al. 2005, p. 308; Menon, Lee & Eldenberg 2000, p. 89).

Not only is technology itself seen as being composed of various components as in Sircar, Nerur and Mahapatra (2001) it is also often viewed as a component, in particular, an organisational component. It acts as a *link* between customers and suppliers (Puschman & Alt 2005) and also between organisations. It is a 'new *engine* for the organization' (Newman & Westrup 2005, p. 260) '*injecting* strategic functionalities' (Lim, Pan & Tan 2005, p. 142) and '*propel*[ling] changes in organizational design' (Straub & Watson 2001, p. 342). This focus on the components of the technological machine as well as the focus on technology as a component of the organisational machine helped establish rich and varied images of the *technology-as-machine* metaphor.

Consistent with the results of Chapter 4, there was also a focus on the physical structure of technology that further contributed to the clarity of the technological machine metaphor. Technology is *designed* (Santosa, Wei & Chan 2005; Singh, Dalal & Spears 2005) and *engineered* (Puschmann & Alt 2005) according to associated '*blue-prints*' (Gosain, Lee & Kim 2005, p. 383). It is then *assembled* (Daniel & White 2005), '*pieced* together' (Lam 2005, p.185) or even '*kludged* together' (Gosain, Lee & Kim 2005, p. 375) using various approaches such as 'open' (Santosa, Wei & Chan 2005, p. 163), 'homogenous' (Lim, Pan & Tan 2005, p. 141), 'component-based' (Kotlarsky & Oshri 2005, p. 42), and 'integration' (Lam 2005, p. 175) *architectures*. During the existence of the system it may have to be tailored through various '*re-engineering*' efforts to streamline the existing system. Additionally, in the maintenance effort '*plugging* gaps' (Swanson & Dans 2000, p. 279) and '*bolts-ons*, ' (Wei, Wang & Ju 2005, p. 325) may be required.

### Frequency and variety of mechanistic discourse within articles

Mechanistic discourse was more frequent than any other root metaphor discourse type in relation to technology. Indeed, there are many articles relying solely on mechanistic rhetoric when discussing technology – more so in the 2000/2001 and 2005 periods than in the 2008 period. A total of 19 papers in the 2000/2001 period did so followed by a total of 8 papers in the 2005 period. Not all of these papers were categorised as dominant for the machine metaphor in relation to the technology concept. Yet, 10 articles (see Agarwal, Sambamurthy & Stair 2000; Bhattacherjee 2001; Bodart et al. 2001; Bordetsky & Mark 2000; Cooper 2000; Dey & Sarkar 2000; Kim, Hahn & Hahn 2000; Peristeras & Tarabanis 2000; Taudes, Feurstein & Mild 2000; Venkatesh & Morris 2000;) in the 2000/2001 period were categorised in this way and likewise 5 articles (Kim, Hahn & Hahn 2005; Ryu et al. 2005; Santosa, Wei & Chan 2005; Tanriverdi 2005; Walden 2005) in 2005 were also categorised in this way. In all of these papers mechanistic discourse was not only frequent but varied when discussing technology in all significant parts of the papers: problem conceptualisation, theory, method, findings and conclusions.

## 6.4.3. Technology as organism

In this phase of the analysis the *technology-as-organism* metaphor was less pervasive than the *organisation-as-machine* metaphor. As shown in Table 6.20 only 84% of articles contained evidence of this metaphor for the sample period 2000/2001. Table 6.21 shows that while this figure rose to 89% in the sample period 2005, it did not achieve the same level of saturation which was achieved in the 2008 period (refer Chapter 4) with approximately 92% of articles containing evidence of this metaphor. Yet, in this phase of analysis there were more articles categorised as dominant for the organism metaphor when discussing technology in both the 2000/2001 period (refer Table 6.20) and the 2005 period (refer Table 6.21) than in the 2008 period. Specifically in the 2000/2001 period around 16% of articles – double the approximate percentage in 2008 (8%) – were categorised as dominant for the technology concept which dropped off slightly to around 13% in the 2005 period. As an overall percentage of articles coded in both these time sampling periods this percentage is still much lower than the number of articles categorised as dominant for the machine metaphor when discussing the technology concept.

As highlighted in Figure 6.9 and Figure 6.10, regardless of the sampling period the *European Journal of Information Systems* is the most likely of all three journals examined to have articles categorised as dominant for the technological organism metaphor. Indeed, articles categorised as dominant in the *European Journal of Information Systems* contribute significantly to the overall number of articles categorised in this way for the technological organism metaphor.

Table 6.22 provides an instance of how organic rhetoric was evidenced for the technology concept for each year in each journal.

Table 6.20. *Results of* technology-as-organism *metaphor in sampling period 2000/2001 (sub-set of Table 6.15)*

| Source | Strength | Technology | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Organism | Dominant | 6<br>*(20%) | 11<br>(35%) | 3<br>(8%) | 20<br>(17%) |
| | Secondary | 15<br>(50%) | 14<br>(45%) | 11<br>(31%) | 40<br>(34%) |
| | Occasional | 9<br>(30%) | 6<br>(19%) | 22<br>(61%) | 37<br>(32%) |
| Organism percentages | | 30<br>(26%) | 31<br>(27%) | 36<br>(31%) | 97<br>(84%) |

* Percentage shown is the percentage of papers for that particular journal.

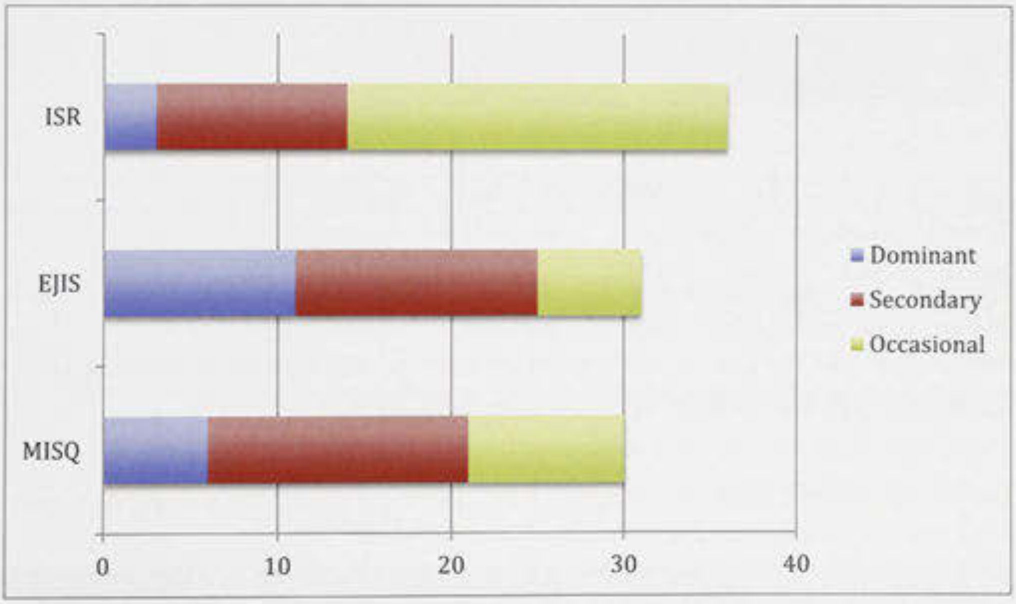


*Figure 6.9.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *technology-as-organism* metaphor in sampling period 2000/2001 (derived from Table 6.20)

Table 6.21. *Results of* technology-as-organism *metaphor in sampling period 2005 (sub-set of Table 6.16)*

| Source | Strength | Technology | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Organism | Dominant | 2 *(10%)* | 6 *(26%)* | 1 *(5%)* | 9 *(13%)* |
| | Secondary | 6 *(30%)* | 9 *(39%)* | 9 *(47%)* | 24 *(34%)* |
| | Occasional | 12 *(60%)* | 8 *(35%)* | 9 *(47%)* | 29 *(40%)* |
| Organism percentages | | *20* *(29%)* | *23* *(33%)* | *19* *(27%)* | *62* *(89%)* |

* Percentage shown is the percentage of papers for that particular journal.

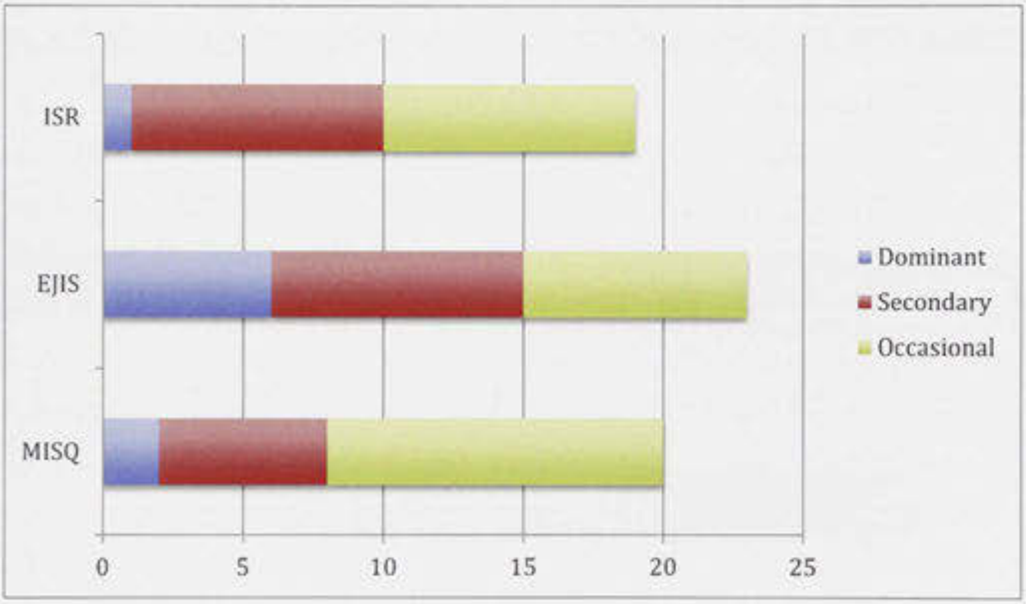


*Figure 6.10.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *technology-as-organism* metaphor in sampling period 2005 (derived from Table 6.21)

Table 6.22. *Sample metaphor excerpts for* technology-as-organism *metaphor from each journal in sampling periods 2000/2001 and 2005.*

| JOURNAL | YEAR | ORGANISM METAPHOR EXCERPTS FOR TECHNOLOGY |
|---|---|---|
| ISR | 2000 | The same open architecture that made *cloning* easier was *spawned* by IBM's desire to quickly obtain necessary complementary assets such as software (West & Dedrick 2000, p. 200) |

| | | |
|---|---|---|
| | 2001 | During the training process, input data are *fed* to the network through the processing elements (nodes) in the input layer. (Kiang & Kumar 2001, p. 180) |
| | 2005 | One effect of evolving requirements is that despite *debugging* effort, *bugs* may continue to persist in the system, in part because the requirements have changed and what was originally a correctly working feature is now considered a defect in the system. (Ji, Mookerjee & Sethi 2005, p. 294) |
| MISQ | 2000 | Cases in which software projects go *wildly* over budget or drag on long past their originally scheduled completion date have been labeled "runaway systems" in the trade press ... (Keil et al. 2000, p. 632) |
| | 2001 | When scrutinizing the search results, we insured that the role and responsibility description associated with the position announcement was that of a senior IT executive charged with the responsibilities of a CIO, e.g., building and operating an IT infrastructure as well as *seeding*, developing/acquiring and operating IT applications. (Chatterjee, Richardson & Zmud 2001, p. 49) |
| | 2005 | Especially in systems with tightly coupled components (Orton and Weick 1990), as in the case of an organization's knowledge system, mutually causal feedback loops can easily be amplified across the system, thereby rendering it more susceptible to *pathologies* (Perrow 1984). (Garud & Kumaraswamy 2005, p. 25) |
| EJIS | 2000 | Maintainability is the ease with which a software system or component can be modified to correct faults, improve performance, or other attributes, or *adapt* to a changed *environment*. (Kunda & Brooks 2000, p. 230) |
| | 2001 | The eventual success of their information system was realised through a bespoke implementation, based upon a traditional systems development *lifecycle* that indirectly addressed learning issues following the earlier failed deployment. (Irani, Sharif & Love 2001, p. 55) |
| | 2005 | These application software packages had their *roots* in manufacturing resource planning systems ... Since then they have *evolved* to include support for front-office and even interorganizational activities ... (Volkoff, Strong & Elmes 2005, p. 110) |

## Forms and types of technologies as organisms

The organic forms and types associated with the technology concept are even more limited than was revealed in Chapter 4 with only four specific forms being evidenced rather than five: *viruses*, *bugs, beasts* and *dog*. Two of these forms, viruses and bugs, were also revealed in Chapter 4. In this phase of the analysis, March, Hevner and Ram (2000) refer to technology as *viruses* as shown in Table 6.22. Weaknesses, shortcomings and problems in a system are referred to as '*bugs*' (Wei, Wang & Ju 2005, p. 330). Although it is not a direct reference to technology as an organism Ljungberg (2000) refers to a technological difficulty, specifically software development problems as a beast: 'no silver bullet to *kill* the *beast*' (p. 213). The last form, that of the dog, is also an indirect reference to technology as an organism. Lim, Pan and Tan (2005) use this indirect reference through the term *unleash* in relation to the strategic value of ERP.

In addition to the specific forms and types listed in the previous paragraph, indirect references to the technological organism in a general form also occur through the terms *breed* and *hybrid*. Sambamurthy and Zmud (2000) provide an example of this:

> IT infrastructures in most firms have been transformed from monolithic, stable architectures into *hybrid*, best of-*breed*, adaptive platforms. (p. 107)

There are certainly more references to anatomy and sense aspects of the organism than was the case in Chapter 4. As noted in Table 6.22 as well as Table 6.11 in the previous section on organisations, there are references to technology having an anatomy or being part of an organisation's anatomy. In particular, technology has *roots* (Volkoff, Strong & Elmes 2005) and *seeds* (Chatterjee, Richardson & Zmud 2001) and is also the '*backbone*' of an organisation (Santosa, Wei & Chan 2005, p. 162). Other anatomical references made when discussing technology include: the notion that certain technologies such as ERP '*embody* exemplary business paradigms' (Lim, Pan & Tan 2005, p. 135) and represent ''low-hanging *fruit*' for development' (Luna-Reyes 2005, p. 101). Although not overly common, such references to technology being an anatomical part of organisations or having an anatomy make an important contribution to the *technology-as-organism* metaphor.

Table 6.22 also shows that references also occur to aspects of an organism's physiology when discussing technology, in particular *reproduction* (West & Dedrick 2000), *digestion* (Kiang & Kumar 2001), *growth* and *development* (Chatterjee, Richardson & Zmud 2001) and *immunity* (Garud & Kumaraswamy 2005). Other interesting references include Lin and Silva's (2005) reference to 'technical *hiccups*' (p. 51). Technology is not only discussed as having a physiology of its own but is also discussed in terms of how it relates to the physiology of other concepts, in particular as a *flavour*, for example, the use of the term '*vanilla*' (Gosain, Lee & Kim 2005, p. 371) to refer to straightforward, uncomplicated implementations. Daniel and White (2005) discuss technology in relation to its impact on organisational *health*. As they assert inter-organisational systems will become a '*hygiene* factor' or part of the 'cost of doing business' (p. 195). Such discussions on the physiology of technology as well as how it interacts or relates with the physiology of other concepts are important in establishing an organic image of technology.

In addition to the anatomy and physiology of technology, references are also made to organic behaviour and relationships – considerably more so than was revealed in Chapter 4. Of particular interest in this phase of the study is behaviour and relationships concerning the environment. Systems exist within a larger environment and also provide an environment. For instance, there is a 'project *climate*' (Fitzgerald & Russo 2005, p. 245) that systems are developed within and data, information as well as processes are *migrated* between one system and another (Lam 2005; Luna-Reyes et al. 2005; Santosa, Wei & Chan 2005). There is also 'mutual *adaptation*' that occurs between systems and the organisations they support (Wei, Wang & Ju 2005, p. 324), and '*evolution*' (Luna-Reyes et al. 2005, p. 96) within their environments. Such a focus on clearly organic relationships and behaviour are significant in forming an image of technology as an organic entity.

The existence of all these references – anatomy, sense, physiology, behaviour and relationships – is all important in establishing the technology as organism image. They also address in a small way the large gap between the number of forms and types associated with the *technology-as-machine* metaphor and those associated with the *technology-as-organism* metaphor. Despite this, there are simply too few of them to mitigate the gap in any meaningful way.

### Frequency and variety of organic discourse within articles

In the 2000/2001 period as well as the 2005 period there were significantly more articles than 2008 where organic discourse dominated discussions on technology. Many of these were published in the *European Journal of Information Systems* during the period 2000/2001 but a number also appeared in this journal during the year 2005 as well as in the two other journals, *Management Information Systems Quarterly* and *Information Systems Research*, in both time periods. Swanson and Dan's (2000) article, *System Life Expectancy and the Maintenance Effort: Exploring Their Equilibration,* is a good example of where organic discourse is both frequent and varied. Systems are discussed throughout as living and aging entities that go through a full lifecycle. Yet, even in this and other papers like it, mechanistic discourse still features, typically in significant ways. For example, Swanson and Dan's (2000) reference to '*Equilibration'* (p. 277) is clearly mechanistic. Furthermore, articles relying on organic discourse when discussing the technology concept did so mostly in the beginning and ending sections, particularly in initial problem conceptualisation/introduction, and conclusions sections. Moreover, organic discourse is typically passed over in favour of more mechanistic terminology in the midsections of the papers.

### 6.4.4. Technology as culture

The *technology-as-culture* metaphor was evidenced in approximately the same percentage of articles in the 2000/2001 period as it was in 2008. As shown in Table 6.23 around 40% of all articles in 2000/2001 displayed some evidence of the culture metaphor when discussing technology. This is only slightly below the 42% (approximately) of all articles that did so in 2008. This number rose a little higher to around 49% in the 2005 sampling period as shown in Table 6.24. Additionally, consistent with the results of Chapter 4, the proportion of articles categorised as dominant for the culture metaphor are about the same as those categorised as dominant for the organism metaphor. Yet, as in 2008, the proportion of articles categorised as secondary and occasional for the culture metaphor were less in both sampling periods than those categorised in the same way for the organism metaphor. Furthermore, consistent with the results of 2008 and as shown in Figure 6.11 and Figure 6.12, articles published in *Information Systems Research* are the least likely to show evidence of the culture metaphor when discussing the technology concept. This phase of the analysis reveals the culture metaphor as the least popular way of conceptualising technology regardless of journal or sample period.

Instances of how cultural discourse was relied on in discussions of technology for the two sample periods are provided in Table 6.25.

Table 6.23. *Results of* technology-as-culture *metaphor in sampling period 2000/2001 (sub-set of Table 6.15)*

| Source | Strength | Technology | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Culture | Dominant | 1 *(5%) | 5 (22%) | 0 (0%) | 6 (5%) |
| | Secondary | 2 (11%) | 9 (39%) | 0 (0%) | 11 (9%) |
| | Occasional | 16 (84%) | 9 (39%) | 5 (100%) | 30 (26%) |
| Culture percentages | | *19* (16%) | *23* (20%) | *5* (4%) | *47* (41%) |

* Percentage shown is the percentage of papers for that particular journal.

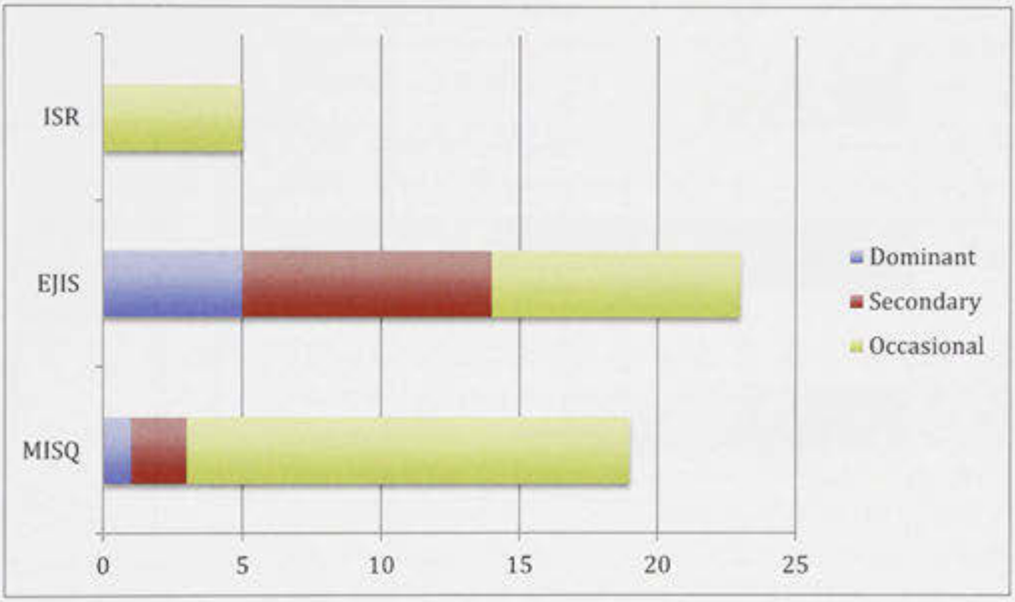


*Figure 6.11.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *technology-as-culture* metaphor in sampling period 2000/2001 (derived from Table 6.23)

Table 6.24. *Results of* technology-as-culture *metaphor in sampling period 2005 (sub-set of Table 6.16)*

| Source | Strength | Technology | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Culture | Dominant | 2 *(25%) | 4 (24%) | 1 (0%) | 7 (10%) |
| | Secondary | 3 (42%) | 8 (48%) | 0 (38%) | 11 (16%) |
| | Occasional | 5 (33%) | 7 (28%) | 5 (63%) | 17 (24%) |
| Culture percentages | | *10* (14%) | *19* (27%) | *6* (9%) | *35* (50%) |

* Percentage shown is the percentage of papers for that particular journal.

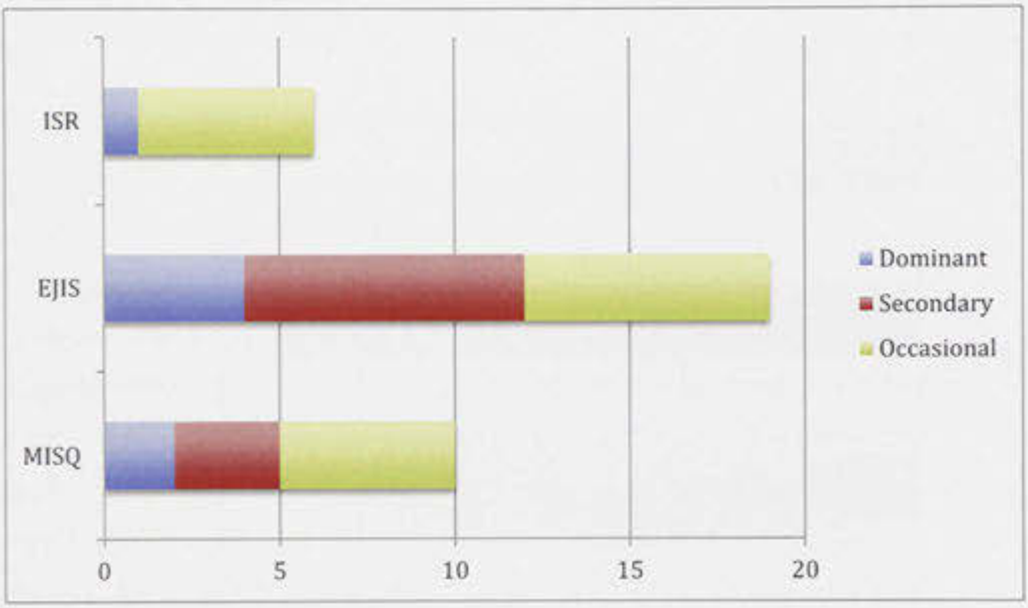


*Figure 6.12.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *technology-as-culture* metaphor in sampling period 2005 (derived from Table 6.24)

Table 6.25. *Sample metaphor excerpts for the* technology-as-culture *metaphor from each journal in sampling periods 2000/2001 and 2005*

| JOURNAL | YEAR | CULTURE METAPHOR EXCERPTS FOR TECHNOLOGY |
|---|---|---|
| ISR | 2000 | While less <u>*dramatic*</u> than so-called "<u>*radical*</u>" [architectural] innovations, the threat they posed was no less severe (West & Dedrick 2000, p. 205) |

| | | |
|---|---|---|
| | 2001 | Within the bounds of the net-enabled *revolution*, though, the IS field has an opportunity to shape the phenomenon with the IS academic and practitioner communities. (Straub & Watson 2001, p. 337) |
| | 2005 | System prototypes are among the most cited examples of "effective" boundary objects because they are seen as useful means for participants (e.g., marketing and engineering professionals) to represent and negotiate differences in their *practices* and *interests* (Bechky 2003, Carlile 2002). Yet many explicit objects do not become boundary objects in practice, as agents do not see their local usefulness or fail to establish a *common* *identity* for them across sites (Levina 2005, p. 112). |
| MISQ | 2000 | Technology structures include the restrictiveness, sophistication, and comprehensiveness of its features as well as the technology's "*spirit*," the general intent of the technology with regard to *values* and goals. (Majchrzak et al. 2000, p. 571) |
| | 2001 | A GSS is inherently a *social* technology, so the way in which a group chooses to use a GSS is affected not just by the task-technology fit, but also by the fit of the technology with the group's *habitual* *routines*--the social structures that evolve slowly over time (Dennis, Wixom & Vandenberg 2001, p. 172) |
| | 2005 | It is the ongoing use of an *artifact* by agents within a specific social context that generates the artifact's social characteristics and gives it *meaning* (Orlikowski 2000). ... to use an *artifact* means to *symbolically* incorporate it into the ongoing dialogue about the *practice*--a constant, reflexive, reaffirmation of what the object *means* in the given context (e.g., future users may discuss a KM application as a "*savior*" or as an "*imposed* piece of junk"). (Levina & Vaast 2005, p. 340) |
| EJIS | 2000 | This is how the EDI *grammar* is continuously emergent. It is under constant *negotiation* and adjustment as a consequence of the application of the grammar in interorganizational *practice*. (Damsgaard & Truex 2000, p. 175) |
| | 2001 | An ERP implementation based on BSPA, in the context of the knowledge-based society and the needs of knowledge management, can lead to the integration of business processes and make transparent *power-oriented* and fragmented organisational structures, thus *emancipating* the HAS content. (Panagiotidis & Edwards 2001, p. 145) |
| | 2005 | In general, an ES *privileges* accuracy over speed, regardless of the preferences of any organizational unit. (Volkoff, Strong & Elmes 2005, p. 119) |

## Forms and types of technology as culture

The same single form for the *technology-as-culture* metaphor that was evidenced in Chapter 4 was evidenced in this phase of analysis: the *cultural artefact*. This occurs in Levina and Vaast's (2008) article – a sample of which is provided in Table 6.32. Note Levina and Vaast's clear use of the *technology as cultural artefact* reflecting or having embedded in it certain meanings, interests and taken-for-granted assumptions. Yet, this is the only specific form in which the *technology-as-culture* metaphor was evidenced.

The same references to general and specific forms of organisational culture, the levels and dimensions of organisational culture occur with the technology concept – albeit in a much diluted form. This is more obvious in these results than those presented in Chapter 4. In this phase of the analysis discussions typically centre on general forms of culture and how technology mirrors the culture of its context – typically that of the organisation (Luna-Reyes et al. 2005) – or those who create it (Majchrzak et al. 2000). Klecun and Cornford (2005) however, also caution us to look at the impact technology may have on the 'way working practices are organised, daily lives are lived and society is (re)-constructed' (p. 229).

The same levels and dimensions of culture encountered in the discussions of organisations are encountered with the technology concept. Many of these articles are focused on how national and economic forms of culture are enabled or manifested through technology. Just as the shared attitudes, values, goals and practices of and within organisations add in their own way to the to the *organisation-as-culture* metaphor, so too is it the case with the *technology-as-culture* metaphor.

In relation to attitudes, whether a technology perceives or is perceived to be legitimate and credible (Fitzgerald & Russo 2005; Singh, Dalal & Spears 2005) is important. Technology is discussed as having value in both general (Luna-Reyes et al. 2005) and more specific terms. As Levina and Vaast (2005) assert, technology as a symbolic artefact can mean different things to different people, a *saviour* or an *imposed* piece of junk. Referring to technology along religious/spiritual lines as Levina and Vaast (2005) do is relatively common – particularly in relation to the '*spirit'* (Santosa, Wei & Chan 2005) of technology. Singh, Dalal and Spears (2005) also refer to the *mystery* encapsulated in technology. Goals that are enabled or sought by technology include *status* (Porra, Hirschheim & Parks 2005), *reputation*, *prestige*

(Siponen 2005) and *power* (Klecun & Corford 2005). Technology is also included as a particular artefact in different practices such as: Information Systems as a *text* (Fitzgerald & Russo 2005) or a *weapon* in a war (Lim, Pan & Tan 2005). Yet, as previously noted in Chapter 4 while all these references add to the imagery of the *technology-as-culture* metaphor they are not taken as evidence of a cultural form in this thesis.

### Frequency and variety of cultural discourse within articles

Although not common, there are articles that have been categorised as dominant for the *technology-as-culture* metaphor. One example – and a good one – is the article by Levina and Vaast (2005) published in *Management Information Systems Quarterly*. Their article, entitled *The Emergence of Boundary Spanning Competence in Practice: Implications for Implementation and Use of Information Systems,* is one of the best examples of frequent and varied use of cultural discourse in the discussion of technology. Systems are discussed throughout as *artefacts*, the 'boundary objects-in-use' which acquire a '*common identity*' (p. 335) and are '*symbolically valuable*' (p. 341). Yet, even in this article, which is so heavily infused with cultural discourse, mechanistic and organic discourse is still relied on.

## 6.5 People

In this section the results concerning the people concept will be discussed. Both Table 6.26 and Table 6.27 are sub-sets of Table 6.1 and Table 6.2 limited to the results concerning the people concept in the sample periods 2000/2001 and 2005. Unlike the results of Chapter 4, the people concept is not the most likely concept to show evidence of a root metaphor. As shown in Table 6.26, 108 articles contain some evidence of a root metaphor in relation to the people concept for the period 2000/2001. This is fewer than both the technology concept at 116 articles and the organisation concept at 113 articles at the same time. Table 6.27 shows that for the period 2005, 71 articles show evidence of a root metaphor. This is less than the organisation concept at 72 articles but more than the technology concept at 71 articles.

As revealed in Chapter 4 the most significant result concerning the people concept is the continued tendency to structure and understand the people concept via the machine metaphor. As shown in Table 6.26, the *people-as-machine* metaphor is evident in all articles that contain evidence of a root metaphor in relation to the people concept for the period 2005. It is the first time, however, that the organism metaphor has been categorised as dominant in a greater number of articles than the machine metaphor – 32 articles as opposed to 30 articles. The difference however, is slight. Furthermore, there are other reasons – notably the forms and types the machine metaphor comes in as well as frequency and variety of mechanistic discourse – that ensures the machine metaphor is still the most prevalent way of structuring and understanding people. As shown in Table 6.27, the sample period of 2005 is the only time that the organism metaphor has been evidenced in all articles that contain evidence of a root metaphor. Nevertheless, the *people-as-organism* metaphor during this same period was still categorised as dominant in fewer articles than the *people-as-machine* metaphor – 35 articles as opposed to 40 articles.

This section now examines the results concerning each of the three metaphors in further detail. It does so by starting with the *people-as-machine* metaphor.

Table 6.26. *Results of metaphor analysis for people in sampling period 2000/2001*

| **Source** | **Strength** | **People** | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 8 *(7%)* | 1 *(1%)* | 21 *(19%)* | 30 *(28%)* |
| | Secondary | 17 *(16%)* | 12 *(11%)* | 8 *(7%)* | 37 *(34%)* |
| | Occasional | 12 *(11%)* | 18 *(17%)* | 11 *(10%)* | 41 *(38%)* |
| Machine percentages | | *37 (34%)* | *31 (29%)* | *40 (37%)* | *108 (100%)* |
| Organism | Dominant | 20 *(19%)* | 10 *(9%)* | 2 *(2%)* | 32 *(30%)* |
| | Secondary | 14 *(13%)* | 18 *(17%)* | 20 *(19%)* | 52 *(48%)* |
| | Occasional | 3 *(3%)* | 3 *(3%)* | 17 *(16%)* | 23 *(21%)* |
| Organism percentages | | *37 (34%)* | *31 (29%)* | *39 (36%)* | *107 (99%)* |
| Culture | Dominant | 10 *(9%)* | 14 *(13%)* | 3 *(3%)* | 27 *(25%)* |
| | Secondary | 13 *(12%)* | 8 *(7%)* | 4 *(4%)* | 25 *(23%)* |
| | Occasional | 8 *(7%)* | 6 *(6%)* | 12 *(11%)* | 28 *(26%)* |
| Culture percentages | | *31 (29%)* | *28 (26%)* | *19 (18%)* | *78 (72%)* |
| TOTAL CODED ARTICLES | | **37** | **31** | **40** | **108** |

Note: % shown is rounded to the nearest per cent

Table 6.27. *Results of metaphor analysis for people in sampling period 2005*

| Source | Strength | People | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 18 *(25%)* | 5 *(7%)* | 17 *(24%)* | 40 *(56%)* |
| | Secondary | 5 *(7%)* | 16 *(23%)* | 3 *(4%)* | 24 *(34%)* |
| | Occasional | 2 *(3%)* | 5 *(7%)* | 0 *(0%)* | 7 *(10%)* |
| Machine percentages | | *25* *(33%)* | *26* *(38%)* | *20* *(29%)* | *71* *(100%)* |
| Organism | Dominant | 15 *(21%)* | 11 *(15%)* | 9 *(13%)* | 35 *(49%)* |
| | Secondary | 10 *(14%)* | 12 *(17%)* | 9 *(13%)* | 31 *(44%)* |
| | Occasional | 0 *(0%)* | 3 *(4%)* | 2 *(3%)* | 5 *(7%)* |
| Organism percentages | | *25* *(35%)* | *26* *(37%)* | *20* *(28%)* | *71* *(100%)* |
| Culture | Dominant | 7 *(10%)* | 15 *(21%)* | 2 *(3%)* | 24 *(34%)* |
| | Secondary | 7 *(10%)* | 1 *(1%)* | 1 *(1%)* | 9 *(13%)* |
| | Occasional | 10 *(14%)* | 5 *(7%)* | 11 *(15%)* | 26 *(37%)* |
| Culture percentages | | *24* *(34%)* | *21* *(30%)* | *14* *(20%)* | *59* *(83%)* |
| TOTAL CODED ARTICLES | | **25** | **26** | **20** | **71** |

Note: % shown is rounded to the nearest per cent

## 6.5.1. Discourse on people

While people were the most discussed concept in 2008 (as revealed in Chapter 4) the results of this phase of the study assert that this has not always been the case. As is evident in Table 6.26, a total of ten articles for the period 2000/2001 contained no evidence of a root metaphor in relation to people. In these same ten articles there was very little or no discussion of the people concept. Table 6.27 however, shows that these types of articles decreased significantly. In 2005 there was only one article (Menon, Sarkar & Mukherjee 2005) that contained no evidence of a root metaphor. This article also contained very little discussion of the people concept per se. Although not all articles discussed the people concept in enough detail to be coded it was nevertheless an important concept.

As revealed in Chapter 4, many articles in the 2000/2001 and 2005 period are concerned with the impacts as well as interactions occurring at the nexus between people and technology in the context of organisations. Different types of people such as users and IT professionals were certainly evident in the 2008 results but they lacked the distinction and clarity of those uncovered in these results.

In this phase of analysis it is the user group that gets most of the attention. This occurs in both time sampling periods. Articles investigate such issues as user acceptance (Hwang 2005; Venkatesh & Morris 2000), attention and recall (Wells, Fuerst & Palmer 2005), bias (Lim, Benbasat & Ward 2000), competence (Marcolin et al. 2000), perception (Lin & Silva 2005; Singh, Dalal & Spears 2005), expectations (Lim, Pan & Tan 2005) and preferences (Konana, Gupta & Whinston 2000), involvement and satisfaction (Fitzgerald & Russo 2005; Santosa, Wei & Chan 2005) are all areas of interest.

The group that gets the next significant chunk of attention is IT professionals. Articles look at such things as their creativity (Cooper 2000) and turnover (Moore 2000). Additionally, there is also a focus on IT professionals' interactions with their business colleagues (Hatzakis et al. 2005; Trauth & Jessup 2000), other important stakeholders such as government (Luna-Reyes et al. 2005), each other (Kotlarsky & Oshri 2005), as well as a combination of all these interactions (Newman & Westrup 2005). The ability of IT professionals acting in teams to respond to general business and technology changes are also important areas of investigation (Lee & Xia 2005; Newman & Westrup 2005).

People in themselves are the next major area of focus. Cognitive issues (Kim, Hahn & Hahn 2000) are perhaps the largest area of focus here followed by such things as approaches to (Klecun & Cornford 2005) and human knowledge required in (Irani, Sharif & Love 2005) Information Systems evaluation. Hence, although people are not discussed in all articles they remain a significant area of research in the two time-sampling periods 2000/2001 and 2005.

Following the conventions established so far with presentation this section will present the evidence associated with each root metaphor: machine, organism and culture.

### 6.5.2. People as machines

The *people-as-machine* metaphor was the most pervasive metaphor across the two time periods sampled. As shown in Table 6.28 and Table 6.29, this metaphor was evident in all articles in both time periods examined. Additionally, this metaphor was categorised as dominant in more articles overall than any other metaphor. Yet, in the two sampling periods examined – 2000/2001 and 2005 – the percentage of articles categorised as dominant for the machine metaphor was less than in 2008. As shown in Table 6.28, the percentage was considerably less at roughly 28% in the 2000/2001 period as opposed to around 58% of all articles in 2008. This rose to 56% in 2005, as can be seen in Table 6.29, but was still just under the 2008 figure. This relatively low overall figure was attributed to the very low percentages of papers categorised as dominant in the *European Journal of Information Systems* in both sampling periods. Consistent with Chapter 4 and as highlighted in Figure 6.13 and Figure 6.14, articles published in the *European Journal of Information Systems* were least likely to be categorised as dominant for the machine metaphor in relation to the people concept. This very low number of articles – particularly in the 2000/2001 period – contributed to the overall percentages of articles being categorised as dominant for the *people-as-machine* metaphor being relatively low in comparison to the 2008 period.

Table 6.30 provides a few instances of how mechanistic rhetoric was evidenced in relation to the people concept across the articles of each journal in each sampling year.

Table 6.28. *Results of* people-as-machine *metaphor in sampling period 2000/2001 (sub-set of Table 6.26)*

| **Source** | **Strength** | **People** | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 8 *(22%) | 1 (3%) | 21 (53%) | 30 (28%) |
| | Secondary | 17 (46%) | 12 (39%) | 8 (20%) | 37 (35%) |
| | Occasional | 12 (32%) | 18 (58%) | 11 (28%) | 41 (37%) |
| Machine percentages | | *37* *(34%)* | *31* *(29%)* | *40* *(37%)* | *108* *(100%)* |

* Percentage shown is the percentage of papers for that particular journal.

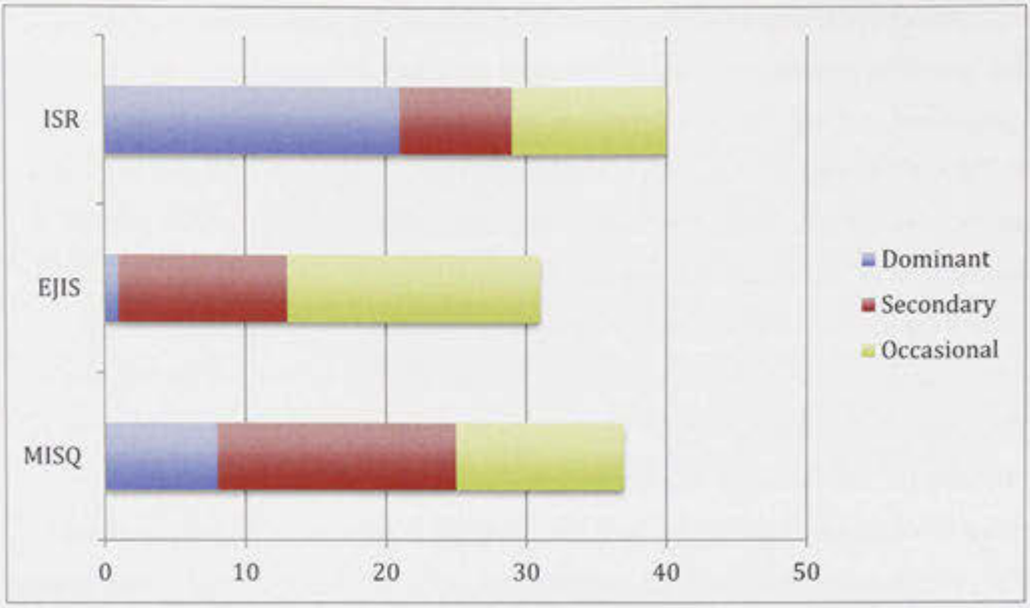


*Figure 6.13.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *people-as-machine* metaphor in sampling period 2000/2001 (derived from Table 6.28)

Table 6.29. *Results of* people-as-machine *metaphor in sampling period 2005 (sub-set of Table 6.27)*

| **Source** | **Strength** | **People** | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Machine | Dominant | 18 **(72%)* | 5 *(19%)* | 17 *(85%)* | 40 *(56%)* |
| | Secondary | 5 *(20%)* | 16 *(62%)* | 3 *(15%)* | 24 *(34%)* |
| | Occasional | 2 *(8%)* | 5 *(19%)* | 0 *(0%)* | 7 *(10%)* |
| Machine percentages | | *25 (33%)* | *26 (38%)* | *20 (29%)* | *71 (100%)* |

* Percentage shown is the percentage of papers for that particular journal.

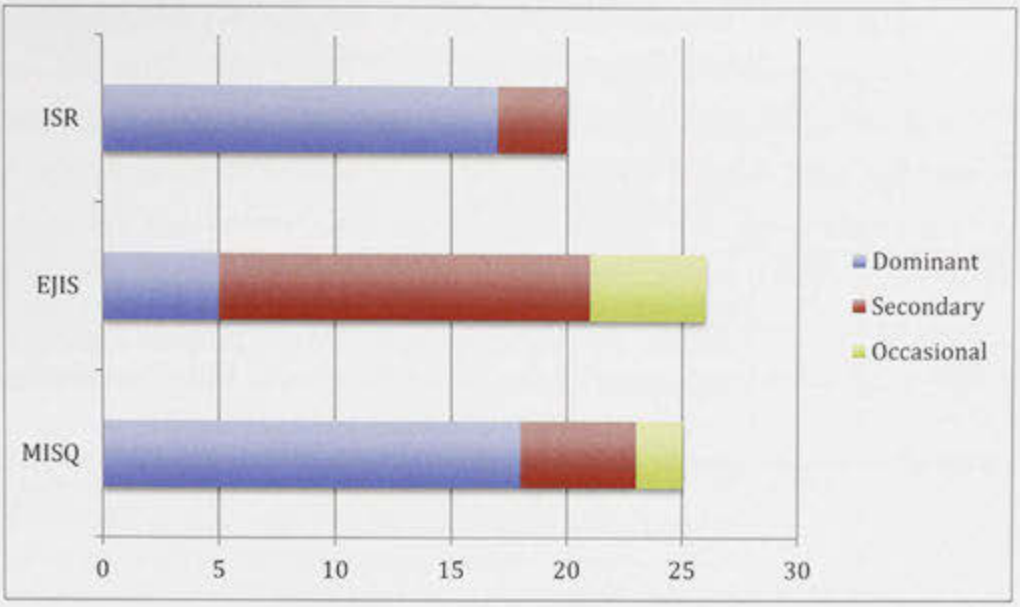


*Figure 6.14.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *people-as-machine* metaphor in sampling period 2005 (derived from Table 6.29)

Table 6.30. *Sample metaphor excerpts for* people-as-machine *metaphor from each journal in sampling periods 2000/2001 and 2005.*

| JOURNAL | YEAR | MACHINE METAPHOR EXCERPTS FOR PEOPLE |
|---|---|---|
| ISR | 2000 | The use of complementary cues leads to better retention and retrieval of information by providing more potential links to knowledge in long-term memory. As a result, the information is better registered in the decision maker's mind, and inconsistent information becomes more difficult to ignore. (Lim, Benbasat & Ward 2000, p. 130) |
| | 2001 | A veteran air-traffic controller made the following observations about a specific decision being discussed: "Now that's crisp vectoring! Make a plan, make it work, but don't think about the plan. Real educated people, somebody with real smarts, can't do this because they're always pondering. I don't have time for that." (Lerch & Harter 2001, p. 74) |
| | 2005 | For instance, in collocated settings, managers can presumably determine rather easily whether or not team members are "pulling their weight." (Chidambaram & Tung 2005, p. 149) |
| MISQ | 2000 | For example, the technology acceptance model posits that usage behavior is driven by instrumentality and cognitive complexity beliefs. (Agarwal & Karahanna 2000, p. 666) |

| | | |
|---|---|---|
| | 2001 | In contrast, the asserting style is thought to potentially lead to deadlocks or one-way solutions. (Barki & Hartwick 2001, p. 203) |
| | 2005 | She felt that the new system would increase her workload, reduce her productivity, and decrease her commission-based salary (Beaudry & Pinsonneault 2005, p. 515) |
| EJIS | 2000 | In social science, critical mass refers to 'the idea that some threshold of participants or actions has to be crossed before a social movement explodes into being' (Oliver et al, 1985). ... Therefore, achieving a 'critical mass' of users has been recognised as the key for successful groupware acceptance. (Lou, Lou & Strong 2000, p. 93) |
| | 2001 | the modus operandi of their trading businesses so that I could get a feel and get a handle on how it operates, get a feel of what the management is like, .. because seeing the operation, talking to them, trying to ask questions and get a feel as to how good they are, and they're pretty switched on these guys (Randall et al. 2001, p. 118) |
| | 2005 | Not only did each person have to do every task and complete it in the order specified, but they had to do it correctly every time so that they were not the weak link in the chain. (Volkoff, Strong & Elmes 2005, p. 116) |

### Forms and types of people as machines

Consistent with the results of Chapter 4, there are many instances in the 2000/2001 and 2005 periods of people being talked about as particular forms and types of machines. As in 2008 there are many references made to individuals and teams as *generators*. Garfield et al. (2001) provide a good example:

> Many of these firms have created 'idea *factories*,' in which teams brainstorm using e-mail, Web-based groupware, and face-to-face meetings, with the goal of *generating* ideas that change existing business paradigms. (p. 322)

Chidambaram and Tung (2005), Dennis, Wixom and Vandenberg (2001) and Butler (2001) also refer to idea generators in different contexts. Alavi and Leidner (2001) as well as Kim, Hahn and Hahn (2000) refer to hypothesis *generation* and Malhotra et al. (2001) more simply to information *generation*.

References are also made to people or teams as *vehicles* (Jones & Hughes 2001; Sambamurthy & Zmud 2000) for the achievement of particular organisational goals. Perhaps one of the best examples of *people-as-vehicle* is contained in Cooper (2000) where contractors are discussed as being taken for a '*test drive*' (p. 556) by the company before being given a permanent position. Indirect references are also frequently made to people or teams acting as simple *scaling machines* that *weigh* various things such as classification costs (Mookerjee & Mannino 2000), trade-offs concerning organisational competence (Levina & Vaast 2005) and concerns about product quality and task deadlines (Austin 2001). Additionally, indirect references are made to *people-as-trains*. For example, in Levina (2005) consultants 'pick up *steam*' (p. 119), and in Barki and Hartwick (2001) parties engage in '*steam rolling*' (p. 198).

Another interesting reference to people as machines is the following quote in Levina (2005) from a graphic designer asserting what he is not:

> I am not a water *faucet* that just *turns on* and out comes beautiful art work. (p. 126)

Likewise, a similar quote appears in Irani, Sharif and Love (2005) from a Managing Director:

> People are not *machines* and need gentle persuasion. (p. 221)

People are also conceptualised as having or being components. The most commonly evidenced form and component of people as machines is the *mechanism*. Mechanisms range from those affecting an individual person e.g. underlying mechanisms which influence their intention to use technology (Venkatesh & Morris 2000) to those that affect a much larger group such as knowledge production in society (Newman & Westrup 2005). As shown in Table 6.30 previously, people are also conceptualised as *links* in a *chain* (Volkoff, Strong & Elmes 2005) and also contain *links* (Lim, Benbasat & Ward 2000). Some of the more interesting references include *devices* such as cognitive *devices* (Lin & Silva 2005, p. 49) and *triggers*. Triggers range from those that activate routine behavior (Johnston & Gregor 2000) to those that stimulate new ideas (Garfield et al. 2001). Kim, Malhotra and Narasimhan (2005) provide one of the more interesting references highlighted below:

> However, with repetition of the same behavior over time, the same set of mental *links* tends to be repetitively formulated. In such a routinized situation, the knowledge structure *linking* situational cues and a subsequent action becomes *hard wired* in the mental representation. (p. 419)

People are also conceptualised as working in much the same way as machines work. They are *switched on* (Volkoff, Strong & Elmes 2005), *driven* (Agarwal & Karahanna 2000) and *register* information (Lim, Benbasat & Ward 2000). They also have similar requirements. They have a *workload* (Beaudry & Pinsonneault 2005), *pull their weight* (Chidambaram & Tung 2005) and in turn realise a *threshold* (Lou, Lou & Strong 2000) for acceptance. There are faults and defects such as *deadlocks* (Barki & Hartwick 2001), which can occur within and between people just as they can in machines resulting in *breakdowns* (Kotlarski & Oshri 2005) that need *fixing* or *correcting* (Hwang 2005).

