Title:
A strategic approach to making sense of the wicked problem of ERM

Abstract

Abstracts should contain no more than 250 words. Write concisely and clearly. The abstract should reflect only what appears in the original paper.

Purpose of this paper: What are the reason(s) for writing the paper or the aims of the research?
This article provides an approach to viewing the 'wicked' problem of electronic records management (ERM), using the Cynefin framework, a sense-making tool. It re-conceptualises the ERM challenge by understanding the nature of the people issues. This supports decision-making about the most appropriate tactics to adopt to effect positive change.

Design/methodology/approach: How are the objectives achieved? Include the main method(s) used for the research. What is the approach to the topic and what is the theoretical or subject scope of the paper?
Cynefin was used to synthesise qualitative data from an empirical research project that investigated strategies and tactics for improving ERM.

Findings: What was found in the course of the work? This will refer to analysis, discussion, or results.
ERM may be thought of as a dynamic, complex challenge but, viewed through the Cynefin framework, many issues are not complex; they are simple or complicated and can be addressed using best or good practice. The truly complex issues need a different approach, described as emergent practice. Cynefin provides a different lens through which to view, make sense of and re-perceive the ERM challenge and offers a strategic approach to accelerating change.

Research limitations/implications (if applicable): If research is reported on in the paper this section must be completed and should include suggestions for future research and any identified limitations in the research process.
Since Cynefin has been applied to one data set the findings are transferrable not generalisable. They, and/or the approach, can be used to further test the propositions.

Practical implications (if applicable): What outcomes and implications for practice, applications and consequences are identified? Not all papers will have practical implications but most will. What changes to practice should be made as a result of this research/paper?
The resultant ERM framework provides a practical example for information and records managers to exploit or use as a starting point to explore the situation in particular organisational contexts. It could also be used in other practical, teaching and/or research related records contexts.

Social implications (if applicable): What will be the impact on society of this research? How will it influence public attitudes? How will it influence (corporate) social responsibility or environmental issues? How could it inform public or industry policy? How might it affect quality of life? Not all papers will have social implications.
None

What is original/value of paper: What is new in the paper? State the value of the paper and to whom.

This paper provides a new strategic approach to addressing the wicked problem of ERM which is applicable for any organisational context.

Keywords: Electronic records, Strategic Approach, Cynefin framework
Article Type: Research paper

A strategic approach to making sense of the wicked problem of ERM

Introduction

Despite significant developments over more than two decades, in both professional and academic contexts, managing electronic records continues to be a significant challenge for many organisations. This is partly due to technology democratising, decentralising and individualising the way people create, use and manage information and records in the workplace. In this wild frontier (McDonald, 1995a; McDonald, 2005) use of information is dynamic, mobile and global. Have we moved from order to chaos in the electronic office? How can we make progress? Are traditional methods of managing records adequate or is a new paradigm required?

This article, the first of two, attempts to answer these questions by sharing the strategic understanding of findings from an empirical research project, gained by using the Cynefin framework (Snowden, 2010). The research project investigated ways of accelerating change in electronic records management (ERM), gathering data from participants across the world to discover and understand the issues and identify potential solutions to try or to avoid. The data, rich and nuanced, required further synthesis to make sense of the issues and potential solutions. The Cynefin framework, a practical sense-making tool with roots in knowledge management and complexity science, provides a different lens. It offers information and records professionals a strategic framework for tackling the ERM challenge and informing practice, which can be used at both the theoretical and practical levels. Using Cynefin highlights the need to have a deeper, shared understanding of the issues in order to make appropriate decisions, adopt appropriate management styles and select appropriate solutions. The second article gives examples of how the findings can be exploited in one's own context. Both articles focus specifically on people issues which cover human resources and human capacity, roles and responsibilities, vision, leadership, culture, awareness, drivers and barriers, attitudes and user needs.

The 'wicked' problem of ERM

ERM, defined by Gilliland-Swetland (2005, p225) as "a blanket term that refers both to the practical management of electronic records, from birth to final disposition, and to theoretical and applied research relating to the nature, management, and use of those records" appears to be a 'wicked' problem. A wicked problem, first articulated by Rittel and Webber (1973), has 10 characteristics:

i. lack of a definitive formulation of the problem
ii. no criteria for knowing when the/a solution has been found
iii. solutions that are not true or false, but rather good or bad
iv. no immediate or ultimate test of a solution
v. every solution counts, and has significant consequences
vi. no criteria for proving that all solutions have been identified and considered
vii. an essentially unique problem
viii. a symptom of another problem
ix. no criteria for determining the 'correct' explanation of the problem
x. leaders/managers have no right to be wrong.

Grouping interrelated characteristics together, ERM displays these characteristics. For example:

- *(i) lack of a definitive formulation of the problem, (vii) an essentially unique problem, (viii) a symptom of another problem, (ix) no criteria for determining the 'correct'*

explanation of the problem

The context of the ERM problem determines how it can be formulated. Different stakeholder perspectives on ERM, their different needs/wants from systems and their different contexts, will result in different formulations of the problem. Wicked problems are like a Russian doll: the level at which a stakeholder functions will determine the level at which they formulate the problem. A CEO might think the organisation lacks a strategy, the IT manager a technical system, the records manager an appropriate RM programme, the end user a method for confidential disposal of electronic media. The formulation of the problem is the problem! The scope of ERM can be defined, i.e. the records continuum. But organisations (i.e. records creating entities) have different contexts, cultures and history and different contingencies at a particular point in time, making their ERM problem a 'one off' (McLeod, Childs and Hardiman, 2011, p.73-4).

- *(ii) no criteria for knowing when the/a solution has been found, (vi) no criteria for proving that all solutions have been identified and considered, (iii) solutions that are not true-or-false, but rather good/bad, better/worse, good enough/not good enough*

  There are as many potential solutions as the possible formulations of the problem[i]. There is no silver bullet for ERM. How should we manage electronic records? Should we implement an RM programme, a system(s) (e.g. an EDRMS or ECM), use SharePoint, make our line of business systems MoReq2010 compliant, or allow people to manage their records in the most convenient way for them but ensuring they meet a minimum set of requirements? (Mcleod, Childs and Hardiman, 2010a, p. 21). Or are there other solutions? And as technology changes, are there other technical options to be tried that form part of the total solution? A solution will be chosen because it seems suitable, or the CEO likes it, or it fits the constraints the organisation has to work within. Different stakeholders will have their own views on how good, bad or satisfactory a proposed or actual solution is for managing the records they create and/or use; and they may have different views about the same solution in different contexts. A solution that works in one context may not work in a similar context at a different time (Stevens, 2009).

