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MAKING SENSE OF IS WITH THE CYNEFIN FRAMEWORK.

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Abstract

This paper examines aspects of the field of Information Systems (IS) concerned with its diversity and with the rapid changes within the discipline that have been incurred by the continued evolution of the IS artefact. This examination is done in order to establish the suitability of the Cynefin framework, developed for knowledge management, as a suitable tool for sense-making in IS. A description and assessment of the Cynefin framework is provided with its varied applications in both organisational practice and research. The paper then applies the framework to make sense of some historical trends and contemporary issues of IS emphasising their diversity and changing nature. We conclude with speculation on how this approach may help guide future sense-making in IS research.

Keywords: IS discipline, sense-making, Cynefin framework, wicked problems, diversity, change

1 INTRODUCTION

If Adams and Fitzgerald were correct in 2000 to describe the Information Systems (IS) field as having "40 or so years of history" (Adams & Fitzgerald 2000 p1) we must now, in 2009, be approaching the end of its fifth decade. This half century of development has been long enough to establish the IS profession with associations, conferences, journals, educational curricula etc but not to confirm a mature discipline. Over time, numerous negotiations have occurred about the name and location of IS courses within the existing discipline structures of educational institutions as well as the place of IS practices in human enterprises of all kinds. The identity, foundation and directions of IS have been discussed and debated both informally, when IS people get together at conferences, and formally in essay papers (eg Adam & Fitzgerald 2000; Banville & Landry 1989; Gregor & Jones 2007; Hirschheim &. Klein 1989, 2003; Klein & Hirschheim 2007; Van Gigch & Pipino 1986), empirical studies of IS publications (eg Chen & Hirschheim 2004; Cheon et al 1993; Culnan & Swanson 1986; Holsapple et al 1993; Sidorova 2008) and definitive books on the field (eg Boland & Hirschheim 1987; Galliers 1992; Mumford et al 1985, Nissen et al 1991). Contemporary appraisals of IS in terms of communities of practice and knowing (Klein & Hirschheim 2008), and types of theory (Gregor 2006) have added insightful dimensions to the IS identity and this paper contributes along this theme.

While there are many descriptions of IS, a relatively uncontentious statement is that IS is a field of academic endeavour that informs, and is informed by, practice involving information systems artefacts in organisations. The next section of this paper takes this description into more controversial ground as we contend that one of the main elements that makes it so difficult to delineate IS as a distinct discipline, is the rapidly changing nature and perception of the IS artefact and its complex relationship to people and what they do. Twenty to thirty years ago the IS artefact was primarily located in organisations and definitions of the IS discipline from that time explicitly reflected this. However this has changed and no doubt will continue to do so. Today many of the IS artefacts in large organisations have ossified as legacy or enterprise resource planning (ERP) systems, whereas many of the exciting developments are in the global virtual social and knowledge space. We propose that the field of IS should embrace this change but be aware that such change poses a challenge and requires appropriate new perspectives and research agendas as did the IS developments of the 1960s and 70s, that were mysterious and exciting at that time.

In the course of our research into dynamic areas of IS involving socio-technical systems, communities and network-centric configurations, we have been impressed by the potential contribution of the Cynefin (pronounced kun-ev'in) framework to the IS discipline. As will be described in the paper, we have used it both to position our research and to underpin the analysis and interpretation of data. Cynefin is a holistic sense-making framework developed through research and practice of Knowledge Management (KM) by Dave Snowden (2002) when working at IBM. As will be explained in this paper, Cynefin consists of five domains: two of 'order' (the known and the knowable), two of 'unorder' (complexity and chaos) and one of 'disorder'. In some respects these domains signify what in IS are variously referred to as different worldviews, epistemological stances or paradigms that make it difficult to present IS as a single coherent discipline.

We see Cynefin as one of Gregor's (2006) 'theories for explaining' comparable with other models and frameworks such as Structuration Theory (Giddens 1984), Actor Network Theory (Latour 1987) and Activity Theory (Leontiev 1981), each of which has been appropriated by IS researchers. For us, Cynefin provides a research tool that spans the increasing breadth of capability of the IS artefact, its support for human activities and its continuing evolution into unanticipated new forms. Many of the big problems in IS are 'wicked' (Rittel & Webber, 1973; Courtney, 2001) with ill-defined, shifting definitions that demand resolution through a holistic perspective such as Cynefin that acknowledges and incorporates diversity and change. Cynefin is neither a definitive solution to all IS problems nor a grand theory to explain all things. However in this paper we present evidence and argument to demonstrate how it provides a new lens through which to make sense of the kaleidoscope of IS topics, research approaches and paradigms. We aim to show how the framework affords a mapping of changing perspectives of IS artefacts and issues over time.