Discussions that focused on people as different types or forms of machines were critical in establishing a rich image of the *people-as-machine* metaphor in the articles examined in this chapter. Additionally, focusing on various mechanistic operations of people was also important. Aspects of or the underlying mechanistic operations of machines are critical in establishing the *people-as-machine* metaphor in this phase of the results – just as they were in Chapter 4.

### Frequency and variety of mechanistic discourse within articles

Mechanistic discourse surrounding the people concept in this phase of the study was, on the whole, both frequent and varied. There are many excellent examples of such usage. Beaudry and Pinsonneault (2005) however, are one of the more interesting and perhaps illuminating examples. In their article, *Understanding User Responses to Information Technology: A Coping Model of User Adaptation,* both organic and cultural rhetoric, is used in addition to mechanistic discourse when discussing people. Even so, mechanistic rhetoric is not only more frequent than organic and cultural rhetoric it is also more varied. For example, their Coping Model of User Adaptation (CMUA) is '*triggered* by a significant IT event' (p. 498), an individual's anxiety '*generate*[s] further anxiety' (p. 499), '*performance*' of individuals is improved (p. 509) and they '*vent*[] anger' (p. 515). Furthermore, their jobs are '*streamlined*' (p. 505), and as quoted by one informant '*automated* 100 percent. We don't even have to think anymore. The system does it for you' (p. 517). Such frequent and varied displays of mechanistic rhetoric as evidenced here in Beaudry and Pinsonneault (2005) is common.

### 6.5.3. People as organism

In comparison to the results of Chapter 4, the organism metaphor, while more salient in these results, was not categorised as dominant in as many articles. Table 6.31 illustrates that around 30% of articles published in the period 2000/2001 were categorised as dominant for the organism metaphor. Table 6.32 shows this figure rose to 33% in the period 2005. Both these figures are relatively low compared to the 51% of articles that did so in 2008. Yet, the period 2005 was the first time that the number of articles categorised as dominant for the organism metaphor was greater than the machine metaphor – albeit by two articles – than for any other concept in any other period. Opposing the results of Chapter 4, and as highlighted in Figure 6.15, articles published in *Information Systems Research* were the least likely, rather than the most likely, to be categorised as dominant for the organism metaphor in the 2000/2001 period. This changed to the *European Journal of Information Systems* in 2005 as being the least likely as shown in Figure 6.16. Articles in the *Management Information Systems Quarterly* were the most likely to be categorised as dominant for the organism metaphor when discussing people in both time periods sampled.

Table 6.33 provides a few examples of how the *people-as-organism* metaphor was evidenced in the articles of the three journals examined during the 2000/2001 and 2005 sampling periods.

Table 6.31. *Results of* people-as-organism *metaphor in sampling period 2000/2001 (sub-set of Table 6.26)*

| Source | Strength | People | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Organism | Dominant | 20 *(54%) | 10 (32%) | 2 (5%) | 32 (30%) |
| | Secondary | 14 (38%) | 18 (58%) | 20 (51%) | 52 (48%) |
| | Occasional | 3 (8%) | 3 (10%) | 17 (44%) | 23 (21%) |
| Organism percentages | | *37* (34%) | *31* (29%) | *39* (36%) | *107* (99%) |

* Percentage shown is the percentage of papers for that particular journal.

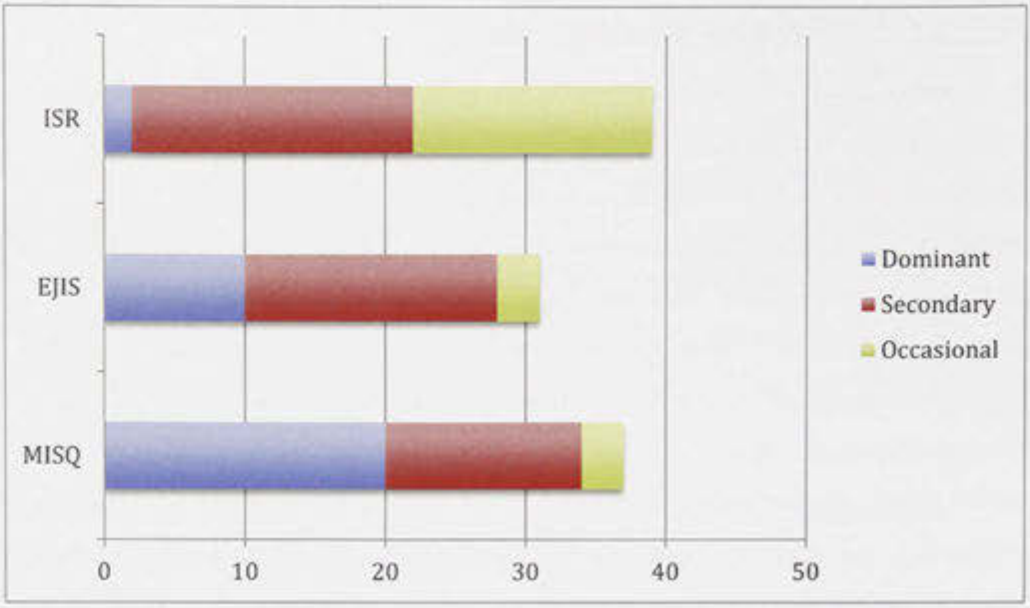


*Figure 6.15.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *people-as-organism* metaphor in sampling period 2000/2001 (derived from Table 6.31)

Table 6.32. *Results of* people-as-organism *metaphor in sampling period 2005 (sub-set of Table 6.27)*

| Source | Strength | People | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Organism | Dominant | 15 *(60%) | 11 (42%) | 9 (45%) | 35 (33%) |
| | Secondary | 10 (40%) | 12 (46%) | 9 (45%) | 31 (29%) |
| | Occasional | 0 (0%) | 3 (12%) | 2 (10%) | 5 (5%) |
| Organism percentages | | 25 (35%) | 26 (37%) | 20 (28%) | 71 (100%) |

* Percentage shown is the percentage of papers for that particular journal.

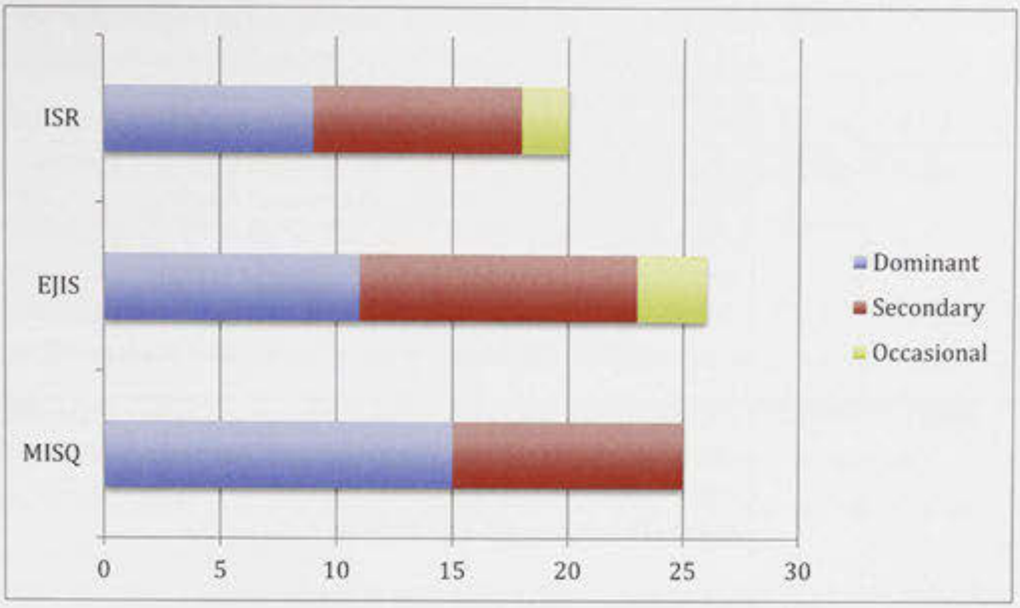


*Figure 6.16.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *people-as-organism* metaphor in sampling period 2005 (derived from Table 6.32)

Table 6.33. *Sample metaphor excerpts for* people-as-organism *metaphor from each journal in sampling periods 2000/2001 and 2005.*

| JOURNAL | YEAR | ORGANISM METAPHOR EXCERPTS FOR PEOPLE |
|---|---|---|
| ISR | 2000 | One of philosophy's oldest paradoxes is the apparent contradiction between the great triumphs and the dramatic failures of the human mind. The same *organism* that routinely solves inferential problems too subtle and complex for the mightiest computers often makes errors in the simplest of judgments about everyday events. (Nisbett and Ross 1980 quoted in Lim, Benbasat & Ward 2000, p. 116) |
| | 2001 | The underlying rationale is that adding slack provides developers with needed "*breathing* room," allowing them to be more thorough and quality conscious. (Austin 2001, p. 196) |
| | 2005 | Research on group behavior has identified social loafing, i.e., the tendency of members to do less than their potential, as a particularly serious problem *plaguing* groups. (Chidambaram & Tung 2005, p. 149) |
| MISQ | 2000 | For example, the technology acceptance model posits that usage *behavior* is driven by instrumentality and cognitive complexity beliefs. (Agarwal & Karahanna 2000, p. 666) |

| | | |
|---|---|---|
| | 2001 | Examples of avoidance in ISD include introverted team members who were observed to ...either withdraw into a *shell* or resist (Barki & Hartwick 2001, p. 203) |
| | 2005 | On that basis, we identify four *adaptation* strategies (benefits maximizing, benefits satisficing, disturbance handling, and *self-preservation*) which are hypothesized to result in three different individual-level outcomes: restoring emotional stability, minimizing the perceived *threats* of the technology, and improving user effectiveness and efficiency. (Beaudry & Pinsonneault 2005, p. 493) |
| EJIS | 2000 | A recent survey indicated that the relationship between CEOs and CIOs is getting worse: 70% of managers said that they would discard their IS department; 58% said that 'talking to their IS department is a source of regular *anxiety*' (Tai & Phelps 2000, p. 163) |
| | 2001 | The important point about this extract is the recognition that the application of lending rules effectively takes place after a decision has already been made on '*gut-feeling*' because, 'they're pretty switched on these guys'. (Randall et al. 2001, p. 118) |
| | 2005 | If you have SAP, you want more. It is like an *addictive drug*. When it is very integrated it is easy to work with. If you implement small you really hate it'. (Gosain, Lee & Kim 2005, p. 376) |

Again, it is not always clear when an organisation or a person is being discussed. At times a placeholder name such as 'client', which can mean either an organisation or a person, is used. Hence, many of the forms and types introduced in the earlier section on the organisation as an organism apply here in conceptualisations of people.

### Forms and types of people as organisms

As in Chapter 4, the *people-as-organism* metaphor appeared in two specific types: *mollusk* and *dog*. Both of these are indirect references. The reference to *person-as-mollusk* occurs in Barki and Hartwick (2001) and the relevant reference is provided in Table 6.33. The reference to *people-as-dog* occurs in Sircar, Nerur and Mahapatra (2001) through the quote, 'we are really *barking* up the wrong tree' (p. 468). In addition to these specific types there is also a direct reference to people as organisms. This reference is included in Table 6.33 and occurs in Lim, Benbasat and Ward (2000) who quote Nisbett and Ross (1980). Apart from these references to two specific types, the *mollusk* and the *dog*, as well as the one general type, organism, no other clear forms and types were referenced.

There are references to a broader indeterminate form or type of people as organisms. This occurs in Montealgre and Keil (2000) through a quote that refers to *people-as-herd animal*: 'Rather than continuing to be part of a *stampede* mentality' (p. 424). Volkoff, Strong and Elmes (2005) also uses the term '*hybrid* accountant' (p. 268), which may be taken as an indirect reference to a general form of organism.

Likewise, in Table 6.33, references are also made to the anatomy and physiology of people as organisms. In particular Randall et al.'s (2005) reference to *gut feeling*, Barki and Hartwick's (2001) reference to *shell*, Austin's (2001) reference to *breathing* and Gosain, Lee and Kim (2005) reference to *addiction*. In addition to these, references to the senses, particularly hearing, sight and touch are made. A few examples are provided below:

- This can cause managers to ignore or downplay 'bad news,' a phenomenon that Keil and Robey (1999) call the '*deaf* effect.' (Montealegre & Keil 2000, p.438)

- MD and PD share the same *vision* of the strategic contributions that ERP can offer. (Irani, Sharif & Love 2005, p. 218)

- 'Hardy suggests this [striving for consensus in systems development] was very *painful* at times.' (Fitzgerald & Russo 2005, p. 252)

There are also references to distinctly organic behaviour/relationships. Of particular concern is the notion of predator/prey relationships and hunting, for example, people '*spearhead[]*' (Gosain, Lee & Kim 2005, p. 374) an initiative, '*chas[e]*' (Santosa, Wei & Chan 2005 p.380) errors and '*track* down' (Newman & Westrup 2005, p. 265) explanations.

Again, these references add significantly to the imagery of the *people-as-organism* metaphor. Yet again however, they do little to close the gap on the sheer number of forms and types associated with the machine metaphor and that associated with the organism metaphor.

## Frequency and variety of organic discourse within articles

The reliance on the organism metaphor when discussing people – evidenced through frequent and varied discourse – is even more limited than revealed in Chapter 4. Furthermore, the same tendency for organic rhetoric to decrease in frequency and variety in the middle parts of articles was also uncovered in these results. There is one exception however, in the article by Montealegre and Keil (2001) on *De-Escalating Information Technology Projects: Lessons from the Denver International Airport.* In this article the authors rely on relatively frequent and varied organic discourse when discussing people throughout the entire article. For example, the following excerpts appear throughout the article when discussing people:

- Rather than continuing to be part of a *stampede* mentality... (p. 424)
- New ideas may emerge after intensive *conscious wrestling* with a problem... (p. 434)
- The decision to embark on a new course of action can be a *bitter* pill to *swallow*. (p. 435)
- Although one might expect individual and organisations to *flee* from such a losing situation (p. 437)
- This can cause managers to ignore or downplay 'bad news,' a phenomenon that Keil and Robey (1999) call the '*deaf* effect.' (p. 438)

Although the use of such discourse is relatively frequent and varied, it does tend to rely more on anatomical and physiological references rather than on different forms or types of organisms. While the relative usage of organic discourse in relation to the people concept in this article was quite high, the people concept was not the only concept discussed. The focus for Montealegre and Keil (2001) was shared with the organisational and technology concepts. This tended to dilute the impact of organic discourse in relation to the people concept while organic discourse was evident in discussions of people, as was mechanistic and cultural discourse. This further dilutes the organic discourse. This example highlights that while there are examples of articles that rely on relatively frequent and varied organic discourse in discussions of people such discourse is limited.

### 6.5.4. People as cultural beings

Evidence of the *people-as-culture* metaphor in this phase of the study was significantly less than was revealed in Chapter 4. Table 6.34 shows that in the period 2000/2001 72% of all articles contained some evidence of the *people-as-culture* metaphor. Table 6.35 shows that this rose to 83% in 2005. Despite the rise this percentage is still considerably less than the 91% that contained evidence of the *people-as-culture* metaphor in 2008. The distribution of articles across the different strength categories was more evenly spread in the 2000/2001 period with the approximate percentages of articles being categorised as dominant, secondary and occasional being: 25%, 24% and 21% respectively. In the 2005 period however, the percentages are closer to that revealed in 2008 where it was least likely for articles to be categorised as occasional. Yet again, as revealed in Figure 6.17 and Figure 6.18, it is the *European Journal of Information Systems* that is most likely to contain articles categorised as dominant for the *people-as-culture* metaphor.

The most notable difference between the results of this phase and that reported in Chapter 4 is that articles are more likely to show evidence of the culture metaphor in more recent times than in past years. A few instances of how cultural discourse was evidenced in relation to people across articles of each journal in each sampling year are provided in Table 6.36.

Table 6.34. *Results of* people-as-culture *metaphor in sampling period 2000/2001 (sub-set of Table 6.26)*

| Source | Strength | People | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Culture | Dominant | 10 *(32%) | 14 (50%) | 3 (16%) | 27 (25%) |
| | Secondary | 13 (42%) | 8 (29%) | 4 (21%) | 25 (23%) |
| | Occasional | 8 (26%) | 6 (21%) | 12 (63%) | 26 (26%) |
| Culture percentages | | *31* (29%) | *28* (26%) | *19* (18%) | *78* (72%) |

* Percentage shown is the percentage of papers for that particular journal.

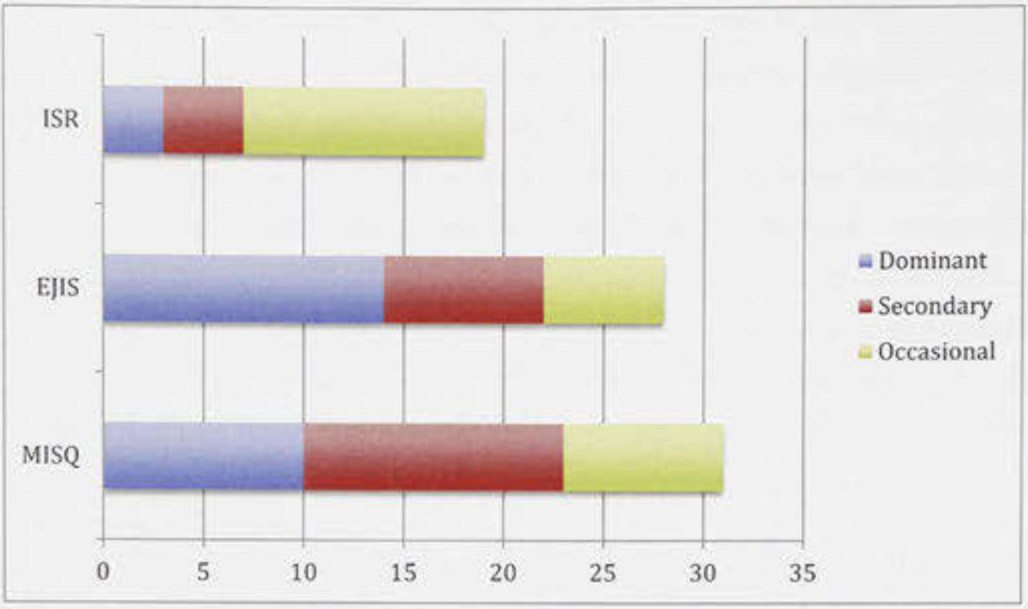


*Figure 6.17.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *people-as-culture* metaphor in sampling period 2000/2001 (derived from Table 6.34)

Table 6.35. *Results of* people-as-culture *metaphor in sampling period 2005 (sub-set of Table 6.27)*

| Source | Strength | People | | | |
|---|---|---|---|---|---|
| | | MISQ | EJIS | ISR | Total |
| Culture | Dominant | 7 *(29%) | 15 (71%) | 2 (14%) | 24 (44%) |
| | Secondary | 7 (29%) | 1 (5%) | 1 (7%) | 9 (27%) |
| | Occasional | 10 (42%) | 5 (24%) | 11 (79%) | 26 (39%) |
| Culture percentages | | *24 (34%)* | *21 (30%)* | *14 (20%)* | *59 (83%)* |

* Percentage shown is the percentage of papers for that particular journal.

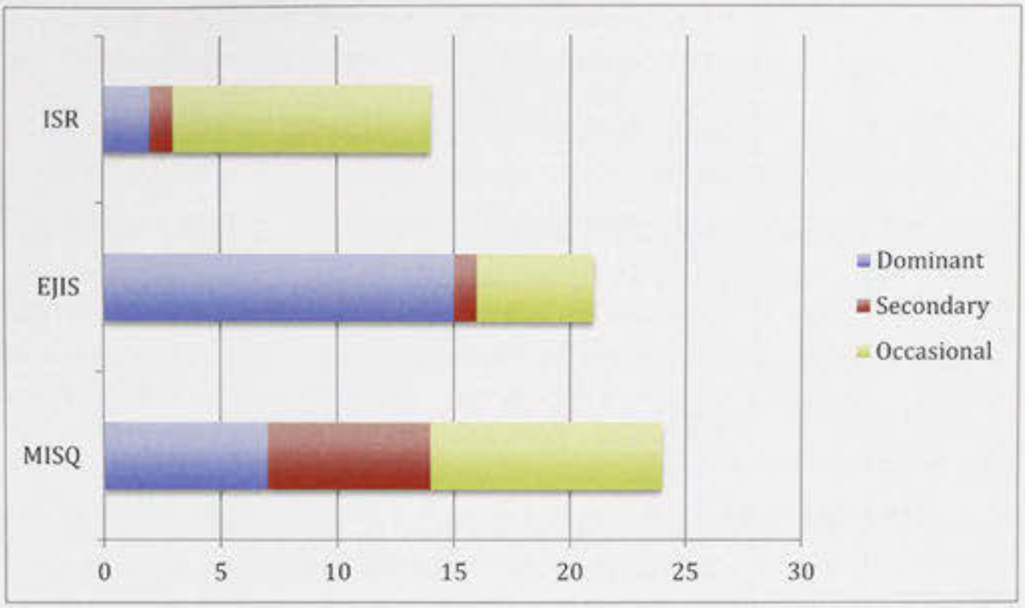


*Figure 6.18.* Categorisation strength of articles appearing in *Information Systems Research*, the *European Journal of Information Systems* and *Management Information Systems Quarterly* showing evidence of the *people-as-culture* metaphor in sampling period 2005 (derived from Table 6.35)

Table 6.36. *Sample metaphor excerpts for the* people-as-culture *metaphor from each journal in sampling periods 2000/2001 and 2005.*

| JOURNAL | YEAR | CULTURE METAPHOR EXCERPTS FOR PEOPLE |
|---|---|---|
| ISR | 2000 | He [Hofstede] conceptualizes "*culture*" as the "collective programming of the mind". As individuals grow up in any culture, their *assumptions* about the way a society should be organized are instilled into them.... The research described in this article compares the differing *perceptions* of the role of "*excellent*" systems analysts between samples gathered in Canada and Singapore. (Hunter & Beck 2000, p. 95) |
| | 2001 | In effect, they chose to incur potential, *shared consequences* (a possible future *failure* for which *blame* would be *shared* with others, e.g., plant personnel who forgot to turn on the backup) rather than immediate, certain, personal consequences (*blame* for delaying the project). (Austin 2001, p. 196) |
| | 2005 | One of the critical ways by which a *collective identity* is produced on ISD projects is through participants *sharing* and *negotiating* the *meaning* attached to the *artifacts* they produce to represent their separate and joint competencies and *interests* (Levina 2005, p. 110) |

| | | |
|---|---|---|
| MISQ | 2000 | When a program had worked the day or even a minute before and all of a sudden stopped functioning, questions like "what happened?" and "what's changed?" quickly turned into a *who-dunnit witch-hunt* to identify the person who last "touched" the system. (Schultze 2000, p.13) |
| | 2001 | Underwriter: And you became good at circumventing [the system]. Because it becomes a *political ball game*. You can't undermine what the computer department is trying to do...you've got to survive. And you can't really be *subversive* to their efforts, because it comes back to *haunt* you anyway, but you have to do what you have to do to get your work out. You can't *complain*. (Quote from Hirschheim and Newman 1991, p.48 in Barki & Hartwick 2001, p. 203). |
| | 2005 | Married people are more likely to visit with friends and relatives (Szinovacz 1992), rely on family more than singles do (Connidis and McMullin 1994), and experience more pressure to "*be like the Joneses*." (Brown & Venkatesh 2005, p. 407) |
| EJIS | 2000 | He concluded that top management and the IT *community* could be viewed as two *subcultures*, each holding different perceptions of IT. The IT community were found to be more system/machine oriented people, whereas top management were more people oriented. (Tai & Phelps 2000, p. 163) |
| | 2001 | As such it resembles an active process of 'remembering' a '*folk* logic' whereby, 'negotiating and coordinating diverging logics is more complex than simply applying a general rule to a particular situation' [Buttny, 1993, p 167] (Randall et al. 2001, p. 118) |
| | 2005 | For example, factors such as user involvement may have different connotations in different contexts (Bagchi et al. , 2003) while others such as balanced and *empowered* team may not be a necessary condition for successful implementation (Sarker & Lee, 2000). (Gosain, Lee & Kim 2005, p. 372) |

## Forms and types of people as cultural beings

Unlike the results of Chapter 4 where no specific forms were evidenced for the *people-as-culture* metaphor, three specific forms were uncovered in these results: *player* and *witch.* Both these references are displayed in Table 6.36 (see Barki & Hartwick 2001 as well as Schultze 2000) and are indirect rather than direct references.

As in Chapter 4 there are references to characteristics, levels and dimensions of culture in relation to people. Both Hunter and Beck (2000) as well as Levina (2005) are excellent examples of the ways in which culture itself is envisioned within articles and also how people relate or are encompassed in that vision. Such details are not typically focused on in articles. References such as that in Singh, Dalal and Spears (2005) to '*culture*-based differences in the perception of Web pages' (p. 300) and Hatzakis et al.'s (2005) reference to a '*learning culture'* (p. 66) is more common.

The same shared attitudes, values, goals and practices of and within organisations that provide substance to the *organisation-as-culture* metaphor uncovered in this phase of the study exist with the *people-as-culture* metaphor. It is after all the people who are typically contextualised within organisations. Hunter and Beck (2000) as well as Tai and Phelps (2000) in Table 6.36 who discuss perceptions toward technology are examples of the types of *attitudes* considered important in articles. Indeed it is this focus on the *shared ways* of *thinking* or *feeling* about technology, which is typical. In terms of *values,* Brown and Venkatesh (2005) provide a good example of the *types* of *behaviour* or *standards* of *judgement* that are discussed in articles. People like technology are also discussed as *valuing* things (Brown & Venkatesh 2005) as well as being *valued* (Hunter & Beck 2000). *Goals* sought by people include *status* and *empowerment* (Gosain, Lee & Kim 2005; Hunter & Beck 2000) but also *reputation* (Lin & Silva 2005) and *prestige* (Hatzakis et al. 2005). The different *practices* engaged in by people are also highlighted in Table 6.36 with references to *attribution* of *blame* (Austin 2001), *sharing* and *negotiating meaning* (Levina 2005), *witch-hunts* (Schultze 2000), *subversion* (Barki & Hartwick 2001) and *folk-logic* (Randall et al. 2001). Such references throughout the articles published in the 2000/2001 and 2005 periods helped add in their own way to the *people-as-culture* metaphor. Yet, they were not evidence of a specific form or type.

### Frequency and variety of cultural discourse within articles

Displays of frequent and varied cultural discourse are more limited in these results than in the results of Chapter 4. Yet there are still several good examples of articles with relatively frequent and varied cultural discourse in relation to the people concept. Some of the better examples are already provided in Table 6.36. In particular: Hunter and Beck (2000) and Levina (2005) – in *Information Systems Research*, Schultze (2000) – in *Management Information Systems Quarterly*, and all three examples – Tai and Phelps 2000; Randall et al. 2001; Gosain, Lee and Kim 2005 – in the *European Journal of Information Systems*. In these articles cultural discourse appears throughout all significant parts of the article: problem formulation, theories relied on and methods used. These articles are good examples of cultural discourse being relatively frequent and varied. Nevertheless, mechanistic discourse still forms a significant part of discussions on people. Additionally, as was noted with the organisation and technology concepts in this chapter and all three concepts in Chapter 4, cultural discourse is considerably less varied than either organic or mechanistic discourse in relation to the people concept.

# 6.6 Metaphor occurrences: isolated and combined

This section is devoted to the discussion of how each of the three root metaphors occurred in relation to each of the three key Information Systems concepts examined. The most significant results of this chapter reinforce those of the previous two chapters: the machine metaphor is the only stand-alone metaphor. It is the only metaphor by which key Information Systems concepts – excluding the people concept – are structured and understood without reliance on another root metaphor. Similarly, when the machine metaphor occurs in combination with other metaphors – as it most typically does – it is generally categorised in a stronger category. Both these aspects concerning the machine metaphor only serve to reinforce its power in this last phase of the analysis.

In this section, the isolated and combined metaphor occurrences in relation to each of the key Information Systems concepts will be presented. When presenting these occurrences, the total number of articles and their breakdown by strength category for each metaphor will be shown. Relevant excerpts from articles highlighting the different occurrences will also be provided.

## 6.6.1. Organisation

Table 6.37 illustrates that the three root metaphors for the organisational concept occurred in three ways during the two sampling periods 2000/2001 and 2005:

4. Isolated – machine

   The machine metaphor is evidenced without the organism and culture metaphors in discussions of organisations. This is the least frequently evidenced occurrence accounting for only around 4% of all articles. This was much less than the 11% revealed in Chapter 4 and significantly less that the 33% (average of all years) revealed in Chapter 5.

5. Combined – machine and organism

   Both the machine and organism metaphors occur in discussions of organisations. This accounts for 28% of articles that contain evidence of a root metaphor. This figure sits between the 10% revealed in Chapter 4 and the much larger 51% (average of all years) revealed in Chapter 5.

6. Combined – machine, organism and culture

   A combination of all three root metaphors was evidenced in discussions of organisations. Accounting for around 68% of all articles this form was by far the most frequently encountered way in which metaphors were evidenced. This was the exact same figure revealed in Chapter 4 which also had 79% but significantly more than the 33% (average of all years) revealed in Chapter 5.

Table 6.37. *Articles showing different metaphor manifestations in discussions of organisations for sampling periods 2000/2001 and 2005*

| METAPHOR MANIFESTATIONS | | |
|---|---|---|
| TYPE | METAPHORS EVIDENCED | n |
| Isolated | Machine | 8 *(4%)* |
| Combined | Machine, Organism | 52 *(28%)* |
| | Machine, Organism, Culture | 125 *(68%)* |
| *Total Articles* | | *185 (100%)* |

## Isolated occurrence – machine

The machine metaphor was evidenced on its own in around 4% of all articles. As shown in Table 6.38, this particular manifestation, while quite rare, was still evidenced in both time periods examined. Table 6.38 shows that, for the period 2000/2001, a total of four articles relied solely on mechanistic rhetoric in their discussions of organisations. Two articles – Dey and Sarkar (2000) as well as Kim, Hahn and Hahn (2000) – appeared in *Information Systems Research* during the year 2000, and were categorised as dominant for the machine metaphor. One article by Venkatesh and Morris (2000), published in *Management Information Systems*

*Quarterly,* was categorised as secondary. A single article by Korn (2001) published in the *European Journal of Information Systems* was also categorised as secondary.

Table 6.39 shows that for the period 2005 four articles relied solely on mechanistic discourse to discuss the organisational concept. All of these articles, however, were published in *Information Systems Research* (Adomavicius & Gupta 2005; Ji, Mookerjee, & Sethi 2005; Jiang, Mookerjee & Sarkar 2005; Krishnan et al. 2005) and, as shown in Table 6.39, as well as discussed in Chapter 5 were all categorised as dominant for the machine metaphor. In all of the articles published during the 2000/2001 period and the 2005 period the organisation was either the focus of discussion or an important backgrounding concept.

Table 6.38. *Relative strength of machine metaphor in articles relying solely on the* organisation-as-machine *metaphor in sampling period 2000/2001*

| Strength | MISQ | ISR | EJIS | N |
|---|---|---|---|---|
| DOMINANT | 0 *(0%)* | 2 *(50%)* | 0 *(0%)* | *2* *(50%)* |
| SECONDARY | 1 *(25%)* | 0 *(0%)* | 1 *(25%)* | *2* *(50%)* |
| OCCASSIONAL | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | *0* *(0%)* |
| *Total Articles* | 1 *(25%)* | 2 *(50%)* | 1 *(25%)* | *4* *(100%)* |

Table 6.39. *Relative strength of articles relying solely on the* organisation-as-machine *metaphor in sampling period 2005*

| Strength | MISQ | ISR | EJIS | N |
|---|---|---|---|---|
| DOMINANT | 0 *(0%)* | 4 *(100%)* | 0 *(0%)* | *4* *(100%)* |
| SECONDARY | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | *0* *(0%)* |
| OCCASSIONAL | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | *0* *(0%)* |
| *Total Articles* | 0 *(0%)* | 4 *(100%)* | 0 *(0%)* | *4* *(100%)* |

### Combined occurrence – machine and organism

Table 6.40 and Table 6.41 provide further detail on the number of articles that contained evidence of the machine metaphor as well as the organism metaphor in their discussions of organisations during the period 2000/2001 (Table 6.40) and 2005 (Table 6.41). As shown in these tables while both metaphors may have been evident in each of the years, it was more common for the machine metaphor than for the organism metaphor to be categorised as dominant. In the period 2000/2001 it was over four times more likely and in the period 2005 it was almost three times more likely for the machine metaphor than for the organism metaphor to be categorised as dominant. This result is consistent with the results of the past two chapters.

Table 6.40. *Relative strength of machine and organism metaphors in articles relying on both these metaphors in discussions of organisations for sampling period 2000/2001*

| ARTICLES SHOWING EVIDENCE OF THE MACHINE AND ORGANISM METAPHORS AND THEIR RELATIVE STRENGTHS | | | | | |
|---|---|---|---|---|---|
| | | ORGANISM | | | |
| | | DOMINANT | SECONDARY | OCCASIONAL | n |
| MACHINE | DOMINANT | 4 *(11%)* | 18 *(49%)* | 10 *(27%)* | *32 (86%)* |
| | SECONDARY | 4 *(11%)* | 0 *(0%)* | 0 *(0%)* | *4 (11%)* |
| | OCCASIONAL | 0 *(0%)* | 1 *(3%)* | 0 *(0%)* | *1 (3%)* |
| *Total Articles* | | 8 *(22%)* | 19 *(51%)* | 10 *(27%)* | *37 (100%)* |

Table 6.41. *Relative strength of machine and organism metaphors in articles relying on both these metaphors in discussions of organisations for sampling period 2005*

| ARTICLES SHOWING EVIDENCE OF THE MACHINE AND ORGANISM METAPHORS AND THEIR RELATIVE STRENGTHS | | | | | |
|---|---|---|---|---|---|
| | | ORGANISM | | | |
| | | DOMINANT | SECONDARY | OCCASIONAL | n |
| MACHINE | DOMINANT | 3 *(20%)* | 5 *(33%)* | 4 *(27%)* | *12 (80%)* |
| | SECONDARY | 1 *(7%)* | 0 *(0%)* | 0 *(0%)* | *1 (7%)* |
| | OCCASIONAL | 0 *(0%)* | 0 *(0%)* | 2 *(13%)* | *2 (13%)* |
| *Total Articles* | | 4 *(27%)* | 5 *(33%)* | 6 *(40%)* | *15 (100%)* |

As noted in previous chapters, mechanistic discourse typically appears alongside organic discourse either within the same sentence or within one or two sentences of the same paragraph when discussing organisations. Table 6.42 presents a sample of excerpts showing how both mechanistic and organic discourse appears in discussions of organisations. Samples in relation to the journal *Information Systems Research* have already been provided in the previous chapter. The following table, therefore only presents those samples that are relevant to *Management Information Systems Quarterly* and the *European Journal of Information Systems*. In relation to the samples it should be noted that there were no articles published during 2000/2001 period that displayed a combination of mechanistic and organic discourse when discussing the organisational concept. Hence, none are included in the following table. Mechanistic discourse is underlined and organic discourse italicised.

Table 6.42. *Sample metaphor excerpts from* Management Information Systems Quarterly *and* the European Journal of Information Systems *that show evidence of machine (underlined) and organism (italicised) metaphors when discussing organisations in sampling periods 2000/2001 and 2005.*

| JOURNAL | YEAR | EXCERPTS FOR THE MACHINE AND ORGANISM METAPHOR |
|---|---|---|
| MISQ | 2000 | In other words, software platforms do not directly <u>generate</u> value [for a firm] but they enable different value-<u>generating</u> applications to be implemented (p.228)...failure of the traditional NPV model derives mainly from ignoring the value of active management in *adapting* to changing market conditions and proposes to expand the traditional NPV by a value of options from active management or by simply attributing an option value to value projects where opportunities for *adaptation* to a changing *environment* exist (Taudes, Feurstein & Mild 2000, p. 229) |
| | 2001 | While in the learning industry, the pace of transformation may not have been as dramatic, education has not been *immune* to Internet-<u>driven</u> change (Piccoli, Ahmed & Ives 2001, p. 402) |
| | 2005 | companies that implement the systems have the opportunity to <u>redesign</u> their business practices using templates imbedded in the software ... At the aggregate level, an ERP might helpfirm *survive* because it leads to higher profits. (Gattiker & Goodhue 2005, p. 560) |
| EJIS | 2005 | When an organisation *adapts* some business processes to fit the ERP practice, the adaptation will influence not only existing business processes but also other organizational <u>components</u>. (Wei, Wang & Ju 2005, p. 325) |

Consistent with the results of Chapter 4 and Chapter 5 no evidence of the *organisation-as-organism* metaphor could be found in pure form, that is, without any mechanistic influences at all.

### Combined occurrence – machine, organism and culture

When the three root metaphors – machine, organism and culture – occur in discussions of organisations they most frequently do so with each other. The metaphorical combination of machine/organism/culture is by far the most common, accounting for around 68% of all articles that showed evidence of a root metaphor in discussions of organisations. As shown in Table 6.43, articles are more likely to be categorised as dominant for the organism metaphor in 2000/2001. Yet, as shown in Table 6.44, this number falls significantly in 2005. Although there were many articles categorised as dominant for the culture metaphor, there were more articles in total categorised as secondary and occasional during the two periods 2000/2001 and 2005.

Table 6.43. *Relative strength of machine, organism and culture metaphors in articles relying on all of these metaphors when discussing organisations for sampling period 2000/2001*

| MACHINE,ORGANISM AND CULTURE COMBINATION ARTICLES | | | |
|---|---|---|---|
| | MACHINE | ORGANISM | CULTURE |
| DOMINANT | 24 *(33%)* | 45 *(63%)* | 13 *(18%)* |
| SECONDARY | 30 *(42%)* | 17 *(24%)* | 27 *(38%)* |
| OCCASIONAL | 18 *(25%)* | 10 *(14%)* | 32 *(44%)* |
| TOTAL | 72 | 72 | 72 |

Table 6.44. *Relative strength of machine, organism and culture metaphors in articles relying on all of these metaphors when discussing organisations for sampling period 2005*

| MACHINE,ORGANISM AND CULTURE COMBINATION ARTICLES | | | |
|---|---|---|---|
| | MACHINE | ORGANISM | CULTURE |
| DOMINANT | 33 *(62%)* | 13 *(25%)* | 18 *(34%)* |
| SECONDARY | 10 *(19%)* | 35 *(66%)* | 9 *(17%)* |
| OCCASIONAL | 10 *(19%)* | 5 *(9%)* | 26 *(49%)* |
| TOTAL | 53 | 53 | 53 |

Table 6.45 (2000/2001) and Table 6.46 (2005) present the articles that were categorised as dominant for each of the three root metaphors as well as showing the strength of the other metaphors with which they appeared. These tables highlight the pervasiveness of the machine metaphor. In Chapter 4 and Chapter 5, articles categorised as dominant for the organism metaphor were also typically categorised as dominant or secondary for the machine metaphor. While this same tendency was not uncovered in the 2000/2001 period (see Table 6.45), it was in the 2005 period (see Table 6.46). Articles categorised as dominant for the machine metaphor, have a stronger relationship with the organism metaphor than they do with the culture metaphor. That is, these articles are more likely to be categorised as dominant or secondary for the organism metaphor than they are for the culture metaphor. This occurs in both periods. Articles categorised as dominant for the organism metaphor have no similarly noticeable difference in their relationships with the machine or culture metaphors in the 2000/2001 period. This does change in the 2005 period though with articles categorised as dominant for the organism metaphor having a stronger relationship with the machine metaphor than the culture metaphor. This is consistent with the results of previous chapters.

Table 6.45. *Articles relying on all three root metaphors that are categorised as dominant for the machine, organism or culture root metaphors when discussing organisations and the relative strength of their co-occurring metaphors for sampling period 2000/2001*

| ARTICLES THAT ARE DOMINANT FOR THE MACHINE, ORGANISM AND CULTURE METAPHORS AND THE STRENGTH OF THEIR CO-OCCURING METAPHORS | | | | | |
|---|---|---|---|---|---|
| | | MACHINE | ORGANISM | CULTURE | N |
| MACHINE | DOMINANT | - | 9<br>* (20%) | 1<br>(8%) | 10<br>(14%) |
| | SECONDARY | - | 24<br>(53%) | 5<br>(38%) | 29<br>(41%) |
| | OCCASIONAL | - | 12<br>(27%) | 7<br>(54%) | 19<br>(27%) |
| ORGANISM | DOMINANT | 9<br>(38%) | - | 6<br>(46%) | 15<br>(21%) |
| | SECONDARY | 9<br>(38%) | - | 5<br>(38%) | 14<br>(18%) |
| | OCCASIONAL | 6<br>(25%) | - | 2<br>(15%) | 8<br>(11%) |
| CULTURE | DOMINANT | 1<br>(4%) | 6<br>(13%) | - | 8<br>(11%) |
| | SECONDARY | 7<br>(29%) | 21<br>(47%) | - | 28<br>(39%) |
| | OCCASIONAL | 16<br>(67%) | 18<br>(40%) | - | 34<br>(48%) |
| *Total Articles* | | 24<br>(34%) | 45<br>(63%) | 13<br>(18%) | 71<br>(100%) |

* Percentage shown is the percentage of papers for that particular metaphor.

Table 6.46. *Articles relying on all three root metaphors that are categorised as dominant for the machine, organism or culture root metaphors when discussing organisations and the relative strength of their co-occurring metaphors for sampling period 2005*

| ARTICLES THAT ARE DOMINANT FOR THE MACHINE, ORGANISM AND CULTURE METAPHORS AND THE STRENGTH OF THEIR CO-OCCURING METAPHORS | | | | | |
|---|---|---|---|---|---|
| | | MACHINE | ORGANISM | CULTURE | N |
| MACHINE | DOMINANT | - | 7 (54%) | 5 (28%) | 11 (21%) |
| | SECONDARY | - | 5 (38%) | 5 (28%) | 10 (19%) |
| | OCCASIONAL | - | 1 (8%) | 8 (44%) | 9 (17%) |
| ORGANISM | DOMINANT | 7 (21%) | - | 2 (11%) | 9 (17%) |
| | SECONDARY | 22 (67%) | - | 12 (67%) | 34 (64%) |
| | OCCASIONAL | 4 (12%) | - | 4 (22%) | 8 (15%) |
| CULTURE | DOMINANT | 5 (15%) | 2 (15%) | - | 7 (13%) |
| | SECONDARY | 4 (12%) | 4 (31%) | - | 8 (15%) |
| | OCCASIONAL | 24 (73%) | 7 (54%) | - | 31 (58%) |
| *Total Articles* | | 33 (62%) | 13 (25%) | 18 (34%) | 53 (100%) |

* Percentage shown is the percentage of papers for that particular metaphor.

Excerpts in Table 6.47 are extracted from articles showing evidence of all three root metaphors when discussing the organisational concept. The table highlights the different ways in which mechanistic and organic discourse appear alongside culture discourse in articles published during the 2000/2001 and 2005 periods. Only excerpts from *Management Information Systems Quarterly* and the *European Journal of*

*Information Systems* are provided here as excerpts for *Information Systems Research* have been provided in the previous chapter. Mechanistic discourse is underlined, organic discourse is italicised and culture discourse is underlined and italicised.

Table 6.47. *Sample metaphor excerpts from* Management Information Systems Quarterly *and the* European Journal of Information Systems *that show evidence of machine (underlined), organism (italicised), and culture (italicised and underlined) metaphors when discussing organisations in sampling periods 2000/2001 and 2005*

| JOURNAL | YEAR | MACHINE/ORGANISM/CULTURE COMBINATION EXCERPTS |
|---|---|---|
| MISQ | 2000 | In early 1995, some key people were leaving for a variety of reasons, including the changing *nature* of the marketplace ... [skip 3 sentences] With changes in the marketplace (e.g., the move toward *leaner* organizations), promotions became fewer and far between. Success was harder to achieve and *reward*. [skip 2 sentences]. 'We needed to view these issues more holistically, provide some systemic thinking, and develop innovative approaches to building a motivated 3M workforce. We believe leadersip is the key factor and must ensure that everyone is *engaged* in a *journey of change'* (Roepke, Agarwal & Ferratt 2000, p. 332) |
| | 2001 | The *cultures* and procedures of the two companies [previously described as "*parent*" (p.230) companies] before the merger were so different (p.231) Rocketdyne's rocket engines were facing new competition in an expanding market driven by the need for commercial launches of communications satellites. (Malhotra et al. 2001, p. 232) |
| | 2005 | *Vicious* circles arise [in organizations] when mutually causal processes *feed* back into one another to lock a system into a mode of operation that yields progressively negative outcomes... In contrast, *virtuous* circles are those that yield increasing returns. (Garud & Kumaraswamy 2005, p. 10) |
| EJIS | 2000 | The DOJ's condemnation is based on the 'leverage theory', which says that bundling provides a mechanism whereby a firm with monopoly power in one market can use the leverage to monopolise a second market. However, the Chicago school has criticised 'leverage theory' and argued that the main motivation for bundling is price discrimination. Furthermore, they have argued that bundling could be *socially beneficial*, or at worst ambiguous *behavior*. (Lee 2000, p. 217) |

| | | |
|---|---|---|
| | 2001 | In my view, ASPs will change the entire shape of the software industry, but most ASPs will not *survive* [quote from CIO] [ skip 1 paragraph] This was a major concern to many other ASPs who felt that, as the ASP was an emerging market, disaster ***stories*** of ASPs exposing customer data, possibly to competitors on shared software and hardware platforms, would give the industry a ***bad name***. (p.132) ... it is likely that the next 2 years will see a further shake-out of ASPs, as some cease to operate... (Currie & Seltsikas 2001, p. 133) |
| | 2005 | All organizations operate in a technical and institutional *environment* that constrains action to some degree (Scott, 1987), but organizations in highly institutional industries *face* particularly high barriers to change. For example, regulatory agencies require organizations to ***conform*** to particular ***practices***; professional groups exert normative pressures on organizations to adopt and maintain ***sanctioned*** ways of operating. (Davidson & Chiasson 2005, p. 8) |

As observed previously, talking about the organisation as a culture also involves talking about the organisation as a machine and also to a lesser extent as an organism.

## 6.6.2. Technology

Unlike the results of Chapter 4 there are only three as opposed to four ways that the machine, organism and culture metaphors were evidenced in relation to the technology concept in this phase of the study. As shown in Table 6.48 these three ways are:

5. Isolated – machine metaphor
   The isolated occurrence of the machine metaphor is the least evidenced accounting for around 14% of all articles published during the sample periods of 2000/2001 and 2005.

6. Combined – machine and organism metaphors
   The machine/organism combination accounts for around 41% of all articles – similar to the results of Chapter 4.

7. Combined – machine, organism and culture metaphors
   the machine/organism/culture combination accounts for around 42% of all articles.

The machine metaphor is the most salient metaphor in discussions of technology being present in all different metaphor manifestations.

Table 6.48. *Articles showing different metaphor manifestations in discussions of technology for sampling periods 2000/2001 and 2005*

| METAPHOR MANIFESTATIONS | | |
|---|---|---|
| TYPE | METAPHORS EVIDENCED | n |
| Isolated | Machine | 27 *(15%)* |
| Combined | Machine, Organism | 77 *(41%)* |
| | Machine, Organism, Culture | 82 *(44%)* |
| *Total Articles* | | *186* *(100%)* |

## Isolated occurrence – machine

Overall, approximately 14% of all articles published in the 2000/2001 and 2005 periods contained evidence of only a single metaphor, that of the machine, when discussing technology. As shown in both Table 6.49 and Table 6.50, this percentage was relatively evenly split between the two sample periods of 2000/2001 and 2005. In the 2000/2001 period however, most of these articles were published in *Management Information Systems Quarterly* and *Information Systems Research*. In the 2005 period this shifted to *Management Information Systems Quarterly* and the *European Journal of Information Systems*. Most articles that show evidence of only the machine metaphor were categorised as dominant for the metaphor – regardless of sample year or journal. A couple of instances (see Poon 2000; Santosa, Wei & Chan 2005) of how mechanistic discourse was evidenced in isolation with respect to the technology concept has already been discussed in the technology section.

Table 6.49. *Relative strength of machine metaphor in articles relying solely on the* technology-as-machine *metaphor in sampling period 2000/2001*

| Strength | MISQ | ISR | EJIS | N |
|---|---|---|---|---|
| DOMINANT | 3 *(16%)* | 7 *(37%)* | 1 *(5%)* | *11* *(58%)* |
| SECONDARY | 2 *(11%)* | 1 *(5%)* | 1 *(5%)* | *4* *(21%)* |
| OCCASSIONAL | 2 *(11%)* | 1 *(5%)* | 1 *(5%)* | *4* *(21%)* |
| *Total Articles* | 7 *(37%)* | 9 *(47%)* | 3 *(0%)* | *19* *(100%)* |

Table 6.50. *Relative strength of machine metaphor in articles relying solely on the* technology-as-machine *metaphor in sampling period 2005*

| Strength | MISQ | ISR | EJIS | N |
|---|---|---|---|---|
| DOMINANT | 3 *(38%)* | 1 *(13%)* | 1 *(13%)* | *5 (63%)* |
| SECONDARY | 1 *(13%)* | 0 *(0%)* | 2 *(25%)* | *3 (38%)* |
| OCCASSIONAL | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | *0 (0%)* |
| *Total Articles* | 4 *(50%)* | 1 *(13%)* | 3 *(38%)* | *8 (100%)* |

## Combined occurrence – machine and organism

The same percentage of articles as uncovered in Chapter 4, approximately 41% of all articles, contained evidence of the machine metaphor as well as the organism metaphor in their discussions of technology. As was noted in Chapter 4 there is also a marked difference in the strength to which each of these metaphors was evidenced in these results. As shown in both Table 6.51 and Table 6.52, it is the machine metaphor that is the most frequently categorised as dominant at 76% of articles in 2000/2001 and 81% of articles in 2005. This is significantly larger than the percentage of articles that do so for the organism metaphor in both periods – 14% in 2000/2001 and 4% in 2005. The gap between the two metaphors, the machine metaphor being categorised as dominant in more cases than the organism metaphor, is maintained between the two sampling years.