- *(iv) no immediate or ultimate test of a solution, (v) every solution counts, and has significant consequences, (x) leaders/managers have no right to be wrong*

  An ERM *software* solution (e.g. an ERMS or SharePoint) can be tested for correct installation and piloted to see if it fulfils the requirements brief. However, the full impact of its implementation will only become apparent through its use over time across the organisation, sometimes with unanticipated, possibly undesirable, consequences. ERMS result in centralised capture and control but at what cost to the users? Bottom-up, organic SharePoint implementations support document management, information sharing and collaboration but their devolved power and greater autonomy can be difficult to scale up both in technical infrastructure and governance terms (Lappin and McLeod, 2010, p. i). An ERMS implementation has consequences for all those using it or affected by its use. However, very few post implementation studies or failures are published (e.g. Wojcik, Gouin and Dionne, 2003; Maguire, 2005). A software-based solution is a significant financial commitment; it is likely to be irreversible even if it fails or has significant adverse effects. Either the system continues to be used, with inefficient practices and workarounds, or is finally scrapped with the loss of investment (e.g. the cancellation of the UK's NHS National Programme for IT[ii]). In either case the legacy is a situation

that has been made more problematic, with a set of poorly managed or lost records and a demotivated and/or antagonistic staff. Records managers/the system project team have no right to have chosen the wrong system, unlike science where refutation of hypotheses is an integral part of the scientific process.

Wicked problems contrast with tame ones (Rittel and Webber, 1973; Conklin, 2006, p.14-18) which are well-defined, with criteria to know when the solution has been reached, and to evaluate if it is right or wrong; the latter belong to groups of similar problems which can be solved in similar ways, have solutions that can be tried and abandoned with little consequence, and have a limited number of alternative solutions. ERM does not fit this description.

Tackling the wicked problem of ERM: Research and development

Whilst ERM has not previously been explicitly described as a wicked problem, Gilliland-Swetland (2005) traces thoughts about the challenges of 'machine-readable records' back to Bush (1945) and charts significant developments from the 1960s to the 1980s. Contemporary theoretical and applied research about ERM, however, began in the early 1990s and the first analysis of the evolution of thinking/concepts, theory and strategies for managing electronic records was produced by Erlandsson (1996). Based on an exhaustive review of the literature from 1992-1996, it examines the early major electronic records projects in Australia, Canada and the United States in some depth, and some developments in Europe more briefly.

The work of Bearman and Cox, on the requirements for managing electronic records and tactics for satisfying them, is truly seminal work in the field (Bearman, 1990, 1992, 1993, 1994; Cox, 1994). This was followed by Duranti's work on the integrity of electronic records (Duranti and McNeil, 1996) and the global InterPARES projects which examined the issues of creating, maintaining and preserving electronic records in an effort to develop methods of ensuring authentic and reliable records could be maintained over time in electronic systems (Duranti and Preston, 2008). Upward, McKemmish and colleagues (Upward, 1996, 1997) broke new ground in developing an alternative conceptual model for records management, the records continuum, building on the earlier writings of McLean (Upward, 1994). McKemmish has also made major contributions to recordkeeping metadata research (McKemmish, Acland and Reed, 1999; SPIRT, no date). Much of this research began by building theoretical or conceptual constructs which were followed by testing and/or practical application projects, e.g. IMOSA (McDonald, 1995b; National Archives of Canada, 1991), the Indiana University projects (Bantin, 1999, 2001; Indiana University, 2002), Clever Recordkeeping Metadata (CRKM) (Evans, McKemmish and Bhoday, 2005; Evans, Reed and McKemmish, 2008), and the InterPARES 3 projects (InterPARES 3, http://www.interpares.org/ip3/ip3_index.cfm).

This research, and a great deal more beyond the scope of this article to discuss but summarised by Gilliland-Swetland (2005), has been complemented by the development of standards, guidelines and systems by national archives, coalitions, professional associations and software developers globally. Too numerous to review, significant ones include: ISO 15489 (ISO, 2001), the ISO 30300 series (ISO, 2011) and related ISO standards on metadata and work processes; DIRKS (State Records of New South Wales, 2003 and 2007); and functional requirements for both records and record keeping systems (e.g. ARMA, 2009; ICA, 2008; DLM Forum, 2010; US Department of Defense, 1997 and 2007).

Nonetheless, the management of electronic records continues to be a challenge for organisations. By 2005, the 'wild frontier' of managing documents in the 'modern' unstructured electronic office environment identified by McDonald (1995a) had not yet been

tamed, despite some progress. The pace of change had been relatively slow because of poor understanding of how today's office functions, and how it could benefit from advanced tools for managing work processes and their associated records, and what it means to design and implement relevant infrastructures for managing records (McDonald, 2005, p.3). A key inhibitor was managers' lack of understanding about records and records management. To make progress required a "focus on establishing a vision, enhancing awareness, assigning accountability, designing an architecture and building capacity" (McDonald, 2005, p. 8).

The AC^{+}erm project

Influenced by McDonald the authors of this article developed the AC^{+}erm research project (http://www.northumbria.ac.uk/acerm) to critically explore issues and practical strategies, with the aim of helping to accelerate improvements in ERM. Conducted between 2007 and 2010, in the era of the 'promise' of EDRMS, AC^{+}erm[iii] explored the design of an organisational-centred architecture for managing electronic records from three perspectives – people, processes and technology (McLeod, Childs and Hardiman, 2010b). The issues and problems of ERM were investigated and examples of solutions were gathered, analysed and shared. An ambitious project, one of its aims was to produce practical strategies for the contemporary work environment that were scenario based rather than organisational based, presented issues as well as solutions, were capable of being used in practice as well as facilitating discussion and debate, and would support change.