We begin by examining some aspects the field of IS from our perspective and that of others to establish the need for a framework such as Cynefin. We then provide a description and assessment of the Cynefin sense-making framework and its varied applications in both organisational practice (mostly within KM initiatives) and research. We map the most general of the historical trend of IS onto the Cynefin framework and then proscribe a visualisation of current IS issues. We conclude with suggestions about how this approach may be useful, in conjunction with other theories, for the future of sense-making in IS.

It would be noted that in this paper we use the terms: field and discipline interchangeably in the manner of Klein and Hirschheim (2008) as do we the terms model, framework and theory in the manner of Gregor (2007).

2 A VIEW OF IS SHOWING THE NEED FOR CYNEFIN

Two contrasting views of IS come from its top journal, MIS Quarterly. The mission of MIS Quarterly calls for "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."[1] This is a clear, workable statement to guide contributors, reviewers and editors of the journal and, as will be explained later, is consistent with the 'ordered' domains of the Cynefin model. We contrast this with part of an MISQ editorial from Allen Lee (2001) where he says "research in the information systems field examines more than just the technological system, or just the social system, or even the two side by side; in addition, it investigates the phenomena that emerge when the two interact" (p. iii). These emergent phenomena which are often unexpected and even challenging to convention and order place this description of IS in the complex 'unordered' Cynefin domain. As we will show this is quite acceptable and even desirable for a multi-faceted entity such as IS where there is diversity of perspective and inherent change.

2.1 Change and Diversity in IS

In arguing the credentials of Cynefin as a tool for making sense of IS, we concentrate on two critical interrelated aspects, namely change and diversity. IS draws its significance from the uniqueness of computer-based information and communication tools and their continually evolving place in shaping human, social and organisational history. One of the challenges, and also opportunities, for the future of the IS discipline is the inherent diversity coming from this socio-technical way of thinking. On one hand, the characteristic of IS that distinguishes it from other management fields in the social sciences is its use of artefacts in human-machine systems. Conversely, the characteristic that distinguishes IS from more technical fields, such as Computer Science and Information Technology, is its concern for the human elements in organisational and social systems (Hasan 2006). Work in IS crosses traditional discipline boundaries, drawing on the concepts, theories and methodologies of many other areas, including organisational science, computing science, information management and systems thinking. Because of its relationship to continuously evolving information and communications technologies (ICT) and this diverse range of other disciplines, the field of IS acknowledges, expects, studies and welcomes change. Dealing with change and leveraging such power requires new tools of understanding. We intend to show that the Cynefin framework is one of these tools.

Change, together with the diversity of perspectives covering the business, social and technical spectra, has given IS an intriguing history. Looking back over the past five decades we could begin in the 1960s with the introduction of computers (programmed calculating machines) into organisations such as banks and insurance companies as transaction processing systems (TPS). The 1970s saw a re-conceptualisation of TPS as systems which processed data into information, hence the enduring term 'Information Technology' (IT). Management information systems (MIS) and decision support systems (DSS) are instances of 'informating', as opposed to automating, systems (Zuboff 1988) that grew in prominence in the 1980s. As the 1980s progressed there was expanding availability of personal computers (PC) on the office-desk, then in homes, graphical user interfaces (GUI), networks,

[1] www.MISQ.org

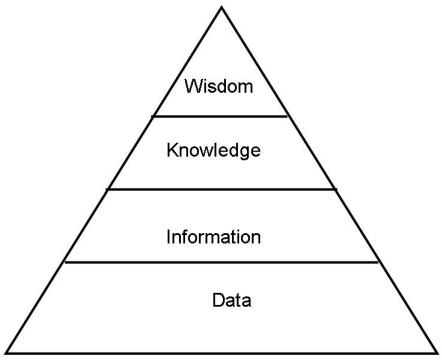
and, in the 1990s, the Internet brought us what we now call Web 1.0. In the 21st Century computer-based technologies are everywhere and ubiquitous, converging with other media, giving us mobility and the social application of Web 2.0. We will use some of these as examples to demonstrate how the Cynefin framework makes sense of the trials and tribulations that dogged many of these developments.