Table 6.51. *Relative strength of machine and organism metaphors in articles relying on both these metaphors in discussions of technology for sampling period 2000/2001*

| ARTICLES SHOWING EVIDENCE OF THE MACHINE AND ORGANISM METAPHORS AND THEIR RELATIVE STRENGTHS | | | | | |
|---|---|---|---|---|---|
| | | ORGANISM | | | |
| | | DOMINANT | SECONDARY | OCCASIONAL | N |
| MACHINE | DOMINANT | 1 *(2%)* | 18 *(36%)* | 19 *(38%)* | *38 (76%)* |
| | SECONDARY | 6 *(12%)* | 1 *(2%)* | 2 *(4%)* | *9 (18%)* |
| | OCCASIONAL | 0 *(0%)* | 1 *(2%)* | 2 *(4%)* | *3 (6%)* |
| *Total Articles* | | 7 *(14%)* | 20 *(40%)* | 23 *(46%)* | *50 (100%)* |

Table 6.52. *Relative strength of machine and organism metaphors in articles relying on both these metaphors in discussions of technology for sampling period 2005*

| ARTICLES SHOWING EVIDENCE OF THE MACHINE AND ORGANISM METAPHORS AND THEIR RELATIVE STRENGTHS | | | | | |
|---|---|---|---|---|---|
| | | ORGANISM | | | |
| | | DOMINANT | SECONDARY | OCCASIONAL | N |
| MACHINE | DOMINANT | 0 *(0%)* | 9 *(33%)* | 13 *(48%)* | *22* *(81%)* |
| | SECONDARY | 1 *(4%)* | 0 *(0%)* | 4 *(15%)* | *5* *(19%)* |
| | OCCASIONAL | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | *0* *(0%)* |
| *Total Articles* | | 1 *(4%)* | 9 *(33%)* | 12 *(44%)* | *27* *(100%)* |

Consistent with the results of Chapter 4, mechanistic discourse typically appears directly beside organic discourse either within the same sentence or within one or two sentences of the same paragraph when discussing technology. Less frequently, mechanistic discourse also appears in more isolated pieces of text within the same article, separated by a number of paragraphs or pages.

Table 6.53 presents a sample of excerpts showing how both mechanistic and organic rhetoric appears in discussions of technology during the two sampling periods 2000/2001 and 2005. Mechanistic discourse is underlined and organic discourse italicised.

Table 6.53. *Sample metaphor excerpts from* Information Systems Research, Management Information Systems Quarterly *and the* European Journal of Information Systems *that show evidence of machine (underlined) and organism (italicised) metaphors when discussing technology in sampling periods 2000/2001 and 2005*

| JOURNAL | YEAR | EXCERPTS FOR THE MACHINE AND ORGANISM METAPHOR |
|---|---|---|
| ISR | 2000 | Every period, the firm uses its available software and hardware to <u>generate</u> information services. (p.161)...Whether production will still be characterized by the Cobb-Douglas production function as technologies *evolve*, (Gurbaxani, Melville & Kraemer 2000, p. 173) |

| | | |
|---|---|---|
| | 2001 | An application based on the technologies proposed in this paper would have, already built in, a certain capability for *understanding* messages plus a flexibility that would allow the system to *grow* with few restrictions provided by the underlying communication system. (Moore 2001, p. 35) |
| | 2005 | Instead, inspection decisions are based on whether or not the IDS generates alarms… [skip 2 paragraphs] Unfortunately, anomaly detection often produces a large number of false alarms because normal patterns of users and system *behavior* can vary widely. (Cavusoglu, Mishra & Raghunathan 2005, p. 31) |
| MISQ | 2000 | Smaller systems might tend toward isolation in the organization, where they would "*starve*" to *death* or fall *prey* to larger-"bigger and better"--replacement systems. Perhaps most significantly, larger systems might also be advantaged because it is more difficult to marshal the resources needed to replace them. The threshold for their replacement may in effect be set higher, leading to their relative *longevity*. (Swanson & Dans 2000, p. 278) |
| | 2001 | The data warehouse proponents argue that data marts can quickly *grow* into an unintegrated collection of information silos that counter the underlying purpose of data warehousing. (Wixom & Watson 2001, p. 37) |
| | 2005 | Can enterprises in a relationship deploy *hybrid* IOSs that are a mix of elements of the value/supply chain IOS and networked IOS? (Malhotra, Gosain & El Sawy 2005, p. 147) |
| EJIS | 2000 | To enterprise systems vendors, it is a great challenge to design the architecture for the next generation enterprise systems that are open, secure, scalable, and *adaptable*. (Fan, Stallaert & Whinston 2000, p. 25) |
| | 2001 | The identification of the financial costs and benefits and the qualitative estimates should be done taking into account ERP's permanent and dynamic *nature*, from the selection process activities to its operation, maintenance and *evolution*. (Stefanou 2001, p. 214) |
| | 2005 | This changing *nature* of e-hubs has been described by Ganesh (2004) as an *evolution* from demand aggregation, through transaction process management, to integration and collaboration, and by Mahadevan (2003) as an *evolution* from market, to quasi-market and then to collaborative mechanisms. (Daniel & White 2005, p. 191) |

Table 6.53 highlights that discussing technologies as organisms also means discussing technologies as machines. Yet again, there is no evidence of the *technology-as-organism* metaphor without the *technology-as-machine* metaphor.

### Combined occurrence – machine, organism and culture

The metaphorical combination machine, organism and culture is slightly more common than the machine and organism combination. This combination was evidenced in around 42% of all articles that contained evidence of a root metaphor in discussions of technology. As was noted in Chapter 4, articles are much more likely to be categorised as dominant for the machine metaphor than for the organism or culture metaphors in relation to the technology concept than for the organisational concept. In 2000/2001 the percentage of articles categorised as dominant for the machine, organism and culture metaphors was (approximately): 36%, 28% and 13% respectively. In 2005 the percentage for the machine and culture metaphors rose to 51% and 20% respectively with the percentage for the organism metaphor dropping slightly to 23%. Regardless of the year sampled the machine metaphor was most likely to be categorised as dominant or secondary and the organism and culture metaphors were most likely to be in a secondary or occasional form.

Table 6.54. *Relative strength of machine, organism and culture metaphors in articles relying on all of these metaphors when discussing technology for sampling period 2000/2001*

| MACHINE, ORGANISM AND CULTURE COMBINATION ARTICLES | | | |
|---|---|---|---|
| | MACHINE | ORGANISM | CULTURE |
| DOMINANT | 17 *(36%)* | 13 *(28%)* | 6 *(13%)* |
| SECONDARY | 26 *(55%)* | 20 *(43%)* | 11 *(23%)* |
| OCCASIONAL | 4 *(9%)* | 14 *(30%)* | 30 *(64%)* |
| TOTAL | 47 | 47 | 47 |

Table 6.55. *Relative strength of machine, organism and culture metaphors in articles relying on all of these metaphors when discussing technology for sampling period 2005*

| MACHINE, ORGANISM AND CULTURE COMBINATION ARTICLES | | | |
|---|---|---|---|
| | MACHINE | ORGANISM | CULTURE |
| DOMINANT | 18 *(51%)* | 8 *(23%)* | 7 *(20%)* |
| SECONDARY | 14 *(40%)* | 15 *(43%)* | 11 *(31%)* |
| OCCASIONAL | 3 *(9%)* | 12 *(34%)* | 17 *(49%)* |
| TOTAL | 35 | 35 | 35 |

Table 6.56 and Table 6.57 provide further detail for the articles that were categorised as dominant for each of the three root metaphors in discussions of technology. These tables show the categorisation strengths of the two other metaphors with which they appeared for the periods 2000/2001 and 2005 respectively. The overall pervasiveness of the machine metaphor in relation to the technology concept is more pronounced than the organisational metaphor. This is the case even though the overall proportion of articles that showed evidence of all three metaphors in discussions of technology is lower than that evidenced with the organisational concept.

A number of articles categorised as dominant for the machine metaphor were also categorised as dominant for the organism metaphor – around 24% in 2000/2001 and 22% in 2005. More commonly however, those articles categorised as dominant for the machine metaphor were categorised as secondary – 47% in 2000/2001 and 44% in 2005 – or occasional – 29% in 2000/2001 and 33% in 2005 – for the organism metaphor. These approximate percentages were even less for the culture metaphor which was more likely to be categorised as occasional in both years. Yet, in relation to those articles that were categorised as dominant for the organism metaphor most articles were categorised as dominant or secondary for the machine metaphor. Interestingly, in relation to the culture metaphor there appeared to be a stronger relationship with the organism metaphor than the machine metaphor. Yet overall, as shown in Table 6.56 and Table 6.57, when articles show evidence of all three metaphors it is the machine metaphor that is most likely to be categorised as dominant, regardless of sample periods.

Table 6.56. *Articles relying on all three root metaphors that are categorised as dominant for the machine, organism or culture root metaphors when discussing technology and the relative strength of their co-occurring metaphors for sampling period 2000/2001*

| ARTICLES THAT ARE DOMINANT FOR THE MACHINE, ORGANISM AND CULTURE METAPHORS AND THE STRENGTH OF THEIR CO-OCCURING METAPHORS | | | | | |
|---|---|---|---|---|---|
| | | MACHINE | ORGANISM | CULTURE | N |
| MACHINE | DOMINANT | - | 4 (31%) | 1 (17%) | 5 (11%) |
| | SECONDARY | - | 9 (69%) | 4 (67%) | 13 (28%) |
| | OCCASIONAL | - | 0 (0%) | 1 (17%) | 1 (2%) |
| ORGANISM | DOMINANT | 4 (24%) | - | 2 (33%) | 6 (13%) |
| | SECONDARY | 8 (47%) | - | 2 (33%) | 10 (21%) |
| | OCCASIONAL | 5 (29%) | - | 2 (33%) | 7 (15%) |
| CULTURE | DOMINANT | 1 (6%) | 2 (15%) | - | 3 (6%) |
| | SECONDARY | 3 (18%) | 3 (23%) | - | 6 (13%) |
| | OCCASIONAL | 13 (76%) | 8 (62%) | - | 21 (45%) |
| *Total Articles* | | 17 (36%) | 13 (28%) | 6 (13%) | 47 (100%) |

Table 6.57. *Articles relying on all three root metaphors that are categorised as dominant for the machine, organism or culture root metaphors when discussing technology and the relative strength of their co-occurring metaphors for sampling period 2005*

| ARTICLES THAT ARE DOMINANT FOR THE MACHINE, ORGANISM AND CULTURE METAPHORS AND THE STRENGTH OF THEIR CO-OCCURING METAPHORS | | | | | |
|---|---|---|---|---|---|
| | | MACHINE | ORGANISM | CULTURE | N |
| MACHINE | DOMINANT | - | 4 *(50%)* | 0 *(0%)* | 4 *(11%)* |
| | SECONDARY | - | 4 *(50%)* | 5 *(71%)* | 9 *(26%)* |
| | OCCASIONAL | - | 0 *(0%)* | 2 *(29%)* | 2 *(6%)* |
| ORGANISM | DOMINANT | 4 *(22%)* | - | 2 *(29%)* | 6 *(17%)* |
| | SECONDARY | 8 *(44%)* | - | 4 *(57%)* | 12 *(34%)* |
| | OCCASIONAL | 6 *(33%)* | - | 1 *(14%)* | 7 *(20%)* |
| CULTURE | DOMINANT | 0 *(0%)* | 2 *(25%)* | - | 2 *(6%)* |
| | SECONDARY | 4 *(22%)* | 2 *(25%)* | - | 6 *(17%)* |
| | OCCASIONAL | 14 *(78%)* | 4 *(50%)* | - | 18 *(51%)* |
| *Total Articles* | | 18 *(51%)* | 8 *(23%)* | 7 *(20%)* | 35 *(100%)* |

Excerpts in Table 6.58 are extracted from articles showing evidence of all three root metaphors when discussing the technology concept. Note that the lines between the organisation and technology concepts are not always clear-cut. For example, in the quote by Alavi and Leidner (2001) the organic term *memory* in the first instance appears to only relate to the organisational concept. In their conceptualisation of organisations however, both individuals and 'other *components*' appear to be what the organisation is made up of. Due to this conceptualisation, the term *memory* in this quote not only seems to relate to the organisational concept but to the technology and people concepts as well. This is a common enough occurrence in the articles and highlights the issue that analysing text for metaphoric evidence is a highly nuanced process – not as straightforward as the presentation of some quotes might lead the reader to believe.

Table 6.58. *Sample metaphor excerpts from* Information Systems Research, Management Information Systems Quarterly *and the* European Journal of Information Systems *that show evidence of machine (underlined), organism (italicised), and culture (italicised and underlined) metaphors when discussing technology in sampling periods 2000/2001 and 2005*

| JOURNAL | YEAR | MACHINE/ORGANISM/CULTURE COMBINATION EXCERPTS |
|---|---|---|
| ISR | 2000 | IT infrastructures in most firms have been transformed from monolithic, stable architectures into *hybrid*, best of- *breed*, *adaptive* platforms… [skip 2 sentences] As a consequence, most contemporary IT organizations are finding themselves transforming their core mission from one centered on applications development toward one emphasizing platform building and solutions delivery (p.107) Integration architectures fulfill another key goal of organizing, which is to give *identity*-character, *meaning*, and definition-to the IT function. (Sambamurthy & Zmud 2000, p. 110) |
| | 2001 | Within the bounds of the net-enabled *revolution*, though, the IS field has an opportunity to shape the phenomenon with the IS academic and practitioner communities. (p.337) Second, a site can *learn* about the customer so that future interactions are tailored to the customer's needs (p.339) Innovative B2B technologies that break the mould with new electronic *alliances*, such as electronic trading networks (ETNs), or turbocharge older technologies, such as XML-enabled EDI transactions (Straub & Watson 2001, p. 340) |
| | 2005 | In addition, as the technology improves in terms of *memory* and processing speed, we should see an improvement in the number of items as well. A key aspect of our approach is the use of sub auctions to update the auction wide information. This *artifact* can be exploited to create parallel algorithms, increasing the current limitation to a potentially larger number, while keeping the overall response time reasonable. (Adomavicius & Gupta 2005, p. 169) |

| | | |
|---|---|---|
| MISQ | 2000 | The *adaptation* process for new technology is not yet well understood (p.569) Technology structures include the restrictiveness, sophistication, and comprehensiveness of its features as well as the technology's "*spirit*," the general intent of the technology with regard to *values* and goals. (p.571) Access to the communication tool (who gets access, when should they get access) (Majchrzak et al. 2000, p. 577) |
| | 2001 | Organizational *memory* extends beyond the individual's memory to include other components such as ... information archives (both internal and external to the organization) (p.118). Procedures that are *culture*-bound can be embedded into IT so that the systems themselves become examples of organizational *norms*. (Alavi & Leidner 2001, p. 122) |
| | 2005 | We argue that, currently, the literature has developed a rather static view of these concepts, focusing on either what these mechanisms [boundary spanners and boundary objects which include IT] are supposed to achieve in theory, or on what actually happens in practice. (p.338) The term boundary object thus refers to a broad range of *artifacts* that "are plastic enough to *adapt* to local needs and constraints of the several parties employing them, yet robust enough to maintain a *common identity* across sites" (Star 1989, p. 393). This concept is useful in understanding how IT-based *artifacts* can support the development of boundary spanning competence. (Levina & Vaast 2005, p. 339) |
| EJIS | 2000 | This is how the EDI grammar is continuously *emergent*. It is under constant *negotiation* and adjustment as a consequence of the application of the grammar in interorganizational *practice*. (p.175) Figure 2(c) depicts a situation that in the literature has been described as the 'hub and spokes' model of EDI (Damsgaard & Truex 2000, p. 175) |
| | 2001 | An ERP implementation based on BSPA, in the context of the knowledge-based society and the needs of knowledge management, can lead to the integration of business processes and make transparent *power-oriented* and fragmented organisational structures, thus *emancipating* the HAS content. This stands in contrast to a software oriented implementation that is usually based on a hard-systems reengineering paradigm...[skip 1 paragraph] We conjecture that BSPA could be equally useful in any *evolutionary* systems development methodology. (Panagiotidis & Edwards 2001, p. 145) |

| | | |
|---|---|---|
| | 2005 | These [ES] application software packages had their *roots* in manufacturing resource planning systems and started as the support for a variety of transaction-based back office functions ... Since then they have *evolved* to include support for ... sales force <u>automation</u> (p.110)...In general, an ES *<u>privileges</u>* accuracy over speed, regardless of the preferences of any organizational unit. (Volkoff, Strong & Elmes 2005, p.119) |

Excerpts in Table 6.58 highlight that talking about technology as a culture also involves talking about technology as a machine and also, although to a lesser extent, an organism. As revealed in Chapter 4, the metaphor of *technology-as-culture* was always bolstered by the *technology-as-machine* metaphor in particular but also by the *technology-as-organism* metaphor.

### 6.6.3. People

Table 6.59 shows that in relation to the people concept there are three ways in which the machine, organism and culture metaphors manifest themselves in the articles:

1. Isolated – machine metaphor
   The isolated occurrence of the machine metaphor was evidenced in a single article in this phase of the analysis.

2. Combined – machine and organism metaphors
   The machine/organism combination was evident in around 21% of cases.

3. Combined – machine, organism and culture metaphors.
   The machine/organism/culture combination, was the most frequently evidenced way in which the three root metaphors manifest themselves. This combination was evident in around 79% of all articles.

The machine metaphor is the most salient metaphor in discussions of people being present in all different metaphor manifestations.

Table 6.59. *Articles showing different metaphor manifestations in discussions of people for sampling periods 2000/2001 and 2005*

| METAPHOR MANIFESTATIONS | | |
|---|---|---|
| TYPE | METAPHORS EVIDENCED | n |
| Isolated | Machine | 1 *(1%)* |
| Combined | Machine, Organism | 41 *(23%)* |
| | Machine, Organism, Culture | 137 *(77%)* |
| *Total Articles* | | *179 (100%)* |

## Isolated occurrence – machine

In this phase of the study there was only a single article: *A Formal Approach to Workflow Analysis* (Basu & Blanning 2000) that relied on only a single metaphor, that of the machine, when discussing people. This article published in the *Information Systems Research* during the sampling period, 2000/2001 discusses the people concept in some depth - particularly in relation to how people are involved in the management of organisational processes and their workflows. Despite this focus it is only mechanistic discourse that is used to discuss the people concept. For example people are referred to as 'information *elements*' or '*components*' of a workflow that '*calculate*' (p. 18) other elements and/or components. Due to the sheer frequency and variety of mechanistic rhetoric, this article was categorised as dominant for the machine metaphor.

## Combined occurrence – machine and organism

Approximately 23% of all articles that contained evidence of a root metaphor when discussing people contained both the machine and organism metaphors. Table 6.60 and Table 6.61 show the same marked difference in the strength to which each of these metaphors is evidenced as was uncovered with the other concepts. In 2000/2001 59% of articles that contain evidence of both the machine and organism metaphors are categorised as dominant for the machine metaphor as opposed to only 7% of these articles being categorised as dominant for the organism metaphor. In 2005 the result is not so marked but there are still almost twice as many articles categorised as dominant for the machine metaphor than are categorised as dominant for the organism metaphor.

Table 6.60. *Relative strength of machine and organism metaphors in articles relying on both these metaphors in discussions of people for sampling period 2000/2001*

| ARTICLES SHOWING EVIDENCE OF THE MACHINE AND ORGANISM METAPHORS AND THEIR RELATIVE STRENGTHS | | | | | |
|---|---|---|---|---|---|
| | | ORGANISM | | | |
| | | DOMINANT | SECONDARY | OCCASIONAL | n |
| MACHINE | DOMINANT | 0 *(0%)* | 13 *(45%)* | 4 *(14%)* | *17 (59%)* |
| | SECONDARY | 1 *(3%)* | 2 *(7%)* | 1 *(3%)* | *4 (14%)* |
| | OCCASIONAL | 1 *(3%)* | 4 *(14%)* | 3 *(10%)* | *8 (28%)* |
| *Total Articles* | | 2 *(7%)* | 19 *(66%)* | 8 *(28%)* | *29 (100%)* |

Table 6.61. *Relative strength of machine and organism metaphors in articles relying on both these metaphors in discussions of people for sampling period 2005*

| ARTICLES SHOWING EVIDENCE OF THE MACHINE AND ORGANISM METAPHORS AND THEIR RELATIVE STRENGTHS | | | | | |
|---|---|---|---|---|---|
| | | ORGANISM | | | |
| | | DOMINANT | SECONDARY | OCCASIONAL | n |
| MACHINE | DOMINANT | 4 *(33%)* | 4 *(33%)* | 1 *(8%)* | *9 (75%)* |
| | SECONDARY | 1 *(8%)* | 1 *(8%)* | 1 *(8%)* | *3 (25%)* |
| | OCCASIONAL | 0 *(0%)* | 0 *(0%)* | 0 *(0%)* | *0 (0%)* |
| *Total Articles* | | 5 *(42%)* | 5 *(42%)* | 2 *(17%)* | *12 (100%)* |

Table 6.62 presents a sample of excerpts from all three journals examined showing how both mechanistic and organic discourse appears in discussions of people. Mechanistic discourse is underlined and organic discourse italicised.

Note there are no articles published in *Management Information Systems Quarterly* or the *European Journal of Information Systems* during the year 2001 with the machine/organism combination, hence no sample excerpts are included.

Table 6.62. *Sample metaphor excerpts from* Information Systems Research, Management Information Systems Quarterly *and the* European Journal of Information Systems *that show evidence of machine (underlined) and organism (italicised) metaphors when discussing people in sampling periods 2000/2001 and 2005*

| JOURNAL | YEAR | EXCERPTS FOR THE MACHINE AND ORGANISM METAPHOR |
|---|---|---|
| ISR | 2000 | One of philosophy's oldest paradoxes is the apparent contradiction between the great triumphs and the dramatic failures of the human *mind*. The same *organism* that routinely solves inferential problems too subtle and complex for the mightiest computers often makes errors in the simplest of judgments about everyday events. (Nisbett and Ross 1980) (p.116) The use of complementary cues leads to better retention and retrieval of information by providing more potential <u>links</u> to knowledge in long-term *memory*. (Lim, Benbasat & Ward 2000, p. 130) |
| | 2001 | A veteran air-traffic controller made the following observations about a specific decision being discussed: "Now that's crisp <u>vectoring</u>! Make a plan, make it work, but don't *think* about the plan. " (Lerch & Harter 2001, p. 74) |
| | 2005 | Given the proliferation of web personalization, it is surprising to find that there is little *behavioral* research on the topic so far. [skip 2 sentences] So far, few studies have investigated the <u>mechanism</u> by which personalized content influences the decision process of web users. (Tam & Ho 2005, p. 272) |
| MISQ | 2000 | Prior research suggests that the experience a decision maker has with solving a particular type of problem can have important impacts on the processes they use and the outcomes they <u>generate</u> (p.603) ...Thus, the professionals who engaged in solving this research task may have <u>processed</u> it more fastidiously because such *behavior* would be part of their regular work routine (Mennecke, Crossland & Killingsworth 2000, p. 625) |
| | 2005 | The Effects of Virtual Reality on Consumer *Learning* [title] (p.673) On the other hand, *vision* is considered to be the most important sense in the context of <u>generating</u> virtual experiences through realistic 3D displays (Suh & Lee 2005, p. 692) |
| EJIS | 2000 | They have to keep changing with the changing *taste* and *behaviour* of online shoppers. (p.30) Today's enterprise systems are able to capture all of the transaction data, but they seriously lack analytical tools to examine the data and help managers to make <u>optimal</u> decisions. (Gosain, Lee & Kim 2000, p. 31) |

| | | |
|---|---|---|
| | 2005 | *Facing* frequent changes in business and technology contexts, ISDP teams must continuously *sense* and *respond* to these changes (p.78) To close the flexibility gaps, however, theories are needed to provide managers with insights about the organizational antecedents and mechanisms that improve or hinder ISDP team flexibility. (Lee & Xia 2005, p. 90) |

Table 6.62 highlights that talking about people as organisms also means talking about them as machines. There is no evidence of people being discussed as organisms without also being discussed as machines.

### Combined occurrence – machine, organism and culture

The metaphorical combination of machine/organism/culture is by far the most common way in which the root metaphors were evidenced in relation to the people concept accounting for around 79% of all articles. Both Table 6.63 and Table 6.64 highlight that the organism and to a slightly lesser extent the culture metaphors are dominant in a significant proportion of these articles for the 2000/2001 and 2005 periods. Indeed in the 2000/2001 sampling period they are evident in almost double that of the machine metaphor. In relation to those articles categorised as dominant for the organism metaphor only two are published in *Information Systems Research*. Most of the articles are published in *Management Information Systems Quarterly* (66%) or the *European Journal of Information Systems* (28%). At this time there was a strong concentration on topics of knowledge and its management (Huang, Newell & Pan 2001; Karsten et al. 2001), which contributed heavily toward those articles categorised in this way. In relation to the culture metaphor most of the articles categorised as dominant for this metaphor are published in the *European Journal of Information Systems* (50%) and to a slightly lesser extent *Management Information Systems Quarterly* (38%). Topics covered here range from Torvinen and Jalonen's (2000) study on power games as a part of systems development to Schultze's (2000) confessional account on knowledge work. Such topics are important in ensuring frequent cultural discourse and their resulting dominant categorisation of the culture metaphor. Yet, even in these articles that cover such topics, the machine metaphor is still present.

Table 6.63. *Relative strength of machine, organism and culture metaphors in articles relying on all of these metaphors when discussing people for sampling period 2000/2001*

| MACHINE,ORGANISM AND CULTURE COMBINATION ARTICLES | | | |
|---|---|---|---|
| | MACHINE | ORGANISM | CULTURE |
| DOMINANT | 12 *(9%)* | 30 *(22%)* | 27 *(20%)* |
| SECONDARY | 33 *(24%)* | 33 *(24%)* | 25 *(18%)* |
| OCCASIONAL | 33 *(24%)* | 15 *(11%)* | 26 *(19%)* |
| TOTAL | 78 | 78 | 78 |

Table 6.64. *Relative strength of machine, organism and culture metaphors in articles relying on all of these metaphors when discussing people for sampling period 2005*

| MACHINE,ORGANISM AND CULTURE COMBINATION ARTICLES | | | |
|---|---|---|---|
| | MACHINE | ORGANISM | CULTURE |
| DOMINANT | 31 *(23%)* | 30 *(22%)* | 24 *(18%)* |
| SECONDARY | 21 *(15%)* | 26 *(19%)* | 9 *(7%)* |
| OCCASIONAL | 7 *(5%)* | 3 *(2%)* | 26 *(19%)* |
| TOTAL | 59 | 59 | 59 |

Table 6.65 (sample period 2000/2001) and Table 6.66 (sample period 2005) show the number of articles categorised as dominant for each of the three root metaphors and the strengths of the other two metaphors with which they appeared. Unlike Chapter 4, the tendency for articles to be more strongly influenced by the machine metaphor is not present to the same degree in this phase of the results. That is, it was *less* likely that an article categorised as dominant for the organism or culture metaphors would be categorised as dominant for the machine metaphor. Yet, when an article was categorised as dominant for the machine metaphor it was not more likely to be

categorised as dominant for either the organism or culture metaphors. There are differences between sampling years, in particular this tendency while still true in 2005 was certainly more pronounced in 2000/2001.

Table 6.65. *Articles relying on all three root metaphors that are categorised as dominant for the machine, organism or culture root metaphors when discussing people and the relative strength of their co-occurring metaphors for sampling period 2000/2001*

| ARTICLES THAT ARE DOMINANT FOR THE MACHINE, ORGANISM AND CULTURE METAPHORS AND THE STRENGTH OF THEIR CO-OCCURING METAPHORS | | | | | |
|---|---|---|---|---|---|
| | | MACHINE | ORGANISM | CULTURE | N |
| MACHINE | DOMINANT | - | 4 * (13%) | 0 (0%) | 4 (5%) |
| | SECONDARY | - | 19 (63%) | 9 (33%) | 28 (36%) |
| | OCCASIONAL | - | 7 (23%) | 18 (67%) | 25 (32%) |
| ORGANISM | DOMINANT | 4 (33%) | - | 8 (30%) | 12 (15%) |
| | SECONDARY | 7 (58%) | - | 15 (56%) | 22 (28%) |
| | OCCASIONAL | 1 (8%) | - | 4 (15%) | 5 (6%) |
| CULTURE | DOMINANT | 0 (0%) | 8 (27%) | - | 8 (10%) |
| | SECONDARY | 5 (42%) | 15 (50%) | - | 20 (26%) |
| | OCCASIONAL | 7 (58%) | 7 (23%) | - | 14 (18%) |
| *Total Articles* | | 12 (9%) | 30 (22%) | 27 (20%) | 78 (100%) |

Table 6.66. *Articles relying on all three root metaphors that are categorised as dominant for the machine, organism or culture root metaphors when discussing people and the relative strength of their co-occurring metaphors for sampling period 2005*

| ARTICLES THAT ARE DOMINANT FOR THE MACHINE, ORGANISM AND CULTURE METAPHORS AND THE STRENGTH OF THEIR CO-OCCURING METAPHORS | | | | | |
|---|---|---|---|---|---|
| | | MACHINE | ORGANISM | CULTURE | N |
| MACHINE | DOMINANT | - | 14 (47%) | 4 (17%) | 18 (31%) |
| | SECONDARY | - | 15 (50%) | 13 (54%) | 28 (47%) |
| | OCCASIONAL | - | 0 (0%) | 2 (8%) | 2 (3%) |
| ORGANISM | DOMINANT | 14 (45%) | - | 11 (46%) | 25 (42%) |
| | SECONDARY | 15 (48%) | - | 11 (46%) | 26 (44%) |
| | OCCASIONAL | 2 (6%) | - | 2 (8%) | 4 (7%) |
| CULTURE | DOMINANT | 4 (13%) | 11 (37%) | - | 15 (25%) |
| | SECONDARY | 6 (19%) | 7 (23%) | - | 13 (22%) |
| | OCCASIONAL | 21 (68%) | 12 (40%) | - | 33 (56%) |
| *Total Articles* | | 31 (23%) | 30 (22%) | 24 (18%) | 59 (100%) |

A sample of how each of the three metaphors was evidenced when discussing people has already been provided in the previous section on people in this chapter. Specifically, in Table 6.30, Table 6.33 and Table 6.36 excerpts from Randall et al. (2001) and Barki and Hartwick (2001) illustrate these concepts. In these articles evidence of the three root metaphors occur very close to one another, either within one or two sentences of one another. These excerpts highlight that talking about people as cultural beings entails talking about them as organisms and machines.

## 6.7 Conclusions

This chapter was motivated by the question of how diversity in Information Systems research has changed over time. Instead of focusing on a single concept, that of the organisation, it broadened the search to focus on two other concepts: technology and people. Additionally, this chapter also included all three journals focused on in Chapter 4: *Information Systems Research*, *Management Information Systems Quarterly* and the *European Journal of Information Systems*. By using the same fictive metaphor analysis relied on in both Chapter 4 and Chapter 5 it explored the evidence for three root metaphors – machine, organism and culture – when discussing organisations, technology and people. It did this in two historical sampling periods 2000/2001 and 2005. While the results vary from concept to concept, journal to journal and year to year the results are generally consistent with those of the previous two chapters. The machine metaphor is certainly not always as strong as that which was uncovered in previous chapters. For example, it is not categorised as dominant nearly as much as was revealed in Chapters 4 and 5. Yet, it is still the most pervasive way of structuring and understanding key Information Systems concepts. Key Information Systems concepts as machines come in a wide variety of forms and types. Additionally, culture and organism metaphors were only ever found with the machine metaphors. Before discussing the important implications of this result as well as those revealed in the previous two chapters attention will now turn to the secondary data analysis. This analysis is the topic of the next chapter, Chapter 7.

# Chapter 7 - ANALYSIS: SECONDARY EVIDENCE

## 7.1 Introduction

Where the previous three chapters focused on the primary evidence – in particular linguistic evidence of metaphors or metaphor tokens – this chapter focuses on secondary evidence. In this phase of the study all the metaphor tokens found in the full set of articles investigated in the previous three chapters are the evidentiary data set for analysis. Secondary evidence is derived from the primary evidence and encompasses sub-metaphors, high-level entailments and logical reasonings associated with root metaphors. Table 7.1 is a summary of the information already provided in Chapter 3, *viz*. what these secondary forms of evidence are (Section 3.3.1), an example on each form (more complete examples in Section 3.3.1) and the actions taken in this thesis to reveal each of the forms (Section 3.4.7).

Table 7.1. *Secondary evidence forms abstracted from Chapter 3.*

| Secondary Evidence | Description | Example | Action |
|---|---|---|---|
| Sub-metaphors | A derivative of an overarching metaphor – often appearing in a hierarchical arrangement. | *Purpose* – a sub-metaphor of the machine root metaphor. | Ascertain any sub-domain mappings, sub-metaphor source and domains and inheritance hierarchies. |
| High-level Entailments | Inference patterns or logical consequences of a metaphor. | *Efficiency* – a high-level entailment of the machine root metaphor. | Ascertain the major consequences invoked in the metaphor |
| Logical Reasonings | Reckonings that are transferred when relying on a metaphor. | *Field of Location* – a primary category of reasoning for the machine root metaphor. | Uncover any of the logical reasonings – as defined by Pepper (1942) - associated with the root metaphor. |

The results of the analysis reveal that, in terms of secondary evidence, the skew toward the machine metaphor is even more acute than was uncovered in the previous three chapters. Not only can sub-metaphors and high-level entailments be derived clearly from the primary evidence for this metaphor but the logical entailments are also readily apparent. This is not the case with the organism and culture metaphors. This acute skew toward the machine metaphor revealed in this chapter suggests that Information Systems research may not be as diverse as many have claimed to be the case. This finding as well as its various implications – including possible sclerosis of the discipline – is the focus of the next chapter.

This chapter begins with an overview of the results (Section 7.2). Directly following this overview, the secondary evidence associated with each of the root metaphors are presented in order of development and strength: machine (Section 7.3), organism (Section 7.4) and culture (Section 7.5). Within each of these major sections the secondary evidence (where it is found) is presented in the order of: a) sub-metaphors, b) high-level entailments and c) logical reasonings. The chapter concludes with some final reflections.

## 7.2 Results overview

The most significant finding of this last phase of the study reinforces the findings of the previous three results chapters. The machine metaphor is found to be the leading way in which key Information Systems research concepts are structured and understood. Not only did all three forms of secondary evidence exist for the machine metaphor, but these forms of evidence were both well developed and clearly distinct. The organism and culture metaphors on the other hand lacked sub-metaphors; further, their high-level entailments and logical reasonings lacked the development of those associated with the machine metaphor. Additionally, the high-level entailments and logical reasonings associated with the organism and culture metaphors suffered interference from the machine metaphor. All of these aspects contributed to the organism and culture metaphors being much weaker in comparison to the machine metaphor. The machine metaphor, therefore, emerges as the strongest and most comprehensively developed of all three root metaphors.

Before discussing metaphor interference, a recap on what was found during the first and second stages of coding will be provided. This recap will provide important background information to understanding findings of this chapter. In both types of coding the purpose was to uncover what, if any, of the three root metaphors were used to conceptualise three key Information Systems concepts: organisations, technology and people. The first stage involved examining the discourse within individual articles for primary evidence, that is, metaphor tokens of which an example is provided below:

> IT is increasingly the *engine driving* the new business models.
> (Sambamurthy & Zmud 2000, p. 105)

This first stage is essentially a 'first cut' at the top layer of articles to gain some initial insight into what metaphors appear to be responsible for conceptualising key Information Systems concepts. It is the results of this first stage, which have been presented in the previous three chapters. Yet, as highlighted in Chapter 3, there is more to uncovering what metaphors are at play than primary evidence alone; this is the purpose of the second stage.

The second stage involves looking beyond the primary evidence to the secondary forms of evidence: sub-metaphors, high-level entailments and logical reasonings. It is the results of this secondary stage that is presented in this chapter. In this thesis, secondary forms of evidence are taken as indicators of how intricate or fundamental the reliance on metaphors are. If evidence of sub-metaphors, high-level entailments and logical reasonings of a given metaphor are easily derived from the primary evidence then this is taken as evidence that this metaphor is being relied on in a comprehensive way; there are deep ontological structures in place that support the metaphor.

As explained in Chapter 3 Section 3.4.7, in this secondary stage, analysis was done to establish the variation in dependence on metaphors but did not quantify that variation. In the primary stage, analysis was done to both establish the variation in dependence on metaphors and also quantified that variation. At the primary stage, inclusion of quantities was achieved relatively easily and believed to be useful in the sense that it helped communicate a large amount of information in a concise manner; the reader was more likely to understand what was found at a glance. These quantities also helped add emphasis to what was found in terms of the variation in dependence on the three different metaphors. In this secondary stage of analysis however, the ability to arrive at specific quantities is certainly more difficult, if not impossible, to achieve: it is an analysis of an analysis or perhaps to be more precise a meta-analysis. It is also believed to be – at this stage – less useful and necessary. Remember of course that the question under investigation in this study is to explore how conceptually diverse Information Systems research is and not to quantify the precise magnitude of that conceptual diversity (although quantification is, at least in the initial stages, a useful way of exploring that question). Hence, the same types of tables and figures that include numbers and percentages of articles as reported in the previous three chapters are not encountered in this chapter.

Secondary analysis revealed that, while there may be a significant amount of primary evidence associated with a given metaphor, this evidence is not supported necessarily by the secondary evidence available for that same metaphor. As stated previously, in relation to the machine metaphor several clear sub-metaphors, high level entailments and logical reasonings were found. This was not the case with the organism and culture metaphors. Yet, as revealed in the previous three chapters, there were articles that contained a significant amount of primary evidence associated with the organism and culture metaphors. From this primary evidence however, no clear sub-metaphors could be determined at all. It was also more difficult to derive high-level entailments for these metaphors than it was for the machine metaphor. Compounding this finding only rarely were the logical reasonings – as described by Pepper (1942) – associated with these metaphors evidenced in the metaphor tokens. Hence, even though many articles in the previous three chapters were categorised as dominant – due to the number of metaphor tokens – for the organism and culture metaphors, the results of this chapter suggest that overall reliance on these metaphors is much weaker than the results of the previous three chapters suggest.

Another interesting finding that contributed to a further weakening of the organism and culture metaphors in these results is metaphor interference. As stated in the previous chapters, organic and cultural metaphor discourse never occurred in isolation. There was always some background mechanistic discourse. This meant that the primary evidence – the metaphor tokens – associated with the organism and culture metaphors always occurred in combination with primary evidence associated with the machine metaphor. This was often in very close proximity, e.g., the same sentence. When analysing organic and cultural metaphor tokens, the presence of, as well as proximity to, the mechanistic metaphor tokens, turned out to be significant.

Proximity is important because when the organic and cultural metaphor tokens were analysed for secondary evidence, one of two things typically occurs – both related to metaphor interference. In the first case, analysis of organic and culture metaphor tokens resulted in no clear secondary evidence associated with these metaphors. Instead, evidence associated with the machine metaphor was found quite often. This indicated that although a given article might be categorised as dominant for a given metaphor there may be no deeper ontological structures in place that support the metaphor. In this first case it may indeed be the metaphor that appears to be weaker in an article that provides the deeper structural support for understanding.

In the second case, secondary forms of evidence – specifically high-level entailments and logical reasonings – associated with the organism and culture metaphors were found. Yet when these secondary forms of evidence were examined further they were often understood in terms of the machine metaphor's secondary forms of evidence: sub-metaphors, high-level entailments and reasonings. This led to a situation where the high-level entailments and reasonings associated with the organism metaphor were redundant. This results in a similar situation to that discussed above, but in this second case the deeper ontological structures of the organism metaphor are present they are simply redundant in terms of conceptualising the key Information Systems concept.

These findings relating to machine metaphor interference are significant in two ways. The first is in direct relation to this study. The findings suggest that both the organism and culture metaphors are even weaker than initially revealed in the previous three chapters. Second, these findings suggest that metaphors may not always work by way of a simple transference and that uncovering a metaphor for a given conceptualisation is not always straightforward. This second point, which centres on theory and method, will be discussed more in the final chapter.

The following sections discuss the findings in relation to each of the metaphors in more detail.

## 7.3 Machine

In this section, the secondary evidence associated with the machine metaphor is presented. The machine metaphor is the only root metaphor for which all the forms of secondary evidence – sub-metaphors, high-level entailments and logical reasonings – were found. Before presenting this secondary evidence however, this section starts with an overview of the three metaphors for the machine domain explored in this study: *organisation-as-machine*, *technology-as-machine* and *person-as-machine*. The underlying metaphor mappings are derived from the results presented in the previous three chapters. They provide the reader with an at-a-glance summary of each of the root metaphors and how the three key Information Systems concepts explored in this study fit in with each of these metaphors. The metaphor mappings also serve as important contextual information for the following three sections on sub-metaphors, high-level entailments and reasonings found for the machine metaphor.

### 7.3.1. Metaphor mappings

The metaphor mappings for the machine metaphor are presented in Table 7.2. As Lakoff (1993) asserts, a metaphor can be understood as a mapping of 'ontological correspondences' (p. 206) from a source domain to a target domain. The three target domains for the machine metaphor were the three key Information Systems concepts of organisation, technology and people. The most common set of ontological correspondences for each of these target domains, as represented in the primary evidence of metaphor tokens are provided in Table 7.2.

Table 7.2. *Machine metaphor mappings for organisation, technology and people*

| TARGET DOMAIN | ONTOLOGICAL CORRESPONDENCE |
|---|---|
| Organisation | Organisation corresponds to a machine |
| | Employees correspond to parts |
| | Technology corresponds to parts |
| Technology | Technology corresponds to a machine |
| | Organisation corresponds to fuel or external force |
| | People correspond to fuel or required input |
| People | People correspond to machine |
| | Organisation corresponds to fuel or external force |
| | Technology corresponds to fuel, required input or generated output |

It is important to realise, that the name of the mapping, implied in Table 7.2, is not the same as the mapping itself. Take for example, the name of the mapping *organisation-as-machine* in Table 7.2. This name is a mnemonic for a whole set of correspondences not a single correspondence. This is a subtle yet important distinction and relevant contextual information for the next sections.

## 7.3.2. Sub-metaphors

Table 7.3 presents the four sub-metaphors associated with the machine metaphor that were uncovered from the analysis: *purpose*, *product*, *process* and *part*. The associated inheritance hierarchy uncovered for the sub-metaphors presented in Table 7.3 was as follows: A *machine* is created for a particular *purpose*; this *purpose* is achieved through the creation of *products*; which are generated by a number of *processes*; the *processes* themselves are performed by various *parts* that work together. As shown the table these four machine sub-metaphors (first column) were identified for each of the three key Information Systems concepts (second column) explored in this study.

As discussed previously in Chapter 3 Section 3.4.7, sub-metaphors were derived from metaphor tokens – in this case from all *mechanistic* metaphor tokens. So, in some of the articles where a metaphor token was identified it was possible to detect a mapping in these tokens between the source domains of purpose, product, process and part with some target domain. In the analysis these target domains varied somewhat; Table 7.3 lists the most common target domains (third column) as they existed in the machine metaphor tokens. Overall, the derivation of these sub-metaphors and their existence in a hierarchical arrangement is important as it shows the bias toward the machine metaphor as revealed in the previous three chapters is supported at a deeper ontological level.

The following sections discuss each of these sub-metaphors in detail. These sections also explain how these sub-metaphors were derived from the primary evidence, that is, examples of metaphor tokens existing in articles that were used to derive the sub-metaphor.

Table 7.3. *Sub-metaphor mappings for organisation-as-machine, technology-as-machine and people-as-machine metaphors*

| SOURCE DOMAIN | CONCEPT | TARGET DOMAIN |
|---|---|---|
| PURPOSE | Organisation | Wealth generation |
| | Technology | Directly or indirectly to Organisation's Purpose |
| | People | Directly or indirectly to Organisation's Purpose |
| PRODUCT | Organisation | Goods, service |
| | Technology | Informational products and services |
| | People | Directly or indirectly to Organisation's Product |
| PROCESS | Organisation | Tasks, routines, operations, workflow, |
| | Technology | Software development, Information Systems change (cross), Information Systems implementation |
| | People | Technology usage behaviour, communication, |
| PART | Organisation | Departments, functional areas, people, technology |
| | Technology | Software, hardware |
| | People | Mind, body |

### Purpose

Table 7.4 presents an indicative sample of mechanistic metaphor tokens from which the purpose sub-metaphor was derived. Note that the metaphor tokens presented in this table as well as other tables in this chapter (reproduced from previous chapters) contain italics and other special mark-ups that indicate the main metaphor not the sub-metaphor – although at times these may overlap. It was noted in the analysis of mechanistic metaphor tokens that key IS concepts just like machines were discussed – either implicitly or explicitly – as having a pre-defined purpose. For example, take the mechanistic metaphor token by Gopal and Sivaramakrishnan (2008) in the first row of Table 7.4. This quote was originally identified as a mechanistic metaphor token due to the mechanistic term *drivers*, which has been highlighted in the quote with italics. In this phase of the analysis, a finer-grained mapping within this mechanistic metaphor token (and others like it in Table 7.4) was detected. In Gopal and Sivaramakrishnan (2008) this occurred through the term *drivers,* which suggests movement toward a goal. Just like a machine the organisation is driven. The organisation has a purpose. Note that the purpose is a more refined source domain of the main machine metaphor. The purpose sub-metaphor is distinct in its own right but contributes through its own unique imagery to the main overarching metaphor.

Table 7.3 illustrates that the target domain for the purpose sub-metaphor was typically conceptualised in terms of some form of wealth generation. For example, organisations have profit *drivers* (Gopal & Sivaramakrishnan 2008) and must realise cost savings (Holmström Olsson et al. 2008). In Keil et al.'s (2000) use of the train metaphor, the critical impact technology can have on the ultimate goal of the organisation's ability to generate wealth is difficult to miss. In Levina (2005) it is clear that organisations rely on people in much the same way as they rely on technology: to generate wealth. Beaudry and Pinsonneault (2005) provide a similar but reversed perspective to that provided by Levina (2005): people rely on organisations to generate wealth. See in Beaudry and Pinsonneault (2005) how the person is contextualised in the organisation. A person, like a part in a machine, has a '*workload'*, they have a purpose within the organisation to be productive. Yet, they also have their own purpose and reasons for being a part of the organisation – also focused on wealth – the 'commission-based salary' (p. 515). There is also the unspoken assumption within this metaphor token, that anything which interferes with the purpose of wealth generation, (such as the system in this token) is to be avoided. Such a focus on wealth generation (target domain) is commonly encountered in the metaphor tokens that were used to derive the purpose sub-metaphor.

Table 7.4. *Sample metaphor excerpts for the machine metaphor from which the purpose sub-metaphor was derived*

| CONCEPT | MACHINE METAPHOR TOKEN |
|---|---|
| ORGANISATION | Is the relative importance of various profit drivers different across two contractual regimes? (Gopal & Sivaramakrishnan 2008, p. 202) |

| | |
|---|---|
| | Potential cost savings, reduced cycle time arising from 'follow-the-sun' software development, and access to a larger labor pool have helped fuel the amount of work being offshored (Holmström Olsson et al. 2008, p. 258) |
| | Here I focus on the former, as the posited model is concerned with economic drivers of investment in new technology. (Fichman 2001, p. 145) |
| ORGANISATION/ PEOPLE | This environment [private sector] is immensely competitive, where tight budgets set by prudent finance directors spark creativity and innovation, which leads to cost savings. (Irani & Elliman 2008, p. 336) |
| | She felt that the new system would increase her workload, reduce her productivity, and decrease her commission-based salary (Beaudry & Pinsonneault 2005, p. 515) |
| | Many of these firms have created 'idea factories,' in which teams brainstorm using e-mail, Web-based groupware, and face-to-face meetings, with the goal of generating ideas that change existing business paradigms. (Garfield et al. 2001, p. 322) |
| ORGANISATION/ TECHNOLOGY | Internet-based electronic markets, such as eBay, exemplify how information technology (IT) can propel long-standing business processes, such as auctions, to an unprecedented scale and scope. (Bapna, Jank & Shmueli 2008, p. 400) |
| | Organizations put these diverse professionals on ISD project teams as a means of addressing market necessities or in hopes of igniting creative sparks to discover new market opportunities. (Levina 2005, p. 109) |
| | Cases in which software projects go wildly over budget or drag on long past their originally scheduled completion date have been labelled 'runaway systems' in the trade press (Mehler 1991; Willbern 1989). Like a runaway train, these are projects that are hurtling out of control; difficult to stop, yet in need of redirection or termination. (Keil et al. 2000, p. 632) |

In addition to the metaphor tokens presented in Table 7.4, there were others that contributed greatly to the derivation of the purpose sub-metaphor. These metaphor tokens discussed:

- Organisations and their various substituent *components* as being *designed* (Alavi & Leidner 2001; Luna-Reyes et al. 2005), *redesigned* (Cooper 2000), *engineered* (Sharif, Irani & Love 2005), *reengineered* (Panagiotidis & Edwards 2001), and *built* (Duhan, Levy & Powell 2001) according to various business *blueprints* (Gosain, Lee & Kim 2005).

- Technology as being *designed* (Hinz & Spann 2008; Singh, Dalal & Spears 2005) and *engineered* (Puschmann & Alt 2005), according to its associated *blueprints* (Gosain, Lee & Kim 2005; Smolander, Rossi & Purao 2008).

- People as being a *workforce* (Roepke, Agarwal & Ferratt 2000) and having *workloads* (Beaudry & Pinsonneault 2005). Their jobs are also subject to the same *engineering* and *design principles* (Moon & Sproull 2008; Ravichandran & Rai 2000) that organisations and technology are.