A multi-disciplinary empirical project, its qualitative methodology comprised three phases:

1) a comprehensive systematic review of the relevant literature to identify ERM issues (Centre for Reviews and Dissemination, 2008)
2) an investigation of the three perspectives of ERM
3) a major dissemination activity running throughout its life.

The investigation phase, in which just over 200 people participated, used a combination of electronic Delphi studies and face-to-face colloquia. The Delphi technique gathers expert[iv] opinion on a topic through several rounds of questions usually to reach consensus (Linstone and Turoff, 2002; McLeod and Childs, 2007). In AC^{+}erm it was used to refine and discuss the issues identified from the literature review, rank them in order of importance, propose and discuss solutions to the issues, and then evaluate the solutions. Fifty five people across the world participated in the Delphi studies, representing all four stakeholder groups involved in ERM (ISO 2001, 2011). They came from different disciplines and organisations in different sectors and responded based on their own knowledge and experience, providing real-life examples where possible. Their responses were analysed using a range of different approaches, the analysis used as the basis for the colloquia.

A rich, nuanced and unique set of data was collected, rooted in the participants' experiences. Ten headline findings emerged from the data analysis (McLeod, Childs and Hardiman, 2011), many of which relate to people aspects rather than to process or technology ones, including:

- the people, process and systems/technology aspects of ERM are inextricably linked
- people issues are predominant, fundamental and challenging
- tactics and solutions for ERM are contextualised and complex
- the success and/or failure of ERM implementations can be contingent on the presence/absence of small or accidental factors.

People issues are omnipresent, a critical success factor for ERM: “The old 80-20 rule applies to implementation [of EDMS]; for the most success, focus just 20 percent of the efforts on the technology and 80 percent on the cultural issues” (Downing, 2006 p. 45). For the people perspective, the AC^{+}erm data comprises 446 issues and over 1,000 related solutions (to try or to avoid). The complexity, contextualisation and contingency, the focus on people issues and the huge number and range of issues and solutions identified, made producing a conceptual overview of the findings very challenging. Making sense of the data in order to help practitioners choose which solutions to try in a particular circumstance required further synthesis. The Cynefin framework (Snowden and Boone, 2007) provided an appropriate tool.

The Cynefin framework

The Cynefin framework was developed from research conducted over a period of years by Snowden and colleagues (Snowden, 2010). It is a ‘sense-making’ framework which helps decision makers to make sense of a range of business problems and situations, in different dynamic contexts, and to take appropriate action (Kurtz and Snowden, 2003). The conceptual thinking that underpins the framework draws from knowledge management and complexity science. Complexity science (Burnes, 2005; Stacey, 2011) was developed by researchers in disciplines working with natural systems and briefly comprises three key concepts: (i) chaos theory - some dynamic systems are non-linear, demonstrating complex patterns that are not directly proportional to, nor predicted from, their causes/inputs, e.g. weather systems; (ii) dissipative structure theory - some systems can pass through states of instability/randomness to new organised states by self-organisation, e.g. chemical systems; (iii) CAS - a system comprising a large number of entities interacting with each other following local principles and rules, from which emerges a self-organising group-wide pattern, not determined by the entities, the emergent patterns, or anything outside the system, e.g. biological systems. The ideas of complexity theory have been used by many authors to study organisations, based on the argument that organisations are complex, non-linear, self-organising systems. Mingers and White (2010), for example, in their review of systems thinking, discuss how complexity theory has been applied to strategic decision making, development of information systems within organisations, and understanding of organisational structures and processes, within sectors as diverse as agriculture, environment and health care.

Cynefin comprises five domains (Figure 1) predicated on the construct of order (Snowden, 2005, 2010). The ordered domains are labelled *simple* and *complicated,* the un-ordered ones *complex* and *chaos* and the fifth domain, the central area, is the domain of *disorder*. It is important to appreciate that un-order is not lack of order (i.e. its opposite) but a different type of order; order that is not directed or designed but ‘emergent’ (Kurtz and Snowden, 2003). The domains are the types of situations or environments that organisations typically experience and need to respond to and manage (Lambe, 2007 p. 134). Each one can be described according to its characteristics, decision model and resultant action(s), management style, work pattern and organisational connections/networks (Table 1).

Insert Fig. 1. Cynefin framework from Snowden (2010, Part 7)

Insert Table 1. Summary explanation of the four Cynefin domains: simple, complicated, complex, chaos

The *simple* domain is characterised by clear cause and effect. The decision model is to sense the situation, *categorise* it and respond based on best practice. The domain of efficiency, there is often a right answer; standard operating procedures and process re-engineering are appropriate practices. Scanning paper documents to process incoming mail

in a centralised operation would fall in the simple domain; best practice exists (e.g. work flow design, legal admissibility guidelines). The *complicated* domain is also characterised by cause and effect but there may be multiple right answers. The decision model is therefore to sense, *analyse* and respond. This requires expertise to choose the appropriate answer i.e. good rather than best practice. Possible practices are systems thinking and scenario planning. Designing a new patient record system falls in this domain; there are many possible technological approaches, and a diversity of clinical and administrative systems with which a patient record system would have to integrate.

Unpredictability and flux characterise the *complex* domain. Cause and effect can only be understood in retrospect; experimentation is required to find answers. The decision model is therefore to *probe* first then sense and respond; practice emerges. The early strategic adoption of cloud computing in organisations falls into this domain in the absence of established best or good practice for implementation. Turbulence and lack of any link between cause and effect characterise the domain of *chaos*. In the absence of any right answers the decision model must be to *act* first and then sense and respond, e.g. crisis management. This can lead to innovative practice; for example, the US response to the 2010 Haiti earthquake, where social media technologies were used for the first time in a crisis as the main knowledge sharing mechanism (Yates and Paquette, 2011). The fifth domain, the central area, is the domain of *disorder* where people are unable to decide which of the other domains represents their situation.