The diversity of IS is reflected in its descriptions as inter-disciplinary, cross-disciplinary and multi-disciplinary. IS has connections to social sciences of management, organisational behaviour and communications as well as technical disciplines of computer science and software engineering. IS also overlaps with other fields of study that deal with the human/social/business uses of IT such as human-computer interaction, computer-supported cooperative work, decision support systems, socio-technical systems as well as information science and KM. While some benefits would come from a clear delineation of the scope of each field, this has not happened and consensus seems unlikely to be reached in the near future. Suffice to say that we believe that it is beneficial that IS researchers publish in all these areas, in addition to IS outlets.

2.2 Some Traditional IS Sense-making Frameworks

IS research uses a myriad of models frameworks and theories, many borrowed and adapted from other disciplines. It is not our intention to review all these here but we give one example from each of two common approaches to sense-making frameworks, namely hierarchies and generations.

One of the simplest hierarchies, which appears in almost every introductory text on IS, makes a distinction between four fundamental concepts: Data, Information, Knowledge and Wisdom, with wisdom at the top of the hierarchy as shown in Figure 1. One of the controversies of this classification of concepts is that each is defined in terms of the others such as in the following based on the Australian KM Standard (AS 5037 - 2005):



Wisdom: The ability to beneficially apply accumulated knowledge or experience or understanding or common sense and insight
Knowledge: A body of understanding and skills that is constructed by people. Knowledge is increased through interaction with information
Information: Processed data in a context to which meaning has been attributed
Data: Any manifestation in the environment, including symbolic representations that in combination may form the basis of information.

Figure 1: The Data, Information Knowledge Wisdom (DIKW) hierarchy

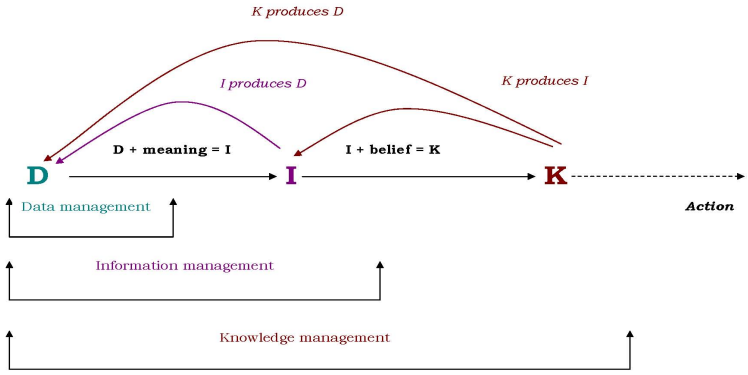


Figure 2: DIK as a revised model for KM according to Callioni (2003)

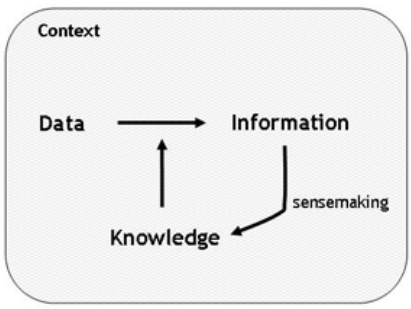


Figure 3 DIK according to Callahan (2007)

Despite its almost universal recognition in IS, the DIKW hierarchy in Figure 1 has many critics, particularly since the mid 1990s when the field of KM grew in prominence. Fricke (2007) suggests that it is unsound and methodologically undesirable not only because of the reciprocity of the definitions of each term but also that the oversimplification of the categories is misleading. From a KM perspective, Callioni (2003) provides an alternative, and more insightful, set of relationships among the DIK elements as shown in Figure 2 showing how knowledge is needed to make sense of data and information. Callahan (2007) proposes the model of Figure 3 where knowledge is created through a sensemaking process and acts as an interpretant to turn data into information. Writers, such as these, illustrate the shortcomings of simple hierarchies for making sense of IS principles.

Although elements of IS include many obvious examples of the generations approach to sensemaking (programming languages being the most obvious), we will continue on the KM theme with an example of the generations approach as it is the Cynefin framework's source field. As discussed on the ActKM list[2] both Snowden and Firestone suggest three generations of KM. Snowden's (2002) are more aligned with IS as follows:

- The first generation, clearly associated with increased ICT capabilities, focussed on timely information provision for decision support.
- The second generation, triggered by the SECI model (Nonaka 1994), focussed on the tacit-explicit knowledge conversion as the process of knowledge creation in organisations.
- The emerging third generation of KM, that Snowden associates with his work at the Cynefin Centre, uses a sense-making model of collective knowledge creation, disruption and utilisation to allow a pragmatic and conceptual alternative to the orthodoxy of scientific management.