Overall the purpose sub-metaphor provided necessary support for the main overarching machine metaphor. It did this by contributing its own detailed mappings that were a more refined aspect of the machine metaphor. The purpose sub-metaphor as with all the sub-metaphors was crucial to the finding that the machine metaphor was indeed the strongest and most powerful root metaphor in this study.

### Product

A number of sample metaphor tokens that were used to derive the products sub-metaphor are presented in Table 7.5. All of these samples have a focus on key Information Systems concepts producing something. For example, in the first token by Choudhury and Karahanna (2008) the assumption is that the organisation produces products that consumers buy. The target domain (the actual product) is conceptualised in very general terms – simply as the product (Choudhury & Karahanna 2008; Cooper 2000; Datta & Chatterjee 2008; Malhotra et al. 2001) – and in more specific terms, for example 'natural experiments' (Huber 2001). The target domains also vary between each of the key Information Systems concepts, for example, the organisation produces market information (Datta & Chatterjee 2008) while technology produces knowledge artifacts (Beaudry & Pinsonneault 2005). They also overlap however, for example, Sawyer (2000) asserts that both organisations and people produce software – albeit in this case organisations produce software through people. The following paragraphs go into further detail on the types of metaphor tokens associated with each of the key Information Systems concepts and their target domains for the product sub-metaphor.

Table 7.5. *Sample metaphor excerpts for the machine metaphor from which the product sub-metaphor was derived*

| CONCEPT | MACHINE METAPHOR TOKEN |
|---|---|
| ORGANISATION | Potential cost savings, reduced cycle time arising from "follow-the-sun" software development, and access to a larger labor pool have helped fuel the amount of work being offshored from high-cost locations such as the United States, United Kingdom, and Scandinavia to lower cost economies such as India, China, Russia, and Malaysia. (Holmström Olsson et al. 2008, p. 258) |
| | When the characteristics of buyers and sellers are unobservable, intermediaries generate market information and provide guaranties for product quality to address adverse selection. (Datta & Chatterjee 2008, p. 15) |
| | I think we need to view the world of organisations as a generator of many 'natural experiments' (Huber 2001, p. 78) |
| TECHNOLOGY | But whereas communication technologies may serve as the transport mechanism for task products and storage technologies may serve as their repositories, transformational technologies provided the mechanisms for creating, viewing, modifying, and analyzing a large range of knowledge artifacts. (Leonardi & Bailey 2008, p. 412) |
| | This paper describes how a unique type of virtual team, deploying a computer-mediated collaborative technology, developed a radically new product (Malhotra et al. 2001, p. 229) |
| | The execution of this strategy would have been impossible without a data warehouse called VISION that stored information about client behaviors (e.g., products used, transactions), client buying preferences (e.g., attitudes, expressed needs), and client value positions (i.e., profitability). (Cooper 2000, p. 548) |

| | |
|---|---|
| PEOPLE | A byproduct of these demands may be increased levels of exhaustion and burnout (Moore 2000a). Work exhaustion, defined as the depletion of one's emotional, mental, and physical resources (Moore 2000a), often leads IT professionals to such outcomes as reduced job satisfaction (Burke and Greenglass 1995), employee withdrawal (Deery et al. 2002), and increased turnover (Moore 2000a). (Rutner, Hardgrave & McKnight 2008, p. 636) |
| | Since these organizations survive on their ability to produce software, software developers are their main production engine. (Sawyer 2000, p. 53) |
| | The introduction of a new information technology generates a multitude of expected and unexpected consequences in the users' environment .... These consequences are interpreted and understood in a variety of ways by users, triggering equally plentiful, varied, and complex user responses (Beaudry & Pinsonneault 2005, p. 499) |

In relation to the organisational concept, metaphor tokens used to derive the purpose sub-metaphor highlight the notion that the organisation generates one or many types of products in the pursuit of its overarching purpose. As Newkirk, Lederer and Johnson (2008) assert, the introduction of new products and services are essential for organisations in an increasingly dynamic economy. Hardware and software were the most common target domains for the product sub-metaphor. An example in relation to hardware is Sawyer (2000) in Table 7.5, which contains metaphor tokens focusing on how packaged software came about, that is, by unbundling software from hardware. Software was the most commonly evidenced target domain over the years (see Hinz & Spann 2008; Weedman 2008). Terms such as digital goods (Lee, Wyner & Pentland 2008) – a category of technology that includes software as a type were also discussed. Other technology products included mobile technologies and services (Datta & Chatterjee 2008; Kietzmann 2008) as well as information and cultural goods (Alter 2008).

In relation to the technology concept the most common target domain in metaphor tokens for the product were information related products and services. These types of informational products and services focused on in the technology related metaphor tokens appear to align well with Alter's (2008) definition of a work system.

Essentially all technologies that capture, store, retrieve, manipulate and display information in some way are evident. These technologies range from data warehousing systems (Cooper 2000) that are concerned primarily with the storage of information – hence the term warehousing – to what Leonardi and Bailey (2008) term *transformational technologies* which communicate and store 'task critical knowledge and information' (p. 412). Examples of other informational products and services include: Knowledge Management Systems (KMS) that support creation, transfer and application of knowledge in organisations (Alavi & Leidner 2001), Manufacturing Resource Planning systems that help display relevant and accurate information concerning the production process, for example, route cards and delivery lead-times quotations (Irani, Sharif & Love 2001), data mining technologies that help identify and present interesting patterns concerning data in databases (Kiang & Kumar 2001). The exact product of technology in metaphor tokens varies somewhat, particularly in relation to the type of information that is processed and the way that it is processed. Nevertheless, the product or service of technology is always, either explicitly or implicitly, concerned with information of some type.

In relation to the products of people the target domains in metaphor tokens tend to be more wide-ranging and on the whole less tangible than those uncovered for the technology concept. Products of people are very similar to products of the organisation, that is, they are a good or service. Furthermore, as is shown in Table 7.5, the products of people range from the more tangible products such as software (Sawyer 2000) to the less tangible product of work exhaustion and burnout (Rutner, Hardgrave & McKnight 2008). Rutner, Hardgrave and McKnight (2008) by referencing Moore (2000) also highlight another aspect concerning the product of people, which is a reflection of a more widespread finding. There are products and by-products. The by-products are the unintended but inevitably generated products that occur in producing the main product. Some of the more interesting products that were popular in metaphor tokens over the years included the generation of ideas (Garfield et al. 2001; Irani & Elliman 2008), creativity (Levina 2005) and innovation (Subramani & Walden 2001).

As with the purpose sub-metaphor, the derivation of the product sub-metaphor helped provide further detailed understanding of key Information Systems concepts via the main machine metaphor.

## Process

Table 7.6 presents a sample of metaphor tokens that were used to derive the process sub-metaphor – the most fully explored of all machine sub-metaphors. As shown in Table 7.6, the target domains within these metaphor tokens cover a wide range of different activities and tasks concerning key Information Systems concepts from information systems development (Levina 2005) to neural networking (Kiang & Kumar 2001). A process as defined by these metaphor tokens is essentially anything that occurs within or around organisations, technology or people that transforms a certain input into a desired output. As shown in Table 7.6, the target domains within each of these metaphor tokens for each Information Systems concept are very similar, and even at times the same as those that occur in machines, for example, fine-tuning (Au, Ngai & Cheng 2000), igniting (Levina 2005), gauging (Gopal & Sivaramakrishnan 2008), switching (Randall et al. 2001), gearing (Palmer & Markus 2000). The paragraphs following the table go into further detail on the different types of processes evidenced in the metaphor tokens.

Table 7.6. *Sample metaphor excerpts for the machine metaphor from which the process sub-metaphor was derived*

| CONCEPT | MACHINE METAPHOR TOKEN |
|---|---|
| ORGANISATION | Although the category of needs with IS use will remain the same for individuals it is likely that fine-tuning may be required for certain industries where specific inputs are needed. (Au, Ngai & Cheng 2000, p. 56) |
| | Organizations put these diverse professionals on ISD project teams as a means of addressing market necessities or in hopes of igniting creative sparks to discover new market opportunities (Levina 2005, p. 109) |
| | Clients [organizations and people in the services industry and the offshore context, in particular] often face a serious problem of gauging seller reliability, quality, and efficiency. While several mechanisms can be adopted to reduce the impact of this information asymmetry ... they do so only imperfectly. (Gopal and Sivaramakrishnan 2008, p. 206) |
| TECHNOLOGY | A major impediment to accurate information retrieval from the World Wide Web is the inability of search engines to incorporate semantics in the search process (Storey et al. 2008, p. 3) |

| | |
|---|---|
| | Some of the technologies and applications in the program would support a strategy of supplier partnering or of 'customer intimacy,' whereas others are most heavily <u>geared</u> toward a strategy of transaction efficiency. (Palmer & Markus 2000, p. 242) |
| | A major criticism with the applications of neural networks to real-world problems is the need to <u>tune</u> the network for each data set to achieve better performance. (Kiang & Kumar 2001, p. 189) |
| PEOPLE | For instance, in collocated settings, managers can presumably determine rather easily whether or not team members are '<u>pulling their weight</u>.' (Chidambaram & Tung 2005, p. 149) |
| | In social science, <u>critical</u> <u>mass</u> refers to 'the idea that some <u>threshold</u> of participants or actions has to be crossed before a social movement <u>explodes</u> into being' (Oliver et al, 1985). ... Therefore, achieving a '<u>critical</u> <u>mass'</u> of users has been recognised as the key for successful groupware acceptance. (Lou, Lou & Strong 2000, p. 93) |
| | the modus operandi of their trading businesses so that I could get a feel and get a <u>handle</u> on how it operates, get a feel of what the management is like, .. because seeing the operation, talking to them, trying to ask questions and get a feel as to how good they are, and they're pretty <u>switched</u> on these guys (Randall et al. 2001, p. 118) |

In Table 7.6 the sample metaphor tokens highlight that the same internal and external processes that are used to discuss machines are also used to discuss key Information Systems concepts. For example, in relation to the internal workings Levina (2005) asserts that diverse professionals are put on Information Systems development teams in the hope of '*igniting* creative *sparks'* (p. 109). This very same internal process is common in many machines. In a similar fashion, Palmer and Markus (2000) refer to the *gearing* of technology and Lou, Lou and Strong (2000) to the *critical mass* required before a social movement can *explode* into being.

The external workings of key Information Systems concepts are discussed in similar mechanistic terms. There are two aspects of external processes that can be identified in metaphor tokens. The first concerns the operation of organisations, technology and people. In order to get these key Information Systems concepts to work one must be able to operate them just as one presses various buttons in order to get a machine to work. The second aspect deals with avoiding or handling operational problems. All organisations, technology and people '*break down*' or have the potential to break down, just as a machine does. Hence, one must consider aspects of maintenance and also how to fix key Information Systems concepts if they do break down.

In relation to the external operational processes organisations, technology and people are seen as entities that must be operated on from outside in order to work – just as machines are. A particularly good example of this is in Newman and Westrup's (2005) article: *Making ERPs work: accountants and the introduction of ERP systems*. Even in the title the aspect of external operation is obvious. ERPs, a particular form of technology, do not operate independently. They must be made to operate. Organisations are also seen in a similar way. They are *driven* (Gopal & Sivaramakrishnan 2008), *steered* (Garud & Kumaraswamy 2005), and *geared* (Ravichandran & Rai 2000). Likewise, people are *switched on* (Randall et al. 2001) and taken for a '*test drive*' (Cooper et al. 2000, p.556). Viewing organisations, technology and people as entities that are operated on by an external force in order to work is a significant part of how they are structured and understood in these metaphor tokens.

The second aspect of external processes highlighted in the metaphor tokens deals with the longer-term issues of operation. Understanding how to get key Information Systems concept to work is not enough. One must also understand how to keep them running, how to get the best performance out of them, and also how to fix them when they break down.

Certain indicators can be referred to in order to keep organisations, technology and people operational as well as to improve their performance. Various organisational, technological and people *gauges* (Abbasi & Chen 2008; Gopal & Sivaramakrishnan 2008; Wang, Chaudhury & Rao 2008) can be read and different organisational, technological and people *levers* (Alavi, Marakas & Yoo 2002; Lee 2000; Majchrzak, Malhotra & John 2005) can be pulled to see the exact state of operations and adjust them accordingly.

The processes within organisations, technology and people can be *fine-tuned* (Au, Ngai & Cheng 2008; Kiang & Kumar 2001), *calibrated* (Ghose, Smith & Telang 2006; Singh, Dalal & Spears 2005; Vlaar, van Fenema & Tiwari 2008) and even, more drastically, *reengineered* (Doherty & King 2001; Kietzmann 2008; Stefanou 2001) or *redesigned* (Ashurst, Doherty & Peppard 2008) to ensure better performance – just as they are in the machine.

Key Information Systems concepts *wear down*, *break down* and *shut down* (Sarkar & Ramaswamy 2000; Sawyer 2000; van der Aalst & Kumar 2003) just as any machine does. In these cases they need *fixing* or *replacing* (Cooper 2000; Hwang 2005; Siponen 2005) just as a machine and its parts do. Issues of maintenance as well as fault correction, that is, fixing, issues are significant in forming a clear image of these key Information Systems concepts as machines.

The derivation of the process sub-metaphor helped provide some of the most detailed imagery of the main machine metaphor. This detail was significant in reinforcing the power and strength of the leading machine metaphor as a way of structuring and understanding key Information Systems concepts.

### Part

Sample metaphor tokens from which the parts sub-metaphor was derived are presented in Table 7.7. Easily identifiable mechanistic parts are evident in these metaphor tokens, for instance *chain* (Kuruzovich et al. 2008), *mechanism* (Wang 2008) and *engine* (Sambamurthy & Zmud 2000). What is perhaps not so immediately recognisable are the two complementary but distinct views for the parts sub-metaphor evident in these metaphor tokens – two distinct views that are evident more broadly: key Information Systems concepts as machine and key Information Systems concepts as parts of a machine.

The remaining paragraphs following Table 7.7 expand upon these two distinct views of the parts sub-metaphor derived from metaphor tokens such as those presented in Table 7.7.

Table 7.7. *Sample metaphor excerpts for the machine metaphor from which the part sub-metaphor was derived*

| CONCEPT | MACHINE METAPHOR TOKEN |
|---|---|
| ORGANISATION | The physical and information components of the value <u>chain</u> have been decoupled (Kuruzovich et al. 2008, p. 182) |

| | |
|---|---|
| | Organizational memory is an organizational mechanism that captures, stores, and disseminates knowledge learned from previous experience that can be brought to bear on decisions (Wang 2008, p. 222) |
| | As demonstrated by entrepreneurial firms such as Amazon.com, E*Trade, and Commerce One, IT is increasingly the engine driving the new business models (Sambamurthy & Zmud 2000, p. 105) |
| TECHNOLOGY | Pentland and Feldman (2007) argue that the 'Lego-like' quality of modern information and communication technologies allows participants to design their own business processes (or at least significant aspects of those processes). (Lee, Wyner & Pentland 2008, p. 758) |
| | The solutions [enterprise integration] often take the form of connecting stovepipe legacy applications (Umapathy, Purao & Barton 2008, p. 518) |
| | COTS-Based Systems (CBS) development focuses on building large software systems by integrating previously existing software components. CBS success depends on successful evaluation and selection of Commercial-Off-The-Shelf (COTS) software components to fit customer requirements. (Kunda & Brooks 2000, p. 226) |
| PEOPLE | ANT is viewed as a guide to study how things, people, and ideas become connected and assembled in larger units. (Cho, Mathaiassen & Nilsson 2008, p. 616) |
| | There are many and frequent interactions among nurses because of tight linkage of our work. It is like a gear. We need to collaborate closely to prevent any trouble which is related to patient safety. (Chu & Robey 2008, p. 89) |
| | Since these organizations survive on their ability to produce software, software developers are their main production engine. (Sawyer 2000, p. 53) |

The first view, that key Information Systems concepts are machines, is supported by metaphor tokens where organisations, technologies and machines themselves are seen as machines composed of a number of individual parts. In relation to the organisation, this view sees the individual parts, as (typically) the other two key Information Systems concepts examined: technology and people. This is readily apparent in

Sawyer (2000) and Chu and Robey (2008) in Table 7.7. Yet, other organisational parts include departments and functional areas. These parts gain particular significance in the many metaphor tokens that discuss or explore aspects of business process re-engineering (see Newman & Westrup 2005; Sharif, Irani & Love 2005; Stefanou 2001). In relation to technology the parts are typically some form of software or other system as highlighted in the Table 7.7. People parts are most commonly seen in terms of mental or cognitive parts rather than physical parts. An important aspect of this view is the notion that parts can be replaced and in many cases be interchanged with one another. This is particularly noticeable in business process re-engineering, that is, people and technologies (in the form of systems) within an organisation cannot only be replaced but added to, removed, re-designed or reconfigured.

The second view, that key Information Systems concepts are parts of a machine, is supported by metaphor tokens that conceptualise organisations, technology and people as parts of a more sizable machine: the economy (Datta & Chatterjee 2008; Mithas, Jones & Mitchell 2008; Rustagi, King & Kirsch 2008). Likewise, the same notion of replaceability and interchangeability exists in this view. There are various different types of organisations, technology and people that make up the economic machine. As with the first view, none of these parts are irreplaceable. The economic machine will grind along whether a specific key Information Systems concept or even type of key Information Systems concept exists or not. There are literally hundreds, if not thousands or millions, to replace the one or type that becomes worn, stressed or breaks. This secondary view, along with the primary view, is both discernible in the metaphor tokens used to derive the parts sub-metaphor.

The parts sub-metaphor, as with all sub-metaphors, provided valuable detailed mappings – mappings that were more specific than the main root metaphor but ones that ultimately provided further comprehensive understanding of the main metaphor.

### 7.3.3. High-level entailments

High-level entailments are logical consequences of a metaphor. In this phase of the study, three well-developed high-level entailments were discerned for the machine metaphor in associated mechanistic metaphor tokens: accuracy, effectiveness and efficiency. These clear and distinct logical consequences of the machine metaphor contributed further ontological support for this leading metaphor. These high-level entailments are discussed further in the following sections along with how they were derived from the primary evidence.

### Accuracy

The first entailment of accuracy concerned the underlying assumption within many metaphor tokens for which even the most intangible aspects of key Information Systems concepts can be measured and accounted. From organisational investment decisions (Xue, Liang & Boulton 2008) to a search engine's information retrieval (Storey et al. 2008) and a person's decision-making ability (Dabbish & Kraut 2008), accuracy is seen as a critical aspect of these activities. Organisations, technology and people are essentially conceptualised within metaphor tokens as a configuration of parts having accurate locations, which determine their underlying workings. This is of course the same logical consequence that exists within our understandings of machines.

Wang, Ahmed and Rafiq (2008) provide a good example of how the high-level entailment of accuracy is expressed in the metaphor tokens of a single coherent piece of writing. In this article Wang, Ahmed and Rafiq (2008, p. 219) introduce and validate their Knowledge Management Orientation (KMO) construct – the degree to which a firm demonstrates 'organized and systematic knowledge management (KM) implementation'. This particular construct is:

- '*operationalized* as a second-order latent construct consisting of four main *component* factors: organizational memory, knowledge sharing, knowledge absorption, and knowledge receptivity' (p. 219) that

- 'encapsulate the organizational *mechanisms* of managing explicit and tacit knowledge within and from outside the organization, and underpin KM efficiency and effectiveness, which are conducive to firm performance' (p. 220)

As seen above, the definition for the KMO construct contains mechanistic tokens that discuss the construct as if it were something that can be measured and accounted for. In the further detailed descriptions of the component factors, what stands out is the precision to which the factors are located, validated and later tested within organisations – despite the organic overtones in terms such as *organisational memory*. For example, even though organisational memory is an all-encompassing concept, Wang, Ahmed and Rafiq (2008) take the 'knowledge repository approach to organizational memory' (p. 222) a rather reduced but entirely more precise approach. This is an approach that ultimately allows the organisational memory construct to be accurately measured, validated and tested within the organisation. Such accuracy is critical for determining the relationship between their KMO construct on firm performance. Wang, Ahmed and Rafiq (2008) through their mechanistic metaphor tokens highlight how locating the precise locations of parts within an organisation are critical in any discussions of the organisation.

The focus on accuracy visible in the many mechanistic metaphor tokens is significant in lending an overall coherency to the leading machine metaphor in this study.

### Effectiveness

Effectiveness is the next high-level entailment derived from mechanistic metaphor tokens. After examining the metaphor tokens associated with the machine metaphor it was deduced that not only are key Information Systems concepts conceptualised as having a purpose (sub-metaphor) but that the ability to achieve this purpose was of great importance. These metaphor tokens highlighted the notion that an organisation, technology or person that does not achieve their purpose is essentially as useful as a machine that does not or cannot achieve its purpose, their very existence comes into question.

As asserted previously, two complementary but distinct views concerning key Information Systems concepts as machines were discerned from mechanistic metaphor tokens. The first is that organisations, technologies and people are themselves machines composed of a number of individual parts. In the metaphor tokens that promote this view, the logical consequence is that the individual parts are expected to operate with one another in the most effective manner possible. In the mechanistic metaphor tokens that focus on organisations, it is typical to conceptualise technology and people as its component parts. In these same metaphor tokens there is also a focus on the individual parts (technology and people) operating effectively not only with other like parts but also with dissimilar parts.

One example of this first view is in the metaphor token that discusses an organisation's business functions and work practices as being integrated through the connection of '*stovepipe* legacy applications' (Umapathy, Purao & Barton 2008, p. 518). Through such a connection the technology operates effectively with other technology but also allows an effective operation between people in the organisation. A part of enterprise integration is to ensure an organisation can achieve its predetermined goals of being effective – that is, profitable – in a global market. If an organisation cannot achieve its pre-determined goals, if it is not profitable or competitive, then its existence has to be questioned. Likewise, if the parts within the organisation, the technology and people of which it is made ceases to be effective then their existence too must be questioned.

The second view is visible in mechanistic metaphor tokens that view key Information Systems concepts as parts of a much larger machine: the economy. Mechanistic metaphor tokens that exist in the above example by Umapathy, Purao and Barton (2008) are also useful in illustrating this view. Umapathy, Purao and Barton illustrate this view in various metaphor tokens by asserting that the effective integration of an enterprise from within is essential for the effective 'participation in a competitive global market' (2008, p. 518). The implicit assumption made here is that if there is no effective participation then the participation of the organisation at all within the global market is questionable. The very existence of the organisation in the larger economic machine is brought into question. This second view, expressed in Umapathy, Purao and Barton is relatively common, particularly in relation to enterprise integration.

### Efficiency

The last entailment that was discerned from mechanistic metaphor tokens was efficiency. There is a view within metaphor tokens that a clear relationship exists, not only between how effective the relationships between parts of organisations as machines are, but also on how efficient they are. The focus in many metaphor tokens was on the manipulation of various parts in the organisational, technological or people machine to increase its efficiencies.

March, Hevner and Ram's (2000) article *Research commentary: an agenda for information technology research in heterogeneous and distributed environments* contains various metaphor tokens that highlight the logical consequence of efficiency – mostly in relation to the organisational and technological concepts. As they state, 'The transformation of physically networked computers into an effective and efficient distributed system requires methods and techniques for *building* a systems *architecture*, establishing rigorous controls, and *optimizing* the system *performance*'

(p. 329). Furthermore, metaphor tokens within March, Hevner and Ram (2000) suggest that it is this type of optimization research that will *drive* the organisation toward its purpose of meeting the many challenges of globalization, interactivity and high productivity.

Likewise, metaphor tokens in Ba, Stallaert and Whinston (2001) highlight the view that organisations, like machines, are seen as encompassing many processes that can not only be accurately identified and measured but also modified with the goal of making them more efficient: 'We believe that market-based supply *chain* coordination [previously described as a *process*] can be *run* efficiently with the proper information systems support' (p. 11). During the analysis, a clear concern for how to maximize the efficiency of organisations, technology and people as well as their underlying parts and processes in order to drive them toward a clearly defined purpose was evident.

### 7.3.4. Types of reasonings evident in mechanistic metaphor tokens

As discussed in the results overview section, mechanistic metaphor tokens were inspected for evidence of logical reasonings associated with the machine domain. These logical reasonings as developed by Pepper (1948) are presented in Table 7.8. The most significant finding with regards to this inspection is that the complete set of these logical reasonings was evident within the metaphor tokens. Furthermore, these reasonings were the only types of reasonings obvious in the metaphor tokens. These reasonings along with the sub-metaphors and high-level entailments were taken as an indication that the machine metaphor was a well-developed way of conceptualising key Information Systems concepts in this study.

The sections below expand more fully on how the mechanistic logical reasonings – as presented in Table 7.8 – were evident in the mechanistic metaphor tokens examined in this study.

Table 7.8. *Logical reasonings of the machine metaphor*

| ROOT METAPHOR | CATEGORY | REASONING | DESCRIPTION |
|---|---|---|---|
| Machine | Primary | Field of Location | The machine is a configuration of parts having specific locations. Location is defined in terms of space and time |
| | | Primary Qualities | Parts of the machine are expressed in exact quantitative terms. Qualities differentiate the field of location |
| | | Primary Laws | Laws holding for configurations of primary qualities – there is an effective law that holds among parts of the machine |
| | Secondary | Secondary Qualities | We infer primary categories only through secondary qualities. These qualities are irrelevant to the machine (texture, colour etc.) but still exist |
| | | Secondary Principle/s | Principle/s for connecting secondary qualities with the first three primary categories. |
| | | Secondary Laws | Laws for regularities among secondary qualities. |

Source: Pepper (1942, pp. 191-193)

## Reasoning via mechanistic categories

As shown in Table 7.8, there are three primary and three secondary categories of mechanistic reasoning. All of these reasonings were visible in the metaphor tokens as a whole as well as within metaphor tokens of individual articles. Yet, in terms of the categories, it was the primary categories, which were the most prominent: Field of Location, Primary Qualities and Primary Laws. Furthermore, while all of the primary categories are evident in mechanistic metaphor tokens, the Field of Location is most prominent. There is also a strong relationship between the high-level entailments of the machine metaphor and the mechanistic reasoning categories. For example, in metaphor tokens that focus on the logical conclusion of accuracy there is also a strong focus on the field of location. The sections below discuss the mechanistic reasoning categories in more detail along with the high-level entailment with which it appears to have a strong relationship.

### *Field of Location*

The Field of Location is the first of the three primary reasoning categories associated with the machine metaphor. As shown in Table 7.8, the Field of Location is a logical reasoning about the machine domain that all parts within the machine can be located. Mechanistic metaphor tokens as a whole as well as those limited to single articles contain this particular reasoning when discussing key Information Systems concepts. These same metaphor tokens are also often the same ones used to deduce the high-level entailment of accuracy. The particular assumption evident in these metaphor tokens is whatever is real can be located and whatever can be located is real – that things must be identified accurately to know that they exist. This is the primary reasoning category of Field of Location defined by Pepper (1942).

To provide an example of how metaphor tokens were examined to see if they contained evidence of the Field of Location take the previous example by Wang, Chaudhury and Rao (2008). This particular example contained mechanistic metaphor tokens that were used to derive the high-level entailment of accuracy; yet these same metaphor tokens also contain evidence of the Field of Location reasoning category. In various metaphor tokens – such as those already provided in the previous sub-metaphor section – there is a focus on locating the precise locations of parts within an organisation. If the factors of KMO can be located, validated and even tested there is the implied assumption within these metaphor tokens that these factors have to be real. This gives Wang, Chaudhury and Rao's (2008) study more rational credence. Such reasoning, particularly within the high-level entailment of accuracy, is common.

### *Primary Qualities*

Primary Qualities is the second of the primary reasoning categories associated with the machine metaphor. This category of reasoning was readily evident in the metaphor tokens of individual articles and the set of articles as a whole. Like the Field of Location, this reasoning category had a strong relationship with a high-level entailment, in this case, effectiveness. Mechanistic metaphor tokens that contained evidence of Primary Qualities and which also had a strong relationship with effectiveness contained the assumption that it is quantities alone that are relevant to the effective functioning of key Information Systems concepts.

An interesting example of an article that contains mechanistic metaphor tokens where the Primary Qualities are evident is in Bapna, Jank and Shmueli's (2008) study of consumer surplus in online auctions. In their study 'real bidders participating in real auctions, and voting with real dollars' are essentially reduced to quantitative terms in an effort to find out more about the 'quantifiable consumer surplus levels in such a *mechanism*' (p. 400) of Internet auctions. 'Real bidders' who in their common-sense guise would have certain feelings and aspirations attached to the things they actually do – even in an auction situation – are reduced ultimately to the status of consumer. This status allows the real bidder to be measured quantitatively in terms of a single monetary value. As Bapna, Jank and Shmueli (2008) assert, 'Our analysis, based on a sample of 4,514 eBay auctions' (again the quantitative measure here is significant – any lower and the study would not according to the authors be as robust) 'indicates that consumers extract a median surplus of at least $4 per eBay auction' (p. 400). Likewise the thrill and excitement of a real auction is seen only in terms of the money it generates: 'We find that eBay's auctions *generated* at least $7.05 billion in total consumer surplus in 2003 and could *generate* up to $7.68 billion' (p. 400). Bapna, Jank and Shmueli (2008) show how the common-sense qualities and associations concerning organisations are reduced down to specific quantitative measures.

In the above example the various objects within and external to the organisation as well as the organisation itself are essentially stripped of all characteristics that are not associated with a particular quantitative measurement. Yet at other times the organisation and its constituent parts are not entirely stripped down to their quantitative terms and some of their common-sense qualities remain.

One example of this is the metaphor tokens in August and Tunca's (2008) study of software security patch restrictions. In this study the more common-sense qualities of organisations and particularly users are discussed. For example, organisations act selfishly and consumers act both 'ethically' and 'unethically' in terms of whether they 'choose to pirate a product' or not (p. 52). Yet, while these particular qualities are duly noted, they are secondary qualities only; they do not seem to have any effective bearing on the organisation they do seem to have a certain attachment to it. For instance, when organisations act selfishly this impacts their ability to turn a profit. Likewise, while consumers may be unethical and pirate software, each consumer is reduced to two types: Type L, which denotes a consumer of 'Low piracy tendency' and Type H, which denotes a consumer of 'High piracy tendency' (p. 52). Thus all parts in the August and Tunca (2008) problem space are essentially reduced to quantitative measures; therefore, while at times certain common-sense qualities concerning the organisation are not entirely disposed of, so far as the effectiveness of the organisation is concerned, the quantitative measures are all that is required.

### *Primary Laws*

The last of the primary reasoning categories as described by Pepper (1942) is the Primary Laws. In the mechanistic metaphor tokens this category was clearly evident – both in the metaphor tokens as a whole as well as within individual articles. The same metaphor tokens that contained evidence of Primary Laws were also often the very same ones that were used to derive the last high-level entailment of efficiency. These metaphor tokens contained the view that there is a law or principle that governs the efficiency of key Information Systems concepts.

In any article that discussed the organisational, technological and people concepts in any great depth, this particular relationship or law contained within metaphor tokens is typically described in the form of a functional equation. The different laws within metaphor tokens referenced over the years in relation to the efficient operation of organisations, technology and people include: Conway's Law and its inverse Yawnac's Law (Holmström Olsson et al. 2008), Parkinson's Law (Austin 2001), natural law (Pries-Heje & Baskervielle 2008), power law (Lyytinen & Newman 2008), social law (Parsons & Wand 2008), Belady and Lehman's laws of software evolution dynamics (Banker & Slaughter 2000) as well as the law of large numbers (Lee 2000). The paragraphs below provide more detail on the different ways in which these laws or relationships were expressed in metaphor tokens within articles.

The underlying principles of mathematics, physics and chemistry are commonly used to understand organisations, technology and people just as they are in machines. For example, the terms *physics* and *chemistry* are used in their broadest terms in relation to people, i.e., 'the *physics* of dispersion' (Chidambaram & Tung 2005, p. 154) as well as 'bad' (Pries-Heje & Baskerville 2008, p. 741) or 'better' (Yang, Kang & Mason 2008, p. 57) *chemistry* between people and teams. In relation to chemistry the more specific concept is that of a *catalyst*; yet, in relation to physics and mathematics more specific concepts than that of chemistry are encountered.

The underlying principles used to understand matter and its motion in physics are commonly evidenced in metaphor tokens in relation to all three key Information

Systems concepts. Organisations, technology and people are frequently discussed in terms of their *mass*, which is of course critical in physics. Additionally, mass is the only true differentiating primary quality. August and Tunca (2008) are a good example of how the concept of mass was used in discussions of key Information Systems concepts. The concept of *critical mass* is particularly popular in discussions of organisations, technology and people. For example, critical mass is used to refer to both large organisations (Mithas, Jones & Mitchell 2008) as well as the number of people asking questions about technical problems (Moon & Sproull 2008). Yet, Lou, Lou and Strong (2000) provide one of the most complete explanations of this term in relation to the key Information Systems concept of people within metaphor tokens.

Mass is only one aspect of physics; the other critical aspect is movement. Fundamental principles from physics around movement are also commonly encountered in mechanistic metaphor tokens that discuss key Information Systems concepts. *Acceleration* and *velocity* are concepts commonly encountered in these metaphor tokens. For example, organisations *accelerate* their information diffusion practices and *operate* in high *velocity* environments (Xue, Liang & Boulton 2008). Aspects of non-movement are also commonly discussed, in particular, organisational (Devaraj, Easley & Crant 2008), technological and social *inertia*.

There are other principles of physics often encountered in mechanistic metaphor tokens discussing key Information Systems concepts. These include general and more specific *forces* under which organisations, technologies and people must work. General forces include references such as in Xue, Liang and Boulton (2008) above. More specific forces include references to *gravity* as in Montealegre and Keil (2000). Various references to *pressure* (Sharif, Irani & Love 2005), *friction* and *resistance* are all commonly encountered in metaphor tokens. Typically these metaphor tokens centre on what key Information Systems concepts must overcome in their efforts to move toward their pre-defined goals. *Dynamics* of operation is another aspect of organisational, technological and social operation commonly encountered, for example, Cha, Pingry and Thatcher (2008) reference to the dynamics that drive production costs.

Other than the formulas already discussed previously the most common specific references in relation to mathematics are the basic operations. Examples include: Lee and Xia's (2005) metaphor tokens that reference the *division* of phases in an enterprise systems implementation; Ågerfalk and Fitzgerald's (2008) interesting reference to *multiplication* of work and; Barki and Harwick's (2001) reference to the 'fixed pie, zero sum' (p. 394) situation of conflict. There are also references within metaphor tokens to more complex mathematical operations such as *vectors* (Lerch & Harter 2001), *ratios* (Alavi & Leidner 2001) and various *formulas* as in Cooper (2000).

As Pepper (1942) asserts, it is rare to encounter a mechanism without any laws. So too in this study was it rare to encounter any detailed discussion of key Information Systems concepts containing metaphor tokens that do not also make clear the particular laws that apply to them. These particular laws are expressed typically in the form of various equations or functions and are as much a feature of discussions on key Information Systems concepts as are the description of their constituent parts.

In this section on the machine metaphor the sub-metaphors, high-level entailments and logical reasonings uncovered for the metaphor were discussed. All of these secondary forms of evidence were clear, distinct and also well developed. As outlined previously in Chapter 3, this is an important indicator of a strong and well-developed metaphor. This particular situation did not exist for all metaphors examined as will be discussed in the following two sections on the organism and culture metaphors.

## 7.4 Organism

As stated in the results overview section, the organism metaphor was not as strong as the machine metaphor in these results. This finding was based on the analysis of all tokens associated with the organism metaphor as reported in the previous three chapters. This analysis resulted in fewer secondary forms of evidence than the machine metaphor. In particular, no sub-metaphors could be clearly identified from the organism metaphor tokens. Both high-level entailments and logical reasonings were evident to some degree in these tokens but lacked the clarity of those associated with the machine metaphor. In addition to this, however, the secondary forms of evidence associated with the organism metaphor suffered interference from those associated with the machine metaphor. All of these aspects contributed to the organism metaphor being an even less popular way of conceptualising key Information Systems concepts than the previous three results chapters revealed.

To begin this section, an overview of the three metaphors for the organism domain and their underlying mappings are provided: *organisation-as-organism*, *technology-as-organism* and *person-as-organism*. Following this presentation the high-level entailments of these metaphors will be outlined: needs, environmental interaction and life. A discussion on how these high-level entailments suffer interference from the machine metaphor is then provided. The section then moves on to an outline of the logical reasonings inherent in the primary evidence: organic and mechanistic.

### 7.4.1. Metaphor mappings

This study uncovered a set of ontological correspondences for each of the target domains in relation to the organism metaphor. The most common correspondences are provided in Table 7.9. When comparing the organic mappings to the mechanistic ones there is indeed more in common than there are differences. For instance, take the ontological correspondences for the target domain of the organisation in both the organism metaphor mappings – Table 7.9 – and the machine metaphor mappings – Table 7.2. One only need interchange the labels *parts* and *cells/specialised cells* in either of the table correspondences and the ontological correspondences are the same. Hence, at this very broad level the only real difference between the organism and machine metaphor mappings are the labels. This observation is important for the remaining sections on high-level entailments and logical reasonings as at this stage there does not appear to be a significant ontological difference between the two.

Table 7.9. *Organism metaphor mappings for organisation, technology and people*

| TARGET DOMAIN | ONTOLOGICAL CORRESPONDENCE |
|---|---|
| Organisation | Organisation corresponds to an organism |
| | Employees correspond to cells |
| | Technology corresponds to specialised cells (particularly nerves) |
| technology | Technology corresponds to an organism |
| | Organisation corresponds to the environment |
| | People correspond to sustenance (particularly food) |
| People | People correspond to organism |
| | Organisation corresponds to the environment |
| | Technology corresponds to sustenance (particularly food) |

## 7.4.2. High-level entailments

Although more difficult to derive than the machine metaphor, three high-level entailments could be discerned for the organism metaphor in organic metaphor tokens: needs, environmental interaction and life. The high-level entailments of the organism metaphor also lacked the clarity that was apparent in those of the machine metaphor. Yet, these logical consequences of the organism metaphor are apparent in a number of organic metaphor tokens (as presented in the previous three chapters). In these tokens there was a focus on key Information Systems concepts, like organisms, having needs that are typically met by their interaction with the environment so that they can live. These logical consequences of the organism metaphor derived from metaphor tokens are outlined in further detail in the following sections.

### Needs

A significant number of organic metaphor tokens exhibit a certain organic understanding about key Information Systems concepts: that they have needs. Indeed, the very same fundamental needs of organisms are the same as those of key Information Systems concepts in these tokens from the more simple – for example food and water – to the more complex – for example reproduction and socialisation. It is these basic and more complex requirements for life focused on within metaphor tokens that helped derive the logical consequence of needs. The following paragraphs go into more detail on how the various basic and complex requirements – the needs – were evidenced in the metaphor tokens.

The simplest requirements for life focused on in the organic metaphor tokens are food and air. In terms of food, aspects of the hunt are a compelling way in which this need is focused on in organic metaphor tokens. For example, consumers are '*prey*' to organisations (Datta & Chatterjee 2008, p. 17), and users are '*poached*' (p. 176) by competitors who also '*headhunt*' top developers (Ågerfalk & Fitzgerald 2008, p. 385). Additionally, however, there are direct references within the tokens to providers being '*hungrier*' (Gefen & Carmel 2008, p. 39) and people having a '*taste*' (Li & Hitt 2008, p. 458) for conformity. More direct references to the simple need of feeding within tokens are also made. Organisations '*cannibalize* their current leading products' by '*eating* their own lunch' (Nault & Vandenbosch 2000, p. 304) and privileged information is discussed as requiring less cognitive effort to '*digest*' (Malhotra, Gosain & El Sawy 2007, p. 273). Additionally, references within tokens are made to the simple needs of food and air: context is established by top management that may '*suffocate*' or improve performance (Ravichandran & Rai 2000, p. 393) and Information Systems help organisations '*digest*' information (Malhotra, Gosain & El Sawy 2005, p. 156). Smaller systems '*starve* to *death*' or 'fall *prey*' to larger bigger systems (Swanson & Dans 2000, p. 278). Additionally, input data are '*fed*' to a network (Kiang & Kumar 2001, p. 180) and funding agencies refuse to '*spoon feed*' (Madon 2005) entrepreneurs. Just as many organisms must have food and air to survive, so too are key Information Systems concepts conceptualised within organic metaphor tokens.

Consistent with previous results there are complex as well as simple needs concerning key Information Systems concepts as organisms focused on in metaphor tokens. References to the complex need of reproduction are clearly apparent: online information sources are the '*spawn*' (Kuruzovich et al. 2008, p. 182) of the Internet. A '*seeding*' strategy that '*propagates*' a message (Bampo et al. 2008, p. 274). New organisational forms are '*spawned*' by developments in IT (Ma & Agarwal 2007, p.

42) and new competitors are '*born*' on the Internet (West & Dedrick 2000, p. 213). References to socialisation needs are also apparent in metaphor tokens. For example, metaphor tokens in Kumar and Benbasat (2006) make reference to the bonds between the company and customer having '*intimacy* and *warmth*' (p. 425). Hence, there are complex needs as well as more simple needs that are evident in the primary evidence.

### Environmental interaction

Within the organic metaphor tokens there is a focus on key Information Systems concepts – like organisms – as entities that must interact with their environment in order to survive. The environment of key Information Systems concepts within these tokens is – like the environment of organisms – conceptualised as consisting of other living and non-living entities. Additionally, there is a focus on there being both an internal and an external environment. It is these aspects that helped derive the high-level entailment of environmental interaction. The following paragraphs will outline these internal and external environmental interactions and how they were displayed in the metaphor tokens.

In the case of the internal environment, metaphor tokens contain the understanding that key Information Systems concepts, just like organisms, are not autonomous entities completely cut off from their surroundings. Organisations, technology and people – like the cells of an organism – must, interact with other living and non-living elements. The most common internal environmental issues relate to the interaction of key Information Systems concept with potentially harmful invader entities. For instance, in relation to the technology concept there are references to the interactions of technological code or programs with *bugs* (Ji, Mookerjee & Sethi 2005; Wei, Wang & Ju 2005) *viruses* (March, Hevner & Ram 2000) and *worms* (August & Tunca 2008) – also in the form of code and programs. These interactions are conceptualised in a very similar way to how organic cells cope with foreign cells in the internal environment of the organism. In addition, *infection* (August & Tunca 2008), *immunity* and '*suscept[ability]* to *pathologies*' (Garud & Kumaraswamy 2005, p. 25) of technology which focuses at the internal cellular level are also discussed within metaphor tokens.

In the case of external interactions, key Information Systems concepts, like organisms, are seen within metaphor tokens as interacting with other living and non-living entities both in physical/structural ways as well as behavioural ways. In terms of physical/structural interactions, the most important concepts covered here are those related to adaptation and evolution. Organisations adapt to the systems that support them and vice versa (Wei, Wang & Ju 2005). Employees adapt to technology (Beaudry & Pinsonneault 2005), each other (Choudhury & Sabherwal 2003) and new ways of doing things (Ragu-Nathan et al. 2008). Technology adapts to a 'changed *environment'* (Kunda & Brooks 2000, p. 213) and 'local *needs'* (Levina & Vaast 2005, p. 335) but the adaptation process itself is not always well understood (Majchrzak et al. 2000). In a similar fashion, organisations co-evolve with new technology (Van de Ven 2005). Technology, or information systems – particularly Enterprise Systems are discussed as *evolving* (Gurbaxani, Melville & Kraemer 2000; Luna-Reyes et al. 2005; Smolander, Rossi & Purao 2008; Volkoff, Strong & Elmes 2005). More specific evolutions include physical instantiations, for example, network structures (Trier 2008) as well as methodological instantiations, for example, development methodologies (Panagiotidis & Edwards 2001). Another aspect of adaptation and evolution that is typically highlighted in discussions of technology is breed. For example, Sambamurthy and Zmud (2000) discuss how IT infrastructures have transformed into '*hybrid, best-of-breed, adaptive* platforms' (p. 107). People are also discussed as evolving. For example, Dennis, Fuller and Valacich (2008) make the suggestion that 'humans have *evolved* to favor face-to-face communication' (p. 578). Evolution itself, regardless of the concept goes through stages as Lyytinen and Newman (2008) assert.

Key Information Systems concepts are seen within metaphor tokens as interacting with other living and non-living entities this occurs at an individual, inter-individual and group level. At an individual level, innate behaviour such as simple sense-and-respond actions are important. For instance, in relation to organisations, metaphor tokens within Sambamurthy and Zmud (2000) assert that sense-and-respond is 'a new paradigm of business strategy' (p. 106). Additionally metaphor tokens within Raghu, Jayaraman and Rao (2004) provide further explanation on what organisations respond to and how they respond: 'organizations respond to environmental uncertainty by processing and exchanging information' (Raghu, Jayaraman & Rao 2004, p. 318). Likewise in Lee and Xia (2005) metaphor tokens contain the assertions that people in the form of teams also sense and respond to changes in 'business and technology contexts' (p. 78).

Other behaviours focused on in the tokens are learned behaviours that have distinct biological underpinnings. These metaphor tokens focus on the biological or physiological underpinnings of behaviour in relation to key Information Systems concepts. In relation to organisations, Kasi et al. (2008), for example contain the following phrase in an organic metaphor token: 'organizational *learning* dysfunctions' (p. 62). Other metaphor tokens also discuss organisational learning and unlearning in this way (Im, Dow & Grover 2001; Subramani & Walden 2001). Technology is also discussed in tokens in terms of *learning* (Straub & Watson 2001) and also as having a *memory* (Adomavicius & Gupta 2005). Additionally, it is common for people's innate and learned behaviour to be discussed in metaphor tokens in terms of their biological, chemical and physical bases of behaviour. For instance, decisions are made on '*gut-feeling*' (Randall et al. 2001, p. 117), technology becomes 'like an *addictive* drug' (Gosain, Lee & Kim 2005, p. 376), and memories of failed projects '*stimulate fears*' (Lesca & Caron-Fasan 2008, p. 381). Hence, there are both innate and learned behaviours, contained within metaphor tokens – both of which have strong biological underpinnings.

Those behaviours that occur inter-individually or between two individuals within metaphor tokens include behaviours such as predation or symbiosis. Predation is the most commonly discussed form of behaviour discussed in relation to organisations and people. Predatory behaviour is also used in relation to technology. People '*spearhead*' IT initiatives for instance (Gosain, Lee & Kim 2005, p. 374) and smaller systems 'fall *prey* to larger – "bigger and better" – replacement systems' (Swanson & Dans 2000, p. 284). Some of the more interesting forms of symbiosis contained with metaphor tokens include discussions of the organisation as the '*host*' of technology (Ågerfalk & Fitzgerald 2008, p. 391; Ashurst, Doherty & Peppard 2008, p. 361; Sawyer 2000, p. 55). In these interactions both the organisation and the technology benefit – indeed many metaphor tokens conceive of organisations and technology in this relationship as obligate in much the same way two different organisms are conceived in biology. They depend on each other for their survival. Other behaviour that occurs between the same key Information Systems concepts within metaphor tokens, for example organisation to organisation, is in relation to mimicry. Weber and Zheng (2007) contain tokens that discuss the mimicry of organisations and Rutner, Hardgrave and McKnight (2008) contain ones that do so in relation to people. These are the main ways in which behaviours between organisations, technology and people are explored in organic metaphor tokens.

Alternatively, behaviour is also explored at a group level within metaphor tokens; in particular herding, flocking and migration. Organisations '*stampede*' (Moore 2000, p.34) toward technology and '*migrate*' (Gengatharen & Standing 2005, p. 429) their relationships online. Additionally, organisations '*run* in *packs*' (Van de Ven 2005, p. 365) to be viable. People also have a '*stampede mentality*' (Montealegre & Keil 2001, p. 424) and conform to *herding behaviour* (Li & Hitt 2008). Just as organisms group together in various ways to assure their need for resources are met so too are organisations, technology and people conceptualised within metaphor tokens.

#### Life

Life was perhaps the single most critical high-level entailment derived from the organic metaphor tokens in this study. In relation to organisations, organic concepts that are stressed most are the birth (Kuruzovich et al. 2008; Ma & Agarwal 2007; West & Dedrick 2000), death (Feller et al. 2008) and the ultimate struggle for survival (Cooper 2000; Venkatesh et al. 2008). Likewise, technology is commonly discussed within metaphor tokens as having a *lifecycle* (Irani, Sharif & Love 2001; Ramasubbu et al. 2008) and also 'go *live*' (Gosain, Lee & Kim 2005; Ranganathan & Brown 2006; Wei, Wang & Ju 2005). This lifecycle is one where technologies are '*spawned*' (Kuruzovich et al. 2008, p. 182) or even *cloned* (West & Dedrick 2000), *live* and *grow* (Cha, Pingry & Thatcher 2008) and ultimately *die* (Kasi et al. 2008). People too are discussed in metaphor tokens as living and dying. For example, in Barki and Harwick (2001) the following quote from an underwriter asserts that 'You can't undermine what the computer department is trying to do...you've got to *survive*' (p. 203).

### 7.4.3. High-level entailment interference

The high-level entailments that were derived from the organic metaphor tokens lacked the clarity of those associated with the machine metaphor due to interference from the machine metaphor. Interference occurred with the organism metaphor in two ways. The first is perhaps not a true form of interference but is important nonetheless. This first type occurs when no high-level entailments could be derived from organic metaphor tokens but high-level entailments, sub-metaphors or logical reasonings associated with the machine metaphor are derived or found. An example of this occurs in Wang, Ahmed and Rafiq (2008) outlined in the section on the machine metaphors high-level entailment of accuracy with the construct of organisational memory. This first type obviously contributes to a much weaker conceptualisation of key Information Systems concepts as organisms.