The tetrahedrons (Figure 1) are a vital part of Cynefin. They represent the connections between the centre (e.g. managers) and the constituents (e.g. staff), and reflect management style and work patterns. In the ordered domains (simple and complicated) connections between managers and staff are strong. Structures are in place to control behaviour. In the unordered domains (complex and chaos) the connections between managers and staff are weak, and control through structures is unsuccessful. Connections between staff are strong in the complicated and complex domains; stable groups and patterns of activity form between staff. Connections between staff are weak in the simple and chaos domains, and such staff patterns do not emerge on their own. Management style and work patterns are discussed further later in the article.

Unlike many 2x2 ‘management’ matrices, which categorise problems/situations and identify the top right hand quadrant as the most desirable solution/situation, no domain is more desirable than the other; they just describe the situation facing the organisation (Kurtz and Snowden, 2003).

Cynefin can be used in different organisational contexts and for different purposes e.g. to gain new insights on a challenging problem or contentious issue, to plan actions to move a situation from one domain to another, to consider strategies for managing different situations (Kurtz and Snowden, 2003, p.471). There appear to be no published examples of its use in records management other than Lomas’ co-operative action research PhD project (Brown, Demb and Lomas, 2009; Ellis, Lomas and Ridge, 2009), nor any for data synthesis. However, in management science it has been used in the context of decision-making and leadership, and in health and in information management for a variety of purposes.[v]

The Cynefin framework resonates with the problem the AC^{+}erm project set out to explore as it has roots in knowledge management, has been developed to address critical business issues (which ERM is) and aims “to support decision making in varied, dynamic contexts” (which is the case for ERM) (Kurtz and Snowden, 2003, p. 462).

Applying Cynefin

Snowden (2010, Part 5) has developed a range of techniques for deploying the framework, including a social construction approach comprising:

- a pre-process in which items are collected about the particular issue or topic of interest or concern. These form the data (the narratives) for sense-making and can be events, points of view, anecdotes etc;
- a workshop in which a representative group of people place the items in the Cynefin framework, without any prior explanation, so that the definitions of the domains and the boundaries between them emerge from the data;
- a post-process in which the resultant contextualised Cynefin framework of the issue of interest is used for planning or more detailed discussion.

A variant of this method was applied to the AC^{+}erm project data. The data relates to the people issues and solutions collected from the systematic review of literature published from 1997-2009 and from the three Delphi studies. Though each Delphi study focused on one facet of the research (people, processes and technology), people issues and solutions were identified from all three studies, not just from the people Delphi. The data comprise the themes from the first order analysis of the raw data. In total there were 446 themes: 128 from the systematic literature review, 318 from the Delphi studies. Of these, some were duplicated across the different Delphi studies and the literature.

In the pre-process stage the 446 themes were used as the narratives. The authors (researchers from the AC^{+}erm project) undertook the workshop stage. Themes in each domain were grouped by subject into meta-themes, with scope notes.

Findings

Domain mapping of the people issues
Figure 2 summarises the results of mapping the 446 themed people issues into the Cynefin framework. It shows the number of themes placed in each domain and on the boundaries, highlighting that the majority (58%) are simple (34%) or complicated (24%). Almost a third of the issues are complex (32%) - a similar proportion to the simple issues. Few themes fall in the chaotic domain (2%) or on the boundaries (7%). Only one item falls into the disorder domain.

Insert Figure 2: Summary results of mapping the people issues data in the Cynefin framework domains

It is perhaps surprising that the majority of the people issues fall within the simple (best practice) and complicated domains (good practice), given the AC^{+}erm project conclusion that the ERM challenge is complex, contextualised and contingent. Best practice and good practice for ERM exist in abundance in the form of published standards and guidelines, tested and approved systems, case examples. Given the proportion of simple and complicated issues, is it that ERM is not innately complex but just appears to be complex? Does the complexity come from the large number of simple and complicated issues that need to be addressed? Partly, but 'complexity' is not only due to the volume of simple and complicated issues as a large proportion of issues (32%) fall in the complex domain.

Table 2 shows the 25 meta themes that emerged from grouping the 446 individual themed people issues, with examples of individual themes.

In the simple domain a key meta theme is 'training' (lack of training, provision of poor quality training and need for training in RM / ERM). The simple domain should not be confused with

easy or quick solutions; addressing the expert-novice gap can be challenging (Lambe, 2007 p.138). Though many tried and tested training methods exist, records managers require adequate skills and knowledge to use them effectively, captured in the theme 'Education programmes for records professionals should provide skills in training'. Another key meta theme in the simple domain is 'critical success factors (CSFs) for good RM/ERM or ERMS implementation' which includes the straightforward aspects of provision of resources and guidance.

The complicated domain naturally includes meta themes such as the role and nature of all the key professions (i.e. RIM, IT, business, legal), and one of their major activities, the design of RM/ERM systems. It became clear that the complicated domain's definition, viz. 'the domain of experts', initially influenced the mapping as all issues about experts were placed there. However, some were not appropriately located and moved into the simple domain (e.g. training of experts) or the complex domain (e.g. attitudes, perceptions and behaviour of experts).

Challenging people issues are found in the complex domain, including the meta themes 'RM/ERM and organisational culture'; 'Attitudes/perceptions of manages and staff' and 'Attitudes/perceptions of experts'. Such people issues are challenging because they concern culture, philosophical perspectives, preferences and behaviour related to use of RM/ERM systems.

There is just one meta theme in the chaos domain - 'The breakdown of records management/recordkeeping' – whose themes include: 'Computers have brought individualisation to the conducting of business processes' and 'Culture of casual creation of records and lack of discipline'. The only theme that was difficult to locate and therefore remained in the disorder domain was 'Vendors sell "silver bullets"'.

Meta themes on domain borders capture some of the interconnections between domains. Between the complicated and complex domains sit 'Recordkeeping is difficult' and 'Change'. Recordkeeping is difficult because of both its complicated nature (the systems required to do it) and its complex nature (the predominance of challenging people issues). ERM causes change and implementation of ERM/ERMS requires change. These changes cover both work processes, often complicated, and human attitudes and behaviour, often complex. Between the complex and chaos domains sits one meta theme - 'The different characteristics of the types of information, processes and technology' - reflecting the fact that both structured and unstructured information/processes and controlled and uncontrolled technologies are used; management of records differs between these different 'systems'.