Organisational management has warmed to the idea that knowledge is a critical but ethereal resource, that it is both explicit and tacit, and that it can be treated sometimes as a thing, to be captured and stored with the aid of ICT, and at others as a flow, to be shared among people. We believe that the Cynefin framework is helpful for depicting these ideas both in and beyond the KM context.

3 THE CYNEFIN FRAMEWORK

Cynefin is the name of a sense-making framework proposed by Snowden (2002). As shown in Figure 4, the framework has five domains reflecting the different relationships between cause and effect in each domain and between central and ways of working in the various domains. Each domain has a different mode of community behaviour and each implies the need for a different form of management and a different leadership style with the adoption of different tools, practices and conceptual understanding. Four of the Cynefin domains set the context for collective decision making, an approach which has been used in KM as well as in other applications including conflict resolution. These four domains are:

- **Simple or Known**, in which the relationship between cause and effect is obvious to all. The approach suited to this context is to *Sense - Categorise - Respond* (SCR) then apply *best* practice. This suits a centralised bureaucratic way of working with weak horizontal links in organisations
- **Complicated or Knowable**, in which the relationship between cause and effect requires analysis or some other form of investigation and/or the application of expert knowledge. The approach suited to this context is to *Sense - Analyse - Respond* (SAR) then apply *good* practice. This domain is the realm of most scientific research and of matrix organisational structures.
- **Complex**, in which the relationship between cause and effect can only be perceived in retrospect, but not in advance. The approach suited to this context to *Probe - Sense - Respond* (PSR) and then allow *emergent* practice. Aspects of Complexity Theory developed in biological disciplines are relevant to this domain.
- **Chaotic**, in which there is no relationship between cause and effect at systems level. The approach suited to this context is to *Act - Sense - Respond* (ASR) to discover *novel* practice. Aspects of

[2] See www.actkm.org

Chaos Theory developed in mathematical disciplines are relevant to this domain. The connections between individuals and organizations working in this domain are weak.

The fifth central domain is **Disorder**, which is the destructive state of not knowing what type of causality exists and thus not knowing which way of working is best. While problems may legitimately be allowed to exist in the other four domains if approached with suitable solutions, those in states of *disorder* are normally harmful and should be guided into one of the other domains.

People are usually most comfortable in one of the first four Cynefin domains. In the domain of Disorder, individuals from each domain:

> *Compete to interpret the central space on the basis of their preference for action. Those most comfortable with stable order seek to create or enforce rules; experts seek to conduct research and accumulate data; politicians to increase the number and range of their contacts; and finally, the dictators, eager to take advantage of a chaotic situation, seek absolute control. The stronger the importance of the issue, the more people [seem] to pull it towards the domain where they feel most empowered by their individual capabilities and perspectives (Kurtz & Snowden, 2003, p. 470).*

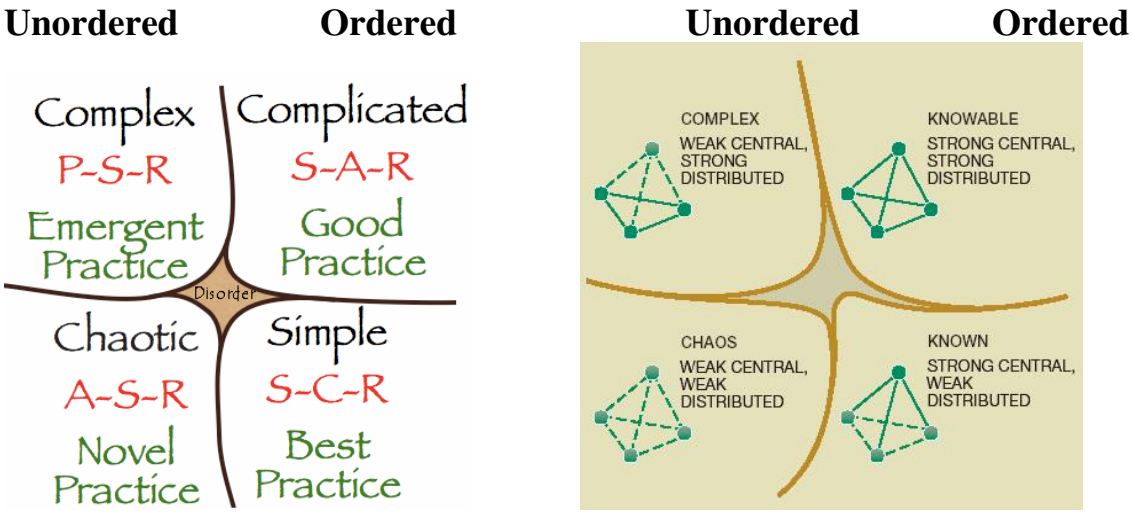


Figure 4: Two representations of the Cynefin framework with the two ordered and unordered domains with disorder in the centre. On the left an interpretation of the original model from (Snowden 2002). On the right are the connection strengths of Cynefin domains (Kurtz and Snowden 2003).