The second way is perhaps a truer form of interference: high-level entailments of the organism metaphor were often understood in terms of the sub-metaphors, high-level entailments and logical reasonings of the machine metaphor. Some examples of interference of the high-level entailments associated with the organism metaphor with the machine's sub-metaphors are provided in Table 7.10. The excerpts provided in the second column are examples of where organic high-level entailments appear with certain mechanistic sub-metaphors (the first column). Note how organic high-level entailments do not just appear with mechanistic sub-metaphors; they are bolstered and even understood in those terms. For example, in the metaphor token from Raghu, Jayaraman and Rao (2004), the organic high-level entailment of environmental interaction is understood directly by the mechanistic sub-metaphor of process. Organisations are able to respond to the environment by processing information. The high-level entailment of the organism metaphor is understood in terms of a mechanistic sub-metaphor. Understanding a logical consequence of the organism metaphor somewhat paradoxically occurs through the ontological mappings of the machine metaphor. As with the first type, the result of this is a weakening of the organism metaphor as a way of understanding key Information Systems concepts.

Table 7.10. *Sample excerpts of the organism high-level entailments being bolstered by machine sub-metaphors.*

| MACHINE SUB-METAPHOR | ORGANIC METAPHOR TOKEN IN CONTEXT |
|---|---|
| PURPOSE | Alternatively, when knowledge transfers are not sufficiently large, some *short-lived* offshoring [IT] projects may <u>generate</u> substantial cost savings to the domestic firm (Cha, Pingry & Thatcher 2008, p. 281) |

| | |
|---|---|
| | In other words, software platforms do not directly generate value [for a firm] but they enable different value-generating applications to be implemented (p. 228) ... failure of the traditional NPV model derives mainly from ignoring the value of active management in *adapting* to changing market conditions and proposes to expand the traditional NPV by a value of options from active management or by simply attributing an option value to value projects where opportunities for *adaptation* to a changing *environment* exist. (Taudes, Feurstein & Mild 2000, p. 229) |
| | … companies that implement the systems have the opportunity to redesign their business practices using templates imbedded in the software [skip 5 paragraphs]... At the aggregate level, an ERP might help a firm *survive* because it leads to higher profits. (Gattiker & Goodhue 2005, p. 560) |
| PRODUCT | Today's information technology professionals *shoulder* a heavy load. [skip 3 sentences] A byproduct of these demands may be increased levels of exhaustion and burnout (Moore 2000a). (Rutner, Hardgrave & McKnight 2008, p. 636) |
| | Every period, the firm uses its available software and hardware to generate information services. (p. 161) ... Whether production will still be characterized by the Cobb-Douglas production function as technologies *evolve*, … (Gurbaxani, Melville & Kraemer 2000, p. 173) |
| PROCESS | In contrast to such a static view, others propose that competition between standards (or architectures of related standards) is an ongoing process in which control of a standard is used to drive its *evolution* and maintain competitive advantage. (West & Dedrick 2000, p. 211) |
| | Organizations *respond* to *environmental* uncertainty by processing and exchanging information … (Raghu, Jayaraman & Rao 2004, p. 318) |
| | Prior research suggests that the experience a decision maker has with solving a particular type of problem can have important impacts on the processes they use and the outcomes they generate (p.603) ...Thus, the professionals who engaged in solving this research task may have processed it more fastidiously because such *behavior* would be part of their regular work routine … (Mennecke, Crossland & Killingsworth 2000, p. 625) |

| | |
|---|---|
| PART | In both high-velocity and traditional markets, *knowledge-* and *learning-*based mechanisms guide the *evolution* of dynamic capabilities and underlie path dependence in acquiring, reconfiguring, and integrating resources. (Wheeler 2002, p. 128) |
| | When an organisation *adapts* some business processes to fit the ERP practice, the adaptation will influence not only existing business processes but also other organizational components. (Wei, Wang & Ju 2005, p. 325) |
| | Can enterprises in a relationship deploy *hybrid* IOSs that are a mix of elements of the value/supply chain IOS and networked IOS? (Malhotra, Gosain & El Sawy 2005, p. 147) |

Table 7.11 presents examples of similar organic metaphor tokens to those presented in Table 7.10; however, Table 7.11 illustrates the overlap between organic high-level entailments and mechanistic high-level entailments rather than sub-metaphors. Yet again, the high-level entailments of the organism metaphor appear to be directly bolstered or quite commonly understood in mechanistic terms, in this case in terms of the machine metaphor's high-level entailments. Swanson and Dans (2000) provide an interesting example of this in Table 7.11. The organic high-level entailment of life is structured and understood in terms of the mechanistic high-level entailment of accuracy. More specifically, how long a system will live for can be accurately measured and predicted. It has a threshold for replacement, which can be set higher or lower. Life is then, quite paradoxically, understood in terms of accuracy. The other examples in the table above highlight similar occurrences of where the high-level entailments of the organism metaphor are either bolstered or directly understood in terms of mechanistic high-level entailments.

Table 7.11. *Sample excerpts of the organism high-level entailments being bolstered by machine high-level entailments.*

| MACHINE ENTAILMENT | ORGANIC METAPHOR TOKEN IN CONTEXT |
|---|---|
| ACCURACY | Smaller systems might tend toward isolation in the organization, where they would '*starve*' to *death* or fall *prey* to larger-'bigger and better'--replacement systems. Perhaps most significantly, larger systems might also be advantaged because it is more difficult to marshal the resources needed to replace them. The <u>threshold</u> for their replacement may in effect be <u>set</u> higher, leading to their relative *longevity*. (Swanson & Dans 2000, p. 278) |
| | A veteran air-traffic controller made the following observations about a specific decision being discussed: 'Now that's crisp <u>vectoring</u>! Make a plan, make it work, but don't *think* about the plan. ' (Lerch & Harter 2001, p. 74) |
| | They have to keep changing with the changing *taste* and *behaviour* of online shoppers. (p.30) Today's enterprise systems are able to capture all of the transaction data, but they seriously lack analytical tools to examine the data and help managers to make <u>optimal</u> decisions. (Fan, Stallaert & Whinston 2000, p. 31) |
| EFFECTIVENESS | On the other hand, for proprietary software, creating positive incentives for patching by users can be <u>effective</u> whereas imposing usage taxes will *hurt* both vendor profits and social welfare. [2 sentences]. Second, we explore an additional control <u>lever</u> for the vendor beyond price... (August & Tunca 2008, p. 51) |
| EFFICIENCY/ EFFECTIVENESS | This has resulted in communication and information <u>overload</u> - individuals are exposed to more information than they can efficiently handle and effectively use (Fisher and Wesolkowski 1999). [skip 1 sentence]. These factors result in what is known as 'information *fatigue*' (Weil and Rosen 1997) and 'data <u>smog</u>' (Brilhart 2004). (Ragu-Nathan et al. 2008, p. 421) |

| | |
|---|---|
| | Individuals can more effectively and efficiently encode and decode information when the symbol set matches the needs of the message. Symbol sets can be thought of as similar to a '*hygeine* factor' in the terminology of Herzberg et al. (1953). (Dennis, Fuller & Valacich 2008, p. 586) |
| | ... a seller with superior efficiencies of production can, over time, price its competitor out of the market by ratcheting up production capacity. Such *behavior* is seen in real life... (Bandyopadhyay, Barron & Chaturvedi 2005, p. 57) |

Even when an article contains many organic metaphor tokens and where it is relatively easy to derive high-level entailments, there exists the situation that these high-level entailments are understood in terms of mechanistic reasoning categories. The most common way in which this occurs is by referring to mechanistic laws – Category 3 – which govern the organic high-level entailments of needs, environmental interaction and life. While this occurs to a greater or lesser extent with all high-level entailments, it is particularly salient in relation to the high-level entailment of environmental interaction. Some examples are provided in Table 7.12.

Table 7.12. *Sample excerpts showing mechanistic laws of environmental interaction.*

| MECHANISTIC LAW EXCERPTS |
|---|
| The capabilities offered by digital communication are leading to the evolution of new network structures that are grounded in communication patterns. As these structures are significant for organizations, much research has been devoted to understanding network dynamics in ongoing processes of electronic communication. (Trier 2008, p. 335) |
| Describing and explaining the content, scope, drivers, and dynamics of this change [IS change] has remained contested and challenging. (p. 589) ... systems evolve through stages, which follow alternative behavioral laws … (Lyytinen & Newman 2008, p. 593) |
| Several behavioral models for explaining/predicting the adoption and usage of information technology have been proposed in the IS literature. (p. 5) ... PTT [technology] can only be successful when a critical mass is using it … (Dickinger, Arami & Meyer 2008, p. 9) |

Every period, the firm uses its available software and hardware to generate information services. (p. 161) ...Whether production will still be characterized by the Cobb-Douglas production function as technologies evolve … (Gurbaxani, Melville & Kraemer 2000, p. 173)

### 7.4.4. Types of reasonings evident in organic metaphor tokens

Two types of reasonings are evidenced in organic metaphor tokens: organic and mechanistic reasonings. Organic reasonings are perhaps the most expected type to emerge in such tokens yet they are not common – either overall or within given articles. Additionally, this type of secondary evidence associated with the organism metaphor is rarely clear. In almost all cases secondary evidence associated with the machine metaphor also occurs, particularly in the form of logical reasonings. Furthermore, while the logical reasonings associated with the machine metaphor may be least expected, it is this form of secondary evidence that is most frequently evidenced. This finding is critical to the results as though there is some evidence of the organism metaphor being used it is the reasonings of the machine metaphor that are often relied on to structure and understand key Information Systems concepts.

The following sections discuss how the two different types of reasonings that were discerned in organic metaphor tokens.

#### Reasoning via categories of organicism

As shown in Table 7.13 there are seven categories of organic reasoning as defined by Pepper (1942). Unlike the machine metaphor the full set of organic categories are not generally found in the metaphor tokens that are limited to a single article. Rather a sub-set – or more commonly one or two categories – is found in the metaphor tokens of a single article. Moreover these categories are not generally very well exhibited within the tokens of a given article or across all articles.

Table 7.13. *Logical reasonings of the organism metaphor*

| ROOT METAPHOR | CATEGORY | REASONING | DESCRIPTION |
|---|---|---|---|
| Organism | Progressive | Fragments of experience | Negative category acquiring significance in terms of integration not achieved. |
| | | Nexuses | Within fragments are nexuses – the 'internal drives' toward the connections that complete them. |
| | | Contradictions | Fragments inevitably encounter contradictions in their reach to be part of a whole. |
| | Progressive and ideal | Organic whole | The resolution of conflicting fragments. |
| | Ideal | Implicitness of fragments | Fragments are implicit within the organic whole |
| | | Coherent totality | The organic whole transcends the previous contradictions by means of a coherent totality. |
| | | Economy | The coherent totality economises all the original fragments without loss. |

Source: Pepper (1942, pp. 281-283)

### *Organic reasoning*

Porra, Hirschheim and Parks (2005) provide one of the few examples of an article that contains evidence of organic reasoning. Working on an organic systems interpretation, in addition to a mechanistic and colonial interpretation, (organic, mechanistic and colonial are terms used by the authors) the article by Porra, Hirschheim and Parks (2005) contains a number of organic metaphor tokens. These tokens contain evidence of the progressive categories included in Table 7.13 but not the ideal categories. The actual event in which the organic process exists is Texaco's corporate IT function. It is the metaphor tokens that exist in and around Porra, Hirschheim and Parks's (2005) use of and application of 'incremental change toward an end' (p. 733), that the organic process is the most obvious. It is from this instantiation of the organic process where the four progressive categories of organicism, although not perfectly clear, are at the very least glimpsed.

1) *fragments* of experience. Fragments of experience are the materials of integration. In Porra, Hirschheim and Parks (2005) the 'units' or 'functions' of Texaco are the fragments of experience. These units achieve significance only when they are integrated with other units into a coherent 'well fitting' system. As metaphor tokens in Porra, Hirschheim and Parks assert, top management highlighted that the 'fittest' functions that 'constantly *adapt* to the *environment'* were the ones that would stay. Functions or units attained their significance in their ability to form a coherent 'fit' system. Functions or units that were 'unfit' did not make business sense and therefore had to leave. 'They will be sold, traded or closed' (p. 734). These fragments of experience appeared with

2) *nexuses* or connections or implications. Within fragments are nexuses or 'internal drives' that complete them. Within the metaphor tokens discussed in (1) above, there is also a sense of nexuses within Texaco's units or functions. The units have an implicit connection with the larger organisation. Taken for granted is that units belong to the larger whole that they fit. By referring directly to von Bertalanffy (1968) Porra, Hirschheim and Parks' (2005) suggestion that units have contained within them nexuses, is reinforced by Porra, Hirschheim and Parks' reference to 'wholeness' (p. 733).

3) *contradictions*, gaps, oppositions, or counteractions. In the metaphor tokens of Porra, Hirschheim and Parks (2005) that make reference to adaptation with the environment, the organic category of contradictions or conflict concerning the fragments is made most clear. As organic metaphor tokens within Porra, Hirschheim and Parks make clear, Texaco's functions compete against each other. There is conflict over resources, which is resolved only through integration. The fittest functions adapt to the environment and stay, they are integrated as it were. The unfit ones do not adapt, are not integrated and go. The resolution comes about in the form of

4) an *organic* whole. The organic whole in the metaphor tokens of Porra, Hirschheim and Parks (2005) is the organisation. The organisation as an organic whole moves through various phases, what is referred to in metaphor tokens as as '*organic* periods' (p.733) where conflicting units are either integrated or *sloughed* off. There is 'incremental change toward the end of the system' (p. 733). The organic process moves from one '*organic* period' to the next but always in the direction of further integration. It is only the functions, units and people, which are fit for purpose that stay.

Although the metaphor tokens within Porra, Hirschheim and Parks (2005) are not very illustrative of organic categories *per se* they are typical of how organic categories are evidenced in this study: they are not very clear and nor are they obvious. This is in stark contrast to the reasonings associated with the machine metaphor.

### *Mechanistic reasoning*

Organic metaphor tokens typically mechanistic rather than organic reasoning categories – contrary to what might be expected. Indeed, it is more often the case that mechanistic reasoning is evident in organic metaphor tokens than the other way around. A good example of a single article that contains organic metaphor tokens that are understood in terms of mechanistic logical reasonings is Sircar, Nerur and Mahapatra (2001). Sircar, Nerur and Mahapatra (2001) contain organic metaphor tokens that contain a discussion of the authors' efforts to reconcile the differing views of whether moving from a structured to object-oriented systems development approach represents an evolutionary or revolutionary change.

This article is replete with organic rhetoric and hence organic metaphor tokens – particularly in relation to people. For example, the '*migration* to a new development approach involves extensions and/or *adaptations* of an existing approach' (p. 458). In these metaphor tokens it is made clear that Sircar, Nerur and Mahapatra rely on a conceptualisation of organisational change developed by Henderson (1996) which asserts that technological change phenomenon can be categorised by the intensity of change it engenders in a system, process or product. At one end of the spectrum are innovations that engender evolutionary change. At the other end are innovations that engender revolutionary change. While talk of evolution certainly appears to be suggestive of organic reasoning, further inspection reveals that the categories of reasoning are mechanistic rather than organic. These mechanistic categories (only primary categories are listed for the purposes of this illustration) and how they are evidenced are explained in the points below:

1) Field of location – Like a machine metaphor tokens in Sircar, Nerur and Mahapatra (2001) assert that a 'system, process, or product that is the subject of change can be described in terms of its components and its architecture. Components are parts of a system; together they constitute the whole. A system's architecture specifies how its components fit together to create the whole' (p. 459). The important point to be made here is that Sircar, Nerur and Mahapatra conceptualisation of evolutionary change as displayed in this metaphor token relies on a fundamental category of mechanistic reasoning: whatever can be located is real and is real by virtue of location.

2) Primary qualities – Sircar, Nerur and Mahapatra (2001) differentiate an innovation on the field of location by particular qualities, for example, architecture. 'Change is incremental when the components undergo minor changes but the architecture remains unchanged' (p. 459). Sircar, Nerur and Mahapatra rely heavily on the qualities of a system to differentiate the field of location: to know what is evolutionary and what is not.

3) Laws holding for configurations of primary qualities in the field (primary laws) – The effective relationship which holds among the parts of a system is highlighted well in metaphor tokens of Sircar, Nerur and Mahapatra's that discuss their model of change – itself adapted from Henderson (1996). When change in components are low and architecture is unchanged change in the system is evolutionary. When change in components is high and change in architecture is also high, change in the system is revolutionary. Sircar, Nerur and Mahapatra (2001) plot this change in a neat 2 x 2 grid. The faith that mechanists follow in that 'there is a law for everything that happens in the physical world' (Pepper 1942, p. 207) is thus conserved in the metaphor tokens of Sircar, Nerur and Mahapatra's (2005) reasoning.

In this section the secondary forms of evidence for the organism metaphor were presented. Unlike the machine metaphor no sub-metaphors could be derived for the organism metaphor. High-level entailments and logical reasonings could be identified but lacked the clarity, distinction and development of those associated with the machine metaphor. Additionally, these secondary forms of evidence suffered interference from the sub-metaphors, high-level entailments and logical reasonings associated with the machine metaphor. All these factors contributed to a much weaker image of key Information Systems concepts as organisms in comparison to the image of these same concepts as machines.

## 7.5 Culture

In this phase of the study the culture metaphor emerged as the weakest of all three root metaphors examined. This finding – like that of the machine and organism metaphors – was based on the analysis of all metaphor tokens associated with the culture metaphor. Similar to the organism metaphor, no clear sub-metaphors could be derived from the primary evidence – the cultural metaphor tokens. Likewise, a similar situation regarding the high-level entailments and logical reasonings found with the organism metaphor also existed with the culture metaphor. While high-level entailments and cultural reasonings could be derived, they lacked the development and clarity of the machine metaphor. Additionally, the high-level entailments also suffered interference from the machine metaphor in a similar way to that of the organism metaphor. As with the organism metaphor, two types of reasonings were uncovered from cultural metaphor tokens: cultural and mechanistic reasonings. Yet, the cultural reasonings were even less well developed and rarer than was the case with the organism metaphor. All these factors suggest that the skew away from the culture metaphor – as revealed in the previous three chapters – is even more acute than initially thought.

In keeping with the presentation of analytical results for previous metaphors, this section begins with an overview of the three culture metaphors explored in this study: *organisation-as-culture*, *technology-as-culture* and *person-as-culture*. Included in this overview are the culture metaphor's underlying mappings. This presentation is followed by the high-level entailments of these metaphors: norms, values and beliefs. High-level entailment interference is discussed before concluding with an outline of the logical reasonings inherent in the primary evidence: viz. cultural and mechanistic reasonings.

### 7.5.1. Metaphor mappings

Table 7.14 presents the most common set of ontological correspondences for each culture metaphors mapping: *organisation-as-culture*, *technology-as-culture* and *people-as-culture*. Note that unlike the various machine and organism metaphors, only one level of correspondences was uncovered. Regardless of metaphor the correspondences remain essentially unchanged. For instance, there is no correspondence where technology corresponds to anything other than an artefact.

Table 7.14. *Culture metaphor mappings for organisation, technology and people*

| TARGET DOMAIN | ONTOLOGICAL CORRESPONDENCE |
|---|---|
| Organisation | Organisation corresponds to a culture |
| | Employees correspond to human beings |
| | Technology corresponds to an artefact |
| Technology | Technology corresponds to an artefact |
| | Organisation corresponds to a culture |
| | People correspond to human beings |
| People | People correspond to human beings |
| | Organisation corresponds to a culture |
| | Technology corresponds to an artefact |

As noted in the previous sections the ontological correspondences implied by these mappings are important for the following sections on high-level entailments and logical reasonings.

### 7.5.2. High-level entailments

Two high-level entailments were uncovered for the culture metaphor: norms and values/beliefs. These high-level entailments lacked the clarity and development of the machine metaphor. Yet, these logical consequences of the culture metaphor were derived from several significant cultural metaphor tokens. These high-level entailments allowed a very different understanding of organisations, technology and people to emerge than that which came from the machine and organism metaphors. Organisations are essentially a web of meaning (a culture), which is created by the norms, and values/beliefs of people. In their symbolic interactions with each other, people create technology, an artefact of their culture. The following sub-sections present the findings in relation to these two high-level entailments.

### Norms

Contained within many of the cultural metaphor tokens there is a certain assumption that there exists a set of accepted behaviours or actions that bind people together and thus help create a culture: these are the norms. Within the metaphor tokens these norms manifest themselves in symbolic and ideational ways. Examples of norms that were uncovered in these metaphor tokens include, but are not limited to, rituals, ceremonies and story telling. In many of the metaphor tokens, the very same fundamental norms of any culture as defined by Smircich (1985) are the same norms that are used to discuss organisations, technology and people. The following paragraphs provide further detail on how the high-level entailment of norms was derived from the primary evidence associated with each of the three key Information Systems concepts.

In relation to the organisational concept, the most common reference to norms within metaphor tokens occurs directly. Most metaphor tokens reference organisational norms and practices explicitly as in one of the metaphor tokens in Choudhury and Sabherwals (2003) that references 'culture and norms' (p. 133) of different teams. The types of practices and norms most commonly referred to in the primary evidence are those in relation to knowledge or information collaboration (Levina & Vaast 2005) and sharing (Alavi & Leidner 2001). Most references within metaphor tokens are made directly to the broader practices and norms. Yet, there are other more specific references occurring with the primary evidence. Some of the more interesting examples occur in the primary evidence of: Robert, Dennis and Ahuja (2008) who assert that knowledge integration in digitally enabled teams is a *dance* of communication and exchange; and Choudhury and Sabherwal (2003) who refer to *clan* controls in outsourced development software projects. It is clear in the metaphor tokens of Choudhury and Sabherwal (2003) that not only are there accepted practices and norms but there is also enforcement of those practices and norms. In particular, there are sanctions and punishments (Feller et al. 2008) that enforce accepted norms.

Technology, which in a number of cultural metaphor tokens is seen as a symbolic product of people's interactions with one another, has a number of different norms associated with it. Metaphor tokens contain the view that users identify valuable system features called user stories, which describe the path through the system (Dawande et al. 2008). The information systems planning process is identified in cultural metaphor tokens from Cordoba and Midgley (2008) as a form of institutional *ritual* that privileges concerns of one section of the community over others. Some of the more unusual norms discussed in cultural metaphor tokens include: Lyytinen and Newman's (2008) reference to information systems change processes as 'Mad Hatter's *Parties*' (p. 589) a '*drama*' where success turns into failure overnight; and Ljungberg (2000) who refers to open source projects as a *bazaar,* that is, a marketplace where people enter and leave, sell, buy and exchange goods. Cultural metaphor tokens stress not only how practices and norms of people shape the technological artefact, as in Leonardi and Bailey (2008), but how the artefact of technology shapes the practices and norms of people (Kappos & Rivard 2008).

In relation to people's norms, the different types of norms discussed in metaphor tokens include: team *norms* (Robert, Dennis & Ahuja 2008), behavioral norms (Vlaar, van Fenema & Tiwari 2008) and even anti-*norms* (Johnson, Cooper & Chin 2008). Such norms were important in establishing communication and information sharing. Some of the interesting examples of norms contained within the primary evidence relating to people include: a 'who-dunnit *witch-hunt'* for the person who last touched a system (Schultze 2000, p. 13), a 'political *ball game'* in system circumvention (Barki & Hartwick 2001, p. 203), and a '*folk logic'* for remembering (Randall et al. 2001, p. 118).

What is common in all these cultural metaphor tokens is that there is usually an inextricable link between norms and the underlying values and beliefs. Norms are (typically) the more or less visible manifestation of the underlying values and beliefs. These will be outlined in the next section.

## Values and beliefs

Contained within cultural metaphor tokens is a concern with those unquestioned assumptions people take for granted when creating and making meaning of their world. These values and beliefs, ones that are normally associated with a culture, for example, spiritual/religious beliefs, are used in cultural metaphor tokens that discuss organisations, technology and people. The paragraphs below discuss these values and beliefs – the logical consequences of the culture metaphor – and how they were derived/observed in the primary evidence.

In relation to cultural metaphor tokens that focus on the organisation, values and beliefs are typically discussed in more specific rather than general terms. The more specific values that are contained within the primary evidence includes: mutual *respect* within organisations (Levina 2005), *independence* of the open source movement from organisational constraints (Stewart, Ammeter & Maruping 2006), *loyalty* of customers to organisations (Ma & Agerwal 2007) and *status* of centralised IT organisations (Porra, Hirschheim & Parks 2005). Beliefs include: *perceptions* of *blame* (Westland 2000), those that centre on *trust* (McKnight, Choudhury & Kacmar 2002; Raghu, Jayaraman & Rao 2004), *tenets* of open source movement concerning organisations (Stewart, Ammeter & Maruping 2006), *ownership* of information within departments (Huber 2001) and even organisational *notions* of *existence* 'if you are not a banker, you are nothing' (Lin & Silva 2005, p. 54). Such beliefs of and within organisations are seen as critical to establishing the web of meaning that is essentially the organisation.

Values and beliefs are also used in cultural metaphor tokens that discuss technology – particularly in relation to what the technology means to people within organisations. Values include: the role technology plays in *privileging* particular social concerns over others (Cordoba & Midgley 2008); and the ability of a system to *emancipate* content (Panagiotidis & Edwards 2001) or *privilege* accuracy over speed (Volkoff, Strong & Elmes 2005). Beliefs centre on the *assumptions* (Leonardi & Bailey 2008) and *power orientations* (Panagiotidis & Edwards 2001) a technology reflects, the *common identity* attributed to technology (Levina & Vaast 2005), and the *implicit threats* '*radical'* technologies carry with them (West & Dedrick 2000, p. 205). Religious beliefs concerning technology are also commonly encountered. For example, Majchrzak et al.'s (2000, p. 571) reference to the '*spirit'* of a technology and Levina and Vaast's (2005) discussion of what the technology means in a given context - a '*savior'* or an '*imposed* piece of junk' (p. 340). It is values and beliefs such as these that are critical within metaphor tokens for establishing not only how technology is created but also how it is interpreted and made sense of.

In relation to people, the values and beliefs discussed in metaphor tokens are similar, if not the same, as those discussed in relation to organisations and technology. The types of values discussed include: *loyalty* of volunteers to the organisation (Moon & Sproull 2008), *interests* and *goal priorities* (Vlaar, van Fenema & Tiwari 2008) and even the *desire* of couples to be like the Joneses (Brown & Venkatesh 2005). The types of beliefs discussed include: the *ethos* of open source communities (Feller et al. 2008), *identification*, *trust* and *obligation* to a team (Robert, Dennis & Ahuja 2008), *underlying assumptions* of groups (Holmström Olsson et al. 2008), *worldviews*, *power* and *status* (Vlaar, van Fenema & Tiwari 2008) and differing *perceptions* of what makes an excellent systems analyst (Hunter & Beck 2000). These are just some of the different value and belief types that were discussed within cultural metaphor tokens concerning how people assigned meaning not only to different objects but to events and circumstances.

### 7.5.3. High-level entailment interference

The high-level entailments associated with the culture metaphor suffered interference from the machine metaphor in the same ways as the organism metaphor. Yet, it was the second type of interference. Where the high-level entailments associated with the culture metaphor could be derived they were often understood in terms of the sub-metaphors, high-level entailments and logical reasonings associated with the machine metaphor.

Some examples of the high-level entailments of the culture metaphor being interfered with in some way by the sub-metaphors of the machine metaphor are provided in Table 7.15. Note that in the examples below high-level entailments of the organism metaphor are also visible. Yet, it is the machine sub-metaphors that appear to be the primary mapping on which the cultural high-level entailments depend. For example, in the metaphor token of Gal, Lyytinen and Yoo (2008) the cultural high-level entailment of norms, the collaborative distributed practices, appears to rely on the notion of cultivation, the organic high-level entailment of environmental interaction. Yet, both high-level entailments are only secondary to the mechanistic sub-metaphor of parts: it is how they 'lever' each other's knowledge.

Also apparent in the metaphor token by Gal, Lyytinen and Yoo (2008) is that mechanistic high-level entailments are implicit in cultural high-level entailments. For example, collaborative distributed practices only appear to attain their importance in the logical terms of the machine. The norms of distributed teams are consequential only in terms of the accurate, effective and efficient operation of organisations. This is a more specific case of a more widespread phenomenon: logical consequences of the culture metaphor derived from the tokens only tended to make sense or gain importance in terms of the logical consequences of machines.

Table 7.16 provides examples of cultural metaphor tokens where both machine and culture high-level entailments are derived. A single metaphor token per mechanistic high-level entailment is shown.

Table 7.15. *Sample excerpts of the culture high-level entailments being bolstered by machine sub-metaphors.*

| MACHINE SUB-METAPHOR | CULTURAL METAPHOR TOKEN IN CONTEXT |
|---|---|
| PURPOSE | Offering volunteers *meaningful* work opportunities may increase their *loyalty* and *commitment* to the organization [skip paragraph] The second challenge – managing the work done by Internet-based volunteers - entails work design... work must be designed (or a work design must be chosen) so that the basic unit of work contribution is both small and *meaningful* (Moon & Sproull 2008, p. 409) |
| PRODUCT | Participatory Design, with the underlying assumption that design is mostly concerned with determining details to meet a particular purpose, focuses on an *emancipatory* element that is guided by *conflicts* and concerns as perceived by the user. (p.308) [skip paragraph] Such a struggle emphasises that *learning* occurs when these two parties try to align their respective activities, which then informs the actual innovation process and the resulting product itself.[skip 4 paragraphs]... In recognition of the impact of the supra-individual influences on activities, even when a subject is apparently working alone, the community component gives weight to the social and *cultural* context of the work *environment* and to *neighbouring* activities. (Kietzmann 2008, p. 308) |

| | |
|---|---|
| PROCESS | The capabilities offered by digital communication are leading to the evolution of new network structures that are grounded in communication patterns. As these structures are significant for organizations, much research has been devoted to understanding network dynamics in ongoing processes of electronic communication.[skip paragraph] They are defined as groups of people interacting in a virtual environment with a purpose, supported by technology, and guided by norms and policies. (Trier 2008, p. 335) |
| PART | In recent years, more organisations engage in *collaborative distributed practices* that span across multiple locations, heterogeneous perspectives, and organisational contexts. Companies from multiple industries *cultivate* their relationships with their customers, suppliers, and other partners to leverage each others distinct knowledge... (Gal, Lyytinen & Yoo 2008, p. 292) |

Table 7.16. *Sample excerpts of the culture high-level entailments being bolstered by machine high-level entailments.*

| MACHINE ENTAILMENT | CULTURAL METAPHOR TOKEN IN CONTEXT |
|---|---|
| ACCURACY | In reviewing the research on offshore sourcing, Levina and Ross (2003), suggest that the primary reason behind offshore sourcing is the need to reduce and control IT operating costs. [skip paragraph] This group is differentiated from the previous two by its underlying assumptions that there are shared *norms* and a harmony of *interests* between parties that go beyond the formal contract. (p.259)... We have sent several engineers to *hand-hold* at other sites, if the deliverable was new to the other site. (Holmström Olsson et al. 2008, p. 273) |
| EFFECTIVENESS | Offering volunteers *meaningful* work opportunities may increase their *loyalty* and *commitment* to the organization [skip paragraph] The second challenge – managing the work done by Internet-based volunteers – entails work design... work must be designed (or a work design must be chosen) so that the basic unit of work contribution is both small and *meaningful* (p.409)...In this paper, we examined how managers interested in *cultivating* their online communities as a virtual extension of their organizational work force might more effectively retain volunteers and ensure high-quality contributions. (Moon & Sproull 2008, p. 495) |

| | |
|---|---|
| EFFICIENCY | Digitally enabled teams are *hybrid* teams (p.315) ...Social interactions through the network ties are the mechanisms by which teams exchange information to integrate knowledge successfully (Patrashkova-Volzdoska et al. 2003) and are directly related to performance for knowledge integration tasks (Baldwin et al. 1997) (p.318)...In summary, the more team members *identify* with the team, *trust* the team, perceive an *obligation* to the team, and are willing to abide by the team *norms*, the more they will share information. (Robert, Dennis & Ahuja 2008, p. 320) |

As with the organism metaphor, even when an article contains a number of cultural metaphor tokens and high-level entailments are readily derived, these high-level entailments are often understood in terms of mechanistic reasoning categories. In particular, although articles may stress the high-level entailments of norms as well as values and beliefs, the logical reasonings underlying these entailments are quite often derived from mechanistic categories and not cultural categories. Refer for example to the excerpts from Moon and Sproull (2008) and Kietzmann (2008) in Table 7.15 and excerpts from Moon and Sproull (2008) and Robert, Dennis and Ahuja (2008) in Table 7.16. What many of these articles have in common, which is a reflection of a broader phenomenon, is the inclusion of the secondary categories, either alone or in addition to, the primary categories of mechanism when reasoning about key Information Systems concepts. Moon and Sproull (2008) and others discuss the high-level entailments of the culture metaphor as mechanistic categories; typically as secondary qualities which while not essential to the functioning of key Information Systems concepts are still tied to it.

### 7.5.4. Types of reasonings evident in cultural metaphor tokens

There are two types of reasonings that can be discerned in cultural metaphor tokens: those of the culture metaphor itself and those of the machine metaphor. As observed with the organism metaphor, the culture metaphor rarely occurs in primary evidence with logic from its own domain. On the contrary, it is the reasonings associated with the machine metaphor that are most frequently evidenced.

The following sections will show how the two different types of reasonings – as discussed in Chapter 3 – were discerned in the primary evidence.

### Reasoning via categories of symbolism/culturalism

Table 7.17 presents the four categories of cultural reasoning outlined by Pepper (1942). Uncovering evidence of these categories in metaphor tokens for the culture metaphor was the most difficult of all to discern. The categories of symbolism/culturalism associated with the culture metaphor are the most complicated and least 'straightforward' of all the logical categories. Identifying them in the results of this study was, however, even more difficult. Nevertheless, there were some cases in which reasoning via the culture categories could be discerned. This section endeavours to present the categories of cultural reasoning as they were evidenced in the metaphor tokens of this study.

Table 7.17. *Logical reasonings of the culture metaphor*

| ROOT METAPHOR | CATEGORY | REASONING | DESCRIPTION |
|---|---|---|---|
| Culture | Ineradicable | Change | A detail within the quality and texture categories. |
| | | Novelty | A detail within the quality and texture categories. |
| | *Not specified* | Quality | Total meaning of an event. Encompasses the concepts of: the spread of an event, its change, its degrees of fusion. |
| | | Texture | Details and relations that make up an event. Encompasses the concepts of: strands of a texture, its context, its references. |

Source: Pepper (1942, pp. 235-237)

The article of Jones and Hughes (2001) provides a single rare example of how cultural reasoning categories are evident in the cultural metaphor tokens of a single article. In the metaphor tokens of Jones and Hughes two different approaches to Information Systems evaluation are discussed; one which is clearly mechanistic and one which, although not named as such, appears to match well with a cultural approach. The total given event here is information systems evaluation. The below sections discuss how Jones and Hughes discussions recommended situated practice approach to Information Systems evaluation contain evidence of cultural reasoning.

In the cultural metaphor tokens of Jones and Hughes (2001) the two ineradicable categories of contextualistic reasoning are evident: change and novelty. There are multiple references to both change and novelty throughout the metaphor tokens of Jones and Hughes (2001). Particularly, in the various tokens that highlight norms and values/beliefs. This occurs primarily in tokens that discuss the changes in organisations and how information systems support those changes as well as the novelty of the situated hermeneutic evaluation approach. Quality and texture, the two ineradicable categories of which change and novelty are details, are also evident in the metaphor tokens of Jones and Hughes (2001) as is discussed in the two points below:

*1) Quality*, as described by Pepper (1942) approximates to the total meaning of an event. In the cultural metaphor tokens of Jones and Hughes (2001), it is made clear that Heidegger (1976) is relied on for a different approach to Information Systems evaluation. The following statement exists in one of the cultural metaphor tokens 'individuals come to understand their life-world, which is a complex whole, from preconceptions about meanings of its parts and their interrelationships.' (p. 192). It is in this intuited wholeness that Pepper's (1942) category of quality is evident.

Pepper's (1942) three characteristics of quality are present (to a greater or lesser extent) in the various metaphor tokens from Jones and Hughes (2001) that explain this intuited wholeness:

- the *spread* of an event (or its specious present). In the metaphor tokens of Jones and Hughes (2001), the notion of *throwness*. In various metaphor tokens, social actors are discussed as being *thrown* into their life-world and make sense of it not only from a mosaic of their past experiences and histories but also in light of future events. The metaphor tokens within Jones and Hughes (2001) therefore make clear that an event, in this case information systems evaluation, has a spread, which, as Pepper (1942) asserts, reaches both forward and backward.

- its *change*. In terms of information systems evaluation, metaphor tokens within Jones and Hughes (2001) assert, 'evaluation is not a static event'. It is a continuously changing event 'based upon experiential and subjective judgement' (p. 200). This is, as Pepper argues, a categorical feature of all events when viewed through the culture metaphor lens.

- its *degrees of fusion*. In the metaphor tokens of Jones and Hughes (2001) there is an argument for an interpretive epistemology in information systems evaluation based on fusion. In particular that information systems evaluation is a socially embedded practice where formal procedures entwine with informal assessments. This particular fusion is how actors make sense of their situation. The implication here is the same as in Pepper – that with a shift in the ways in which formal procedures entwine with informal assessments leads to different meaning.

2) *Texture* – is the details and relations that make up the quality of an event. These too, are evident to an extent in the metaphor tokens of Jones and Hughes (2001) and are explained below:

   - the *strands* of a texture. Relying on the hermeneutic perspective, Jones and Hughes assert in a given cultural metaphor token that, 'realities are constructed from multiple, intangible mental models' (p. 192). It is here that the same strands discussed by Pepper (1942) are apparent; the strands being a single intangible mental model. They are a strand because they contribute directly to the total meaning of a reality, that is, the texture.

   - its *context*. In the primary evidence of Jones and Hughes (2001) the importance and significance of context is made very clear: ' … context is therefore, of key importance to an interpretive perspective …' (p. 192). The context here, as with many cultural interpretations, changes. For example, when the discussion in primary metaphor evidence turns to the reality of a single actor, the context is the realities held by other people or groups. Yet, when the discussion in primary metaphor evidence turns to reality formation, then the context is whatever indirectly contributes to that person's ability to make sense of a given situation: their historical, cultural, social and material circumstances they inhabit. Context is critical in the primary evidence of Jones and Hughes (2001) and is a significant aspect that contributes to the quality of a texture in Pepper's cultural categorisations.

- its *references*. In the metaphor tokens of Jones and Hughes (2001), the importance of references is also made clear. The context, texture and strand as they are instantiated in Jones and Hughes' information systems evaluation approach are all relative to one another. Social interaction in context 'can only be fully understood in relation to the particular situation in which it actually occurred' (p. 193). Hence, if an individual's formation of reality is taken as a texture, the context includes their various historical, cultural, social and material circumstances. The strands are the single intangible mental models. Yet, the primary evidence in Jones and Hughes also considers an individual's reality as a strand when considering the texture of what an Information System means as a whole. The particular references considered in the primary evidence of Jones and Hughes is of the simple and most basic type: the linear type. The Information Systems evaluation event has a point of initiation, a transitive direction, and achieves an ending or satisfaction. For instance, one of the linear references initiated in a cultural metaphor token by Jones and Hughes is by an individual's separate mental model. In making sense of a situation, this model essentially reaches forward and achieves satisfaction in the resolved complex whole: the reality.

The metaphor tokens in Jones and Hughes (2001) do not examine each different cultural category to the depths that appear in Pepper (1942); nor are they as clear as the particular examples provided by Pepper (1942), complicated at times by the existence of categories from other metaphor domains. Yet, Jones and Hughes, relying on Heidegger (1976) and Suchman (1993), provide the most compelling examples of an article that contains primary evidence from which cultural reasonings can be discerned.

***Reasoning via mechanistic categories***

One might initially expect cultural metaphor tokens to contain evidence of cultural reasoning. Yet many, if not all, metaphor tokens contain evidence of mechanistic reasoning. This is apparent in all the cultural metaphor tokens from Moon and Sproull (2008) and Kietzmann (2008) presented in Table 7.15 and cultural metaphor tokens from Moon and Sproull (2008) and Robert, Dennis and Ahuja (2008) in Table 7.16. What these articles have in common within their cultural metaphor tokens is the inclusion of the secondary categories, either alone or in addition to, the primary categories of mechanism when reasoning about key Information System concepts. This is reflective of a broader phenomenon.

To explain this further, take the cultural metaphor token by Robert, Dennis and Ahuja (2008) in Table 7.16. In the second statement, the first three categories of mechanism are all apparent. The field of location in the teams, primary qualities, to a certain extent in the information exchange (e.g., motion), and primary laws in the explanation of mechanisms. In the second statement, the remaining three categories of mechanism are apparent and it is this statement that deals explicitly with the cultural high-level entailment of norm. The secondary qualities are essentially the high-level entailments, that is, team identification, trust, obligation, willingness to abide by team norms. These are not essential to the functioning of the team but are still tied to its functioning. A principle for connecting secondary to primary qualities is visible in the secondary statement as well. In particular the notion that the more individuals invest in the secondary qualities, the more the primary qualities will be realised. Laws or regularities among the secondary qualities are not obvious in the token provided previously. There does however appear to be an implicit relationship between them. In particular the placement of the secondary qualities seems to imply a certain ordering and even an escalation of importance or significance. Initially, one needs to identify with the team; once this has been done one can trust the team and so on up to abiding by the team norms. Once one reaches this top level then the more they will share information.

Robert, Dennis and Ahuja (2008) reflect a more widespread phenomenon noted in relation to cultural metaphor tokens. Forms of secondary evidence in relation to the culture metaphor – in particular the high-level entailments – are typically seen as secondary qualities in mechanistic reasoning. This finding further decreases the strength of the culture metaphor in this study.

## 7.6 Conclusions

The results of this analysis chapter showed that the machine metaphor is an even stronger as well as more powerful and pervasive way of conceptualising key Information System concepts than initially revealed in the previous three results chapters. This finding is based on the secondary evidence associated with each of the three root metaphors examined in this study: machine, organism and culture. This secondary evidence comes in the form of sub-metaphors, high-level entailments and logical reasonings.

The machine metaphor was the only metaphor for which each of these forms of evidence could be easily and clearly discerned. Sub-metaphors could not be determined for the organism or culture metaphors at all. Of particular importance to the relative strengths of each of the root metaphors was the notion of metaphoric interference. In particular the machine metaphor did not have to contend with interference from the other root metaphors. It was the machine metaphor that interfered in the secondary evidence, specifically the high-level entailments and logical reasonings, of the other root metaphors. This led to a situation where the organism and culture metaphors were often understood in mechanistic terms.

This paradox is what ultimately led to the strength and saliency of the machine metaphor, one that is even more pronounced than initially revealed in the previous three chapters. The following chapter – Chapter 8 – will now examine what this bias might mean in more concrete terms. In particular it will address the 'So what?' question in relation to the difference diversity makes in Information Systems research.

# Chapter 8 - WHAT BENEFITS MIGHT DIVERSITY BRING?

## 8.1 Introduction

This thesis has, thus far, shown it is possible to identify whether, and to what extent, articles published in leading Information Systems research journals rely on each of the three root metaphors to conceptualise three key Information Systems concepts: organisations, technology and people. The thesis has also shown that articles rely more heavily on the machine metaphor for conceptualising organisations, technology and people than any other metaphor. While the machine metaphor offers a relatively adequate world-view, it is argued that a bias toward any root metaphor can be limiting. It is the aim of this chapter to make clear the potential benefits that come with pursuing alternative metaphors.

To achieve this aim three representative articles previously coded and analysed in this thesis were selected for further analysis. Each of these three articles were coded as being dominant for one of the three metaphors: machine (Bapna et al. 2008), organism (Bharadwaj 2000), and culture (Schutlze 2000). For each article, this chapter briefly describes the paper, the primary metaphor used within the paper and discusses what might have been revealed if a different metaphoric lens was applied to the problem. Note that this discussion is not comprehensive, it simply raises some potential avenues for further work and suggests some insights that may be possible if alternative metaphors had been relied on. A complete re-analysis of the papers using alternative metaphors is an avenue for future work. Table 8.1, summarises the articles examined in this chapter.

Table 8.1. *Outline of articles examined in this chapter*

| Paper | Research topic | Dominant Metaphor |
|---|---|---|
| Section 8.2 – Bapna et al. (2008) | Consumer Surplus in Online Auctions | Machine |
| Section 8.3 – Bharadwaj (2000) | IT Capability and Firm Performance | Organism |
| Section 8.4 – Schultze (2000) | Information Production in Knowledge Work | Culture |

As raised previously in this thesis, the apparent dominance of a single root metaphor across the vast majority of a discipline's research output may be a cause for concern. The fact that a root metaphor provides a relatively adequate way of understanding the world does not mean that alternative metaphors should be ignored. Such ignorance suggests that there are questions, perspectives and findings that are being overlooked and that a greater level of metaphorical diversity could improve the quality and impact of Information Systems research. As Pepper (1942) suggests, in our pursuit for knowledge and understanding we should not neglect any of the root metaphors 'Our postrational eclecticism is simply the recognition of the equal … adequacy of a number of world theories and a recommendation that we do not fall into the dogmatism of neglecting any one of them' (p. 342). As a result, the aim of this chapter is to illustrate how the use of alternate metaphors can reveal and suggest additional research to further our knowledge and understanding in the field of Information Systems.

## 8.2 Consumer surplus in online auctions (Bapna et al. 2008)

In Bapna et al.'s (2008) article, *Consumer Surplus in Online Auctions*, the problem of quantifying consumer surplus in online auctions is examined – their particular case being eBay. They state that while eBay is certainly popular, little is known about how much consumers benefit from these exchanges. Consumer surplus in Bapna et al. (2008) relies on the understanding, inherited from classical microeconomic theory, that consumer surplus is a 'welfare measure that quantifies benefits to a consumer from an exchange' (Bapna et al. 2008, p. 400). A copy of Bapna et al.'s (2008) abstract, which includes a brief description of their findings, is included below:

> Despite the growing research interest in Internet auctions, particularly those on eBay, little is known about quantifiable consumer surplus levels in such mechanisms. Using an ongoing novel field experiment that involves real bidders participating in real auctions, and voting with real dollars, we collect and examine a unique data set to estimate consumer surplus in eBay auctions. The estimation procedure relies mainly on knowing the highest bid, which is not disclosed by eBay but is available to us from our experiment. At the outset we assume a private value second-price sealed-bid auction setting, as well as a lack of alternative buying

> options within or outside eBay. Our analysis, based on a sample of 4,514 eBay auctions, indicates that consumers extract a median surplus of at least $4 per eBay auction. This estimate is unbiased under the above assumptions; otherwise it is a lower bound. The surplus distribution is highly skewed given the diverse nature of the data. We find that eBay's auctions generated at least $7.05 billion in total consumer surplus in 2003 and could generate up to $7.68 billion if the private value sealed-bid assumption does not hold. We check for the validity of our assumptions and the robustness of our estimates using an additional data set from 2005 and a randomly sampled validation data set from eBay. (Bapna et al. 2008 p. 400)

Table 8.2 provides an overview of the fictive metaphor analysis conducted on Bapna et al. (2008). The people concept is the primary concept focused on in this article. The organisation and technology concepts are present in the article but only in a contextual or background sense. Due to the frequent mechanistic terms used in the discussion of all three concepts – organisations, technology and people – they were all categorised as dominant for the machine metaphor in this article. The organism metaphor is categorised as secondary and the culture metaphor as occasional but only for the people concept. The organism and culture metaphor are not evident at all for the organisation and technology concepts.

Table 8.2. *Coding for Bapna et al. (2008)*

| | **Organisations (Contextual)** | **Technology (Contextual)** | **People (Primary)** |
|---|---|---|---|
| Machine | Dominant | Dominant | Dominant |
| Organism | - | - | Secondary |
| Culture | - | - | Occasional |

The dominance of the machine metaphor for a single concept in Bapna et al. (2008) makes the article a useful example for exploring what might be gained by using alternative metaphors. Certainly, Bapna et al. (2008) have measured consumer surplus, which is as they highlighted what they had set out to do. They were initially motivated by how much consumers benefited from the exchanges in eBay – the consumer welfare. As they are relying on the machine metaphor however, they view this benefit in purely monetary terms. In terms of the machine metaphor this makes sense: consumers acting as rational agents will try to maximise their financial gain and hence their ultimate consumer welfare (in an economic sense). This is certainly one way of conceptualising what consumers ultimately gain from exchanges on e-markets such as eBay. Relying on the machine metaphor however, hides the human aspects as well as the more organic aspects of what people might gain from an online exchange – aspects that are only visible by relying on the culture and organism metaphors. This is the topic to which the next section now turns.

### 8.2.1. Insights from alternative metaphors

If one were to apply the alternative metaphors of culture and organism to Bapna et al.'s (2008) topic of interest – what consumers gain from the exchanges on eBay – further insights with respect to the symbolic aspects of the exchange as well as the more organic open-systems aspects, might be gained. Take for instance the culture metaphor and its focus on the human aspects of a target domain. If Bapna et al. (2008) had relied on the culture metaphor to try and understand what consumers gained from the online market exchange of eBay monetary aspects (inasmuch as this is not symbolic) would almost be irrelevant. The focus would instead turn to the symbolic aspect of what people gain from the exchange. The questions sparked from such a view may be:

- Do people who buy at online auctions find meaning in buying goods online?
- Does the purchase process allow them to feel part of a community?
- Does the purchase process bring with it some form of identity for them?
- Does buying online allow people to feel as though they belong or identify with a group of people that have the same interests and values as them – perhaps in addition to or in a way that is not possible through normal non-online means?
- Does the purchase process align with their unique set of values?
- Do consumers find that their purchases and the purchase process was ultimately meaningful?
- Does buying online offer people some form of escapism from the rituals of everyday life?

From this conceptualisation and the potential questions that may arise one can see that financial gain in an online exchange may be completely irrelevant if an alternative metaphor is used. That is, a person who buys online through eBay may still have benefited from an online exchange even if they have not gained financially. They may have gained in terms of their connection with a community, extended their own personal identity and found some meaning in the exchange beyond a dollar value. Likewise, applying the same metaphor they may not have benefited from the exchange if they don't feel as though they have connected with a community or found meaning in the exchange even if they do benefit financially. The culture metaphor recognises that we do not always act 'rationally' and we are 'driven' by more than just money. Additionally, we cannot always quantify those things that we do benefit from in terms of our 'consumer welfare'. The culture metaphor, offers insights that are not possible through the machine metaphor alone.