Understanding people issues - their nature

ERM is about people, processes and technology. Is it that process and technology are complicated (sometimes very complicated) but the people issues are complex? Not necessarily; some people issues are in the simple domain, e.g. awareness of RM/ERM. Human aspects are also present in the complicated domain (e.g. the meta theme 'Design of RM/ERM systems' covers the need for 'IT systems designed or adaptable to match work processes, user behaviours and preferences'). Because of this the same themes can be found in both the complicated and complex domains. For example, meta theme: 'Design of RM/ERM systems' and theme: 'ERM systems - Control may cause conflict with informality and spontaneity, and requires a balance between control and flexibility' (complicated domain); meta theme: 'Attitudes/perceptions of managers and staff' and theme: 'Perceptions of RM/ERM - Control of e-communication conflicts with the spontaneity and informality that make it so useful and popular in the first place' (complex domain). However their interpretation is subtly different. There is much research and practical know-how (good practice) about how to design systems to meet user needs and behaviours from the fields of

information systems and human-computer interaction. However, any system needs customised design to meet an individual organisation's specific needs: so the behaviour and preferences of staff in that organisation would need to be understood, leading us into the complex domain.

Using Cynefin reveals the truly complex issues, such as the attitudes and perceptions of the different stakeholders. The complex domain is where all the stakeholders need to collaborate (themes: 'Partnership working/collaboration by RIM professionals with: IT professionals; information security staff; business analysts; legal staff; auditors and compliance; cloud computing service providers'; 'Relationship building between records professionals and end-users').

Cynefin also reveals nuances and helps to decouple conflated issues. In discussing seemingly similar themes that initially were placed in more than one domain, particularly in both the simple and complex domains, it became apparent that the nature of the themes was different. For example, lack of *awareness* of RM/ERM falls into the simple domain, whereas lack of *recognition* of the value of RM/ERM falls into the complex domain. The previous analysis had grouped them together, hiding the nuances. Another example is user involvement and user buy-in. User involvement is a CSF for RM/ERM/ERMS implementation in the simple domain. It comprises the mechanisms set up by managers/records managers to involve staff, e.g. participatory design techniques, designating ERM champions. However, user buy-in is a behavioural response, and is therefore a meta theme in the complex domain.

CSFs for ERM/ERMS implementation is a meta theme in both the complex and simple domains. However, the individual themes are different; they are far more challenging in the complex domain, e.g. 'ERM systems implementation requires realistic expectations about the extent of change', 'Leadership', 'Drive and determination of one individual or team'. A possible alternative view is that this is one meta theme sitting on the simple/complex border, i.e. diagonal not adjacent.

There are chaotic aspects to ERM. On the complex/chaotic border sits the meta theme 'The different characteristics of the types of information, processes and technology'. Different approaches to implementing records management requirements are rarely integrated across systems. When new technologies, such as social networking and cloud computing, are added to the mix, users' attitudes and behaviours become even more disparate (theme: 'People are used to the flexibility, ease of use, communication and sharing of Web 2.0 technologies that they experience in their personal lives. They expect IT to be like that in the workplace'). This suggests a complex situation that can result in chaos as captured in the meta theme 'The breakdown of records management/recordkeeping' in the chaos domain. However, the AC^{+}erm respondents did not think that ERM was a crisis problem where there is little time to act. Organisations can survive a long time with poor or inadequate records management/recordkeeping. The problems are not visible and organisations are willing to accept the risk and consequences. A crisis arises in an organisation when poor records management is highlighted as the cause of, or a contributing factor in, some problem. For example, in the UK, a police service's handling of the Soham murders (Bichard Inquiry, 2004) and a local government agency's operations leading up to the death of 'Baby P' (Laming Inquiry, 2009).

The one theme in the disorder domain (about vendors selling silver bullets) could be placed in the complicated domain under systems design, in the complex domain as an aspect to be considered by managers when making strategic decisions about system choice, or in the chaos domain as unthinking acceptance of vendors' claims will result in poor choice of system. If the theme had been presented by one or more individuals in a Cynefin workshop

then its true meaning could have been discussed to reach a consensus of understanding and appropriately locate it in one of the other domains (Kurtz and Snowden, 2003, p. 469-470).

Understanding the nature of people issues from their Cynefin domain location enables the appropriate decision-making model and action(s) to be identified and used.

Understanding people issues - management style and work patterns

> "Truly adept leaders will know not only how to identify the context they're working in at any given time but also how to change their behaviour and their decisions to match that context" (Snowden and Boone, 2007 p. 75)

In the digital environment, where "the autonomy of the individual reigns supreme!" (McDonald, 1995a, p. 70), adopting the appropriate management approach is vital for successfully implementing a solution. Cynefin provides new consideration of the importance and nature of the management pattern and connections between stakeholders required to address the ERM challenge (Table 1 and tetrahedrons in Figure 1). Centrally controlled management of records through established best practice procedures and good practice systems thinking has operated successfully in the paper world, and could be successful for the simple/complicated aspects of ERM. However, it is unlikely to be adequate for addressing the many complex aspects of ERM.

In the simple domain the management style is hierarchical/directive and the work pattern is co-ordination. Managers determine procedures and direct or delegate staff to carry these out. The actions of staff are co-ordinated to achieve appropriate workflows, and there is little need for detailed communication and discussion between staff to carry out these tasks. An example is recording and confirming student marks. In the complicated domain the management style is oligarchic/consensual and the work pattern is co-operation. Managers set up groups of experts and delegate to them the task of finding an appropriate solution, with the expectation that with their knowledge and skills they will be successful. Experts develop strong cooperative links with other experts in their field and reach a consensus on the most appropriate solution. An example is customising an ERMS for implementation in an organisation. In the complex domain the management style is information/consensual and the work pattern is collaboration. Managers ask for, listen to and learn from staff views and ideas. Staff group together collaboratively, but these collaborations emerge based on common interests, compatibility and happenstance; they are not directed by managers. Such collaborations enable experimentation and the development of new ideas. An example here would be use of different systems/technologies by different project groups to manage their documents and records. In the chaos domain there is usually a crisis situation and the management style is decisive/directive, the work pattern is compliance. Managers have to take control and take rapid action, and whilst the crisis remains, staff have to comply. But as discussed earlier, we do not believe that poor RM/ERM is a crisis situation.

