

Association for Information Systems AIS Electronic Library (AISeL)

BLED 2008 Proceedings

BLED Proceedings

2008

Standing on the Shoulders of Giants: Are ERP Success Factors Relevant for EDRMS Implementation?

Thuy-Linh Nguyen

University of South Australia, linh.nguyen@unisa.edu.au

Paula M.C. Swatman

University of South Australia, paula.swatman@unisa.edu.au

Bardo Fraunholz

Deakin University, bardo.fraunholz@deakin.edu.au

Follow this and additional works at: <http://aisel.aisnet.org/bled2008>

Recommended Citation

Nguyen, Thuy-Linh; Swatman, Paula M.C.; and Fraunholz, Bardo, "Standing on the Shoulders of Giants: Are ERP Success Factors Relevant for EDRMS Implementation?" (2008). *BLED 2008 Proceedings*. 6.

<http://aisel.aisnet.org/bled2008/6>

This material is brought to you by the BLED Proceedings at AIS Electronic Library (AISeL). It has been accepted for inclusion in BLED 2008 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Standing on the Shoulders of Giants: Are ERP Success Factors Relevant for EDRMS Implementation?

Thuy-Linh Nguyen

University of South Australia, Adelaide, Australia
linh.nguyen@unisa.edu.au

Paula M.C. Swatman

University of South Australia, Adelaide, Australia
paula.Swatman@unisa.edu.au

Bardo Fraunholz

Deakin University, Melbourne, Australia
bardo.fraunholz@deakin.edu.au

Abstract

Records management has been a central concern for organisations in both private and public sectors since the beginning of the 21st century. This new focus is due both to the introduction of laws, regulations and standards affecting corporate information management; and to the way records are changing from paper-based to “born-digital” and “made-digital”. The need for an effective automated system to manage records is now greater than ever, with Electronic Document and Records Management Systems (EDRMS) being the most likely solution. Despite their increasing popularity, however, successful uptake of such systems is not yet widespread and research into their implementation is still limited. This paper investigates the possibility of applying existing Enterprise Resource Planning (ERP) models to EDRMS by analysing the substantial body of literature on success factors for ERP implementation, both qualitatively and quantitatively; and then comparing these with the still relatively limited literature on EDRMS.

Keywords: Records management, ERP, EDRMS, ERM, systems implementation, success factors.

Introduction

A growing body of literature has addressed the development and evolution of records management in response to the increasingly electronic nature of stored information (Ryan 2005; Barry 2006). Records management is now a legal requirement for both public and private sector organisations. While the private sector sees these laws and regulations as an unavoidable cost of doing business,

the public sector is increasingly focusing on local and global e-Government initiatives – the second major reason for greater attention to electronic records management. Governments worldwide have begun to issue laws, regulations and standards relating to records management and the provision of accurate corporate records for both public and private sector organisations

The growing organisational demand for automated recordkeeping systems has been met by a variety of commercial software solutions: ranging from focused solutions such as Electronic Records Management System (ERMS) and Electronic Document Management System (EDMS); to multi-module systems such as Enterprise Content Management (ECM), Enterprise Knowledge Management (EKM) or Electronic Document and Records Management System (EDRMS) (Stringer 2006).

Among this group of systems, EDRMS is the one most widely recommended for long term future use by a number of authoritative (or, at least, well-known) sources (Meridio Ltd 2006; McPhee 2007). It refers to a group of computer-based record-keeping solutions which provide a complete solution for organisational records management, defined by State Records of South Australia (2007) as:

“An automated system used to manage the creation, use, management and disposal of physical and electronically created documents and records for the purpose of supporting the creating, revision and management of digital documents, improving an organisation’s work-flow and providing evidence of business activities”.

The benefits of EDRMS have been summarised from a number of studies by Johnston & Bowen (2005) as including:

- For individuals: efficiency and effectiveness improvement, proof of work;
- For organisations: enhanced business, laws and regulation compliance; and
- For society: anti-fraud, access to trustworthy information, better life.

These recommendations make it clear why organisations are increasingly choosing to implement EDRMS, although there is not yet a substantial body of case studies showing how and why public and private sector organisations have made effective use of this latest group of enterprise-wide software solutions (Ryan 2005; Barry 2006).