In terms of the organism metaphor, how people benefit from an online auction exchange would be seen more in terms of an open systems perspective and of satisfying particular needs. By relying on the organism metaphor the target domain (i.e. the customer) would be conceptualised as an entity that interacts with its environment to satisfy its needs in order to survive. Transferring this to the case of Bapna et al. (2008) one might conceptualise the consumer as an entity that interacts with the online auction to satisfy their needs. Hypothesising further, the online auction might act in a way that both stimulates and satisfies certain needs that are necessary for our survival. For example, working from a Darwinian perspective, one of the basic premises is that we essentially compete with one another for limited resources: those that are the 'fittest' or better adapted to their environment survive and reproduce. Perhaps the way in which online auctions work mimics our natural environment in such a way. Perhaps what people gain in such a situation may not therefore be purely monetary but rather that we have competed against one another and 'won' a given item: a limited resource. Our basic instinct to compete with each other over a limited resource is therefore satisfied through an online auction exchange. Some questions that flow from this perspective may be:

- What are the needs of consumers in an online auction context and how well are these matched by eBay exchanges?

- Are there particular adaptations that consumers make in an effort to be successful in online auction exchanges? If so, what are they and how do they impact on success?

- Focusing on the needs of consumers and the concept of homeostasis are there interacting processes that must be balanced within as well as in relation to the environment of an online auction context? If so what are they and how are well are they balanced?

- What are the behaviours displayed by consumers in online auctions and how does this impact on the exchange?

- Are different 'species' of consumers identifiable in e-markets and if so what are the behaviours and characteristics that make them identifiable?

As with the culture metaphor purely financial gain may be rather irrelevant when one relies on the organism metaphor. For example, as long as a basic need is met then it may not be terribly significant the gain or loss in dollar terms from a given exchange. Like the culture metaphor, the organism metaphor offers insights that are not possible through the machine metaphor alone.

## 8.3 A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation (Bharadwaj 2000)

Bharadwaj's (2000) article, *A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation,* applies a resource based view to look at Information Technology's effect on firm performance. Bharadwaj (2000) is specifically interested in the link between information technology and a firms performance. As Bharadwaj (2000) asserts, 'Despite the widely held belief that information technology (IT) is fundamental to a firm's survival and growth, scholars are still struggling to specify the underlying mechanisms linking IT to financial performance.' (p. 169). In order to investigate this link and to find out whether there really is any value in IT for organizations Bharadwaj (2000) relies on the resource-based view of the firm – a view based in management strategy literature that links organisational performance to resources and skills that are specific to the firm, rare, and difficult to imitate or substitute. The abstract provided by Bharadwaj (2000), which also includes their main findings is reproduced below:

> The resource-based view of the firm attributes superior financial performance to organizational resources and capabilities. This paper develops the concept of IT as an organizational capability and empirically examines the association between IT capability and firm performance. Firm specific IT resources are classified as IT infrastructure, human IT resources, and IT-enabled intangibles. A matched-sample comparison group methodology and publicly available ratings are used to assess IT capability and firm performance. Results indicate that firms with high IT capability tend to outperform a control sample of firms on a variety of profit and cost-based performance measures.

Table 8.3 presents an overview of the fictive metaphor analysis conducted on Bharadwaj (2000). As stated previously organisations are the main concept of investigation with technology being a significant secondary focus. People are examined but are not a key focus. Unlike Bapna et al. (2008), all three concepts in Bharadwaj (2000) contain some evidence of the three root metaphors examined in this study. Yet, the concepts all differ with respect to how much evidence is associated with each root metaphor. The main concept of investigation, the organisation, was conceptualised primarily through the organism metaphor, but also contained some evidence of the machine and culture metaphors. The technology concept on the other hand was primarily conceptualised via the machine metaphor but also contained some evidence of the organism and culture metaphors. The people concept, while not a key concept, was categorised as secondary for all three root metaphors examined, containing roughly the same amount of evidence for the machine, organism and culture metaphors respectively.

Table 8.3. *Coding for Bharadwaj (2000)*

| | Organisations (Primary) | Technology (Secondary) | People (Contextual) |
|---|---|---|---|
| Machine | Secondary | Dominant | Secondary |
| Organism | Dominant | Secondary | Secondary |
| Culture | Occasional | Occasional | Secondary |

Bharadwaj (2000) does not rely on any single metaphor to structure and understand any of the key Information Systems concepts examined. In this way it lacks the simplicity of Bapna et al. (2008) as an example. Yet, as highlighted in the previous four chapters there are no articles that rely on the organism or culture metaphors without also relying on the machine metaphor. In short there are no perfect examples to rely on for this part of the analysis. Due to Bharadwaj's (2000) clear preference for conceptualising organisations through the organism metaphor via the resource-based perspective it does however provide a useful, and somewhat interesting example on which to explore what insight might have been gained if alternative metaphors had been relied on.

Based on the assumption that there are links between Information Technology and business performance Bharadwaj (2000) use RBV to theoretically examine these links. Their key motivation is to find out what businesses gain in performance (if any) from Information Technology where both tangible and intangible capabilities are examined. RBV is a distinctly organic theory (Morgan 2006). As such their research emphasises the needs aspects of organisations – that organisations have needs that must be met in order to survive and essentially it is the strongest and fittest who survive. This is certainly a compelling way of viewing organisations but is again just one way of conceptualising organisations. As with Bapna et al. (2008), by relying heavily on the organism metaphor Bharadwaj (2008) tend to overlook the human aspects of the organisation and also aspects that may be more like a machine.

## 8.3.1. Insights from alternative metaphors

If Bharadwaj (2000) had relied more heavily on the alternative metaphors of machine and culture to structure and understand the relationship between IT capability and firm performance it is likely that different and perhaps richer insights might have been gained. Let's look first at what might have been gained from a mechanistic perspective. Rather than apply a resource based perspective on the relationship between IT and firm performance Bharadwaj (2000) could have applied a perspective more embedded in classical management theory – focusing on those aspects of the organisation that are most like the machine. It should be noted here that while the machine metaphor is widely criticised, the goal-driven aspects highlighted by the machine metaphor are seen to a greater or lesser extent in all organisations.

In applying a more classical management theory perspective Bharadwaj (2000) may have looked at the relationship between IT and organisational performance more in terms of how efficient and effective the IT department was and what effects this might have on the performance of the organisation as a whole. The idea being that one conceptualises the organisation as a machine and the IT department as a part or a cog in that machine. As long as the IT department is designed well and is under control then perhaps it stands to reason from the mechanistic perspective that the organisation also works well. One might question:

- How well does the organisational work without the IT department or how does the particular design of the IT department impact on organisational performance (specifically how profitable an organisation is).

- What are the points of resistance between the IT department and the other parts of the organisation and how does this effect organisational performance? What can be done to remove or lessen such resistance?

- How can one design the IT department and the rest of the organisation to ensure the processes between them operate smoothly and efficiently?

These are again just some of the ways in which the Bharadwaj (2000) conceptualisation of the relationship between IT and organisational performance might have been different and also how some of the questions may have varied. Bringing Bharadwaj (2000) back to a more fundamental mechanistic perspective on the relationship between IT and organisational performance might bring further insights into that relationship.

If one were to rely more heavily on the culture metaphor to Bharadwaj (2000) topic of interest – the relationship between IT and firm performance – one would be looking at the symbolic significance of this relationship. The culture metaphor would likely move beyond the notion of purely financial gain in terms of both value and performance. Hence, the notion of firm performance would likely be reconceptualised along more symbolic lines. Questions sparked from such a view may include:

- Do IT departments and other parts of the organisation form separate sub-cultures? If so how do they create and re-create meaning within their own cultures and other cultures? Does this process of meaning creation impact on the overall cultural well-being of the firm – their success as a web of meaning?

- Do the relationships that are formed between those in the IT department and the rest of the organisation allow them to feel part of the organisation? Does this have any impact on the normal day-to-day rituals of the organisation?

- What are the values, norms and beliefs of the IT department and how are they similar or different to the organisation as a whole (if such a unitary thing exists)? How do these values, norms and beliefs impact on their interactions with other parts of the organisation? How does this impact on the organisation as a whole in terms of the organisation being a meaningful place to work?

- How does the IT department see itself and what aspirations do they have for their organisation? How is this similar or different to how other parts of the organisation see the IT department and what their aspirations are? Do these shared patterns of belief exert any influence over the organisations ability to deal with the challenges it faces?

Like the machine metaphor the culture metaphor provides insights on Bharadwaj's (2000) topic of study that are different but no less valuable than those provided through the organism metaphor. Indeed by moving beyond a purely organic perspective the topic is enriched in a way that is not possible from this single metaphor alone.

## 8.4 A Confessional Account of an Ethnography About Knowledge Work (Schultze 2000)

Schultze's (2000) article *A Confessional Account of an Ethnography About Knowledge Work*, focuses on the production of informational objects, work that is central to knowledge work. Their research examines what people 'actually' do *in situ* when producing such objects and so is practice-oriented research. Their aim – to understand what producing information entails and what knowledge work is like. It studies the work practices in their 'mundane, day-to-day detail' in a way that is 'sensitive to the social conditions of work' (p. 4). The abstract from Schultze (2000) is reproduced below:

> Information systems research has traditionally focused on information as an object that serves as input to decision making. Such a perspective attends mainly to the use of information. Increasingly, however, organizations are concerned about the production of information. This paper focuses on the work of producing informational objects, an activity central to knowledge work. Based on data collected during an eight-month ethnographic study of three groups of knowledge workers - computer system administrators, competitive intelligence analysts, and librarians - I explore the informing practices they relied upon. These are identified as expressing, monitoring, and translating. Common to these informing practices is the knowledge workers' endeavor to balance subjectivity and objectivity, where subjectivity is a necessary part of doing value adding work and objectivity promises workers authority and a sense of security.
>
> Recognizing that researchers are knowledge workers too, I draw on my own experiences as an ethnographic researcher to identify parallels between my informing practices and those of the knowledge workers I studied. These parallels are intended to challenge the taken-for-granted assumptions underlying scientific practice. I adopt a confessional genre of representation for this purpose.

Table 8.4 presents the fictive metaphor analysis overview for Schultze (2000). People in the form of knowledge workers are the main focus for this study with organisations and technology being important backgrounding/situating concepts. Like Bharadwaj (2000) in the previous section Schultze (2000) contains evidence of all three root metaphors examined. Apart from technology (which is discussed in a very superficial way) there is a decided skew toward conceptualising the key Information System concepts via the culture metaphor. The main concepts of investigation, people – and to a lesser extent – organisations, are conceptualised primarily through the culture metaphor, then through the organism metaphor and lastly through the machine metaphor.

Table 8.4. *Coding for Schultze (2000)*

| | Organisations (Contextual) | Technology (Contextual) | People (Primary) |
|---|---|---|---|
| Machine | Occasional | Occasional | Occasional |
| Organism | Secondary | Occasional | Secondary |
| Culture | Dominant | Occasional | Dominant |

Similar to the previous example of Bharadwaj (2000), while Schultze (2000) does not rely on a single metaphor to conceptualise organisations, technology or people, the article still provides an excellent example of reliance on the culture metaphor. As shown in Table 8.4 Schultze (2000) relies heavily on the culture metaphor to conceptualise organisations and people – indeed the way in which they do so makes the article an exemplar in this regard. In addition however, Schultze (2000) provides a good example of the insights that come with pursuing alternative metaphors to knowledge work – particularly the work of producing informational objects, which is central to Schultze's work.

Through the method of ethnography Schutlze (2000) provides a rich and nuanced account of the work practices for three groups of knowledge workers. Schutlze (2000) was motivated by the broader goal of trying to better understand knowledge work and the role of knowledge management technologies in it – they did this by researching the work of producing information in practice. Because they are relying on the culture metaphor however, they are attending primarily to the symbolic aspects of their research topic. In particular through their ethnographic method they reveal the social conditions of knowledge work, its assumptions and practices. In terms of the culture metaphor this seems entirely fitting. Yet while the culture metaphor offers some important insights in Schultze (2000) it does so only through hiding the more mechanistic and organic aspects of knowledge work.

## 8.4.1. Insights from alternative metaphors

If Schultze (2000) had relied more heavily on the machine metaphor to try and understand knowledge work and the role of knowledge management technologies in it she would have attended to the more mechanistic aspects of producing information rather than the symbolic aspects. The day-to-day practices, the mundane rituals that knowledge workers engage in would be irrelevant. The mechanistic perspective would attend to the rational, goal-driven aspects of information production and place much more emphasis on precision and objectivity. Some questions that may be asked from this perspective might be:

- What are the individual elements that encompass the task of producing information? How can these individual elements be designed and controlled to produce the most effective outcome?

- What are the most inefficient parts and sub-tasks in the production of information? How can these be eliminated to increase the efficiency of the whole process?

- What particular combinations of the information production sub-processes work most effectively? How can these be implemented to best effect in knowledge workers?

One can see how conceptualising the topic differently, a different set of research questions might follow. These questions offer alternative insights on the topic of information production in knowledge workers. The machine metaphor is compelling in the sense that it appeals to our sense of simplifying a problem by breaking it down into discrete sub-events or parts and working on these separately. Additionally, it appeals to our pragmatic side in a way that the culture metaphor does not. The culture metaphor does not typically provide answers in the same way that the machine metaphor does. Hence, the machine metaphor offers understanding and insights that are not possible through the culture metaphor alone.

Like the machine metaphor the organism metaphor would offer its own unique insights and understandings on information production in knowledge workers. As discussed previously the power of insight gained from the organism metaphor is seeing the target domain as an open system that interacts with its environment. In this sense knowledge workers would be seen as open systems and the production of information perhaps in a more functional sense. Some questions asked from this perspective might be:

- Is the production of information in some way linked to our survival? If so how?

- To what types of behaviour is information production related to (e.g. competitive or co-operative)?
- How do we and in what ways do knowledge workers interact with their environment (including each other) to produce information?
- What are the needs of knowledge workers and how is information production involved in these needs?
- How do knowledge workers grow and evolve in the information production process?

As with the machine metaphor the more symbolic aspects of information production may be irrelevant when one relies on the organism metaphor. For example, as long as knowledge workers are driven by their basic instincts to produce information what this means to them in a symbolic sense may not be significant at all. Relying on the organism metaphor provides further understanding and insight into Schultze's research problem and enriches it in a way that would not be possible through the culture metaphor alone.

## 8.5 Conclusion

This chapter has illustrated the potential benefits of diversity in Information Systems research. This was done by examining three different papers – each of which was categorised as dominant for a different metaphor: machine, organism and culture. By relying heavily on a given metaphor each of the articles provided insight by highlighting certain aspects of their research topic. They only provided insight though by overlooking other aspects. Insight with regards to these hidden aspects were only revealed through alternative metaphors. While this analysis was not exhaustive it illustrated how research in Information Systems might benefit by diversifying the metaphors it relies on. In particular by providing insights that are not possible through reliance on a single metaphor. This analysis as well as the findings presented in the previous three chapters have important implications for the diversity of Information System research the topic to which we turn in the next and final chapter: Chapter 9.

# Chapter 9 - DISCUSSION AND CONCLUSIONS

## 9.1 Introduction

The issue of diversity in Information Systems research has resulted in a great deal of soul-searching for those in the Information Systems field. It has caused us to ask complex and at times troubling questions over who we are, what we do and why anyone should care; however, the more fundamental issue of research diversity has remained largely overlooked. This thesis has addressed this critical oversight by making research diversity the prime focus. Despite the widespread claims in the discipline that Information Systems research is diverse, this study finds little evidence to support this claim. By exploring three primary conceptualisations of three key disciplinary concepts this thesis reveals a distinct bias toward mechanistic understandings. This final chapter provides a summary of the key findings as presented in the previous five chapters. Interpretations of the findings are also presented. Not only does this study make significant theoretical and empirical contributions but the revelation of bias in Information Systems research has significant implications not only for individual researchers, but Information Systems journals and the broader disciplinary community as a whole. Before offering some final reflections, this chapter reviews the main limitations of this study as well as avenues for future research.

This thesis was motivated by one broad research question: *How conceptually diverse is Information Systems research?* There is a widespread assumption within the Information Systems discipline that Information Systems research is diverse. This assumption has spawned a long and heated debate over issues such as identity, practice and relevance. Yet, the more fundamental issue of how much diversity there really is in Information Systems research has remained largely overlooked. The broad research question was therefore divided into two sub-questions: *How conceptually diverse is Information Systems research now?* and *Has this diversity changed over time and if so how?*

A unique combination of philosophical approach, theory and method was adopted to gain insight into these critical and yet largely unexplored questions. The novel philosophical approach of fictism was adopted as the worldview in this study. Not only was this approach well suited to the subject matter and aims of the research, it also offered a number of significant advantages: creativity, richness and holism. Metaphor theory provided the necessary structure on which an empirical study could proceed. This theory holds that much of our conceptual system is metaphorical in nature: we understand one thing through another. It was also through the theory of metaphors that the notion of root metaphors was uncovered. In particular, the different ways in which we understand our world and the things in it can be traced back to three primary or root metaphors. These are the machine, organism and culture. In an effort to uncover conceptual diversity in Information Systems research the comprehensive corpus method was used to search for evidence of these three root metaphors in relation to three key Information Systems concepts: organisation, technology and people.

The primary evidentiary source relied on this study was the academic discourse appearing in three leading Information Systems journals. The three journals were the two North American journals *Information Systems Research* and *Management Information Systems Quarterly* plus the *European Journal of Information Systems*. Both *Information Systems Research* and *Management Information Systems Quarterly* have been at or near the top of journal rankings since their inception. The *European Journal of Information Systems*, which is a new journal compared to *Information Systems Research* and *Management Information Systems Quarterly,* is now also regarded as one of the top journals in which to publish. Not only are these three journals significant in terms of tenure and promotion for individual Information Systems academics but they also pride themselves on the diversity of research they publish. Editorial policies in *Information Systems Research* and *Management Information Systems Quarterly* are geared toward publishing a wide variety of topics, perspectives and approaches in Information Systems research. The *European Journal of Information Systems* in particular prides itself on publishing research that would not normally appear in mainstream North American journals. Hence, due to the high regard with which these journals are held in the Information Systems community as well as their links to the research question they were chosen as the source from which evidence of diversity was sought.

In this chapter the findings as presented in Chapters 4 to 8 will be discussed and assessed. The chapter is divided into three main sections. The first is a summary of the most significant findings, most notably that there exists a distinct bias towards the machine metaphor. The second section, which comprises the bulk of the chapter, is dedicated to an interpretation of the findings. It reviews the philosophical, theoretical and empirical contributions made as well as the implications for individual researchers, journals and the discipline. The third section considers the limitations that apply to this study as well as potential avenues for future research. The chapter closes with some final reflections.

## 9.2 Summary of findings

The most significant result of this study was the unearthing of a distinct bias toward the machine metaphor in Information Systems research. This bias occurred through both primary and secondary means. As described in Chapters 4 to 6, the primary evidence associated with key Information Systems concepts that of discourse was largely biased toward mechanistic understandings both now and over the recent past. As presented in Chapter 7, the bias toward the machine metaphor was reinforced through secondary evidence: high-level entailments, sub-metaphors and metaphoric reasoning. Chapter 8 discussed the 'so what' factor in relation to diversity in Information Systems research through the analysis of three papers.

In Chapter 4 the results of the exploration into the current profile of Information Systems research were presented. Insight with respect to the current profile of Information Systems research was gained by examining the full set of articles published in three leading journals: the *Information Systems Research* journal, the *Management Information Systems Quarterly* journal and the *European Journal of Information Systems* during a recent publishing year: 2008. Each article was examined for evidence of three root metaphors: machine, organism and culture when discussing three key Information Systems concepts: organisations, technology and people. The key findings of this analysis showed that rhetoric from the machine domain was both more frequent and more varied than rhetoric associated with the organism and culture domains. Additionally, rhetoric from the machine domain was always evident in some form whenever organism and culture rhetoric was evidenced but not vice versa. This was the case even when organism and culture rhetoric was more overt. To summarise then, the most significant result from this phase of the study was the discovery of a distinct bias toward the machine metaphor through three aspects of rhetoric: frequency, variety and overall saliency.

While Chapter 4 presented the results of investigation into the current profile of Information Systems research, Chapter 5 presented the results of how this profile has changed over time. More specifically, Chapter 5 presented the results of a single longitudinal examination of the same three root metaphors explored in the current profile of Information Systems research but narrowing the focus to a single concept: the organisation. The evidentiary data source was also limited to the published articles of a single journal: *Information Systems Research*. The discourse concerning organisations appearing in the articles of *Information Systems Research* over a period of eight years 2000–2008 was explored. The results aligned with those of Chapter 4: not only was there a distinct bias toward the machine metaphor in current conceptualisations of Information Systems research but this bias did not appear to have changed over time. Moreover, this lack of conceptual diversity over time manifested itself in the same ways.

The focus of Chapter 6 was similar to Chapter 5 but different in several important respects. While Chapter 5 presented the analysis of a full eight-year period, Chapter 6 presented results concerning two historical snapshots in time: 2000/2001 and 2005 but for all three concepts and journal sources: *Information Systems Research*, *Management Information Systems Quarterly* and the *European Journal of Information Systems*. The results again aligned with those of the previous two chapters, showing the same distinct preference for the machine metaphor and manifested in the same ways.

While Chapters 4 to 6 presented primary evidence for the root metaphors, Chapter 7 presented secondary evidence in the form of high-level entailments, sub-metaphors and reasonings. It showed that bias toward the machine metaphor occurred not only through primary means (rhetoric) but also occurred through secondary means (high-level entailments, sub-metaphors and reasonings). Through the establishment of several clear high-level entailments, sub-metaphors and the presence of its own germane set of categorical reasonings, the machine metaphor emerged as the most coherent and compelling image in the sources. By contrast, while high-level entailments and to a lesser extent a germane set of categorical reasonings could be discerned for both the organism and culture metaphors, no clear sub-metaphors could be discerned for these alternative metaphors. Furthermore, the high-level entailments and reasonings of the organism and culture metaphors were not as clear or coherent as the machine metaphor due to interference from this same dominant metaphor.

Hence, the results presented in Chapter 7 reinforced the finding of bias toward the machine metaphor found in the previous three chapters through secondary evidence: high-level entailments, sub-metaphors and associated reasonings.

Chapter 8 departed from the presentation of findings to an analysis of what these findings might mean. In short it demonstrated through three concrete examples that had been categorised as dominant for the three root metaphors examined in this study what might have been gained if alternative metaphors had been relied on. Chapter 8 illustrated that a diversity in metaphors shines more light on a given research problem and therefore may lead to an expansion of knowledge and understanding in the broader domain of Information Systems research.

This summary section has reviewed how through both primary and secondary means bias toward the machine metaphor was present not only across all three concepts explored but also across all three data sources. It has also reviewed the 'So what?' question of diversity in Information Systems research using three specific examples. Attention now turns to a consideration of what these key findings mean and imply.

## 9.3 Interpretation of findings

The purpose of this section is to provide some sense of what this study means. That is, to transcend the specific findings and move to the general ideas and concepts that motivated this study in the first instance. The contributions made to the specific area of diversity in Information Systems research as well as beyond the disciplinary boundaries of Information Systems will be discussed, as will the implications, challenges and opportunities for individual researchers, their journals and the discipline as a whole. Finally, the limitations of this study and potential avenues for further research will be addressed.

### 9.3.1. Contributions

This study makes philosophical, theoretical and empirical contributions to Information Systems research as well as more generally. In terms of philosophical contributions this study employs fictism, a novel philosophic approach in Information Systems. As such it expands on the author's previous work (Behrens 2008) showing the feasibility of this approach in a 'real' study. Theoretically, it explores diversity through the lens of concepts, thereby helping to broaden understanding of what diversity in Information Systems research means. Additionally, it challenges some conventional understandings in metaphor theory about how metaphors work. Empirically, it contributes an extensive study of a type not previously done in the area of diversity in Information Systems research.

### Philosophical

The novel philosophic approach of fictism is employed in this study. As such it is a departure from the two most typical approaches employed in Information Systems research: positivism and interpretivism. Such a departure is important as:

a) despite the suitability and benefits of fictism it is relatively unknown in Information Systems, and

b) it shows that such a departure is not only possible in theory but also in practice.

In terms of the first point it is conceded that introducing a new philosophical approach into the area of Information Systems should not be regarded necessarily as a significant contribution. Its significance, however, is not simply in its novelty but in how well it matches the subject matter and aims of Information Systems research and practice. This study shows how well the fictional approach matches a problematic and yet critical area of Information Systems research: that of diversity in Information Systems research. Not only can much of what is done in Information Systems research and practice be thought of as fictions, this study shows a specific as well as crucial area in which this is the case. Additionally, this study has been beneficial in demonstrating the three significant benefits – creativity, richness and holism – this study has over more traditional approaches. The way in which this study has been approached and the results which have been uncovered are creative, rich and holistic in ways that would have been difficult – if not impossible – to achieve through more traditional approaches. Hence, this study has helped to introduce a rare and potentially very beneficial philosophic approach to the study of Information Systems.

This study also offers a significant philosophical contribution in terms of showcasing a new approach through an empirical study. In a previous paper, *Fact or Fiction: The Philosophy of Fictions in IS Research* (Behrens 2008), this author presented the blended approach of fictism as a legitimate alternative to positivism and interpretivism. It was argued that fictism was not only appropriate and beneficial for Information Systems research and practice but that, as a blended approach, it may be a way of mending the tear between the two warring paradigms: postivism and interpretivism. Yet, while this paper surveyed Information Systems research and practice in terms of the fictive approach, there was no demonstration of how this approach might be used in a real study. The research presented in this thesis does precisely that. It shows the feasibility of the fictive approach. Moreover, this study clearly outlines how the worldview flows through to the reasoning and practices applied in a real study – one that is not trivial either in scope or subject matter. This practical application of the fictive approach may provide useful guidelines for those in Information Systems and further afield who are attracted to the potential benefits of fictism but are unsure of how to put it into practice. This study, therefore, provides a significant philosophical contribution in that it demonstrates the feasibility of the fictive approach in Information Systems.

### Theoretical

Perhaps the most significant contribution this study makes is in challenging widespread assumptions about the diversity of Information Systems research. Benbasat and Weber (1996) typify the conventional understanding that research can be regarded as a set of problems, theories and methods. This is a common way of conceptualising research not only in the field of Information Systems but more broadly (Blaxter, Hughes & Tight 1996); however, this particular understanding overlooks the research process as an act of cognition (Kumar 1996). Hence, what initially might appear to be very diverse research (as previous studies have found) in terms of problems, theories and methods may in other important respects not be that different at all. Certainly, the problems that are seen, the theories that are relied upon and the methods that are used are all affected by our underlying conceptual systems – the ways in which we think. This study, however, takes seriously the notion that research is an act of cognition: as such it results in a very different view of what it means to research.

This study also contributes more generally to the theory of metaphor. In particular, it challenges conventional understandings of how metaphors work. In the conventional understanding, metaphors enable insight and understanding by way of simple transference (Lakoff & Johnson 1980; Morgan 2006). For example, an organisation *is* an organism, or more generally an A *is* a B. The logic is that the most salient features of the source domain are transferred directly to the target domain. In this study, however, this understanding is challenged, most notably through the fact that the machine metaphor is always evidenced with the organism and culture metaphors but not vice versa.

It appears that at least on some occasions, particularly with the organism concept, that the direct mapping of source domain to target domain may not necessarily be that simple or indeed that direct. This seems largely because the source concept from which the mappings occur may already be laden with understandings from another domain. Most notably, in this study, as in biology more generally (Rosen 1999), it became evident that the organism concept was largely understood in terms of the machine metaphor. An organism is itself a machine so, even when the rhetoric suggests that the organism metaphor is in use, deeper inspection reveals that it is in effect a mask for the machine metaphor.

Relating this back to metaphor theory in general, it appears that metaphors may not always work by way of simple and direct transference. What initially appears to be a simple transference of the form 'A is a B' may rather be a case of 'A being a C because C is used as a way of conceptualising and understanding B'. This study, therefore, also contributes more generally to metaphor theory by challenging, or perhaps deepening, the conventional understanding of how metaphors work.

Flowing from this contribution to metaphor theory, this study also makes a significant contribution to the field of Organisational Science (OS) since, for many years, the root metaphors of machine, organism and culture have been considered to be very different ways of conceptualising organisations. Indeed, this was the understanding used to pursue the topic of diversity in Information Systems research in this study. The problem however, is that even where these root metaphors are elaborated in the Organisational Science literature the same masking observed in this study is found. This in itself challenges the conventional understanding those in Organisational Science have of these purportedly very 'different' views of organisations.

Morgan (2006) is perhaps one of the best examples of this since, while he offers one of the most complete and comprehensive accounts of the organism metaphor in the field of OS, he also perhaps quite unwittingly provides one of the best examples of masking the organism metaphor with the machine metaphor. As Cummings and Thanem (2002) point out in their critique, rather than using the organism metaphor as a completely different way of viewing the organisation, Morgan's (2006) conceptualisation of the organism is itself based largely on the machine metaphor.

This is of course not a unique problem and is itself perhaps caused by the larger cultural understanding that an organism is a machine (Rosen 1999). In subscribing to such theoretical elaborations which in fact mask one metaphor for another, we may be compromising unwittingly the effort to develop truly different but nevertheless complementary and therefore more complete overall understandings of organisations.

### Empirical

The results of this study contribute significantly to the empirical knowledge of diversity in Information Systems research. As highlighted in the introduction, there is a general dearth of studies in this area. Furthermore, two of the three known studies approach diversity in Information Systems research using the conventional understandings of research. The author's initial exploratory study into diversity in Information Systems research (Behrens 2007) was the only other study to rely on a different theoretical understanding of research: that it is at its core an act of cognition that is enabled through metaphor. This initial study helped to challenge the widespread assumption that research in Information Systems was indeed diverse. This thesis builds on that exploratory study but is more comprehensive. Not only does it add two other key Information Systems concepts (technology and people) to the analysis but it also relies on a vastly increased data source through its inclusion of two more leading Information Systems journals: *Management Information Systems Quarterly* and the *European Journal of Information Systems* in addition to the journal used in the initial study: *Information Systems Research*. This study therefore contributes greatly to what is empirically known on the topic of Information Systems research diversity and, furthermore, challenges through its findings widespread assumptions about the diversity of Information Systems research.

The empirical contributions of this study are not limited to the disciplinary boundaries of Information Systems but extend to research in general. This is the first study of its kind to investigate how metaphor frames our understandings in research. Certainly, scholars in economics (Nelson 2004), chemistry and biology (Rosen 1999), the social sciences (Straus 1981) and the related discipline of Organisational Science (Alvesson 1993; Smircich 1985) have asserted that the metaphors we use are critical to the ways in which we understand our chosen areas of research. They have asserted that such metaphors are critical to the research endeavour, both limiting as well as providing many opportunities for understanding; however, their assertions are based on their own observations and experiences in their own fields. This study is the first to provide empirical evidence to back up these kinds of assertions.

This study also contributes by being one of the few studies which has comprehensively examined in-depth such a large corpus of text. Studies such as these are rare both in Information Systems as well as more generally in studies that apply metaphor theory.

One of the difficulties facing those who wish to study diversity or conduct a similar meta-analysis is the immensity of the task. Typically, the task is made more manageable by reliance on completely automated methods. Citation analysis in particular is a popular way of finding large-scale trends in the discipline. Other fully automated ways of inspecting large numbers of articles include Latent Semantic Analysis. Sidorova, Evangelopoulos and Ramakrishnan (2007) rely on this method to gain some idea of diversity in the Information Systems field. Such fully automated methods remove the burden of having to manually read the articles that are analysed. Nevertheless, while these studies are valuable in capturing certain aspects – particularly in relation to reference disciplines – they fail to capture much of the detail concerning the research.

Despite many of the advantages offered by more comprehensive in-depth studies of the Information Systems field, such studies are much harder to come by. Orlikowski and Iacono (2001) as well as Swanson and Ramiller (1993) are two of the notable exceptions. These studies give a richer, more nuanced idea of the research conducted in the Information Systems discipline due to their in-depth nature, but such studies are not common in the field of Information Systems. In the area of diversity in Information Systems research, comprehensive in-depth studies are rare. As stated previously, there are only three known studies to focus directly on diversity in Information Systems research, and of these Vessey, Ramesh and Glass (2002) and the previous exploratory study by this author were the only two comprehensive in-depth examinations of the field. In being one of the few studies to comprehensively examine such a large corpus of text this study therefore contributes not only to what is empirically known in the specific area of diversity in Information Systems research but more broadly to those studies that have examined the state of the field.

In-depth comprehensive examinations of such a large corpus of text are not only rare in the Information Systems field but more generally in metaphor theory application studies. Metaphor analyses are typically conducted on single texts. The only other metaphor analysis, which is comparable to this study in size is by Santa Ana (2002). This was a study of Latino marginalisation in America and, while the total number of articles examined is not explicitly reported, Santa Ana (2002) does provide the total number of metaphor excerpts in his study (approximately 4,500). Comparing this number of excerpts with the number uncovered in this study puts both in roughly the same category. This study is, therefore, an example of a very rare breed if only because of its detailed and comprehensive examination of a very large corpus of text.

## 9.3.2. Implications

The finding of bias toward the machine metaphor in Information Systems research has important implications for individual researchers, journals and the discipline. Before reviewing these implications, it is important to realise that the results as revealed here should not be dismissed as just uncovering the ways in which key Information Systems concepts are *talked* about. This is because talk is an indicator of what is actually *done*. As Lakoff and Johnson (1980) assert, metaphoric language is not just figurative, it is literal. Key Information Systems concepts are talked about as machines because that is the way they are conceived. Moreover, people act according to the way they conceive things. Hence, talking about key Information Systems concepts primarily as machines will, as argued below, have profound implications for individual researchers, journals and the discipline.

### Individual Researchers

Given the common assumptions about diversity in Information Systems research as well as the repeated calls to 'let many flowers bloom,' the results of bias in Information Systems research may come as a surprise – the least of whom will perhaps be the authors of the articles that constituted the primary evidentiary data for this study; however, conventional understandings of research overlook the fundamental act of cognition. We rely instead on the understanding that research is a collection of problem types, reference disciplines, research methods, and research theories. Such conventional understandings of research extend well beyond the boundaries of the Information Systems discipline. Of course research does involve problems, methods, theories and reference disciplines (regardless of how one views the ontology and epistemology of these things), but identifying problems, using methods, relying on theories and methods requires thought. Such a statement might seem too trivial and obvious, or even trite, but the results of this study challenge that assumption. Conceptualising research as an act of cognition is not trivial and it is certainly not obvious. Doing so leads us to identify with research in a completely new way. Research as an act of cognition gives new meaning to what it is we do every day.

In thinking about research as metaphor based, individual researchers might also be encouraged to reflect more deeply on their own research. What particular metaphors do they rely on most strongly when they research? Metaphors offer powerful ways of seeing and understanding the world but these insights come at a cost. Metaphors always hide particular aspects while emphasising others of those things we seek to understand. It is only by being aware of those metaphors we use in our research that we can grasp what are the strengths and weaknesses of that research. The results of this study show the importance of examining our discourse for the ways in which we structure and understand those things we seek knowledge about. Many of us might believe we use a particular metaphor but it is only through an extensive examination of our discourse that we can be sure that our beliefs match the reality. This research gives individual researchers practical guidance they can use to understand the ways in which they search for meaning in their own research endeavours: by examining their discourse for metaphors.

The results of this research should not only encourage individual researchers to reflect on the ways in which they currently search for meaning in their own research but also identify ways in which they may search for meaning in the future. Certainly, the results of this study show that on the whole Information Systems researchers tend to structure and understand their research by relying on the machine metaphor. While this metaphor offers many advantages it is also plagued by some well-known limitations. Many times, as Pepper (1942) asserts, it is typically the weakness of one metaphor that is the strength of another. For those researchers who want to arrive at a more comprehensive and full account of the subject under investigation, this thesis provides ways for doing so. Not only may their perspective of the research topic perhaps be different and novel but they will most likely arrive at a more complete and richer account than they would otherwise.

### Information Systems journals

Perhaps the stakeholders who should be most directly influenced by the results of this study are the three journals examined: *Information Systems Research*, *Management Information Systems Quarterly* and the *European Journal of Information Systems*. The results of this research may come as a surprise to the North American journals, *Management Information Systems Quarterly* and *Information Systems Research*, and perhaps even a disappointment. That is, despite their best efforts to attract and publish research that is diverse, neither *Management Information Systems Quarterly* nor *Information Systems Research* has, according to the results of this research, been successful. To others the result may not be so surprising. There is a widespread belief, evident in the literature (e.g., Galliers & Meadows 2003; Willcocks, Whitley & Avgerou 2008;), that North American journals publish 'mainstream' North American research based mainly on orthodox, positivistic traditions, and that makes use of 'objective' empirical research approaches consistent with and derived from one universal scientific method (Landry & Banville 1992). The author's personal experience, from presenting the exploratory study results (Behrens 2007), at the International Conference on Information Systems (2007) supports such a view. Many in the audience expressed their lack of surprise that *Information Systems Research* was biased toward mechanistic understandings. To them, *Information Systems Research*, while still highly prestigious, was in the business of publishing mainstream North American research biased towards positivistic perspectives.

While the aim and scope of the *European Journal of Information Systems* is to provide a distinctive European perspective on the theory and practice of information systems, the results of this study suggest that such a perspective is not vastly different to 'mainstream' North American research. The perceived divide between European and North American research goes back many years and is perhaps best expressed by Landry and Banville (1992). As they state, where the North American research model was based on an orthodox rational and mechanistic view of the world, the European research model was perceived as one that challenged this orthodoxy by advocating greater pluralism, increased diversity, greater use of methods that allow researchers scope for interpretation, and adoption of theoretical perspectives not based on a rational and mechanistic view of the world. Researchers adopting such a view were characterised by Landry and Banville (1992) as the *knights of change*; however, the results of this study show that European research is just as likely to be based on a rational and mechanistic view as North American research. The European research model, at least as it emerged in this study, does not appear to have done much to challenge the perceived orthodoxy of North American research. European research, as it is published in the *European Journal of Information Systems*, is as much a part of the orthodoxy as North American research.

Although there is a bias towards the machine metaphor in three of the leading Information Systems journals, such a state does not have to be a *fait accompli*. The journals examined in this study as well as Information Systems journals in general have a great deal of influence in the disciplinary community, particularly when it comes to either reinforcing or changing certain regimes of truth. With power comes responsibility and journals have a considerable responsibility to their disciplinary communities to challenge the type of bias uncovered in this research: bias that in many ways prevents the progress of knowledge in the discipline. While there appears to be a general willingness and overall desire by many journals, including the ones examined here, to publish diverse research, the results reported in this study suggest more specific actions that could be undertaken. One might be that journals consider promoting the exploration of alternative metaphors through special issues.

### Discipline

The bias towards the machine metaphor is also significant for the discipline as a whole. Scholars have worried about the lack of a dominant paradigm in the Information Systems discipline for years (Banville & Landry 1989) and such concerns continue unabated (Benbasat & Weber 1996). As Banville and Landry (1989) assert, these concerns have and continue to be based on preoccupations with disciplinary progress and maturation. The understanding is that a discipline is in a state of progress and maturity if there is one dominant paradigm. Based on the results of this study it appears that those supporting the monistic view of science have nothing to fear. The Information Systems discipline may indeed have already entered, albeit quite unwittingly, into a period of 'normal science' as conceived by Kuhn (1970).

While some may see the dominance of a particular paradigm as evidenced by a bias towards a single root metaphor as cause for celebration, many others will not be so jubilant. Various scholars such as Banville and Landry (1989) take the view that a monistic view of science is not only inappropriate but dangerous. The dangers of a dominant paradigm are, as Banville and Landry (1989) assert, not only realised in social terms but (contrary to those who believe a dominant paradigm will bring with it progress and maturation) actively work against such goals:

> In conclusion, the idea of establishing a paradigm for MIS, along the lines of the popular conception of Kuhn's model, if at all practicable, would not bring about the effects expected by the very proponents of this idea. On the contrary, the most probable result would be a break-up of the field into rather hermetic factions and the consequent loss of the creativity generated by exchanges about research topics and research methods. (p. 51)

With root metaphors, which are essentially a shorthand for paradigms (Pepper 1942), similar observations can be made. Pepper (1942) argues that to assert the dominance of any one paradigm over another is foolhardy. Placing any one metaphor over another as a superior world view asserts that only certain things should be studied, only certain questions asked and only certain rules followed in interpreting the answers. While many have asserted that having multiple paradigms is confusing and hence so too would multiple root metaphors, Herbert Simon (1964) warns that 'confusion, by another name is progress to which we have not yet become accustomed' (p. 82). Relying on multiple root metaphors and multiple paradigms may offer a certain amount of confusion but it may also be in that confusion that progress is made. Rather than perversely ignoring all the available evidence and the benefits of multiple modes of corroboration, disciplines may actively work toward a richer and fuller account of their area of study. The results of this study may therefore be taken as a warning that, rather than progressing and maturing, the discipline may indeed be at risk of possible sclerosis.

## 9.4 Limitations and future research

Before concluding this chapter and thesis, a brief discussion of the main limitations of the study is necessary. There are three main limitations: scope, data format, and perspective. These three are discussed in turn below.

With respect to scope, while the effort was made to capture as broad and deep a cross-section of academic discourse as possible, the study is still limited to the evidence of the discourse in three Information Systems journals. But do people talk about key Information Systems concepts (primary data) in the same way they write about them (secondary data)? While to test this would make a useful avenue for future research it was simply impractical in the current study. The task of examining almost 400 separate articles was already a massive undertaking. Yet, this question does provide an interesting possible avenue for further research.

The journals examined may also be seen as limiting. While the attempt was been made to select journals capturing as broad a cross-section of the Information Systems academic community as possible, some might criticise the choice of two North American and one European journal as the basis for the analysis. It was the intention of the study, however, to use journals that were not only highly regarded in the discipline but that were also likely to represent a diversity of views. Both *Management Information Systems Quarterly* and *Information Systems Research* have been rated as the top journals in the field almost since the time such rating exercises began in the discipline. These two journals, while of North American origin, have had people from all over the world sitting on their editorial board and authors from varying backgrounds frequently publish in them. These two journals were also judged by previous studies (Sidorova, Evangelopoulos & Ramakrishnan 2007; Vessey, Ramesh & Glass 2002) to be diverse in the research they publish. The *European Journal of Information Systems* is also highly regarded in the discipline and prides itself on publishing papers with a diversity of perspectives. Further research could investigate other journals that are not only based outside North America but also are more humble in their rankings. Such journals are potential sources for gaining insights into research that, while not as prestigious, may exhibit the type of diversity investigated in this study.

While many other studies including those of Vessey, Ramesh and Glass (2002) and Sidorova, Evangelopoulos and Ramakrishnan (2007) include five or more journals in their examination, this study was limited to three. This was due to the desire to undertake as deep an examination of the journals under study as possible, but also not to limit the study to a single journal, and three was the maximum number deemed practical at the time. Even so, because of the immensity of the analysis task, not all years were included for all concepts in all journals. This is certainly a limitation but in a single study one can only achieve so much. Nevertheless, with the help of other analysts this study could be expanded to include not only the years missed but also a greater number of Information Systems or Information Systems related journals.

The final limitation that will be discussed here is in relation to the author as a researcher. It has to be recognised that the analysis presented here represents a Western perspective. While another coder was employed to increase confidence in the results, both coders are from a Western background. Therefore it needs to be remembered that the work and results reported in this study were produced through the lens of a Western cultural background and, as Lakoff and Johnson (1980) point out, our metaphors and those things we recognise as metaphors are very much influenced by culture. As an avenue for future research it would be interesting to conduct a similar metaphor analysis but done by analysts from different cultural backgrounds.

In addition to the future avenues for research on diversity in Information Systems research highlighted above, there are several other possibilities:

- Is the lack of conceptual diversity found in this study a more widespread phenomenon? The same approach reflected in this study could be applied not only to the same journals over a different time period, but other Information Systems journals, and even more broadly to other disciplines. It could also be applied to the concept of research more generally. That is, what evidence exists for the different root metaphors of research?

- The key concepts explored in this study also limit the results. Future studies may wish to explore different concepts and – perhaps – the results for different concepts may yield different results. Also, on the subject of key Information Systems concepts are all concepts in Information Systems – or further afield for that matter – dependent on metaphors for their conceptualisation? If so, what metaphors?

- Is the lack of conceptual diversity found in this study a more widespread phenomenon? The same approach reflected in this study could be applied not only to the same journals over a different time period, but other Information Systems journals, and even more broadly to other disciplines. It could also be applied to the concept of research more generally, that is, what evidence exists for the different root metaphors of research?

- While this study has revealed a lack of conceptual diversity in a particular medium with Information Systems researchers, it would be interesting to see whether the same case holds for other media, conferences, books etc. and for different stakeholders, Information Systems teaching academics, Information Systems practitioners etc. Are the conceptualisations in these media and for these stakeholder groups as restricted as those revealed in this study? What are the similarities and difference between the different media and different groups?

- Another significant question arising from this study is 'Why?' Why is there such a fundamental lack of diversity in our research? Is there any truth in the hypothesis that the results are simply a reflection of the larger societal myth of rationality? Or are there other social, historical political or even cognitive reasons that might explain why such a bias exists?

- Additionally, why is there such a lack of difference in terms of root metaphors between the European journal and North American journals investigated? Is it, as Galliers (2008) suggest, something to do with the increasing drive to assess, quality assure, benchmark, appraise, evaluate, etc., that eventually drives all scholarly publication into a narrow insular academic straightjacket?

## 9.5 Final conclusions

This thesis began as an enquiry into the diversity of Information Systems research. It was motivated by a single broad research question *How conceptually diverse is Information Systems research*? Despite the widespread assumption that Information Systems research is diverse the results of this thesis provide little to support this notion. A fictive root metaphor analysis was conducted on the discourse of three leading journals and a distinct bias toward mechanistic understandings of key Information Systems concepts was uncovered. Bias toward the machine metaphor was produced in two main ways: through primary means, that is, discourse and secondary means, that is, high-level entailments, reasonings and sub-metaphors. Relying primarily on the machine metaphor in our research has significant implications for individual researchers, journals and the discipline. The root metaphor of the machine, like all root metaphors, is not perfect. It provides many insights but at the cost of distortion. The challenge for those in Information Systems is to explore the alternative root metaphors of organism and culture more completely without casting aside the root metaphor of the machine as an inferior world-view. Perhaps it is, as

Pepper (1942) asserts, only through diversity in our root metaphors that we will find the way to a richer and more complete understanding of our world and ourselves.

# Appendix A

Analysis results for the journal *Information Systems Research* during the period 2000–2007 inclusive.

# 2000

Table A.1. *Coding of articles published in ISR during the year 2000*

| ARTICLE | MACHINE | ORGANISM | CULTURE |
|---|---|---|---|
| Basu, A., and Blanning, R. W. "A Formal Approach to Workflow Analysis," Information Systems Research (11), 2000, pp. 17-36 | D | S | O |
| Marcolin, B. L., Compeau, D. R., Munro, M. C., and Huff, S. L. "Assessing User Competence: Conceptualization and Measurement," Information Systems Research (11), 2000, pp. 37-60 | D | O | - |
| Dey, D., and Sarkar, S. "Modifications of Uncertain Data: A Bayesian Framework for Belief Revision," Information Systems Research (11), 2000, pp. 1-16 | D | - | - |
| Kauffman, J. R., McAndrews, J., and Wang, Y. "Opening the "Black Box" of Network Externalities in Network Adoption," Information Systems Research (11), 2000, pp. 61-82 | S | D | - |
| Menon, N. M., Lee, B., and Eldenberg, L. "Productivity of Information Systems in the Healthcare Industry," Information Systems Research (11), 2000, pp. 83-92 | D | O | - |
| Hunter, G. M., and Beck, J. E. "Using Repertory Grids to Conduct Cross-Cultural Information Systems Research," Information Systems Research (11), 2000, pp. 93-101 | S | D | S |
| West, J., and Dedrick, J. "Innovation and Control in Standards Architectures: The Rise and Fall of Japan's PC-98," Information Systems Research (11), 2000, pp. 197-216 | O | D | S |
| Mookerjee, V. S., and Mannino, M. V. "Mean-Risk Trade-Offs in Inductive Expert Systems," Information Systems Research (11), 2000, pp. 137-158 | D | S | - |
| Sambamurthy, V., and Zmud, R. W. "Research Commentary: The Organizing Logic for an Enterprise's IT Activities in the Digital Era – A Prognosis of Practice and a Call for Research," Information Systems Research (11), 2000, pp. 105-114 | S | D | - |
| Gurbaxani, V., Melville, N., and Kraemer, K. "The Production of Information Services: A Firm-Level Analysis of Information Systems Budgets," Information Systems Research (11), 2000, pp. 159-176 | D | S | - |
| Lim, K. H., Benbasat, I., and Ward, L. M. "The Role of Multimedia in Changing First Impression Bias," Information Systems Research (11), 2000, pp.115-136 | D | O | - |

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| Konana, P., Gupta, A., and Whinston, A. B. "Integrating User Preferences and Real-Time Workload in Information Services," Information Systems Research (11), 2000, pp. 177-196 | D | O | O |
| Banker, R. D., and Slaughter, S. A. "The Moderating Effects of Structure on Volatility and Complexity in Software Enhancement," Information Systems Research (11), 2000, pp. 219-240 | D | D | - |
| Palmer, J. W., and Markus, M. L. "The Performance Impacts of Quick Response and Strategic Alignment in Specialty Retailing," Information Systems Research (11), 2000, pp. 241-259 | S | D | - |
| Kim, J., Hahn, J., and Hahn, H. "How Do We Understand a System with (So) Many Diagrams? Cognitive Integration Processes in Diagrammatic Reasoning," Information Systems Research (11), 2000, pp. 284-303 | D | - | - |
| Nault, B. R., and Vandenbosch, M. B. "Research Report: Disruptive Technologies – Explaining Entry in Next Generation Information Technology Markeets," Information Systems Research (11), 2000, pp. 304-319 | S | D | - |
| Westland, C. J. "Research Report: Modeling the Incidence of Postrelease Errors in Software," Information Systems Research (11), 2000, pp. 320-324 | S | S | O |
| Venkatesh, V. "Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model," Information Systems Research (11), 2000, pp. 342-365 | D | D | - |
| Johnson, R. D., and Marakas, G. M. "Research Report: The Role of Behavioral Modeling in Computer Skills Acquisition – Toward Refinement of the Model," Information Systems Research (11), 2000, pp. 402-417 | D | S | - |
| Bordetsky, A., and Mark, G. "Memory-Based Feedback Controls to Support Groupware Coordination," Information Systems Research (11), 2000, pp. 366-385 | D | S | O |
| Agarwal, R., Sambamurthy, V., and Stair, R. M. "Research Report: The Evolving Relationship Between General and Specific Computer Self-Efficacy – An Empirical Assessment," Information Systems Research (11), 2000, pp. 418-430 | D | S | - |
| Limayem, M., and DeSanctis, G. "Providing Decisional Guidance for Multicriteria Decision Making in Groups," Information Systems Research (11), 2000, pp. 386-401 | D | O | - |
| March, S., Hevner, A., and Ram, S. "Research Commentary: An Agenda for Information Technology Research in Heterogeneous and | D | D | - |

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|---|---|---|---|
| Distributed Environments," Information Systems Research (11), 2000, pp. 327-341 | | | |

Legend: D – dominant, S – secondary, O – occasional.