The Cynefin framework supports the use of both space (diversity) and time (change) to explicate the perspectives of different stakeholders, who populate the complex, socio-technical global contexts of the 21st century, making those perspectives visible to, and providing insights for, those involved in decision making. Many of these contexts can be regarded as 'wicked problems', i.e. problems that are ill-defined, several, conflicting criteria for solution definition, solutions which create further problems and no obvious indications of when enough has been achieved (Rittel & Webber, 1975). We regularly encounter these types of problems in IS research and practice. Such problems are often present in the destructive domain of disorder and so require action to move them into one of the other domains.

Kurtz and Snowden (2003) describe the forces of the past as moving in a clockwise fashion from the domain of chaos, through the emergence, complex stabilisation and ordering of ideas, through the definition, hypothesis formulation and testing of solutions to knowable problems, until those known solutions are implemented as part of everyday ritual. These are countered by the forces of the future: obsolescence and forgetfulness, the curiosity and energy of new generations, the questioning of the current order of things and the arrival of new challenges. Decisions made in the present impact on all domains and are subject to the tension filled pressures of both past and future. Kurtz and Snowden believe that these inherent characteristics of natural systems must be addressed to make sense of any situation.

In proposing the Cynefin model, initially for KM but increasingly for other areas of investigation, Snowden (2002) makes a point of strongly resisting the existence of a single or idealised model but rather sees the key to survival and growth as coming from the ability to adapt to change through diversity of approach. This involves an awareness and understanding of the borders between different domains and the acquisition of tools and techniques to enable border transitions when needed. Other contexts where the Cynefin model has been useful include defence organisations (Hasan & Ali, 2005; Burnett et al., 2005), counter terrorism (Lazaroff & Snowden (2006), emergency management (French et al, 2007), knowledge generation (van der Walt, 2006; the role of information professionals (Botha, 2006); organisational behaviour (Mark, 2006), environmental issues (Moglia et al, 2008), futures studies (Aaltonen et al, 2005), and design (Hasan, 2006)

4 IS INTERPRETED THROUGH THE CYNEFIN FRAMEWORK

As indicated in the previous section of the paper, the Cynefin framework provides a perspective that includes both space and time. It can be used to provide different views on an issue, to make sense of diverse problems by positioning them in appropriate domains and then to identify suitable methods for dealing with those problems. Cynefin can also be used to understand how issues and problems evolve, either of their own accord or as the result of deliberate planning, through different domains as they, and their context, change over time. With the exception of those in the domain of Disorder, there are situations which may best be left in a single domain. Practices in Disorder are usually harmful and should normally be encouraged or forced to move out of that state. A common trajectory for such practices is along the clockwise cycle which takes them through unordered states of *chaos* and *complexity* through the *complicated* or *knowable* domain into the *known* with the establishment of best practice. In contrast there are practices that start out simple and ordered and then either gradually become more complicated and complex or, through an unexpected crisis, become suddenly chaotic. Some diverse issues from the field of IS are now used as examples of the way these changes can be interpreted through the Cynefin framework. This will be followed by a critical assessment of how this approach would describe the evolution of the IS discipline as a whole.

4.1 Some Basic Cycles of Change

The hardware elements of information systems have evolved from the first primitive computers to modern ubiquitous information and communications technologies. The concept of a programmable machine as a basic abstract symbol-manipulating device was described but not implemented by Alan Turing in 1936. However an urgent imperative for automated computing power soon came about with the need to decode enemy communication and to determine complex rocket trajectories in the disorder of World War II. Since then, confronted by the need for more speed and greater processing power, and less physical bulk, computer engineers continued to develop new versions of 'the computer'. Performance, capacity, reliability and functionality have increased at an amazing rate as costs continue to drop. This has provided the technological infrastructure for other groups of experts, to control and expand the operations of these computing machines through evermore complex configuration and sets of instructions. Now experts and users together postulated how 'computers' can be used in a myriad of other contexts and are more aptly referred to as ICT.