Similar differences in management style are discussed with respect to tame and wicked problems. Grint (2005, p.1473) equates the complicated domain to tame problems, and therefore management, and the complex domain to wicked problems, and therefore leadership. A tame problem calls for the manager to provide "the appropriate processes to solve the problem" Grint (2005, p1473). For wicked problems the leader's role "is to ask the right questions rather than provide the right answers because the answers may not be self-evident and will require a collaborative process to make any kind of progress" Grint (2005, p. 1473). Grint (2005, p. 1473) identifies a third type of problem 'critical', e.g. a crisis, which is often associated with authoritarianism (command) because of the limited time for decision-making and action. We suggest there is similarity between a critical problem and the chaos domain.

The dilemma is that records managers are not often appointed at levels in an organisation where they have senior managerial or executive power, nor is RM seen as essential to the organisation. Some of the suggested solutions cover aspects that only senior managers/executives could implement, e.g. appropriate location of the RM function in the corporate structure, allocation of RM roles and responsibilities at all levels within the organisation with performance contracts and measurement. Records managers can only try to influence such developments by communication, marketing, and relationship building. As one Delphi respondent noted "records professionals alone lack effectiveness".

Choosing appropriate solutions

The analysis of the participants' suggested solutions to the people issues generated over 1,000 themes. Using Cynefin enabled us to link the AC^{+}erm issues with proposed solutions to make them more usable to practitioners; the ERM framework provides the ability to focus on individual issues and their solutions, as well as a holistic interpretation of the data. Table 3 provides some examples of the many solutions to use to address the issues in the four domains. Linking issues to solutions highlights a many-to-many not a 1-to-1 relationship between them, i.e. for each issue there are many solutions and each solution can resolve many issues.

Cynefin prompts reflection on whether or not the solutions suggested by the Delphi participants are actually appropriate. Participants were asked for both solutions to try and solutions to avoid. Further analysis is required of those 'solutions to avoid' to discover if this is because they are innately inappropriate, given the nature (domain) of the issue, or due to the contingency of success. For example, the obvious response to the simple issue of lack of RM/ERM training (or poor quality training) is to provide training. There is plenty of best/good practice in how undertake a training activity. However, is training an appropriate solution for the complex issue of attitudes and perceptions of managers and staff? In the context of CEOs' (Chief Executive Officers) lack of awareness of RM/ERM and lack of recognition of its value, some participants said yes, others said no. Some participants said CEO training should be long term and subtle, which seems to be about influencing and marketing, rather than training per se. Marketing rather than training would seem to be an appropriate solution to this complex issue.

Whilst there are many critical success factors for ERM projects which are applicable to many organisations, how these factors are achieved in a specific organisation, i.e. the solutions that will work for that organisation, are contextualised and complex. Indeed the success and/or failure of ERM implementations can be contingent on the presence, or indeed absence, of small or accidental factors (McLeod, Childs and Hardiman, 2011, p. 76-7). Stevens (2009) discuses how, following the merger to create GlaxoSmithKline (GSK), the UK part of the company adopted a different approach to IT by developing a people-focussed strategy and setting up implementation teams. This approach was very successful. However, when the same managers were asked to propagate this approach across the whole of GSK it failed. The challenge lies in selecting those factors that have the most likelihood of success in a given organisation or context and then choosing the right implementation tactics. Because of the rapid and continual change in technology ERM experiences constant re-invention. A different attitude is required – to learn from the past but not to predicate the future on it.

Dynamics

Dynamics (i.e. movements between domains) comes into play to help people understand how change can occur, and to suggest ways they might achieve change in their own context. Kurtz and Snowden (2003, p.475-80) discuss dynamics in great detail, highlighting that considering how issues might move between domains is as important as thinking about the

domain in which they currently reside. It makes participants developing their framework think about different ways of understanding, management styles, work patterns and connections, increasing the sophistication of their decision-making. The examples below illustrate positive and negative movement between domains.

Dynamics highlights that issues might be located in different domains in the future. For example, in the adoption of cloud computing what today is emergent practice (in the complex domain) might in the future become good practice (in the complicated domain). In the complicated domain CSFs for design include the themes: 'Easy to use RM systems'; 'Removal of recordkeeping burden for staff'; 'ERM systems requires easy, automatic recordkeeping by staff'. If we tackle some of the complicated issues with respect to systems design we will actually solve some of the complex issues, e.g. if we can automate RM, then recordkeeping behaviour is by definition improved, and could be moved into the simple domain; more usable, user friendly systems are more likely to be used, once again improving recordkeeping behaviour. In these examples the recordkeeping burden on staff is lifted, and this will encourage more positive attitudes towards RM.

In the ERM framework a few themes fall into the chaos domain and on the border between the complex and chaos domains. Are Cynefin connections a way of explaining this? Have we gone from the simple domain, with strong central control of records/recordkeeping systems by records managers and weak connections between 'staff' in organisations, to one where there are weak connections between all parties, i.e. have we slipped from simple to chaos (the wild frontier)? Snowden and Boone (2007, p71) say "it's important to remember that best practice is by definition, past practice." Managers' complacency in the simple domain can cause a slip into chaos. "Stability in any domain is an illusion" (Lambe, 2007, p.148), even for the simple domain, and organisations need to regularly review systems to see if they need to be changed. Or has ERM moved diametrically (simple to complex) where records managers have weak central control but staff have strong connections and determine their own recordkeeping 'procedures', appropriate to the work they do and the people they work with?

Lambe (2007, p. 141) also notes a number of ways things can go wrong which "relate to either not recognising, or deliberately subverting, the nature of the environment we are working in". These comprise: (i) over simplification in the complex domain, often driven by organisational politics; (ii) premature stabilisation in the complex domain, often driven by politics, and by discomfort with uncertainty;(iii) reinforcing boundaries and silos, often applicable to the complicated domain and to experts and specialists; (iv) failing to accommodate the future; (v) failing to reflect pragmatic needs, particularly common in the simple domain where the 'official' line of the managers, or an off-the-shelf product promoted by a vendor, is adopted rather than end users feedback on what they actually do and want/need.