# 2001

Table A.2. *Coding of articles published in ISR during the year 2001*

| ARTICLE | MACHINE | ORGANISM | CULTURE |
|---|---|---|---|
| Sabherwal, R., and Chan, Y. E. "Alignment between business and IS strategies: A study of prospectors, analyzers, and defenders," Information Systems Research (12), 2001, pp. 11-33 | D | S | - |
| Moore, S. A. "A foundation for flexible automated electronic communication," Information Systems Research (12), 2001, pp. 34-62 | D | S | - |
| Lerch, F. J., and Harter, D. E. "Cognitive support for real-time dynamic decision making," Information Systems Research (12), 2001, pp. 63-82 | D | O | - |
| Thomas, H., and Datta, A. "A conceptual model and algebra for on-line analytical processing in decision support databases," Information Systems Research (12), 2001, pp. 83-102 | D | O | - |
| Im, K. S., Dow, K. E., and Grover, V. "Research report: A reexamination of IT investment and the market value of the firm - An event study methodology," Information Systems Research (12), 2001, pp. 103-117 | D | O | O |
| Orlikowski, W. J., and Iacono, S. C. "Research commentary: Desperately seeking "IT" in IT research - A call to theorizing the IT artifact," Information Systems Research (12), 2001, pp. 121-134 | S | S | S |
| Subramani, M., and Walden, E. "The impact of e-commerce announcements on the market value of firms," Information Systems Research (12), 2001, pp. 135-154 | D | S | S |
| Kiang, M. Y., and Kumar, A. "An evaluation of self-organizing map networks as a robust alternative to factor analysis in data mining applications," Information Systems Research (12), 2001, pp. 177-194 | D | S | - |
| Belanger, F., Collins, R. W., and Cheney, P. H. "Technology requirements and work group communications for telecommuters," Information Systems Research (12), 2001, pp. 155-176 | D | O | O |
| Austin, R. D. "The effects of time pressure on quality in software development: An agency model," Information Systems Research (12), 2001, pp. 195-207 | D | O | - |
| Plouffe, C. R., Hulland, J. S., and Vandenbosch, M. "Research report: Richness versus parsimony in modeling technology adoption decisions - Understanding merchant adoption of a smart card-based payment system," Information Systems Research (12), 2001, pp. 208-222 | D | O | O |

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|---|---|---|---|
| Dutta, A. "Business planning for network services: A systems thinking approach," Information Systems Research (12), 2001, pp. 260-283 | D | S | - |
| Krishnan, R., Li, X., Steier, D., and Zhao, J. L. "On heterogeneous database retrieval: A cognitively guided approach," Information Systems Research (12), 2001, pp. 286-301 | D | O | - |
| Chwelos, P., Benbasat, I., and Dexter, A. S. "Research report: Empirical test of an EDI adoption model," Information Systems Research (12), 2001, pp. 304-321 | D | S | - |
| Garfield, M. J., Taylor, N. J., Dennis, A. R., and Satzinger, J. W. "Research report: Modifying Paradigms - individual differences, creativity techniques, and exposure to ideas in group idea generation," Information Systems Research (12), 2001, pp. 322-333 | D | S | O |
| Ba, S., Stallaert, J., and Whinston, A. B. "Research commentary: Introducing a third dimension in information systems design - the case for incentive alignment," Information Systems Research (12), 2001, pp. 225-239 | D | D | S |
| Raghunathan, S., and Yeh, A. B. "Beyond EDI: Impact of continuous replenishment program (CRP) between a manufacturer and its retailers," Information Systems Research (12), 2001, pp. 406-419 | D | S | - |
| Bodart, F., Patel, A., Sim, M., and Weber, R. "Should optional properties be used in conceptual modelling? A theory and three empirical tests," Information Systems Research (12), 2001, pp. 384-405 | D | O | - |
| Raghu, T. S., Ramesh, R., Chang, A., and Whinston, A. B. "Collaborative decision making: A connectionist paradigm for dialectical support," Information Systems Research (12), 2001, pp. 363-383 | D | O | - |
| Butler, B. S. "Membership size, communication activity, and sustainability: A resource-based model of online social structure," Information Systems Research (12), 2001, pp. 346-362 | D | S | S |
| Straub, D. W., and Watson, R. T. "Research commentary: transformational issues in researching IS and net-enabled organizations," Information Systems Research (12), 2001, pp. 337-349 | D | D | O |

Legend: D – dominant, S – secondary, O – occasional.

## 2002

Table A.3. *Coding of articles published in ISR during the year 2002*

| ARTICLE | MACHINE | ORGANISM | CULTURE |
|---|---|---|---|
| Basu, A., and Kumar, A. "Research commentary: Workflow management issues in e-business," Information Systems Research (13), 2002, pp. 1-14 | D | S | - |
| Sia, C., Tan, B. C., and Wei, K. "Group polarization and computer-mediated communication: Effects of communication cues, social presence, and anonymity," Information Systems Research (13), 2002, pp. 70-90 | D | O | O |
| Kudyba, S., and Romesh, D. "Research report: Increasing returns to information technology," Information Systems Research (13), 2002, pp. 104-111 | D | - | - |
| Koufaris, M. "Applying the technology acceptance model and flow theory to online consumer behavior," Information Systems Research (13), 2002, pp. 205-223 | D | D | - |
| Agarwal, R., and Venkatesh, V. "Assessing a firm's Web presence: A heuristic evaluation procedure for the measurement of usability," Information Systems Research (13), 2002, pp. 168-186 | D | D | - |
| Zahra, S. A., and George, G. "The Net-enabled business innovation cycle and the evolution of dynamic capabilities," Information Systems Research (13), 2002, pp. 147-150 | D | D | - |
| Torkzadeh, G., and Dhillon, G. "Measuring factors that influence the success of Internet commerce," Information Systems Research (13), 2002, pp. 187-204 | D | D | - |
| Wheeler, B. C. "NEBIC: A dynamic capabilities theory for assessing Net-enablement," Information Systems Research (13), 2002, pp. 125-146 | S | D | O |
| Palmer, J. W. "Web site usability, design, and performance metrics," Information Systems Research (13), 2002, pp. 151-167 | S | D | O |
| Devaraj, S., Fan, M., and Kohli, R. "Antecedents of B2C Channel Satisfaction and Preference: Validating e-Commerce Metric," Information Systems Research (13), 2002, pp. 316-333 | D | O | - |
| Kim, J., and Lee, J.,"Businesses as Buildings: Metrics for the Architectural Quality of Internet Businesses," Information Systems Research (13), 2002, pp. 239-254 | D | O | O |
| McKnight, H. D., Choudhury, V., and Kacmar, C. "Developing and Validating Trust Measures for e-Commerce: An Integrative Typology," Information Systems Research (13), 2002, pp. 334-359 | D | S | - |

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|---|---|---|---|
| Zhu, K., and Kraemer, K. L. "e-Commerce Metrics for Net-Enhanced Organizations: Assessing the Value of e-Commerce to Firm Performance in the Manufacturing Sector," Information Systems Research (13), 2002, pp. 275-295 | D | O | - |
| Chen, P., and Hitt, L. M. "Measuring Switching Costs and the Determinants of Customer Retention in Internet-Enabled Businesses: A Study of the Online Brokerage Industry," Information Systems Research (13), 2002, pp. 255-274 | D | O | - |
| McKinney, V., Yoon, K., and Zahedi, F. "The Measurement of Web-Customer Satisfaction: An Expectation and Disconfirmation Approach," Information Systems Research (13), 2002, pp. 296-315 | D | D | - |
| Straub, D. W., Hoffman, D. L., Weber, B. W., and Steinfeld, C. "Toward New Metrics for Net-Enhanced Organization," Information Systems Research (13), 2002, pp. 227-238 | D | D | - |
| Alavi, M., Marakas, M., and Yoo, Y. "A Comparative Study of Distributed Learning Environments on Learning Outcomes," Information Systems Research (13), 2002, pp. 404-415 | D | O | - |
| Nadiminti, R., Mukhopadhyay, T., and Kriebel, C. H. "Research Report: Intrafirm Resource Allocation with Asymmetric Information and Negative Externalities," Information Systems Research (13), 2002, pp. 428-434 | D | - | - |
| Sarathy, R., and Muralidhar, K. "The Security of Confidential Numerical Data in Databases," Information Systems Research (13), 2002, pp. 389-403 | D | D | - |
| Lyytinen, K., and Yoo, Y. "Research Commentary: The Next Wave of Nomadic Computing," Information Systems Research (13), 2002, pp. 377-388 | D | O | - |

Legend: D – dominant, S – secondary, O – occasional.

## 2003

Table A.4. *Coding of articles published in ISR during the year 2003*

| ARTICLE | MACHINE | ORGANISM | CULTURE |
|---|---|---|---|
| Fan, M., Stallaert, J., Whinston, A. B. "Decentralized Mechanism Design for Supply Chain Organizations Using an Auction Market," Information Systems Research (13), 2003, pp. 1-22 | D | D | O |
| Chen, Y., and Png, I. "Information Goods Pricing and Copyright Enforcement: Welfare Analysis," Information Systems Research (13), 2003, pp. 107-123 | D | O | S |
| Sussman, S. W., and Siegal, W. S. "Informational Influence in Organizations: An Integrated Approach to Knowledge Adoption," Information Systems Research (13), 2003, pp. 47-65 | D | O | - |
| Miranda, S. M., and Saunders, C. S. "The Social Construction of Meaning: An Alternative Perspective on Information Sharing," Information Systems Research (13), 2003, pp. 87-106 | D | S | S |
| Ho, V. T., Ang, S., and Straub, D. "When Subordinates Become IT Contractors: Persistent Managerial Expectations in IT Outsourcing," Information Systems Research (13), 2003, pp. 66-86 | D | D | O |
| Van der Aalst, W. M. P., and Kumar, A. "XML–Based Schema Definition for Support of Interorganizational Workflow," Information Systems Research (13), 2003, pp. 23-46 | D | O | - |
| Yi, M. Y., and Davis, F. D. "Developing and Validating an Observational Learning Model of Computer Software Training and Skill Acquisition," Information Systems Research (13), 2003, pp. 146-169 | D | - | - |
| Fisher, C. W., Chengalur-Smith, I, and Ballou, D. P. "The Impact of Experience and Time on the Use of Data Quality Information in Decision Making," Information Systems Research (13), 2003, pp. 170-188 | D | - | - |
| Purao, S., Storey, V. C., and Han, T. "Improving Analysis Pattern Reuse in Conceptual Design: Augmenting Automated Processes with Supervised Learning," Information Systems Research (13), 2003, pp. 269-290 | D | S | - |
| Bapna, R., Goes, P., and Gupta, A. "Replicating Online Yankee Auctions to Analyze Auctioneers' and Bidders' Strategies," Information Systems Research (13), 2003, pp. 244-268 | D | - | - |
| Choudhury, V., and Sabherwal, R. "Portfolios of Control in Outsourced Software Development Projects," Information Systems Research (13), 2003, pp. 291-314 | D | D | S |

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|---|---|---|---|
| Basu, A., and Blanning, R. W. "Synthesis and Decomposition of Processes in Organization," Information Systems Research (13), 2003, pp. 337-355 | D | O | - |
| Bassellier, G., Benbasat, I., and Reich, B. H. "The Influence of Business Managers' IT Competence on Championing IT," Information Systems Research (13), 2003, pp. 317-336 | D | O | - |

Legend: D – dominant, S – secondary, O – occasional.

## 2004

Table A.5. *Coding of articles published in ISR during the year 2004*

| ARTICLE | MACHINE | ORGANISM | CULTURE |
|---|---|---|---|
| Chiang, R. I., and Mookerjee, V. S. "A Fault Threshold Policy to Manage Software Development Projects," Information Systems Research (13), 2004, pp. 3-21 | D | - | - |
| Schultze, U., and Orlikowski, W. J. "A Practice Perspective on Technology-Mediated Network Relations: The Use of Internet-Based Self-Serve Technologies," Information Systems Research (13), 2004, pp. 87-106 | D | O | O |
| Pavlou, P. A., and Gefen, D. "Building Effective Online Marketplaces with Institution-Based Trust," Information Systems Research (13), 2004, pp. 37-59 | D | S | O |
| Hong, W., Thong, J. Y. L., and Tam, K. Y. "Does Animation Attract Online Users' Attention? The Effects of Flash on Information Search Performance and Perceptions," Information Systems Research (13), 2004, pp. 60-86 | D | O | - |
| Bhargava, H. K., and Choudhary, V. "Economics of an Information Intermediary with Aggregation Benefits," Information Systems Research (13), 2004, pp. 22-36 | D | O | - |
| Karimi, J., Somers, T. M., and Gupta, Y. P. "Impact of Environmental Uncertainty and Task Characteristics on User Satisfaction with Data," Information Systems Research (13), 2004, pp. 175-193 | D | S | - |
| Lee, J., Miranda, S. M., and Kim, Y. M., "IT Outsourcing Strategies: Universalistic, Contingency, and Configurational Explanations of Success," Information Systems Research (13), 2004, pp. 110-131 | D | S | O |
| Fichman, R. G. "Real Options and IT Platform Adoption: Implications for Theory and Practice," Information Systems Research (13), 2004, pp. 132-154 | D | D | O |
| Thatcher, M. E., and Pingry, D. E. "An Economic Model of Product Quality and IT Value," Information Systems Research (13), 2004, pp. 268-286 | D | - | - |
| Lilien, G. L., Rangaswamy, A., Van Bruggen, G. H., and Starke, K. "DSS Effectiveness in Marketing Resource Allocation Decisions: Reality vs. Perception," Information Systems Research (13), 2004, pp. 216-249 | D | O | - |
| Hu, X., Lin, Z., Whinston, A. B., and Zhang, H. "Hope or Hype: On the Viability of Escrow Services as Trusted Third Parties in Online Auction | D | S | - |

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|---|---|---|---|
| Environments," Information Systems Research (13), 2004, pp. 236-249 | | | |
| Sundararajan, A. "Managing Digital Piracy: Pricing and Protection," Information Systems Research (13), 2004, pp. 287-308 | D | D | - |
| Jarvenpaa, S. L., Shaw, T. R., and Staples, S. D. "Toward Contextualized Theories of Trust: The Role of Trust in Global Virtual Teams," Information Systems Research (13), 2004, pp. 250-267 | D | S | O |
| Krishnan, M. S., Mukhopadhyay, T., and Kriebel, C. H. "A Decision Model for Software Maintenance," Information Systems Research (13), 2004, pp. 396-412 | D | - | - |
| Kirsch, L. J. "Deploying Common Systems Globally: The Dynamics of Control," Information Systems Research (13), 2004, pp. 374-395 | D | S | O |
| Malhotra, N. K., Kim, S. S., and Agarwal, J. "Internet Users' Information Privacy Concerns (IUIPC): The Construct, the Scale, and a Causal Model," Information Systems Research (13), 2004, pp. 336-355 | O | D | - |
| Koh, C., Ang, S., and Straub, D. W. "IT Outsourcing Success: A Psychological Contract Perspective," Information Systems Research (13), 2004, pp. 356-373 | D | S | O |
| Raghu., T. S., Jayaraman, B., and Rao, H. R. "Toward an Integration of Agent- and Activity-Centric Approaches in Organizational Process Modeling: Incorporating Incentive Mechanisms," Information Systems Research (13), 2004, pp. 316-335 | D | S | O |

Legend: D – dominant, S – secondary, O – occasional.

# 2005

Table A.6. *Coding of articles published in ISR during the year 2005*

| ARTICLE | MACHINE | ORGANISM | CULTURE |
|---|---|---|---|
| Majchrzak, A., Malhotra, A., and John, R. "Perceived Individual Collaboration Know-How Development Through Information Technology-Enabled Contextualization: Evidence from Distributed Teams," Information Systems Research (16), 2005, pp. 9-27 | D | O | O |
| Wixom, H. M., and Todd, P. A. "A Theoretical Integration of User Satisfaction and Technology Acceptance," Information Systems Research (16), 2005, pp. 85-102 | D | S | - |
| Zhu, K., and Kraemer, K. L. "Post-Adoption Variations in Usage and Value of E-Business by Organizations: Cross-Country Evidence from the Retail Industry," Information Systems Research (16), 2005, pp. 61-84 | D | S | O |
| Cavusoglu, H., Mishra, B., and Raghunathan, S. "The value of intrusion detection systems in information technology security architecture," Information Systems Research (13), 2005, pp. 28-47 | D | O | - |
| Bandyopadhyay, S., Barron, J. M., and Chaturvedi, A. R. "Competition Among Sellers in Online Exchanges," Information Systems Research (13), 2005, pp. 47-60. | D | O | - |
| Levina, N. "Collaborating on Multiparty Information Systems Development Projects: A Collective Reflection-in-Action View," Information Systems Research (16), 2005, pp. 109-130 | S | D | D |
| Jiang, Z., Mookerjee, V. S., Sarkar, S. "Lying on the Web: Implications for Expert Systems Redesign,," Information Systems Research (16), 2005, pp. 131-148 | D | - | - |
| Chidambaram, L., and Tung, L. L. "Is Out of Sight, Out of Mind? An Empirical Study of Social Loafing in Technology-Supported Groups," Information Systems Research (16), 2005, pp. 149-168 | D | S | O |
| Adomovicius, G., and Gupta, A. "Toward Comprehensive Real-Time Bidder Support in Iterative Combinatorial Auctions," Information Systems Research (16), 2005, pp. 169-185 | D | - | - |
| Gal-Or, E., and Ghose, A. "The Economic Incentives for Sharing Security Information," Information Systems Research (16), 2005, pp. 186-208 | D | D | O |
| Dellarocas, C. "Reputation Mechanism Design in Online Trading Environments with Pure Moral Hazard," Information Systems Research (16), 2005, pp. 209-230 | D | S | O |

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|---|---|---|---|
| Ferratt, T. W., Agarwal, R., Brown, C. V., and Moore, J. E. "IT Human Resource Management Configurations and IT Turnover: Theoretical Synthesis and Empirical Analysis," Information Systems Research (13), 2005, pp. 237-255. | D | S | O |
| Menon, S., Sarkar, S., and Mukherjee, S. "Maximizing Accuracy of Shared Databases when Concealing Sensitive Patterns," Information Systems Research (13), 2005, pp. 256-270. | D | O | - |
| Tam, K. Y., and Ho, S. Y. "Web Personalization as a Persuasion Strategy: An Elaboration Likelihood Model Perspective," Information Systems Research (13), 2005, pp. 271-291. | D | S | - |
| Ji, Y., Mookerjee, V. S., and Sethi, S. P. "Optimal Software Development: A Control Theoretic Approach," Information Systems Research (13), 2005, pp. 292-306. | D | - | - |
| Krishnan, R., Peters, J., Padman, R., and Kaplan, D. "On Data Reliability Assessment in Accounting Information Systems," Information Systems Research (13), 2005, pp. 307-326. | D | - | - |
| Wu, J., Cook, V. J., and Strong, E. C. "A Two-Stage Model of the Promotional Performance of Pure Online Firms," Information Systems Research (13), 2005, pp. 334-351. | D | D | - |
| Bakos, Y., Lucas, H. C., Oh, W., Simon, G., Viswanathan, S., and Weber, B. W. "The Impact of E-Commerce on Competition in the Retail Brokerage Industry," Information Systems Research (13), 2005, pp. 352-371. | D | D | - |
| Pavlou, P. A., and Gefen, D. "Psychological Contract Violation in Online Marketplaces: Antecedents, Consequences, and Moderating Role," Information Systems Research (13), 2005, pp. 372-399. | S | D | S |
| Chellappa, R. K., and Shivendu, S. "Managing Piracy: Pricing and Sampling Strategies for Digital Experience Goods in Vertically Segmented Markets," Information Systems Research (13), 2005, pp. 372-399. | S | D | S |
| Kim, S. S., Malhotra, N. K., and Narasimhan, S. "Research Note—Two Competing Perspectives on Automatic Use: A Theoretical and Empirical Comparison," Information Systems Research (13), 2005, pp. 418-432. | D | S | O |

Legend: D – dominant, S – secondary, O – occasional.

## 2006

Table A.7. *Coding of articles published in ISR during the year 2006*

| ARTICLE | MACHINE | ORGANISM | CULTURE |
|---|---|---|---|
| Ghose, A., Smith, M. D., and Telang, R. "Internet Exchanges for Used Books: An Empirical Analysis of Product Cannibalization and Welfare Impact," Information Systems Research (17), 2006, pp. 3-19 | S | D | - |
| Dinev, T., and Hart, P. "An Extended Privacy Calculus Model for E-Commerce Transactions," Information Systems Research (17), 2006, pp. 61-80. | S | O | - |
| Ranganathan, C., and Brown, C. V. "ERP Investments and the Market Value of Firms: Toward an Understanding of Influential ERP Project Variables," Information Systems Research (17), 2006, pp. 145-161. | D | S | - |
| Banker, R. D., Kalvenes, J., and Patterson, R. A. "Research Note—Information Technology, Contract Completeness, and Buyer-Supplier Relationships," Information Systems Research (17), 2006, pp. 180-193. | D | S | - |
| Stewart, K. J., Ammeter, A. P., and Maruping, L. M. "Impacts of License Choice and Organizational Sponsorship on User Interest and Development Activity in Open Source Software Projects," Information Systems Research (17), 2006, pp. 126-144. | S | S | S |
| Pavlou, P. A., and El Sawy, O. A. "From IT Leveraging Competence to Competitive Advantage in Turbulent Environments: The Case of New Product Development," Information Systems Research (17), 2006, pp. 198-227. | D | O | - |
| Masuda, Y., and Whang, S. "On the Optimality of Fixed-up-to Tariff for Telecommunications Service," Information Systems Research (17), 2006, pp. 247-253. | D | - | - |
| Li, X., and Sarkar, S. "Privacy Protection in Data Mining: A Perturbation Approach for Categorical Data," Information Systems Research (17), 2006, pp. 254-270. | D | - | - |
| Dellarocas, C. "How Often Should Reputation Mechanisms Update a Trader's Reputation Profile?," Information Systems Research (17), 2006, pp. 271-285. | D | O | - |
| Kim, D., and Benbasat, I. "The Effects of Trust-Assuring Arguments on Consumer Trust in Internet Stores: Application of Toulmin's Model of Argumentation," Information Systems Research (17), 2006, pp. 286-300. | D | O | S |
| Slaughter, S. A., and Kirsch, L. J. "The Effectiveness of Knowledge Transfer Portfolios in | D | - | - |

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| Software Process Improvement: A Field Study," Information Systems Research (17), 2006, pp. 301-320. | | | |
| Nicolaou, A. I., and McKnight, D. H. "Perceived Information Quality in Data Exchanges: Effects on Risk, Trust, and Intention to Use," Information Systems Research (17), 2006, pp. 332-351 | D | S | - |
| Banker, R. D., Bardhan, I., and Asdemir, O. "Understanding the Impact of Collaboration Software on Product Design and Development," Information Systems Research (17), 2006, pp. 352-373 | D | S | - |
| Sun, S. X., Zhao, J. L., Nunamaker, J. F., and Sheng, O. R. L. "Formulating the Data-Flow Perspective for Business Process Management," Information Systems Research (17), 2006, pp. 374-391. *Excellent* | D | - | - |
| Pavlou, P. A., and Dimoka, A. "The Nature and Role of Feedback Text Comments in Online Marketplaces: Implications for Trust Building, Price Premiums, and Seller Differentiation," Information Systems Research (17), 2006, pp. 392-414 | D | D | - |
| Kumar, N., and Benbasat, I. "Research Note: The Influence of Recommendations and Consumer Reviews on Evaluations of Websites," Information Systems Research (17), 2006, pp. 425-439. | D | D | - |

Legend: D – dominant, S – secondary, O – occasional.

## 2007

Table A.8. *Coding of articles published in ISR during the year 2007*

| ARTICLE | MACHINE | ORGANISM | CULTURE |
|---|---|---|---|
| Saar-Tsechansky, M., and Provost, F. "Decision-Centric Active Learning of Binary-Outcome Models," Information Systems Research (18), 2007, pp. 4-22 | D | O | - |
| Garfinkel, R., Gopal, R., and Thompson, S. "Releasing Individually Identifiable Microdata with Privacy Protection Against Stochastic Threat: An Application to Health Information," Information Systems Research (18), 2007, pp. 23-41 | D | O | O |
| Ma, M., and Agarwal, R. "Through a Glass Darkly: Information Technology Design, Identity Verification, and Knowledge Contribution in Online Communities," Information Systems Research (18), 2007, pp. 42-67 | D | D | O |
| Gu, B., Konana, P., Rajagopalan, B., and Chen H. M. "Competition Among Virtual Communities and User Valuation: The Case of Investing-Related Communities," Information Systems Research (18), 2007, pp. 68-85 | D | D | O |
| Mishra, A. N., Konana, P., and Barua, A. "Antecedents and Consequences of Internet Use in Procurement: An Empirical Investigation of U.S. Manufacturing Firms," Information Systems Research (18), 2007, pp.103-120 | D | D | O |
| Chen, Y., and Seshadri, S. "Product Development and Pricing Strategy for Information Goods Under Heterogeneous Outside Opportunities," Information Systems Research (18), 2007, pp. 150-172 | D | - | - |
| Barki, H., Titah, R., and Boffo, C. "Information System Use-Related Activity: An Expanded Behavioral Conceptualization of Individual-Level Information System Use," Information Systems Research (18), 2007, pp. 173-192 | D | D | - |
| Levina, N., and Xin, M. "Comparing IT Workers' Compensation Across Country Contexts: Demographic, Human Capital, and Institutional Factors," Information Systems Research (18), 2007, pp. 193-210 | O | - | - |
| Dhar, V., and Sundararajan, A. "Information Technologies in Business: A Blueprint for Education and Research," Information Systems Research (18), 2007, pp. 125-141 | D | S | O |
| Mithas, S., and Whitaker, J. "Is the World Flat or Spiky? Information Intensity, Skills, and Global Service Disaggregation," Information Systems Research (18), 2007, pp. 237-259 | D | S | O |
| Malhotra, A., Gosain, S., and El Sawy O. A. "Leveraging Standard Electronic Business | D | D | - |

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|---|---|---|---|
| Interfaces to Enable Adaptive Supply Chain Partnerships," Information Systems Research (18), 2007, pp. 260-279 | | | |
| Tanriverdi, H., Konana, P., and Ge, L. "The Choice of Sourcing Mechanisms for Business Processes," Information Systems Research (18), 2007, pp. 280-299 | D | D | - |
| Ghose, A., Mukhopadhyay, T., and Rajan, U. "The Impact of Internet Referral Services on a Supply Chain," Information Systems Research (18), 2007, pp. 300-319 | D | - | - |
| Saraf, N., Langdon, C. S., and Gosain, S. "IS Application Capabilities and Relational Value in Interfirm Partnerships," Information Systems Research (18), 2007, pp. 320-339 | D | O | - |
| Bala, H., and Venkatesh, V. "Assimilation of Interorganizational Business Process Standards," Information Systems Research (18), 2007, pp. 340-365 | D | O | S |
| Dewan, S., and Ren, F. "Risk and Return of Information Technology Initiatives: Evidence from Electronic Commerce Announcements," Information Systems Research (18), 2007, pp. 370-394 | D | - | - |
| Lee, D., and Mendelson, H. "Adoption of Information Technology Under Network Effects," Information Systems Research (18), 2007, pp. 395-415 | D | D | - |
| Weber, T. A., and Zheng, Z. "A Model of Search Intermediaries and Paid Referrals," Information Systems Research (18), 2007, pp. 414-436 | D | - | - |
| Bharadwaj, S., Bharadwaj, A., and Bendoly, E. "The Performance Effects of Complementarities Between Information Systems, Marketing, Manufacturing, and Supply Chain Processes," Information Systems Research (18), 2007, pp. 437-453 | D | D | - |
| Jiang, A., and Benbasat, I. "Investigating the Influence of the Functional Mechanisms of Online Product Presentations," Information Systems Research (18), 2007, pp. 454-470 | D | - | - |

Legend: D – dominant, S – secondary, O – occasional.

# Appendix B

Analysis results for the *European Journal of Information Systems*, *Information Systems Research* and *Management Information Systems Quarterly*. Periods include 2000, 2001, 2005 and 2008.

## 2000

Table B.9. *Coding of articles by concept published during March 2000*

| ARTICLE | MACHINE | | | ORGANISM | | | CULTURE | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Salmela, H., Lederer, A. L., and Reponen, T. "Information systems planning in a turbulent environment," European Journal of Information Systems (9), 2000, pp. 3-15 | O | D | O | D | S | S | O | O | O |
| Torvinen, V., and Jalonen, K. "Stimulating power games as a part of systems development," European Journal of Information Systems (9), 2000, pp. 16-24 | S | S | O | S | S | O | D | D | D |
| Fan, M., Stallaert, J., and Whinston, A. B. "The adoption and design methodologies of component-based enterprise systems," European Journal of Information Systems (9), 2000, pp. 25-35 | S | S | O | D | D | S | O | - | - |
| Edwards, J. S., Duan, Y., and Robins, P. C. "An analysis of expert sys-tems for business decision making at different levels and in different roles," European Journal of Information Systems (9), 2000, pp. 36-46 | S | S | S | D | D | D | O | - | - |
| Sawyer, S. "Packaged software: implications of the differences from custom approaches to software development," European Journal of In-formation Systems (9), 2000, pp. 47-58 | O | S | O | D | S | S | S | S | D |
| Dey, D., and Sarkar, S. "Modifications of Uncertain Data: A Bayesian Framework for Belief Revision," Information Systems Research (11), 2000, pp. 1-16 | D | D | D | - | - | O | - | - | O |
| Basu, A., and Blanning, R. W. "A Formal Approach to Workflow Analysis," Information Systems Research (11), 2000, pp. 17-36 | D | D | D | S | - | - | - | - | - |
| Marcolin, B. L., Compeau, D. R., Munro, M. C., and Huff, S. L. "As-sessing User Competence: Conceptualization and Measurement," In-formation Systems Research (11), 2000, pp. 37-60 | D | O | D | O | - | S | - | - | - |
| Kauffman, J. R., McAndrews, J., and Wang, Y. "Opening the "Black Box" of Network Externalities in Network Adoption," Information Sys-tems Research (11), 2000, pp. 61-82 | S | S | O | D | O | S | - | - | - |
| Menon, N. M., Lee, B., and Eldenberg, L. "Productivity of Information Systems in the Healthcare Industry," Information Systems Research (11), 2000, pp. 83-92 | D | D | D | O | O | O | - | - | - |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Hunter, G. M., and Beck, J. E. "Using Repertory Grids to Conduct Cross-Cultural Information Systems Research," Information Systems Research (11), 2000, pp. 93-101 | S | O | O | D | S | S | S | - | D |
| Schultze, U. "A Confessional Account of an Ethnography About Knowledge Work," MIS Quarterly (24), 2000, pp. 3-41 | O | O | O | S | O | S | D | O | D |
| Trauth, E. M., and Jessup, L. M. "Understanding Computer-Mediated Discussions: Positivist and Interpretive Analyses of Group Support Sys-tem Use," MIS Quarterly (24), 2000, pp. 43-79 | O | S | O | S | O | S | D | O | D |
| Reich, B. H., and Benbasat, I. "Factors that Influence the Social Dimen-sion of Alignment Between Business and Information Technology Ob-jectives," MIS Quarterly (24), 2000, pp. 81-113 | S | S | O | D | O | S | S | O | D |
| Venkatesh, V., and Morris, M. G. "Why Don't Men Ever Stop to Ask for Directions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behavior," MIS Quarterly (24), 2000, pp. 115-139 | D | O | S | - | - | S | - | - | D |
| Moore, E. "One Road to Turnover: An Examination of Work Exhaus-tion in Technology Professionals," MIS Quarterly (24), 2000, pp. 141-168 | O | O | S | D | - | D | S | - | S |
| Bharadwaj, A. "A Resource-Based Perspective on Information Tech-nology Capability and Firm Performance: An Empirical Investigation," MIS Quarterly (24), 2000, pp. 169-196 | S | D | S | D | S | S | O | O | S |

Legend: O - Organization, T – Technology, P – People, D – Dominant, S – Secondary, O – Occasional.

Table B.10. *Coding of articles by concept published during June 2000*

| Article | Machine | | | Organism | | | Culture | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Poon, S. "Business environment and internet commerce bene-fit – a small business perspective," European Journal of Information Systems (9), 2000, pp. 72-81 | S | S | - | D | - | - | O | - | - |
| Moynihan, T. "'Requirements-Uncertainty': Is it best formu-lated as a latent, aggregate or profile construct?," European Journal of Information Systems (9), 2000, pp. 82-90 | O | S | S | O | D | S | O | D | O |
| Lou, H., Lou, W., and Strong, D. "Perceived critical mass ef-fect on groupware acceptance," European Journal of Informa-tion Systems (9), 2000, pp. 91-103 | S | D | S | D | S | D | S | S | S |

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|---|---|---|---|---|---|---|---|---|---|
| Sambamurthy, V., and Zmud, R. W. "Research Commentary: The Organizing Logic for an Enterprise's IT Activities in the Digital Era – A Prognosis of Practice and a Call for Re-search," Information Systems Research (11), 2000, pp. 105-114 | S | S | S | D | D | S | - | O | O |
| Lim, K. H., Benbasat, I., and Ward, L. M. "The Role of Mul-timedia in Changing First Impression Bias," Information Sys-tems Research (11), 2000, pp.115-136 | D | D | D | O | O | S | - | - | - |
| Mookerjee, V. S., and Mannino, M. V. "Mean-Risk Trade-Offs in Inductive Expert Systems," Information Systems Re-search (11), 2000, pp. 137-158 | D | D | S | S | S | O | - | - | O |
| Gurbaxani, V., Melville, N., and Kraemer, K. "The Production of Information Services: A Firm-Level Analysis of Informa-tion Systems Budgets," Information Systems Research (11), 2000, pp. 159-176 | D | D | D | S | O | O | - | - | - |
| Konana, P., Gupta, A., and Whinston, A. B. "Integrating User Preferences and Real-Time Workload in Information Serv-ices," Information Systems Research (11), 2000, pp. 177-196 | D | D | O | O | O | O | O | - | O |
| West, J., and Dedrick, J. "Innovation and Control in Standards Architectures: The Rise and Fall of Japan's PC-98," Informa-tion Systems Research (11), 2000, pp. 197-216 | O | D | O | D | S | O | S | - | O |
| Benaroch, M., and Kauffman, R. J. "Justifying Electronic Banking Network Expansion Using Real Options Analysis," MIS Quarterly (24), 2000, pp. 197-225 | D | D | O | S | S | O | - | - | - |
| Taudes, A., Feurstein, M., and Mild, A. "Options Analysis of Software Platform Decisions: A Case Study," MIS Quarterly (24), 2000, pp. 227-243 | D | D | O | S | - | S | - | - | - |
| Cooper, R. B. "Information Technology Development Creativ-ity: A Case Study of Attempted Radical Change," MIS Quar-terly (24), 2000, pp. 245-276 | D | D | O | S | - | S | O | - | D |
| Swanson, E. B., and Dans, E. "System Life Expectancy and the Maintenance Effort: Exploring Their Equilibration," MIS Quarterly (24), 2000, pp. 277-297 | O | S | O | S | D | D | - | - | - |
| Keil, M., Bernard, C. Y. T., Wei, K. K., Saarinen, T. "A Cross-Cultural Study on Escalation of Commitment Behavior in Software Projects," MIS Quarterly (24), 2000, pp. 299-325 | O | O | S | O | O | D | S | O | D |
| Roepke, R., Agarwal, R., and Ferratt, T. W. "Aligning the IT Human Resource with Business Vision: The Leadership Initia-tive at 3M," MIS Quarterly (24), 2000, pp. 327-353 | S | D | S | D | S | D | S | - | S |

Legend: O - Organization, T – Technology, P – People, D – Dominant, S – Secondary, O – Occasional.

Table B.11. *Coding of articles by concept published during September 2000*

| **Article** | **Machine** | | | **Organism** | | | **Culture** | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Marble, R. P. "Operationalising the implementation puzzle: an argument for eclecticism in research and in practice," European Journal of Information Systems (9), 2000, pp. 132-147 | S | S | S | S | S | S | S | S | S |
| Tai, L. A., and Phelps, R. "CEO and CIO perceptions of information systems strategy: evidence from Hong Kong," European Journal of Information Systems (9), 2000, pp. 163-172 | O | S | O | S | O | S | D | S | D |
| Damsgaard, J., and Truex, D. "Binary trading relations and the limits of EDI standards: the Procrustean bed of standards," European Journal of Information Systems (9), 2000, pp. 173-188 | O | S | O | D | D | S | S | S | S |
| Banker, R. D., and Slaughter, S. A. "The Moderating Effects of Structure on Volatility and Complexity in Software Enhancement," Information Systems Research (11), 2000, pp. 219-240 | D | D | S | D | S | S | - | - | - |
| Palmer, J. W., and Markus, M. L. "The Performance Impacts of Quick Response and Strategic Alignment in Specialty Retailing," Information Systems Research (11), 2000, pp. 241-259 | S | S | O | D | D | O | - | - | - |
| Sarkar, S., and Ramaswamy, M. "Knowledge Base Decomposition to Facilitate Verification," Information Systems Research (11), 2000, pp. 260-283 | - | D | - | - | O | - | - | - | - |
| Kim, J., Hahn, J., and Hahn, H. "How Do We Understand a System with (So) Many Diagrams? Cognitive Integration Processes in Diagrammatic Reasoning," Information Systems Research (11), 2000, pp. 284-303 | D | D | D | - | - | S | - | - | - |
| Nault, B. R., and Vandenbosch, M. B. "Research Report: Disruptive Technologies – Explaining Entry in Next Generation Information Technology Markeets," Information Systems Research (11), 2000, pp. 304-319 | S | S | - | D | O | - | - | - | - |
| Westland, C. J. "Research Report: Modeling the Incidence of Postrelease Errors in Software," Information Systems Research (11), 2000, pp. 320-324 | S | D | O | S | D | O | O | O | O |
| Ravichandran, T., and Rai, A. "Quality Management in Systems Development: An Organizational System Perspective," MIS Quarterly (24), 2000, pp. 381-415 | D | D | D | O | O | S | O | O | O |
| Montealegre, R., and Keil, M. "De-escalating Information Technology Projects: Lessons from the Denver International Airport," MIS Quarterly (24), 2000, pp. 417-447 | S | S | S | D | D | D | O | O | S |
| Lim, K. H., and Benbasat, I. "The Effect of Multimedia on Perceived Equivocality and Perceived Usefullness of Information Systems," MIS Quarterly (24), 2000, pp. 449-471 | S | S | S | D | S | D | O | O | O |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Nelson, K. M., Nadkarni, S., Narayanan, V. K., and Ghods, M. "Understanding Software Operations Support Expertise: A Revealed Causal Mapping Approach," MIS Quarterly (24), 2000, pp. 475-507 | S | S | S | D | D | D | O | O | O |
| Gopal, A., and Prasad, P. "Understanding GDSS in Symbolic Context: Shifting the Focus from Technology to Interaction," MIS Quarterly (24), 2000, pp. 509-546 | S | S | O | O | O | O | D | D | D |

Legend: O - Organization, T – Technology, P – People, D – Dominant, S – Secondary, O – Occasional.

Table B.12. *Coding of articles by concept published during December 2000*

| **Article** | **Machine** | | | **Organism** | | | **Culture** | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Ljungberg, J. "Open source movements as a model for organizing," European Journal of Information Systems (9), 2000, pp. 208-216 | O | O | O | S | S | S | D | D | D |
| Lee S. T. "Bundling strategy in base-supplemental goods markets: the case of Microsoft," European Journal of Information Systems (9), 2000, pp. 217-225 | S | S | S | D | D | D | O | - | O |
| Kunda, D. and Brooks, L. "Identifying and classifying processes (traditional and soft factors) that support COTS component selection: a case study," European Journal of Information Systems (9), 2000, pp. 226-234 | S | S | O | D | S | S | S | O | S |
| Johnston, R. B., and Gregor, S. "A theory of industry-level activity for understanding the adoption of interorganizational systems," European Journal of Information Systems (9), 2000, pp. 243-251 | O | S | O | D | S | S | O | O | O |
| Peristeras, V. and Tarabanis, K. "Towards an enterprise architecture for public administration using a top-down approach," European Journal of Information Systems (9), 2000, pp. 252-260 | D | D | - | S | - | S | - | - | - |
| March, S., Hevner, A., and Ram, S. "Research Commentary: An Agenda for Information Technology Research in Heterogeneous and Distributed Environments," Information Systems Research (11), 2000, pp. 327-341 | D | D | O | D | S | O | - | - | - |
| Venkatesh, V. "Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model," Information Systems Research (11), 2000, pp. 342-365 | D | D | D | D | - | D | - | - | O |

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|---|---|---|---|---|---|---|---|---|---|
| Bordetsky, A., and Mark, G. "Memory-Based Feedback Controls to Support Groupware Coordination," Information Systems Research (11), 2000, pp. 366-385 | D | D | D | S | - | S | O | - | S |
| Limayem, M., and DeSanctis, G. "Providing Decisional Guidance for Multicriteria Decision Making in Groups," Information Systems Research (11), 2000, pp. 386-401 | D | D | D | O | O | O | - | - | - |
| Johnson, R. D., and Marakas, G. M. "Research Report: The Role of Behavioral Modeling in Computer Skills Acquisition – Toward Refinement of the Model," Information Systems Research (11), 2000, pp. 402-417 | D | S | D | S | - | S | - | - | - |
| Agarwal, R., Sambamurthy, V., and Stair, R. M. "Research Report: The Evolving Relationship Between General and Specific Computer Self-Efficacy – An Empirical Assessment," Information Systems Research (11), 2000, pp. 418-430 | D | D | D | S | - | S | - | - | O |
| Cooper, B. L., Watson, H. J., Wixom, B. H., and Goodhue, D. L. "Data Warehousing Supports Corporate Strategy at First American Corporation, ," MIS Quarterly (24), 2000, pp. 547-567 | S | D | O | D | S | D | S | - | S |
| Majchrzak, A., Rice, R. E., Malhotra, A., and King, N. "Technology Adaptation: The Case of a Computer-Supported Inter-Organizational Virtual Team," MIS Quarterly (24), 2000, pp. 569-600 | O | S | O | D | S | D | S | O | O |
| Mennecke, B. E., Crossland, M. D., and Killingsworth, B. L. "Is a Map More than a Picture? The Role of SDSS Technology, and Problem Complexity on Map Reading and Problem Solving," MIS Quarterly (24), 2000, pp. 601-629 | - | D | D | - | O | S | - | - | - |
| Keil, M., and Mann, J. "Why Software Projects Escalate: An Empirical Analysis and Test of Four Theoretical Models," MIS Quarterly (24), 2000, pp. 631-664 | D | D | S | D | D | D | O | O | S |
| Agarwal, R., and Karahanna, E. "Time Flies When You're Having Fun: Cognitive Absorption and Beliefs About Information Technology Usage," MIS Quarterly (24), 2000, pp. 665-694 | D | S | D | D | - | D | - | - | O |

Legend: _O_ - Organization, _T_ – Technology, _P_ – People, D – Dominant, S – Secondary, O – Occasional.

# 2001

Table B.13. *Coding of articles by concept published during March 2001*

| Article | Machine | | | Organism | | | Culture | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Galal, G. H. "Design and delivery of information," European Journal of Information Systems (10), 2001, pp. 2-14 | - | S | O | - | D | S | - | S | S |
| Baldwin, L. P., Irani, Z., and Love P. E. D. "Outsourcing information systems: drawing lessons from a banking case study," European Journal of Information Systems (10), 2001, pp. 15-24 | S | D | S | D | O | O | O | - | S |
| Duhan, S., Levy, M., and Powell, P. "Information systems strategies in knowledge-based SMEs: the role of core competencies," European Journal of Information Systems (10), 2001, pp. 25-40 | O | S | O | D | D | D | S | O | S |
| Korn, J. "Design and delivery of information," European Journal of Information Systems (10), 2001, pp. 41-54 | S | D | D | - | O | S | - | - | O |
| Irani, Z., Sharif, A. M., and Love P. E. D. "Transforming failure into success through organisational learning: an analysis of a manufacturing information system," European Journal of Information Systems (10), 2001, pp. 55-66 | S | D | O | D | O | S | S | O | D |
| Sabherwal, R., and Chan, Y. E. "Alignment between business and IS strategies: A study of prospectors, analyzers, and defenders," Information Systems Research (12), 2001, pp. 11-33 | D | D | S | S | S | O | - | - | O |
| Moore, S. A. "A foundation for flexible automated electronic communication," Information Systems Research (12), 2001, pp. 34-62 | D | D | D | S | S | S | - | - | - |
| Lerch, F. J., and Harter, D. E. "Cognitive support for real-time dynamic decision making," Information Systems Research (12), 2001, pp. 63-82 | D | D | D | O | O | S | - | - | - |
| Thomas, H., and Datta, A. "A conceptual model and algebra for on-line analytical processing in decision support databases," Information Systems Research (12), 2001, pp. 83-102 | D | D | - | O | O | - | - | - | - |
| Im, K. S., Dow, K. E., and Grover, V. "Research report: A reexamination of IT investment and the market value of the firm - An event study methodology," Information Systems Research (12), 2001, pp. 103-117 | D | O | O | O | O | O | O | - | D |
| Wixom, B. H., and Watson, H. J. "An empirical investigation of the factors affecting data warehousing success," MIS Quarterly (25), 2001, pp. 17-41 | D | D | S | S | S | D | O | - | S |

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|---|---|---|---|---|---|---|---|---|---|
| Chatterjee, D., Richardson, V. J., and Zmud, R. W. "Examining the shareholder wealth effects of announcements of newly created CIO positions," MIS Quarterly (25), 2001, pp. 43-70 | D | D | D | D | D | D | O | - | S |
| Venkatesh, V., and Brown, S. A. "A longitudinal investigation of personal computers in homes: Adoption determinants and emerging challenges," MIS Quarterly (25), 2001, pp. 71-102 | S | S | O | D | S | D | S | O | S |
| Alavi, M., and Leidner, D. E. "Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues," MIS Quarterly (25), 2001, pp. 107-136 | D | D | S | D | O | D | S | O | D |

Legend: *O* - Organization, *T* – Technology, *P* – People, D – Dominant, S – Secondary, O – Occasional.