These whole-of-enterprise records management systems are the latest edition to an existing group of enterprise wide systems, which also includes Enterprise Resource Planning (ERP), Customer Relationship Management (CRM) and Supply Chain Management (SCM). While all these systems have features in common, ERP is of particular interest to researchers of EDRMS because of its broad, enterprise-wide focus. CRM and SCM, although used by many organisations, focus on a specific group of functions: of the former group of systems manage customer relationships while the latter group manage supplier relationships. This paper discusses the possibility that existing research into ERP has the potential to contribute to the more recent body of research into EDRMS.

Many authors have investigated the range of possible Critical Success Factors (CSF) for ERP implementation. The mandating of enterprise record-keeping systems within the public sector in several parts of the world (Stephens 2005) has not led to an equally wide level of acceptance by agency employees, many of whom do their best to ignore the controls such systems place over the management of records. The research project of which this paper forms part focuses on this issue the development of a framework for effective implementation and acceptance of EDRMS within public sector organisations.

If the similarities between ERP and EDRMS, especially the whole-of-enterprise focus, extend to the success factors for both these systems, it may well prove possible to draw on the substantial body of ERP literature in framing a theoretical foundation for EDRMS implementation. This paper, therefore, compares a qualitative analysis of the literature on ERP implementation and EDRMS implementation with a quantitative analysis of that same literature undertaken using the content analysis tool Leximancer to answer this query.

The paper is structured as follows. Firstly, the use of qualitative and quantitative content analysis is introduced as the appropriate method and tool for this research. The results of a qualitative analysis of ERP and EDRMS literature are then summarised, providing a set of success factors for each of these two research domains, followed by the results of the quantitative analysis conducted using Leximancer. Finally, a comparison of the results of these two analyses is followed by the conclusion and future outlook.

Research Method

Content Analysis

Content analysis has been in existence for nearly 80 years (Krippendorff 1980) and is now popular in a number of quite diverse research fields, including communication, journalism, sociology, psychology, business and tourism (Graneheim and Lundman 2004; Marzano and Scott 2006).

Content analysis is defined as “*any technique for making inferences by objectively and systematically identifying specified characteristics of messages*” (Holsti 1969 p.14) and as “*a research technique for making replicable and valid inferences from data to their context*” (Krippendorff 1980 p.21).

Yin (2003) believes that archival analysis is appropriate when an exploratory answer to a research question is sought. The question under investigation (can the ERP research literature furnish useful clues for the development of an acceptance framework for EDRMS?) is, indeed, exploratory in nature as the topic is new and little empirical information is yet available. Content analysis thus appeared to be a suitable method for reviewing and analysing the literature in these two fields.

Content analysis can be: quantitative (Kassarjian 1977), qualitative (Morgan 1993), or a mixture of both to ensure good (research) operationalisation (Smith 1975). This project uses both these approaches.

Holsti (1969 p.151) identified four reasons for using computers to support content analysis: enabling word frequency counts; simultaneously processing many variables; saving the researcher’s time and labour; and cost-effectiveness for serial research using the same data. Alexa & Zuelle (2000) conducted a study into the commonalities, differences and limitations of the 15 then available software solutions to support text analysis for coding, searching and retrieving text. Lewins & Silver (2007) published a guidebook for using software in qualitative research which summarised the features and functions of seven leading CAQDAS (Computer Assisted Qualitative Data Analysis) packages. They acknowledge that “*it is impossible to answer*” which is the best package, as the key lies in each researcher’s choice of tools “*within a software package best facilitat[ing] their approach to analysis*”.

Leximancer, which is described in further detail in the following section, was used as the quantitative data analysis tool for this paper because of its ability to automatically transcribe and identify the key concepts included in a potentially massive amount of data.

Leximancer™

The content analysis software package Leximancer, developed by Andrew Smith at the University of Queensland, is used to perform conceptual analysis of text data (Smith, Grech et al. 2002). This software package’s operational method follows the procedure of pre-processing text; automatic concept identification; concept editing; thesaurus learning; locating concept occurrences; and mapping in automatic mode (Smith 2007).

Leximancer has been described in recent research projects as being useful for “*exploring the textual data to attempt to uncover important factors*” (Davies, Green et al. 2006; Marzano and Scott 2006). The concept map produced by this software has the potential to provide a picture of

the meaningful themes identified from the literature. As Miller and Riechert (1994) note, such schemes: “*emerge from the data rather than [being] imposed by the researcher*”.