Similar problems are noted by Rittel and Webber (1973, p.161) who state that "it becomes morally objectionable for the planner to treat a wicked problem as though it were a tame one, or to tame a wicked problem prematurely, or to refuse to recognise the inherent wickedness of social problems". Conklin (2006, p.21) notes a number of ways that managers try to tame wicked problems. However he warns that "attempting to tame a wicked problem, while appealing in the short run, fails in the long run. The wicked problem simply reasserts itself, perhaps in a different guise, as if nothing had been done. Or, worse, sometimes the tame solution exacerbates the problem" (Conklin, 2006, p. 22-23).

Wider Discussion

Cynefin as a tool for understanding ERM

Bantin (2001, p. 23) called for "an overall strategy that views conceptual model building as the primary methodology for dealing with many or most of the issues the profession faces in attempting to manage records in automated environments." The Cynefin framework is a tool enabling the development of such a conceptual model, as represented by our ERM framework (Table 2 - a populated Cynefin framework).

In soft approaches to modelling in management science "models are developed so as to allow people to think through their own positions and to engage with others about possible actions" (Pidd, 2009, p. 86). Mingers (2011) has reviewed soft approaches to deal with wicked problems. Such approaches use qualitative modelling, accommodate a range of views, encourage active participation in the modelling process, accept uncertainty, and aim for exploration, learning and engagement. Key examples of such approaches are soft systems methodology (SSM) and strategic options development and analysis (SODA). These approaches comprise: (i) a methodology; the intellectual framework within which the approach is justified (systems theory for SSM and personal construct theory for SODA); (ii) a technique; the modelling rules and methods (rich pictures and root definitions for SSM and cognitive mapping for SODA); (iii) a process; interviews and/or a workshop with the people concerned; (iv) computer-based tools to capture and present the data. Validation of the models produced from such soft approaches comprises: (i) axiomatic validation (the model is consistent with the underlying theory); (ii) constructionist validation (the model is well constructed and provides insights); (iii) instrumentalist validation (the model is useful in practice) (Pidd, 2009, p.276-9). The Cynefin framework comprises many of the above characteristics, i.e. (i) underlying theory from complexity science and knowledge management; (ii) the framework of the five domains; (iii) the workshop. The resulting model (Table 2) can be tested by constructionist and instrumentalist validation.

SSM and SODA have further components that cover agreeing and implementing solutions; SSM is the more complicated with the classic version comprising seven stages (Checkland and Scholes; 1990; Mingers, 2011, p. 732). In practice, use of these approaches often does not extend beyond the problem definition and consensus stages. Cynefin suggests the types of solutions appropriate to the different domains but does not cover agreeing and implementing solutions. For our ERM framework we have given some examples of solutions here, which are explored further in the second article.

The ERM framework (Table 2) can be used by others in teaching, research and practice. It has the potential to become part of the discourse in our field for addressing ERM situations by recognising their nature and therefore the appropriate action to take. The ERM framework cannot link to strategy in the way Cynefin is normally used because that requires a particular context, but our synthesis is offered for others to exploit, together with the examples of solutions so they can develop their own strategy and/or tactics. If practitioners using this framework in their own context find that it does not fit they can develop their own Cynefin framework from scratch. This post process of using Cynefin is part of instrumentalist validation - the exploitation > exploration > exploitation stages referred to by Snowden (2010, Part 5).

Is ERM a wicked problem after all?

Snowden and Boone (2007, p.76) describe an example of a US police chief dealing with a mass murder who "faced four contexts at once. He had to take immediate action via the media to stem the tide of initial panic by keeping the community informed (chaotic); he had to help keep the department running routinely and according to established procedure (simple); he had to call in experts (complicated); and he had to continue to calm the community in the days and weeks following the crime (complex)." A similar 'mixed' situation

faced the NASA flight director dealing with the Apollo 13 disaster. This also appears to be the situation with ERM, based on the deeper understanding of the people issues gained from using the Cynefin framework – there are as many simple issues as there are complex ones. So part of the ERM landscape does comprise a wicked problem. The challenge is identifying which part is which.

Best practice records management (simple domain) has been established over many years. Central control and management of records through established procedures has operated successfully in many contexts, e.g. parts of government and very structured, process-driven or high risk/highly regulated environments. This ordered approach falls in the simple and complicated domains. But is this approach appropriate in the e-environment, given the many people who now have recordkeeping responsibilities? The characteristics of this environment are different, especially in relation to people responsibilities, behaviour and processes of information creation, capture, sharing etc. Some of the people issues of e-recordkeeping will be tamed, and moved back into the simple and complicated domains, by the design and adoption of systems of truly automated ERMS. But not all aspects of ERM can be automated. Automation can work well for workflow driven processes (e.g. parts of clinical trials research) but will not work for activity based work (e.g. collaborative development of a research proposal). The challenging people aspects of ERM are unlikely to be tamed and will remain wicked. ERM will also face continuing reinvention because of rapid technological innovation and societal change, so future ERM frameworks will have to adapt to these changes.

Is complexity thinking an appropriate theory for ERM?
A number of authors have criticised the way that complexity thinking has been applied to organisations (Burnes, 2005; Mingers and White, 2010; Stacey, 2011). Wallis (2009, p.26) "finds more conflict than agreement between definitions" of complexity theory in the organisational field. Richardson (2008) identifies three (inter-connected) schools in the application of complexity theory to organisations: (i) the neo-reductionists; (ii) the 'metaphorticians'; (iii) the critical pluralists. Neo-reductionists look for underlying rules and principles using computer simulations, an approach which can have value in large-scale strategic situations where individual behaviours have little direct effect, but is unlikely to help in day to day activities. Metaphorticians use the ideas of complexity as a different lens to view organisations. Metaphors can be powerful tools for understanding and creativity, but the danger is they can be used superficially, incoherently, uncritically and unjustifiably. Critical pluralists occupy a middle ground, critically reflecting on the applicability and usefulness of different models to a changing reality. Cynefin incorporates the 'metaphorticians' approach, using complexity ideas as a different lens to view sense-making and decision-making.