Table B.14. *Coding of articles by concept published during June 2001*

| **Article** | **Machine** | | | **Organism** | | | **Culture** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *O* | *T* | *P* | *O* | *T* | *P* | *O* | *T* | *P* |
| Huber, G. P. "Transfer of knowledge management systems: unexplored issues and suggested studies," European Journal of Information Systems (10), 2001, pp. 72-79 | S | S | S | D | D | D | D | D | D |
| Sutton, D. C. "What is knowledge and can it be managed?," European Journal of Information Systems (10), 2001, pp. 80-88 | S | S | S | D | O | D | D | O | D |
| Karsten, H., Lyytinen, K., Hurskainen M., and Koskelainen T. "Crossing boundaries and conscripting participation: Representing and integrating knowledge in a paper machinery project," European Journal of Information Systems (10), 2001, pp. 89-98 | O | S | O | D | S | D | D | O | D |
| Marshall, N., and Brady, T. "Knowledge management and the politics of knowledge: Illustrations from complex products and systems," European Journal of Information Systems (10), 2001, pp. 99-112 | D | S | O | D | S | S | O | O | D |
| Randall, D., Hughes, J., O'Brien, J., Rouncefield, M. and Tolmie P. "'Memories are made of this': Explicating organisational knowledge and memory," European Journal of Information Systems (10), 2001, pp. 113-121 | O | O | O | D | - | D | D | - | D |
| Orlikowski, W. J., and Iacono, S. C. "Research commentary: Desperately seeking "IT" in IT research - A call to theorizing the IT artifact," Information Systems Research (12), 2001, pp. 121-134 | S | D | D | S | O | S | S | - | - |
| Subramani, M., and Walden, E. "The impact of e-commerce announcements on the market value of firms," Information Systems Research (12), 2001, pp. 135-154 | D | D | S | S | S | O | S | - | O |

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|---|---|---|---|---|---|---|---|---|---|
| Belanger, F., Collins, R. W., and Cheney, P. H. "Technology requirements and work group communications for telecommuters," Information Systems Research (12), 2001, pp. 155-176 | D | D | D | O | O | S | O | - | - |
| Kiang, M. Y., and Kumar, A. "An evaluation of self-organizing map networks as a robust alternative to factor analysis in data mining applications," Information Systems Research (12), 2001, pp. 177-194 | D | D | D | S | S | S | - | - | - |
| Austin, R. D. "The effects of time pressure on quality in software development: An agency model," Information Systems Research (12), 2001, pp. 195-207 | D | D | O | O | O | O | - | - | O |
| Plouffe, C. R., Hulland, J. S., and Vandenbosch, M. "Research report: Richness versus parsimony in modeling technology adoption decisions - Understanding merchant adoption of a smart card-based payment system," Information Systems Research (12), 2001, pp. 208-222 | D | O | O | O | O | S | O | - | D |
| Orlikowski, W. J., and Barley, S. R. "Technology and institutions: What can research on information technology and research on organizations learn from each other?," MIS Quarterly (25), 2001, pp. 145-165 | S | D | O | D | S | S | S | S | D |
| Dennis, A. R., Wixom, B. H., and Vandenberg, R. J. "Understanding fit and appropriation effects in group support systems via meta-analysis," MIS Quarterly (25), 2001, pp. 167-193 | S | D | D | O | S | S | O | - | O |
| Barki, H., and Hartwick, J. "Interpersonal conflict and its management in information system development," MIS Quarterly (25), 2001, pp. 195-228 | D | D | S | D | S | D | O | - | S |
| Malhotra, A., Majchrzak, A., Carman, R., and Lott, V. "Radical innovation without collocation: A case study at Boeing-Rocketdyne," MIS Quarterly (25), 2001, pp. 229-249 | S | D | S | D | O | D | S | O | S |
| Te'eni, D. "Review: A cognitive-affective model of organizational communication for designing IT," MIS Quarterly (25), 2001, pp. 251-312 | D | D | D | D | D | D | S | O | S |

Legend: O - Organization, T – Technology, P – People, D – Dominant, S – Secondary, O – Occasional.

Table B.15. *Coding of articles by concept published during September 2001*

| **Article** | **Machine** | | | **Organism** | | | **Culture** | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Currie, W. L., and Seltsikas, P. "Exploring the supply-side of IT outsourcing: Evaluating the emerging role of application service providers," European Journal of Information Systems (9), 2000, pp. 123-124 | O | S | - | D | S | - | O | - | - |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Panagiotidis, P., and Edwards, J. S. "Organisational learning – a critical systems thinking discipline," European Journal of Information Systems (10), 2001, pp. 135-146 | D | D | S | D | D | S | S | S | D |
| Doherty, N. F., and King, M. "An investigation of the factors affecting the successful treatment of organizational issues in systems development projects," European Journal of Information Systems (10), 2001, pp. 147-160 | S | S | O | D | D | S | O | O | O |
| Huang, J. C., Newell, S., and Pan, S-L. "The process of global knowledge integration: A case study of a multinational investment bank's Y2K program," European Journal of Information Systems (10), 2001, pp. 161-174 | O | S | O | D | S | D | D | S | D |
| Ba, S., Stallaert, J., and Whinston, A. B. "Research commentary: Introducing a third dimension in information systems design - the case for incentive alignment," Information Systems Research (12), 2001, pp. 225-239 | D | D | S | D | S | D | S | O | S |
| Dutta, A. "Business planning for network services: A systems thinking approach," Information Systems Research (12), 2001, pp. 260-283 | D | D | S | S | S | O | - | - | - |
| Krishnan, R., Li, X., Steier, D., and Zhao, J. L. "On heterogeneous database retrieval: A cognitively guided approach," Information Systems Research (12), 2001, pp. 286-301 | D | D | D | O | O | O | - | - | - |
| Chwelos, P., Benbasat, I., and Dexter, A. S. "Research report: Empirical test of an EDI adoption model," Information Systems Research (12), 2001, pp. 304-321 | D | D | O | S | O | O | - | - | O |
| Garfield, M. J., Taylor, N. J., Dennis, A. R., and Satzinger, J. W. "Research report: Modifying Paradigms - individual differences, creativity techniques, and exposure to ideas in group idea generation," Information Systems Research (12), 2001, pp. 322-333 | D | S | D | S | O | S | O | O | S |
| Ang, S., and Slaughter, S. A. "Work outcomes and job design for contract versus permanent information systems professionals on software development teams," MIS Quarterly (25), 2001, pp. 321-350 | S | S | S | D | - | D | D | - | D |
| Bhattacherjee, A. "Understanding information systems continuance: An expectation-confirmation model," MIS Quarterly (25), 2001, pp. 351-370 | D | D | S | S | - | S | - | - | O |
| Yoo, Y., and Alavi, M. "Media and group cohesion: Relative influences on social presence, task participation, and group consensus," MIS Quarterly (25), 2001, pp. 371-390 | D | D | S | S | S | O | S | S | S |

Legend: O - Organization, T – Technology, P – People, D – Dominant, S – Secondary, O – Occasional.

Table B.16. *Coding of articles by concept published during December 2001*

| Article | Machine | | | Organism | | | Culture | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |

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|---|---|---|---|---|---|---|---|---|---|
| Jones, S. and Hughes, J. "Understanding IS evaluation as a complex social process: a case study of a UK local authority," European Journal of Information Systems (10), 2001, pp. 189-203 | D | D | S | O | O | O | D | D | D |
| Stefanou, C. J. "A framework for the ex-ante evaluation of ERP software," European Journal of Information Systems (10), 2001, pp. 204-215 | S | S | S | D | D | S | S | - | D |
| Al-Mudimigh, A., Zairi, M. and Al-Mashari. "ERP software implementation: an integrative framework," European Journal of Information Systems (10), 2001, pp. 216-226 | D | D | S | S | S | D | O | S | S |
| Shin, N. "The impact of information technology on financial performance: the importance of strategic choice," European Journal of Information Systems (10), 2001, pp. 227-236 | D | D | - | S | S | - | - | - | - |
| Butler, B. S. "Membership size, communication activity, and sustainability: A resource-based model of online social structure," Information Systems Research (12), 2001, pp. 346-362 | D | D | D | S | O | S | S | - | S |
| Raghu, T. S., Ramesh, R., Chang, A., and Whinston, A. B. "Collaborative decision making: A connectionist paradigm for dialectical support," Information Systems Research (12), 2001, pp. 363-383 | D | D | - | O | O | - | - | - | - |
| Bodart, F., Patel, A., Sim, M., and Weber, R. "Should optional properties be used in conceptual modelling? A theory and three empirical tests," Information Systems Research (12), 2001, pp. 384-405 | D | D | D | O | - | S | - | - | - |
| Raghunathan, S., and Yeh, A. B. "Beyond EDI: Impact of continuous replenishment program (CRP) between a manufacturer and its retailers," Information Systems Research (12), 2001, pp. 406-419 | D | D | - | S | O | - | - | - | - |
| Straub, D. W., and Watson, R. T. "Research commentary: transformational issues in researching IS and net-enabled organizations," Information Systems Research (12), 2001, pp. 337-349 | D | O | S | D | O | S | O | O | - |
| Piccoli, G., Ahmed, R., and Ives, B. "Web-based virtual learning environments: A research framework and a preliminary assessment of effectiveness in basic IT skills training," MIS Quarterly (25), 2001, pp. 401-426 | D | D | S | S | S | D | - | - | O |
| Fichman, R. G. "The role of aggregation in the measurement of IT-related organizational innovation," MIS Quarterly (25), 2001, pp. 427-455 | D | D | D | S | S | S | - | - | - |
| Sircar, S., and Nerur, S. P., and Mahapatra, R. "Revolution or evolution? A comparison of object-oriented and structured systems development methods," MIS Quarterly (25), 2001, pp. 457-471 | D | D | D | S | S | S | O | O | - |

Legend: O - Organization, T – Technology, P – People, D – Dominant, S – Secondary, O – Occasional.

## 2005

Table B.17. *Coding of articles by concept published during March 2005*

| Article | Machine | | | Organism | | | Culture | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Davidson, E., and Chiasson, M. "Contextual influences on technology use mediation: a comparative analysis of electronic medical record systems," European Journal of Information Systems (14), 2005, pp. 6-18 | O | S | O | S | S | S | D | D | D |
| Kotlarsky, J., Oshri, I. "Social ties, knowledge sharing and successful collaboration in globally distributed system development projects," European Journal of Information Systems (14), 2005, pp. 37-48 | S | S | S | S | O | S | D | S | D |
| Lin, A., and Silva, L. "The social and political construction of technological frames," European Journal of Information Systems (14), 2005, pp. 49-59 | O | S | O | S | O | S | D | S | D |
| Hatzakis, T., Lycett, M., Macredie, R. D., and Martin, V. A. "Towards the development of a social capital approach to evaluating change management interventions," European Journal of Information Systems (14), 2005, pp. 60-74 | S | - | S | O | - | O | D | - | D |
| Gwanhoo, L., and Weidong, X. "The ability of information systems development project teams to respond to business and technology changes: a study of flexibility measures," European Journal of Information Systems (14), 2005, pp. 75-92 | D | S | D | S | - | S | - | - | - |
| Luna-Reyes, L. F., Zhang, J., Gil-Garcia, J. R., and Cresswell, A. M. "Information systems development as emergent socio-technical change: a practice approach," European Journal of Information Systems (14), 2005, pp. 93-105 | O | S | S | S | S | S | D | D | D |
| Majchrzak, A., Malhotra, A., and John, R. "Perceived Individual Collaboration Know-How Development Through Information Technology-Enabled Contextualization: Evidence from Distributed Teams," Information Systems Research (16), 2005, pp. 9-27 | D | D | D | O | O | S | O | - | O |
| Cavusoglu, H., Mishra, B., and Raghunathan, S. "The value of intrusion detection systems in information technology security architecture," Information Systems Research (13), 2005, pp. 28-47 | D | D | D | O | O | O | - | - | O |
| Bandyopadhyay, S., Barron, J. M., and Chaturvedi, A. R. "Competition Among Sellers in Online Exchanges," Information Systems Research (13), 2005, pp. 47-60. | D | D | D | O | O | O | - | - | - |
| Zhu, K., and Kraemer, K. L. "Post-Adoption Variations in Usage and Value of E-Business by Organizations: Cross-Country Evidence from the Retail Industry," Information Systems Research (16), 2005, pp. 61-84 | D | D | D | S | O | S | O | O | O |
| Wixom, H. M., and Todd, P. A. "A Theoretical Integration of User Satisfaction and Technology Acceptance," Information Systems Research (16), 2005, pp. 85-102 | D | D | D | S | O | D | - | - | O |

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|---|---|---|---|---|---|---|---|---|---|
| Garud, R., and Kumaraswamy, A. "Vicious and Virtuous Circles in the Management of Knowledge," MIS Quarterly (29), 2005, pp. 9-33 | D | D | D | S | S | S | S | S | S |
| McLure Wasko, M., and Faraj, S. "Why Should I Share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice," MIS Quarterly (29), 2005, pp. 35-57 | D | S | D | O | S | S | D | S | D |
| Ko, D., Kirsch, L. J., and King, W. R.. "Antecedents of Knowledge Transfer from Consultants to Clients in Enterprise System Implementations," MIS Quarterly (29), 2005, pp. 59-85 | D | S | D | S | - | D | S | - | D |
| Bock, G., Zmud, R. W., and Kim, Y. "Behavioral Intention Formation in Knowledge Sharing: Examining the Roles of Extrinsic Motivators, Social-Psychological Forces, and Organizational Climate," MIS Quarterly (29), 2005, pp. 87-111 | O | O | O | S | O | D | D | O | D |
| Kankanhalli, A., Tan, B. C. Y., and Wei, K. "Contributing Knowledge to Electronic Knowledge Repositories: An Empirical Investigation," MIS Quarterly (29), 2005, pp. 113-143 | D | S | S | S | O | D | D | O | D |
| Malhotra, A., Gosain, S., and El Sawy, O. A. "Absorptive Capacity Configurations in Supply Chains: Gearing for Partner-Enabled market Knowledge Creation," MIS Quarterly (29), 2005, pp. 145-187 | D | D | D | S | O | S | O | - | O |

Legend: *O* - Organization, *T* – Technology, *P* – People, D – Dominant, S – Secondary, O – Occasional.

Table B.18. *Coding of articles by concept published during June 2005*

| Article | Machine | | | Organism | | | People | | |
|---|---|---|---|---|---|---|---|---|---|
| | *O* | *T* | *P* | *O* | *T* | *P* | *O* | *T* | *P* |
| Volkoff, O., Strong, D. M., and Elmes, M. B. "Understanding enterprise systems-enabled integration," European Journal of Information Systems (14), 2005, pp. 110-120 | D | D | S | S | O | D | O | O | O |
| Puschmann, T., and Alt, R. "Developing an integration architecture for process portals," European Journal of Information Systems (14), 2005, pp. 121-134 | D | D | S | O | O | S | - | - | - |
| Lim, E. T. K., Pan, S. L., and Tan, C. W. "Managing user acceptance towards enterprise planning (ERP) systems - understanding the dissonance between user expectations and managerial policies," European Journal of Information Systems (14), 2005, pp. 135-149 | D | D | S | O | O | D | D | S | D |
| Hwang, Y. "Investigating enterprise systems adoption: uncertainty avoidance, intrinsic motivation, and the technology acceptance model," European Journal of Information Systems (14), 2005, pp. 150-161 | D | D | D | O | O | O | D | S | D |

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|---|---|---|---|---|---|---|---|---|---|
| Sharif, A. M, Irani, Z., and Love P. E. D. "Integrating ERP using EAI: a model for post hoc evaluation," European Journal of Information Systems (14), 2005, pp. 162-174 | D | D | S | S | S | D | S | O | D |
| Lam, W. "Investigating success factors in enterprise application integration: a case-driven analysis," European Journal of Information Systems (14), 2005, pp. 175-187 | D | D | S | S | S | D | O | O | O |
| Daniel, E. M., and White, A. "The future of inter-organisational system linkages: findings of an international Delphi study," European Journal of Information Systems (14), 2005, pp. 188-203 | D | D | S | S | S | O | - | - | - |
| Levina, N. "Collaborating on Multiparty Information Systems Development Projects: A Collective Reflection-in-Action View," Information Systems Research (16), 2005, pp. 109-130 | O | S | S | D | D | D | D | D | D |
| Jiang, Z., Mookerjee, V. S., Sarkar, S. "Lying on the Web: Implications for Expert Systems Redesign,," Information Systems Research (16), 2005, pp. 131-148 | D | D | D | - | S | S | - | - | O |
| Chidambaram, L., and Tung, L. L. "Is Out of Sight, Out of Mind? An Empirical Study of Social Loafing in Technology-Supported Groups," Information Systems Research (16), 2005, pp. 149-168 | D | S | D | S | O | S | O | - | O |
| Adomovicius, G., and Gupta, A. "Toward Comprehensive Real-Time Bidder Support in Iterative Combinatorial Auctions," Information Systems Research (16), 2005, pp. 169-185 | D | D | D | - | S | S | - | O | - |
| Gal-Or, E., and Ghose, A. "The Economic Incentives for Sharing Security Information," Information Systems Research (16), 2005, pp. 186-208 | D | D | D | D | S | S | O | - | O |
| Dellarocas, C. "Reputation Mechanism Design in Online Trading Environments with Pure Moral Hazard," Information Systems Research (16), 2005, pp. 209-230 | D | D | D | S | O | S | O | O | O |
| Lin, L., Geng, X., and Whinston, A. B. "A Sender-Receiver Framework for Knowledge Transfer," MIS Quarterly (29), 2005, pp. 197-219 | D | S | D | D | O | D | O | - | O |
| Poston, R. S., and Speier, C. "Effective Use of Knowledge Management Systems: A Process Model of Content Ratings and Credibility Indicators," MIS Quarterly (29), 2005, pp. 221-244 | D | S | D | S | O | S | O | - | O |
| Ryu, C., Kim, Y. J., Chaudhury, A., and Rao, H. R. "Knowledge Acquisition via Three Learning Processes in Enterprise Information Portals: Learning-by-Investment, Learning-by-Doing, and Learning-from-Others," MIS Quarterly (29), 2005, pp. 245-278 | D | D | D | S | - | S | O | - | O |
| Chen, A. N. K. and Edgington, T. M. "Assessing Value in Organizational Knowledge Creation: Considerations for Knowledge Workers," MIS Quarterly (29), 2005, pp. 279-309 | D | S | D | S | - | S | O | - | O |
| Tanriverdi, H. "Information Technology Relatedness, Knowledge Management Capability, and Performance of Multibusiness Firms," MIS Quarterly (29), 2005, pp. 311-334 | D | D | D | S | - | S | O | - | S |

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|---|---|---|---|---|---|---|---|---|---|
| Levina, N., and Vaast, E. "The Emergence of Boundary Spanning Competence in Practice: Implications for Implementation and Use of Information Systems" MIS Quarterly (29), 2005, pp. 335-363 | O | S | O | S | O | S | D | S | D |
| Van de Ven, A. H. "Running in Packs to Develop Knowledge-Intensive Technologies," MIS Quarterly (29), 2005, pp. 365-378 | S | O | S | D | S | D | D | D | D |

Legend: O - Organization, T – Technology, P – People, D – Dominant, S – Secondary, O – Occasional.

Table B.19. *Coding of articles by concept published during September 2005*

| **Article** | **Machine** | | | **Organism** | | | **Culture** | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Irani, Z., Sharif, A. M., and Love, P. E. D. "Linking knowl-edge transformation to Information Systems Evaluation," European Journal of Information Systems (14), 2005, pp. 213-228 | O | S | O | S | D | S | D | S | D |
| Klecun, E., and Cornford, T. "A critical approach to evalua-tion," European Journal of Information Systems (14), 2005, pp. 229-243 | O | O | O | S | S | S | D | D | D |
| Fitzgerald, G., and Russo, N. L. "The turnaround of the Lon-don Ambulance Service Computer-Aided Despatch Ssytem (LASCAD)," European Journal of Information Systems (14), 2005, pp. 244-257 | S | S | O | S | S | S | D | S | D |
| Newman, M., and Westrup, C. "Making ERPs work: account-ants and the introduction of ERP systems," European Journal of Information Systems (14), 2005, pp. 258-272 | S | S | S | S | O | S | D | D | D |
| Wells, J. D., Fuerst, W. L., and Palmer, J. W. "Designing con-sumer interfaces for experiential tasks: an empirical investiga-tion," European Journal of Information Systems (14), 2005, pp. 273-287 | S | D | S | D | S | D | - | - | - |
| Singh, S. N., Dalal, N., and Spears, N. "Understanding Web home page perception," European Journal of Information Sys-tems (14), 2005, pp. 288-302 | S | S | S | D | D | D | O | - | O |
| Siponen, M. T. "An analysis of the traditional IS security ap-proaches: implications for research and practice," European Journal of Information Systems (14), 2005, pp. 303-315 | D | D | D | S | S | S | D | S | D |
| Ferratt, T. W., Agarwal, R., Brown, C. V., and Moore, J. E. "IT Human Resource Management Configurations and IT Turnover: Theoretical Synthesis and Empirical Analysis," Information Systems Research (13), 2005, pp. 237-255. | D | - | D | S | - | D | O | - | O |
| Menon, S., Sarkar, S., and Mukherjee, S. "Maximizing Accu-racy of Shared Databases when Concealing Sensitive Pat-terns," Information Systems Research (13), 2005, pp. 256-270. | D | D | - | O | S | - | - | - | - |

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|---|---|---|---|---|---|---|---|---|---|
| Tam, K. Y., and Ho, S. Y. "Web Personalization as a Persua-sion Strategy: An Elaboration Likelihood Model Perspective," Information Systems Research (13), 2005, pp. 271-291. | D | D | D | S | O | D | - | - | - |
| Ji, Y., Mookerjee, V. S., and Sethi, S. P. "Optimal Software Development: A Control Theoretic Approach," Information Systems Research (13), 2005, pp. 292-306. | D | D | D | - | S | S | - | - | - |
| Krishnan, R., Peters, J., Padman, R., and Kaplan, D. "On Data Reliability Assessment in Accounting Information Systems," Information Systems Research (13), 2005, pp. 307-326. | D | D | D | - | O | S | - | - | - |
| Brown, S. A., and Venkatesh, V. "Model of Adoption of Technology in Households: A Baseline Model Test and Ex-tension Incorporating Household Life Cycle," MIS Quarterly (29), 2005, pp. 399-426 | O | S | S | S | S | D | O | O | S |
| Ahuja, M. K., and Thatcher, J. B. "Moving Beyond Intentions and Toward the Theory of Trying: Effects of Work Environ-ment and Gender on Post-Adoption Information Technology Use," MIS Quarterly (29), 2005, pp. 427-459 | D | S | D | D | O | D | O | - | S |
| Lapointe, L., and Rivard, S. "A Multilevel Model of Resis-tance to Information Technology Implementation," MIS Quar-terly (29), 2005, pp. 461-491 | O | S | S | S | D | D | S | D | D |
| Beaudry, A., and Pinsonneault, A. "Understanding User Re-sponses to Information Technology: A Coping Model of User Adaptation," MIS Quarterly (29), 2005, pp. 493-524 | D | D | D | S | O | D | O | - | S |
| Jasperson, J., Carter, P. E., and Zmud, R. W. "A Comprehen-sive Conceptualization of Post-Adoptive Behaviors Associated with Information Technology Enabled Work Systems," MIS Quarterly (29), 2005, pp. 525-557 | D | D | D | S | S | D | O | O | S |
| Gattiker, T. F., and Goodhue, D. L. "What Happens After ERP Implementation: Understanding the Impact of Inter-Dependence and Differentiation on Plan-Level Outcomes," MIS Quarterly (29), 2005, pp. 559-585 | D | D | D | S | O | D | - | - | O |

Legend: O - Organization, T – Technology, P – People, D – Dominant, S – Secondary, O – Occasional.

Table B.20. *Coding of articles by concept published during December 2005*

| Article | Machine | | | Organism | | | Culture | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Gengatharen, D. E., and Standing, C. "A framework to assess the factors affecting success or failure of the implementation of government-supported regional e-marketplaces," European Journal of Information Systems (14), 2005, pp. 244-257 | D | D | S | D | D | D | S | O | S |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Wie, H-L., Wang, E. T. G., and Ju P-H. "Understanding misalignment and cascading change of ERP implementation: a stage view of process analysis," European Journal of Information Systems (14), 2005, pp. 324-334 | D | D | D | D | D | D | - | O | O |
| Bandara, W., Gable, G. G., and Rosemann, M. "Factors and measures of business process modelling: model building through a multiple case study," European Journal of Information Systems (14), 2005, pp. 347-360 | D | D | S | S | O | S | O | O | O |
| Santosa, P. I., Wei, K. K., and Chan, H. C. "User involvement and user satisfaction with information-seeking activity," European Journal of Information Systems (14), 2005, pp. 361-370 | O | D | D | O | - | D | - | - | - |
| Gosain, S., Lee, Z., and Kim, Y. "The management of cross-functional inter-dependencies in ERP implementations: emergent coordination patterns," European Journal of Information Systems (14), 2005, pp. 371-387 | S | D | S | D | D | D | S | O | D |
| Madon, S. "Governance lessons from the experience of telecentres in Kerala," European Journal of Information Systems (14), 2005, pp. 401-416 | S | S | S | S | D | D | S | S | D |
| Wu, J., Cook, V. J., and Strong, E. C. "A Two-Stage Model of the Promotional Performance of Pure Online Firms," Information Systems Research (13), 2005, pp. 334-351. | D | D | D | D | S | D | - | - | - |
| Bakos, Y., Lucas, H. C., Oh, W., Simon, G., Viswanathan, S., and Weber, B. W. "The Impact of E-Commerce on Competition in the Retail Brokerage Industry," Information Systems Research (13), 2005, pp. 352-371. | D | D | D | D | S | D | - | - | O |
| Pavlou, P. A., and Gefen, D. "Psychological Contract Violation in Online Marketplaces: Antecedents, Consequences, and Moderating Role," Information Systems Research (13), 2005, pp. 372-399. | S | D | S | D | S | D | S | O | D |
| Chellappa, R. K., and Shivendu, S. "Managing Piracy: Pricing and Sampling Strategies for Digital Experience Goods in Vertically Segmented Markets," Information Systems Research (13), 2005, pp. 400-417 | S | D | S | D | S | D | S | O | S |
| Kim, S. S., Malhotra, N. K., and Narasimhan, S. "Research Note—Two Competing Perspectives on Automatic Use: A Theoretical and Empirical Comparison," Information Systems Research (13), 2005, pp. 418-432. | D | D | D | S | - | D | O | - | O |
| Ray, G., Muhanna, W. A., and Barney, J. B. "Information Tehcnology and the Performance of the Customer Service Process: A Resource-Based Analysis," MIS Quarterly (29), 2005, pp. 625-652 | D | D | S | S | O | S | O | - | O |
| Majchrzak, A., Beaht, C. M., and Lim, R. A. "Managing Client Dialogues During Information Systems Design to Facilitate Client Learning," MIS Quarterly (29), 2005, pp. 653-672 | D | D | D | D | O | D | O | - | O |

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|---|---|---|---|---|---|---|---|---|---|
| Suh, K-S., and Lee, Y. E. "The Effects of Virtual Reality on Consumer Learning: An Empirical Investigation," MIS Quarterly (29), 2005, pp. 673-697 | O | D | D | O | O | D | - | - | - |
| Walden, E. A. "Intellectual Property Rights and Cannibalization in Information Technology Outsourcing Contracts," MIS Quarterly (29), 2005, pp. 699-720 | D | D | D | S | - | S | O | - | O |
| Porra, J., Hirschheim, R., and Parks, M. S. "The History of Texaco's Corporate Information Technology Function: A General Systems Theoretical Interpretation," MIS Quarterly (29), 2005, pp. 699-720 | D | D | D | D | D | D | O | O | S |
| Piccoli, G., and Ives, B. "IT-Dependent Strategic Initiatives and Sustained Competitive Advantage: A Review and Synthesis of the Literature," MIS Quarterly (29), 2005, pp. 747-776 | D | D | D | D | S | D | O | - | O |

Legend: *O* - Organization, *T* – Technology, *P* – People, D – Dominant, S – Secondary, O – Occasional.

# 2008

Table B.21. *Coding of articles by concept published during February 2008*

| Article | Machine | | | Organism | | | Culture | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Dickinger, A., Arami, M., and Meyer, D. "The role of perceived enjoyment and social norm in the adoption of technology with network externalities," European Journal of Information Systems (17), 2008, pp. 4-11 | S | D | S | D | S | D | S | S | S |
| Chu, T., and Robey, D. "Explaining changes in learning and work practice following the adoption of online learning: a human agency perspective," European Journal of Information Systems (17), 2008, pp. 4-11 | D | D | S | S | - | S | S | S | D |
| Datta, P., and Chatterjee, S. "The economics and psychology of consumer trust in intermediaries in electronic markets: the EM-Trust Framework," European Journal of Information Systems (17), 2008, pp. 12-28 | D | S | D | S | S | S | O | - | O |
| Karuppan, C. M., and Karruppan, M. "Resilience of super users' mental models of enterprise-wide systems," European Journal of Information Systems (17), 2008, pp. 29-46 | - | D | D | - | S | D | - | - | - |
| Yang, H-D., Kang, H-R., and Mason, R. M. "An exploratory study on meta skills in software development teams: antecedent cooperation skills and personality for shared mental models," European Journal of Information Systems (17), 2008, pp. 47-61 | D | O | D | S | O | S | D | O | D |
| Kasi, V., Keil, M., Mathiassen, L., and Pedersen, K. "The post mortem paradox: a Delphi study of IT specialist perceptions," European Journal of Information Systems (17), 2008, pp. 62-78 | S | S | S | D | S | D | S | O | S |
| Boonstra, A., Boddy, D., and Bell, S. "Stakeholder management in IOS projects: analysis of an attempt to implement an electronic patient file," European Journal of Information Systems (17), 2008, pp. 100-111 | S | D | S | S | S | S | D | D | D |
| Bartis, E., and Mitev, N. "A multiple narrative approach to information systems failure: a successful system that failed," European Journal of Information Systems (17), 2008, pp. 112-124 | O | S | O | S | O | S | D | D | D |
| Cordoba, J-R., and Midgley, G. "Beyond organisational agendas: using boundary critique to facilitate the inclusion of societal concerns in information systems planning," European Journal of Information Systems (17), 2008, pp. 125-142 | O | O | O | S | O | S | D | D | D |
| Carugati, A. "Information system development activities and inquiring systems: an integrating framework," European Journal of Information Systems (17), 2008, pp. 143-155 | S | D | D | S | O | S | S | S | D |

Legend: O - Organization, T – Technology, P – People, D – Dominant, S – Secondary, O – Occasional.

Table B.22. *Coding of articles by concept published during March 2008*

| Article | Machine | | | Organism | | | Culture | | |
|---|---|---|---|---|---|---|---|---|---|
| | *O* | *T* | *P* | *O* | *T* | *P* | *O* | *T* | *P* |
| Storey, V. C., Burton-Jones, A., Sugumaran, V., and Purao, S. "CONQUER: A Methodology for Context-Aware Query Processing on the World Wide Web," Information Systems Research (19), 2008, pp. 3-25 | - | D | O | - | S | S | - | - | - |
| Santhanam, R., Sasidharan, S., and Webster, J. "Using Self-Regulatory Learning to Enhance E-Learning-Based Information Technology Training," Information Systems Research (18), 2008, pp. 26-47 | D | D | D | O | S | D | - | - | O |
| August, T., and Tunca, T. I. "Let the Pirates Patch? An Economic Analysis of Software Security Patch Restrictions," Information Systems Research (18), 2008, pp. 48-70 | D | D | D | D | S | D | O | - | S |
| Dawande, M., Johar, M., Kumar, S., and Mookerjee, V. S. "A Comparison of Pair Versus Solo Programming Under Different Objectives: An Analytical Approach," Information Systems Research (18), 2008, pp. 71-92 | D | D | D | - | S | D | - | O | O |
| Devaraj, S., Easley, R. F., and Crant, J. M. "Research Note-How Does Personality Matter? Relating the Five-Factor Model to Technology Acceptance and Use," Information Systems Research (18), 2008, pp. 93-105 | D | D | D | D | S | D | - | - | S |
| Wang, J., Chaudhury, A., and Rao, H. R. "Research Note-A Value-at-Risk Approach to Information Security Investment," Information Systems Research (18), 2008, pp. 106-120 | D | D | S | S | S | S | - | - | O |
| Olivera, F., Goodman, P. S., and Tan, S. S-L. "Contribution Behaviors in Distributed Environments," MIS Quarterly (32), 2008, pp. 23-42 | D | D | D | - | - | D | - | - | O |
| Au, N., Ngai, E. W. T., and Cheng, T. C. E. "Extending the Understanding of End User In formation Systems Satisfaction Formation: An Equitable Needs Fulfillment Model Approach," MIS Quarterly (32), 2008, pp. 43-66 | D | D | D | - | O | S | - | - | O |
| Xue, Y., Liang, H., and Boulton, W. R. "Information Technology Governance in Information Technology Investment Decision Processes: The Impact of Investment Characteristics, External Environment, and Internal Context," MIS Quarterly (32), 2008, pp. 67-96 | S | D | S | D | S | D | S | O | S |
| Hsieh, J. J. P-A., Rai, A., and Keil, M. "Understanding Digital Inequality: Comparing Continued Use Behavioral Models of the Socio-Economically Advantaged and Disadvantaged," MIS Quarterly (32), 2008, pp. 97-126 | S | S | S | S | O | S | D | S | D |
| Kamis, A., Koufaris, M., and Stern, T. "Using an Attribute-Based Decision Support System for User-Customized Products Online: An Experimental Investigation," MIS Quarterly (32), 2008, pp. 159-177 | S | D | D | - | O | D | - | - | O |
| Choudhury, V., and Karahanna, E. "The Relative Advantage of Electronic Channels: A Multidimensional View," MIS Quarterly (32), 2008, pp. 179-200 | S | D | D | - | O | S | - | - | O |

Legend: O - Organization, T – Technology, P – People, D – Dominant, S – Secondary, O – Occasional.

Table B.23. *Coding of articles by concept published during June 2008*

| Article | Machine | | | Organism | | | Culture | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Wang, T. C., Ahmed, P. K., and Rafiq, M. "Knowledge management orientation: construct development and empirical validation," European Journal of Information Systems (17), 2008, pp. 219-235 | D | S | S | D | S | S | S | O | O |
| Azad, B., and King, N. "Enacting computer workaround practices within a medication dispensing system," European Journal of Information Systems (17), 2008, pp. 264-278 | D | S | D | O | - | S | D | O | D |
| Gal, U., Lyytinen, K., and Yoo, Y. "The dynamics of IT boundary objects, information infrastructures, and organisational identities: the introduction of 3D modelling technologies into the architecture, engineering, and construction industry," European Journal of Information Systems (17), 2008, pp. 290-304 | S | S | S | S | S | S | D | D | D |
| Mekonnen, S. M., and Sahay, S. "An institutional analysis on the dynamics of the interaction between standardizing and scaling processes: a case study from Ethiopia," European Journal of Information Systems (17), 2008, pp. 279-289 | D | D | D | S | S | S | D | S | D |
| Kietzmann, J. "Interactive innovation of technology for mobile work," European Journal of Information Systems (17), 2008, pp. 305-320 | S | S | S | D | S | D | D | D | D |
| Alter, S. "Defining information systems as work systems: implications for the IS field," European Journal of Information Systems (17), 2008, pp. 448-469 | D | D | S | S | S | O | S | S | S |
| Newkirk, H. E., Lederer, A. L., and Johnson, A. M. "Rapid business and IT change: drivers for strategic information systems planning?," European Journal of Information Systems (17), 2008, pp. 198-218 | D | S | D | D | O | D | O | - | O |
| Rustagi, S., King, W. R., and Kirsch, L. J. "Predictors of Formal Control Usage in IT Outsourcing Partnerships," Information Systems Research (19), 2008, pp. 126-143 | D | S | D | S | - | D | O | - | O |
| Du, A. Y., Geng, X., Gopal, R., Ramesh, R., and Whinston, A. B. "Capacity Provision Networks: Foundations of Markets for Sharable Resources in Distributed Computational Economies," Information Systems Research (19), 2008, pp. 144-160 | D | D | S | O | O | O | O | - | O |
| Cenfetelli, R. T., Benbasat, I., and Al-Natour, S. "Addressing the What and How of Online Services: Positioning Supporting-Services Functionality and Service Quality for Business-to-Consumer Success," Information Systems Research (19), 2008, pp. 161-181 | D | S | S | D | S | D | - | - | O |

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|---|---|---|---|---|---|---|---|---|---|
| Kuruzovich, J., Viswanathan, S., Agarwal, R., Gosain, S., and Weitzman, S. "Marketspace or Marketplace? Online Information Search and Channel Outcomes in Auto Retailing," Information Systems Research (19), 2008, pp. 182-201 | D | S | D | D | S | D | - | - | - |
| Gopal, A., and Sivaramakrishnan, K. "Research Note-On Vendor Preferences for Contract Types in Offshore Software Projects: The Case of Fixed Price vs. Time and Materials Contracts," Information Systems Research (19), 2008, pp. 202-220 | D | S | D | S | O | S | O | - | O |
| Dabbish, L., and Kraut, R. "Research Note-Awareness Displays and Social Motivation for Coordinating Communication," Information Systems Research (19), 2008, pp. 221-238 | S | S | D | O | O | S | O | - | O |
| Vlaar, P. W. L., van Fenema, P. C., Tiwari, V. "Cocreating Understanding and Value in Distributed Work: How Members of Onsite and Offshore Vendor Teams Give, Make, Demand, and Break Sense," MIS Quarterly (32), 2008, pp. 227-255 | S | S | S | D | O | D | D | S | D |
| Holmström Olsson, H., Conchuir, E. O., Agerfalk, P. J., and Fitzgerald, B. "Two-Stage Offshoring: An Investigation of the Irish Bridge," MIS Quarterly (32), 2008, pp. 257-279 | D | S | D | S | O | S | D | S | D |
| Cha, H. S., Pingry, D. E., and Thatcher, M. E. "Managing the Knowledge Supply Chain: An Organizational Learning Model of Information Technology Offshore Outsourcing," MIS Quarterly (32), 2008, pp. 281-306 | D | D | D | S | S | D | O | - | O |
| Levina, N., and Vaast, E. "Innovating or Doing as Told? Status Differences and Overlapping Boundaries in Offshore Collaboration," MIS Quarterly (32), 2008, pp. 307-322 | S | S | S | S | S | S | D | D | D |
| Dibbern, J., Winkler, J., and Heinzl, A. "Explaining Variations in Client Extra Costs Between Software Projects Offshored to India," MIS Quarterly (32), 2008, pp. 333-366 | D | D | D | D | O | S | S | O | D |
| Gefen, D., and Carmel, E. "Is the World Really Flat? A Look at Offshoring at an Online Programming MarketPlace," MIS Quarterly (32), 2008, pp. 367-384 | D | S | D | D | O | S | D | - | S |
| Ågerfalk, P. J., and Fitzgerald, B. "Outsourcing to an Unknown Workforce: Exploring Opensourcing as a Global Sourcing Strategy," MIS Quarterly (32), 2008, pp. 385-409 | S | S | O | D | S | D | D | S | D |
| Leonardi, P. M., and Bailey, D. E. "Transformational Technologies and the Creation of New Work Practices: Making Implicit Knowledge Explicit in Task-Based Offshoring," MIS Quarterly (32), 2008, pp. 411-436 | D | D | D | S | O | S | D | D | D |
| Ramasubbu, N., Mithas, S., Krishnan, M. S., and Kemerer, C. F. "Work Dispersion, Process-Based Learning, and Offshore Software Development Performance," MIS Quarterly (32), 2008, pp. 437-458 | D | D | D | S | O | S | O | - | O |

Legend: _O_ - Organization, _T_ – Technology, _P_ – People, D – Dominant, S – Secondary, O – Occasional.

Table B.24. *Coding of articles by concept published during August 2008*

| Article | Machine | | | Organism | | | Culture | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Irani, Z., and Elliman, T. "Creating social entrepreneurship in local government," European Journal of Information Systems (17), 2008, pp. 336-342 | S | O | O | S | O | S | D | S | D |
| Ashurst, C., Doherty, N. F., and Peppard, J. "Improving the impact of IT development projects: the benefits realization capability model," European Journal of Information Systems (17), 2008, pp. 352-370 | S | S | S | O | O | S | S | S | D |
| Lesca, N., and Caron-Fasan, M-L. "Strategic scanning project failure and abandonment factors: lessons learned," European Journal of Information Systems (17), 2008, pp. 371-386 | S | S | O | D | S | D | S | O | S |
| Junglas, I. A., Johnson, N. A., and Spitzmuller, C. "Personality traits and concern for privacy: an empirical study in the context of location-based services," European Journal of Information Systems (17), 2008, pp. 387-402 | O | O | S | S | S | D | O | - | S |
| Johnson, N. A., Cooper, R. B., and Chin, W. W. "The effect of flaming on computer-mediated negotiations," European Journal of Information Systems (17), 2008, pp. 417-434 | - | S | S | - | S | D | - | O | D |

Legend: O - Organization, T – Technology, P – People, D – Dominant, S – Secondary, O – Occasional.

Table B.25. *Coding of articles by concept published during September 2008*

| Article | Machine | | | Organism | | | Culture | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Kane, G. C., and Alavi, M. "Casting the Net: A Multimodal Network Perspective on User-System Interactions," Information Systems Research (19), 2008, pp. 253-272 | D | D | D | S | O | S | S | O | D |
| Bampo, M., Ewing, M. T., Mather, D. R., Stewart, D., and Wallace, M. "The Effects of the Social Structure of Digital networks on Viral Marketing Performance," Information Systems Research (19), 2008, pp. 273-290 | D | D | D | D | D | D | O | - | O |
| Forman, C., Ghose, A., and Wiesenfeld, B. "Examining the Relationship Between Reviews and Sales: The Role of Reviewer Identity Disclosure in Electronic Markets," Information Systems Research (19), 2008, pp. 291-313 | S | S | D | O | O | S | S | S | D |
| Trier, M. "Toward Dynamic Visualization for Understanding Evolution of Digital Communication Networks," Information Systems Research (19), 2008, pp. 335-350 | S | D | D | - | D | D | - | O | O |
| Robert, L. P., Dennis, A. R., and Ahuja, M. K. "Social Capital and Knowledge Integration in Digitally Enabled Teams," Information Systems Research (19), 2008, pp. 314-334 | D | D | D | S | S | S | D | - | D |

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|---|---|---|---|---|---|---|---|---|---|
| Hinz, O., and Spann, M. "The Impact of Information Diffusion on Bidding Behavior in Secret Reserve Price Auctions," Information Systems Research (19), 2008, pp. 351-368 | D | D | D | - | S | D | - | O | S |
| Hahn, J., Moon, J. Y., and Zhang, C. "Emergence of New Project Teams from Open Source Software Developer Networks: Impact of Prior Collaboration Ties," Information Systems Research (19), 2008, pp. 369-391 | S | S | S | D | S | D | D | S | D |
| Venkatesh, V., Brown, S. A., Maruping, L. M., and Bala, H. "Predicting Different Conceptualizations of System Use: The Competing Roles of Behavioral Intention, Facilitating conditions, and Behavioral Expectations," MIS Quarterly (32), 2008, pp. 483-502 | S | S | D | S | O | D | - | - | O |
| Son, J-Y., and Kim, S. S. "Internet Users' Information Privacy-Protective Responses: A Taxonomy and a Nomological Model," MIS Quarterly (32), 2008, pp. 503-529 | S | S | S | D | S | D | D | - | D |
| Gefen, D., Wyss, S., and Lichtenstein, Y. "Business Familiarity as Risk Mitigation in Software Development Outsourcing Contracts," MIS Quarterly (32), 2008, pp. 531-552 | D | S | - | D | S | - | O | - | - |
| Shanks, G., Tansley, E., Nuredini, J., Tobin, D., Weber, R. "Representing Part-Whole Relations in Conceptual Modeling: An Empirical Evaluation," MIS Quarterly (32), 2008, pp. 553-574 | - | - | D | - | - | S | - | - | - |
| Dennis, A. R., Fuller, R. M., Valacich, J. S. "Media, Tasks, and Communication Processes: A Theory of Media Synchronicity," MIS Quarterly (32), 2008, pp. 575-600 | - | S | D | - | S | D | - | - | S |
| Kappos, A., and Rivard, S. "A Three-Perspective Model of Culture, Information Systems, and Their Development and Use," MIS Quarterly (32), 2008, pp. 601-634 | S | S | S | O | O | O | D | D | D |
| Rutner, P. S., Hardgrave, B. C., and McKnight, D. H. "Emotional Dissonance and the Information Technology Professional," MIS Quarterly (32), 2008, pp. 635-652 | S | - | D | S | - | D | O | - | S |
| Gregg, D. G., and Walczak, S. "Dressing Your Online Auction Business for Success: An Experiment Comparing Two eBay Businesses," MIS Quarterly (32), 2008, pp. 653-670 | S | S | S | D | S | D | O | O | O |

Legend: O - Organization, T – Technology, P – People, D – Dominant, S – Secondary, O – Occasional.

Table B.26. *Coding of articles by concept published during October 2008*

| Article | Machine | | | Organism | | | Culture | | |
|---|---|---|---|---|---|---|---|---|---|
| | O | T | P | O | T | P | O | T | P |
| Williams, K., Chatterjee, S., and Rossi, M. "Design of emerging digital services: a taxonomy," European Journal of Information Systems (17), 2008, pp. 505-517 | D | D | D | D | S | D | O | - | O |
| Umpathy, K., Purao, S., and Barton, R. R. "Designing enterprise integration solutions: effectively," European Journal of Information Systems (17), 2008, pp. 518-527 | D | D | D | S | O | S | - | - | - |

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|---|---|---|---|---|---|---|---|---|---|
| D'Auberterre, F., Singh, R., and Iyer, L. "Secure activity resource coordination: empirical evidence of enhanced security awareness in designing secure business processes," European Journal of Information Systems (17), 2008, pp. 528-542 | D | D | D | S | S | S | - | - | - |
| Aaen, I. "Essence: facilitating software innovation," European Journal of Information Systems (17), 2008, pp. 543-553 | S | D | S | D | D | D | O | O | S |
| Weedman, J. "Client as designer in collaborative design science research projects: what does social science design theory tell us?," European Journal of Information Systems (17), 2008, pp. 476-488 | O | S | S | O | S | S | S | S | D |

Legend: <u>*O*</u> - Organization, <u>*T*</u> – Technology, <u>*P*</u> – People, D – Dominant, S – Secondary, O – Occasional.

Table B.27. *Coding of articles by concept published during December 2008*

| **Article** | **Machine** | | | **Organism** | | | **Culture** | | |
|---|---|---|---|---|---|---|---|---|---|
| | <u>*O*</u> | <u>*T*</u> | <u>*P*</u> | <u>*O*</u> | <u>*T*</u> | <u>*P*</u> | <u>*O*</u> | <u>*T*</u> | <u>*P*</u> |
| Teo, T. S. H., and Men, B. "Knowledge portals in Chinese consulting firms: a task-technology fit perspective," European Journal of Information Systems (17), 2008, pp. 557-574 | D | D | D | D | D | D | S | S | S |
| Smolander, K., Rossi, M., and Purao, S. "Software architectures: Blueprint, Literature, Language or Decision?," European Journal of Information Systems (17), 2008, pp. 575-588 | D | D | D | D | D | D | S | S | S |
| Lyytinen, K., and Newman, M. "Explaining information systems change: a punctuated socio-technical change model," European Journal of Information Systems (17), 2008, pp. 589-613 | D | D | D | D | D | D | S | S | S |
| Cho, S., Mathaiassen, L., and Nilsson, A. "Contextual dynamics during health information systems implementation: an event-based actor-network approach," European Journal of Information Systems (17), 2008, pp. 614-630 | D | D | D | S | S | S | D | S | D |
| Cooper, R. B., and Haines, R. "The Influence of workspace awareness on group intellective decision effectiveness," European Journal of Information Systems (17), 2008, pp. 631-648 | D | S | D | D | S | D | O | - | O |
| Whitley, E. A., and Hosein, I. R. "Doing the politics of technological decision making: due process and the debate about identity cards in the U.K.," European Journal of Information Systems (17), 2008, pp. 668-677 | S | D | S | S | S | S | D | D | D |
| Bapna, R., Jank, W., and Shmueli, G. "Consumer Surplus in Online Auctions," Information Systems Research (19), 2008, pp. 400-416 | D | D | D | - | - | S | - | - | O |

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|---|---|---|---|---|---|---|---|---|---|
| Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., and Tu, Q. "The Consequences of Technostress for End Users in Organizations: Conceptual Development and Empirical Validation," Information Systems Research (19), 2008, pp. 417-433 | D | D | D | D | S | D | O | - | O |
| Wakefield, R. L., Leidner, D. E., and Garrison, G. "A Model of Conflict, Leadership, and Performance in Virtual Teams," Information Systems Research (19), 2008, pp. 434-455 | D | S | D | D | S | D | S | - | S |
| Li, X., and Hitt, L. M. "Self-Selection and Information Role of Online Product Reviews," Information Systems Research (19), 2008, pp. 456-474 | D | S | D | S | O | D | O | - | O |
| Feller, J., Finnegan, P., Fitzgerald, B., and Hayes, J. "From Peer Production to Productization: A Study of Socially Enabled Business Exchanges in Open Source Service Networks," Information Systems Research (19), 2008, pp. 475-493 | D | S | S | D | S | D | D | S | D |
| Moon, J. Y., and Sproull, L. S. "The Role of Feedback in Managing the Internet-Based Volunteer Work Force," Information Systems Research (19), 2008, pp. 494-515 | D | S | S | D | S | D | S | O | D |
| Mithas, S., Jones, J. L., Mitchell, W. "Buyer Intention to Use Internet-Enabled Reverse Auctions: The Role of Asset Specificity, Product Specialization, and Non-Contractibility," MIS Quarterly (32), 2008, pp. 705-724 | D | S | D | D | S | D | S | - | S |
| Pries-Heje, J., and Baskerville, R. "The Design Theory Nexus," MIS Quarterly (32), 2008, pp. 731-755 | D | D | D | D | O | D | O | O | O |
| Lee, J., Wyner, G. M., and Pentland, B. T. "Process Grammar as a Tool for Business Process Design," MIS Quarterly (32), 2008, pp. 757-778 | S | D | S | - | - | O | - | - | - |
| Adomavicius, G., Bockstedt, J. C., Gupta, A. "Making Sense of Technology Trends in the Information Technology Landscape: A Design Science Approach," MIS Quarterly (32), 2008, pp. 779-809 | S | D | S | D | D | S | O | - | O |
| Abbasi, A., and Chen, H. "CyperGate: A Design Framework and System for Text Analysis of Computer-Mediated Communication," MIS Quarterly (32), 2008, pp. 811-837 | S | D | S | S | S | D | S | S | S |
| Parsons, J., and Wand, Y. "Using Cognitive Principles to Guide Classification in Information Systems Modeling," MIS Quarterly (32), 2008, pp. 839-868 | - | D | D | - | - | S | - | - | - |

Legend: *O* - Organization, *T* – Technology, *P* – People, D – Dominant, S – Secondary, O – Occasional.

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Alter, S 2008, 'Defining information systems as work systems: implications for the IS field', *European Journal of Information Systems,* vol. 17, no. 2, pp. 448–469.

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Archard, D 1996, 'Introduction', in D Archard (ed.), *Philosophy and pluralism,* (pp. 1–7), Cambridge University Press, Cambridge.

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Au, N, Ngai, EWT & Cheng, TCE 2008, 'Extending the understanding of end user in formation systems satisfaction formation: an equitable needs fulfillment model approach', *MIS Quarterly,* vol. 32, no. 1, pp. 43–66.
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