This approach seemed ideally suited as a contrast to our more ‘conventional’ qualitative analysis of the literature on ERP and EDRMS. We saw this as a form of methodological triangulation, which would enable us to reflect more effectively on our own, potentially biased, discoveries. As Smith (1975 p.379) noted, this approach is: “*a test-retest reliability check on data quality and ... a means of confirming the validity of earlier findings through checks on the stability of earlier findings*”.

Research Design

Although EDRMS implementation is a fairly new and still comparatively undocumented field, the implementation of enterprise-wide information systems is not a new domain. Our content analysis was therefore designed to establish whether an existing body of literature could assist in developing a testable model for effective EDRMS implementation.

Clearly, then, the first step was to identify the relevant body of literature, before we could demonstrate its relevance in an EDRMS context. As we have already noted in the Introduction to this paper, an exploration of the similarities and differences between the four groups of enterprisewide systems suggested that ERP was the most similar to EDRMS. We therefore conducted a ‘conventional’ qualitative analysis of the implementation literature in both the ERP and EDRMS domains; and enhanced this with a more formal quantitative analysis.

The bases of the quantitative analysis using Leximancer included 107 academic articles on ERP implementation + 46 case studies and articles on EDRMS implementation¹, sourced from professional magazines such as The Information Management Journal, the Records Management Journal, books, the Australian State Records agency websites; and systems providers. We discuss how these papers were analysed and compared in Section 4 of the paper.

Qualitative Analysis

Enterprise Resource Planning (ERP) and Electronic Document and Records Management System (EDRMS)

Organisations purchase ERP solutions to increase the efficiency and effectiveness of their business processes. This is directly aligned with the purpose of EDRMS where, for example, documents are managed to facilitate workflow. Other similarities between these two system types include: the dynamic nature of an ERP implementation; and the requirement to manage change and adopt an ERP culture (Hong and Kim 2002) – which is very similar to the situation occurring when EDRMS is implemented. Wilkins, Holt et al. (2007) note that: “*The introduction of an EDRMS differs from almost all other types of implementation, where there is a clear end point. An EDRMS requires major cultural change in an organisation and thus does not fit into such a simple schema*”. The decision to implement an EDRMS is a major and long-term commitment on the part of the implementing enterprise.

Duncan Holt – at the time the IS Manager for the South Australian City of Charles Sturt – stated that: “*The adoption and organisation of an EDRMS is I believe a minimum five year process*” (Wilkins, Holt et al. 2007).

In the next subsection, we discuss the factors influencing a successful implementation in both these system types.

¹ Despite an extensive search, we were able to uncover only 46 relevant articles, as the literature on EDRMS implementation is still very new (and limited).

Table 1: Comparison of EDRMS and ERP

	EDRMS	ERP
Similarities	<ul style="list-style-type: none"> • automated enterprise-wide system • improve organisation's workflow 	<ul style="list-style-type: none"> • automated enterprise-wide system • provide a total, integrated solution for organisation's information-processing needs
Differences	<ul style="list-style-type: none"> • support the creating, revision and management of digital documents • manage the creation, use, management and disposal of physical and electronically created documents and records • provide evidence of business activities <p>(State Records of South Australia 2007)</p>	<ul style="list-style-type: none"> • support for standard business processes within organisations • manage the efficient and effective use of resources (human resources, finance, etc.) <p>(Shanks, Parr et al. 2000; Nah, Zuckweiler et al. 2003)</p>

ERP

ERP is defined by Parr & Shanks (2000 p.1) as “*comprehensive packaged software solutions which aim for total integration of all business processes and functions*”. Gupta & Kohli (2006 p.1) saw ERP as “*an enabling technology which integrates various functional (operations, marketing, finance) information systems into a seamless suite of business applications across the company and thereby, allowed for streamlined processing of business data and cross-functional integration*”.

Extensive research has been conducted in this field and two studies, by Esteves & Pastor (2001) and Shehab (2004), provide summaries and comparisons of much of this research. Esteves & Pastor provided an annotated bibliography of ERP publications in IS journals and conferences from 1997 to 2000, while Shehab reviewed the research literature into ERP systems over a much longer period (from 1990 to 2003) noting that: “*from the year 2000 till date an increasing number of papers about ERP packages have been published*” (Shehab 2004 p.381). According to Esteves & Pastor, the major trend in ERP research concerned “*issues related to the implementation phase of the ERP lifecycle*” (Esteves and Pastor 2001 p.33). These research surveys categorised the research trends in ERP, identifying: ERP overview; evolution of ERP; main vendors of ERP systems; selection criteria for an ERP system; and implementation of an ERP system (Shehab 2004); while Esteves and Pastor (2001) also identified the ERP lifecycle and ERP in education.