This historical view of the digital revolution could be mapped onto the Cynefin framework as different cycles depending on the perspective taken. From the electronic engineering perspective, computers started as a collection of binary devices built into logic circuits designed to carry out repetitive calculations with a speed and accuracy that far improved on human capability. As transistors and then integrated circuits replaced triode valves, computers become more complicated with the core processing and storage buried under layers of systems software that supported not just numeric calculations but the processing of text and an increasingly diverse range of media. Computers were then networked, not just with each other, but with all kinds of multimedia devices into a complex global phenomenon that now, through end-user controlled social technologies, reaches into the chaotic world of society as a whole. Described in these terms the development of ICT has moved anti clockwise around Cynefin from the engineer's perspective.

Employees in organisations could have a different perspective on this historical development. In the 1960s computers represented enormous change as the jobs for which many of them had been trained were being automated. This threat to livelihoods was to them harmful and a state of disorder with union protests and strikes. The older unskilled workers who thought they had a secure position were faced the chaos of having to start again. A large section of the workforce went through a complex path of retraining as a new order emerged with jobs created by digital technologies. Thus, described in these terms, ICT has taken a clockwise path around Cynefin from the worker's view.

Other examples of *disordered* situations in aspects of IS that have historically gone through the clockwise cycle around the Cynefin model, as just described, could include the following:

- Computer programming: As applications grew in size and complexity, the habits of spaghetti coding and a lack of documentation in the early days made such programs unmaintainable and impossible to update. New approaches to programming were developed whose order solved earlier problems.
- Systems development projects: The chaos of projects being regularly and persistently subject to failure, budget or time overrun, lead to improved tools of project management in systems analysis and design.
- Systems interfaces: The unacceptability of unusable systems interfaces that were unintelligible to all but a select few experts, lead to the development of user-friendly direct manipulations through graphical user interfaces that are an accepted part of almost all systems.
- Systems security: The damage and at times chaos generated by problems of malicious hacking, the spread of computer viruses, spam, phishing etc resulted in the development of improvements to computer and systems security that are now routine.

The cases of computer programming and systems analysis are now used to illustrate how the need for reliability, efficiency and effectiveness drives many elements of *disorder* into the *unordered* domains of *chaos* and *complexity,* and then into the *ordered* world of organisations. Some elements remain *complex*, sometimes they move to *complicated* and stay in *knowable* domain while others are simplified to the extent that they are in the *known* domain in IS and often become 'automated'.

In Figure 5 we depict some of the issues that have influenced the directions of computer programming over the five decades of IS as elements of clockwise cycles on the Cynefin framework. While there are probably others, one of the most notable *disordered* aspects of programming comes from the consequences of undocumented, 'spaghetti code'. Individual experts and hackers can work their way around these deficiencies, an activity that resides in the Cynefin domain of *chaos*. Eventually more widely usable approaches to programming emerged through attraction forces in the *complex* domain. Many aspects of programming later crystallised as standardised languages and structured programming techniques in the *ordered* domains. As good programmers still require substantial training and skill, writing good code can still be perceived as a *complicated*, *knowable* activity. There are however simple contexts where computer applications can be created with program generators, fourth generation languages or wizards, placing this automated activity in the *known* domain. The Cynefin cycle has been approximated with each of several generations of programming languages. For example, with third generation languages (3GLs), object-oriented techniques, visual programming and more recently agile approaches, there has been a general trend that programmers have gone from being regarded as professionals with exceptional expertise, to workers in regular profession, as standard techniques and tools are established.

In Figure 6 we depict some of the issues to do with IS development projects as part of cycles on the Cynefin framework. *Disorder* is obvious in the many tales of projects being abandoned or not meeting requirements or targets. For many years there were debates on whether development was best done as one-off, in-house projects, which suit the disconnected *chaos* domain, or whether development was best outsourced or Enterprise Resource Planning solutions bought. Through the clockwise Cynefin cycle, the area of systems analysis and design has emerged and matured into ordered knowable methods and formal CASE tools.

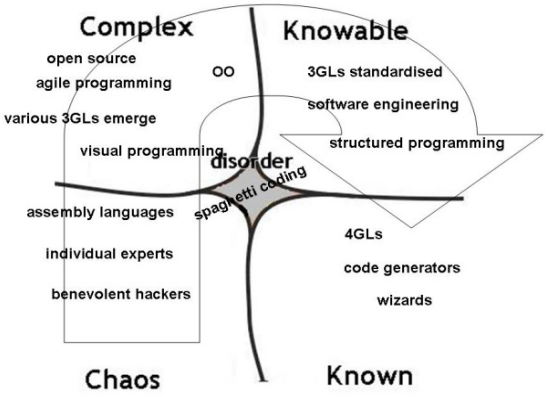


Figure 5: Some changing aspects of computer programming located in domains of the Cynefin framework.