Stacey (2011) concludes that many authors have not fully realised the radical potential of complexity thinking in organisational management, but are re-presenting the dominant discourse of systems thinking using a different language. Mingers and White (2010, p.1148) reached a similar conclusion. Stacey (2011, p.289-295) proposes a more innovative way of applying complexity thinking to organisations, a complex responsive processes perspective. This perspective regards people within organisations as interdependent agents (they are social beings) who communicate with each other during their normal, everyday activities. This communication is based on the individual agent's intentions, choices and values within the wider values, norms and constraints applicable to their context. From this ongoing, local communication arises the organisation-wide pattern. Leaders/managers cannot determine this pattern, though they will have intentions about what they want the pattern to be. They are themselves agents within this communicative interaction, albeit powerful and influential ones. Zhu (2007, p.459) supports many of Stacey's ideas, but criticises his focus on processes and lack of consideration of any kind of organisational structure. He advocates

linking pragmatism to Stacey's ideas so that leaders/managers can translate this theory into practical guidance for action. Stacey (2012) recommends that leaders/managers should use existing tools and techniques, but in a reflexive way, exercising practical judgement, and accepting that they cannot fully control how these tools and techniques will work out in a specific, real-world situation.

In noting the value of Cynefin as a sense-making tool, Van Beurden et al (2013, p. 79) go further and recommend that "CAS theory is a platform that can help unify existing health promotion theories." But in the health field there are also notes of caution on the use of complexity science. Marshall (2011, p.80) states that "Complexity has become the introduction, the theoretical explanation, and the metaphor for the current and future state of healthcare … with little general agreement on definitions and even less precision of application." But she does consider that it is helpful for leaders to have a basic awareness of such ideas. Paley (2007, p. 240) offers some optimism: "our only options are modest ones … that we should look for complex adaptive systems at the local level, teams and wards … [and] be cautiously empirical about our enquiries."

Following Paley's (2007) approach, therefore, the value of complexity science to ERM needs further research by considering particular aspects of ERM in specific organisations, e.g. an e-recordkeeping process in a unit, and analysing the data available on the situation to see if complexity science offers a fruitful explanation. As Paley (2007, p.40) notes "not everything is a system, not all systems are complex, and not all complex systems are CAS."

Conclusion

Managing records in the digital environment is challenging; ERM displays all the characteristics of a wicked problem. The Cynefin framework provides a different lens through which to view and make sense of ERM and shows it is not an intractable problem; aspects of it are tame and can be managed. However, understanding the nature of the many issues that comprise the ERM challenge is vital to selecting the appropriate approaches to tackling them.

Using Cynefin to synthesise research data on people issues, gathered from the AC^{+}erm project, resulted in new insights and a deeper understanding of the nature of those issues and how to address them. It has lead to a conceptual and strategic mapping of the issues and a clearer more coherent contextualised framework for ERM. This framework supports both a holistic approach to understanding the issues as well as a granular approach, focusing on individual issues. It enables the findings to be presented in ways that support a strategic, decision-making approach to ERM that results in action and change - the aim of the AC^{+}erm project. Practitioners can also use it to choose appropriate solutions for particular circumstances.

Mapping the people issues into the Cynefin domains shows that whilst the majority are simple or complicated there are many complex ones; Cynefin reveals the truly complex ones. There are chaotic aspects of ERM however, AC^{+}erm participants did not think it was a crisis situation. Cynefin also reveals the nuances in the people issues and helps to decouple conflated issues, often vitally important in terms of understanding and choosing appropriate solutions. Using best or good practice is not appropriate for complex people issues, such as attitudes and perceptions. Experimentation is needed, from which the appropriate practice emerges. Another benefit of using Cynefin is to recognise the appropriate management style required and the type of work pattern that prevails and/or is required. Addressing complex people issues requires leadership and collaboration between all the stakeholders rather than management through coordination, cooperation or control.

In trying to map the solutions to the people issues a many-to-many relationship emerged, many solutions can be used to tackle one issue and vice versa, and examples of these are given. Cynefin prompts reflection on whether or not the solutions suggested by the Delphi participants are actually appropriate. Participants were asked for both 'solutions to try' and 'solutions to avoid' and further analysis is required of those to avoid to discover if this is because they are innately inappropriate, given the nature (domain) of the issue, or due to the contingency of success.

The Cynefin framework for ERM people issues, developed from the AC^{+}erm research project data, provides a model which can be used as a starting point for others to exploit. In a second article we will share examples of how the findings can be exploited in one's own context. It will also show how the framework can be used to explore either one aspect of ERM, ERM in its broadest sense or another information/records management challenge.

Insert Tables 2a-2i The populated Cynefin framework for the ERM people issues

Insert Table 3 Examples of solutions related to domains/meta themes

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[i] The solutions discussed in this section on wicked problems are not the same as the solutions derived from the AC+erm project. For a wicked problem, the solution attempts to solve the whole of the problem. In the AC+erm project participants suggested solutions, from their experience, that addressed individual, specific issues.

[ii] Department of Health (2011). Press release: Dismantling the NHS National Programme for IT. https://www.gov.uk/government/news/dismantling-the-nhs-national-programme-for-it)

[iii] AC+erm (Accelerating the pace of positive Change in Electronic Records Management) is pronounced āsirm; the + is silent, indicating only that change is positive.

[iv] There is debate about the definition of ‘experts’ but the definition adopted here is “those who have an applicable speciality or relevant experience” (Linstone and Turoff, 2002, p. 65).

[v] In management science see Benson and Dresdow (2009); Gonnering (2010); Moerschell and Lao (2012); Snowden and Boone (2007). In health see Mark (2006); Martin et al (2011); Van Beurden et al (2013). In information management see Burford, 2011; Cronje and Burge, 2006; Hart and Schenk, 2010; Lambe, 2007; Snowden, 2001; Van der Walt and de Wet, 2008.