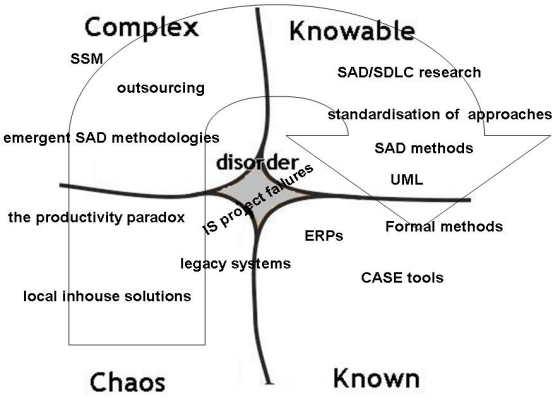


Figure 6: Some changing aspects of information systems development (ISD) located in domains of the Cynefin framework.

4.2 Locating, matching and mapping other IS issues on Cynefin

Not all IS topics can be seen to develop in Cynefin cycles or even to move much between domains. It would be fair to say that both the open source programming movement and the soft systems approach to SAD were born and remain in the *complex* domain. This makes them suited to working on wicked problems in complex environments where stakeholders are prepared to be flexible and innovative.

Likewise not all IS problems have originated in the Cynefin domain of *disorder*. Many have started in the *chaos* domain (where people work independently) and the *complex* domain (with some sponsorship or encouragement as attractors) as clever individuals and innovative companies investigated and trialled diverse technologies and methodologies, sometimes as participants in communities of interest or communities of practice. Examples of such technologies and methodologies are operating systems, human-computer interfaces and forms of databases. While many of these did not survive, some have been stunning achievements, for example the UNIX operating systems and the direct manipulation interface,. In such cases, demand for the development acted as an attractor as the development moved through the *complex* domain, into the complicated domain and emerged into the market as *ordered* commercial products.

The Internet is probably the most startling example of an information system that has had profound influence on the world and yet can be said to have quietly emerged in the *unordered* Cynefin domain. What is more, it continues to develop there but much less quietly as the World Wide Web, or more simply, the web. When Browsers first appeared there was great scepticism that, being text-based, they would be crude and inefficient. However while many other applications had difficulties communicating across diverse interconnected networks, text was universal and this is exactly why the web took off. People everywhere could firstly access everyone else and then participate in the web's development in the way they wanted. Recently, people have tried to make sense of the development of the web through a generational approach using terms such as Web1.0 and Web 2.0.

We believe that Cynefin's domains shed better light on and give us another lens with which to make sense of what has, and is, happening in the web as a global information system. Most of what we call Web 1.0 is now in the *known* domain. Most people know how they can run their lives and even do business on the web, and almost anyone can now establish a presence on the Internet with a website created with an easy to use package. Business, governments and every other type of organisation routinely uses B2B and B2C applications to survive and prosper, although some of these require the higher level of expertise found in the ordered *knowable* domain. On the other hand, Web 2.0 is a whole new emergent phenomenon that is thriving in the *complexity* and *chaos* domains of the social world where blogs, wikis, social sites and virtual worlds, for example, are experimented with, beta versions trialled and then released to the public as web-based businesses that grow exponentially in popularity and yet continue to operate in the complex domain. New developments take the form of additional probes whose impact is sensed and responded to. For example the first online auction of a

car on eBay tested the viability of online car auctions (Snowden and Boone, 2007). These social technologies are treated with reticence and resistance by formal *ordered* organisations and so are not yet part of the *ordered* world of work and commerce. Network centric advocacy such as that mobilised by Senator Barack Obama in the 2008 United States Presidential campaign and the GetUp lobby in the Australian political scenes fit into the *chaos* domain. This mismatch between the 'old' and 'new' web is clearly demonstrated on the Cynefin framework. The new Web 2.0 phenomenon fits into the *complex* domain and only works where users are not constrained by extensive sets of rules and regulations, as well as command and control of organisations which only feel comfortable operating in the *ordered* domains. Recent discussion on the ActKM discussion forum shows how organisations usually fail when attempting to implement the social technologies of Web 2.0 in the workplace where the formal 'ordered' structures and restricted access are the norm.

There are many other topics in IS that could be examined using the Cynefin framework. We offer a final depiction of where we see many IS topics at the present time in Figure 7.

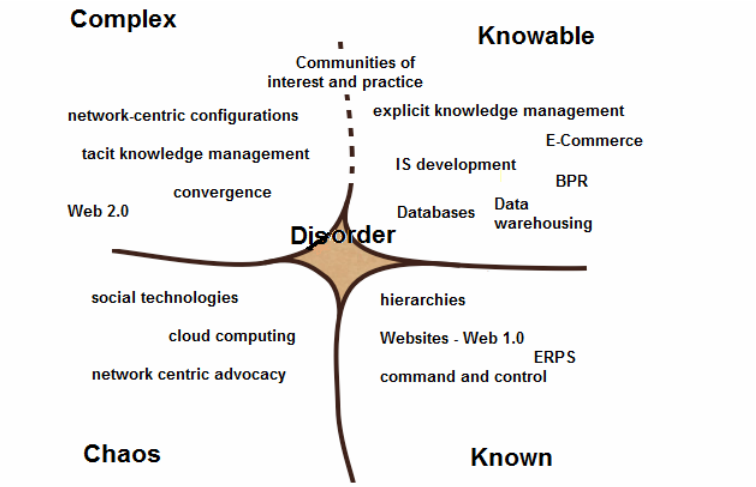


Figure 7: A selection of current IS issues and concepts mapped onto the Cynefin framework

4.3 Using Cynefin to Understand the IS Discipline as a Whole

As presented earlier in this paper, the IS discipline is diverse spanning the technical, organisational and social elements that come together in systems that deal with data, information and knowledge. Some of this diversity is depicted in Figure 7. Figures 5 and 6, on the other hand are examples of cyclic change in two key areas of IS, namely programming and systems development. Diversity and change are an integral part of IS but pose a challenge in establishing the identity of a new discipline; indeed this is indeed a typical wicked problem.

There have been many discussions, debates, workgroup studies and articles written in the identity, foundation and scope of IS. These implicitly attempt to move the complex mix of elements making up the field into the known domain to produce a concise description of the IS discipline. As depicted in Figure 7 the topics of IS span all five Cynefin domains just as the real world does. The pressure for an ordered definition of the discipline usually comes from others external to the area mainly our institutions associations and funding bodies. Internally the diversity and change is less of a stumbling block. There is even general agreement and acceptance of the diverse range of tracks at IS conferences, the scope of IS journals and the content of IS curricula and that there will be regular need for review and change. In all debates on the identity of IS there is recognition of the nexus of theory and practice as one of its critical characteristics. IS has been, is and always will be a field of academic endeavour that informs, and is informed by, practice involving information systems artefacts in organisations. Despite the advantages of order, a field grounded in the messy real world should not be diluted to fit into an ordered paradigm if essential elements of the real complex context of that field are lost.

Just because diversity and change make the discipline at least complicated, or more realistically complex, does not mean that the field is not valid or worthwhile. In fact the complexity within the IS

field mirrors reality and is just what makes it such an important area. The message of the Cynefin framework for IS is that we need to accept diversity and change as strengths and use the framework to support realistic research and practice. Cynefin can help us understand the difference between issues in the different domains and have respect for those issues that are not the same as our own. Using Cynefin to map these diverse elements in a dynamic way allows for change and diversity. It also allows us to match topics to method, to assign reviewers to papers and to explain the breadth of this evolving discipline to others.

5 CONCLUSION

This paper has examined the IS discipline with particular emphasis on change and diversity as characteristics that both challenge the search for a defining identity of the field and yet provide unique opportunities for IS research and practice to flourish. We believe that concepts associated with change and diversity have always posed difficulties in the debate about place of IS in the world. As a possible tool to make greater sense of the issues involved in this debate we have described the Cynefin framework, developed by Snowden when working on KM at IBM. We have explored ways in which it can be used to make sense of various issues that cause problems for the field of IS.

We believe that Cynefin provides a means of making sense of historical change, essential when IS is trying to establish credentials as a discipline. Cynefin also provides a mechanism to match problems to solutions, and match issues to methodologies in the context of their time and place. While recognising the value of order in scientific methods of research and best practice guidelines in practice, Cynefin also allows us to place emphasis on the incorporation of Complexity and Chaos Theories into the more ordered set of tools we have for understanding the world. This is particularly relevant when the changing economic, social and environmental issues in that world drive ongoing change and diversity in IS and ICT artefacts.

We commend the use of Cynefin as a sense-making tool for IS research as we move into a future where complex human enterprises will rely on a diverse, evolving set of social ICT tools for communication and coordination of their collaborative networked activities.

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