A number of authors have discussed the Critical Success Factors (CSFs) for an ERP project (Bingi, Sharma et al. 1999; Shanks, Parr et al. 2000; Nah and Lau 2001; Al-Mashari, Al-Mudimigh et al. 2003; Bradford 2003; Umble, Haft et al. 2003) and the following factors emerge as those most widely agreed-upon:

- Top management support
- Business plan and vision
- Education and training
- Great implementation team
- Project management
- Change management

- Software development, testing and troubleshooting
- Performance evaluation and management

The most important issue to emerge from these studies concerns the nature of those factors identified as essential for a successful ERP project – they are all related to the management of an ERP project. To put this another way, they all focus on how to get the project done.

EDRMS

In order to decide whether we can draw on the extensive ERP literature to establish a theoretical framework for EDRMS, our collection of EDRMS articles was studied to see if the implementation of these systems was also affected by the ERP success factors identified above. The results showed that seven out of eight success factors identified in the ERP literature were also referred to in the articles on EDRMS implementation. “Software development, testing and troubleshooting” was the only ERP factor not explicitly identified by the EDRMS literature. These seven common factors are now discussed in greater detail.

- Top management support

Top management support has been recognised as the crucial factor in ensuring project success for EDRMS implementations (Ellis 2005; Northern Ireland Civil Service 2006; Wilkins, Holt et al. 2007). If this support is shown right from the start, it will provide guidance and direction (Fuzeau 2005), as well as helping to motivate staff interest in the project; and will possibly result in an improved recordkeeping culture, as well as a more efficient implementation project.

- Business plan and vision

A clear business plan and vision assists organisations to identify their goals and justify their implementation of EDRMS (Williams 2005). McDonald (2005) believes that records are not the starting point for solving an organisation's effective management – this starting point, he claims, is provided by the business processes that generate those records. Without a solid understanding of the organisation's strategy and how the EDRM system aligns with that strategy (Middleton 2005), there will be no commitment from management, the Board or from the staff.

- Education and training

The complete implementation of EDRMS does not necessarily guarantee users' adoption of the system. Without on-going and refresher training and timely support, there is a real risk that users will stop using it (Maguire 2005). Training should be one-to-one, aligned with users' jobs and responsibilities; and put into practice immediately after implementation (Middleton 2005; Williams 2005). Effective and timely aftercare from providers (Public Record Office of Northern Ireland 2005; Northern Ireland Civil Service 2006) and in-house consultants (Williams 2005) build user confidence and trust in the new system (Miller 2005).

- Great implementation team

An optimal implementation team is also highly recommended. The team should be a balanced combination of records managers, IT people and records creators (Smyth 2005), and should possibly even include a member of the Board (Williams 2005). The IT personnel with their specialist IT skills provide a complement to the more business-focused skills of the records managers (Williams 2005), while records creators will provide input about end-user needs from the system. An experienced and dedicated internal project manager will play the role of a conductor for the smooth performance of the whole team (Ellis 2005).

- Project management

Effective project management is considered the key to success for EDRMS projects. Jeffrey-Cook (2005) noted that “*most EDRMS projects will fail in the sense they won't be delivered on time, to budget or meet business requirements*”: excellent project management is essential in avoiding these fatal weaknesses. The use of a formal project management methodology is suggested to

bring a “*more structured framework of governance, budget management and scheduling*” (Ellis 2005).

- **Change management**

Change management has been identified as another critical factor for an EDRMS implementation project because EDRMS facilitates changes in the way people work, while the system itself (i.e. the technology) merely enables that change (Jeffrey-Cook 2005). To better manage this change, a number of strategies could be developed in the areas of “*cultural change, process change, consultation and collaboration on new ways of working*” (Ellis 2005). Taking a strategic approach to change management increases the chances of users’ acceptance of such a system (Miller 2005) because they will grasp the benefits of the system rather than seeing it as an additional and unwanted task (Williams 2005).

- **Performance evaluation and management**

In order to ensure effective uptake and use of EDRMS following the implementation of a new system, the management and on-going evaluation of the system’s performance are needed to ensure expected outcomes are achieved; and to enable effective measurement of the business efficiency and effectiveness improvement provided by the enterprisewide management of records and documents (Ellis 2005; Northern Ireland Civil Service 2006).

The following remarks from the (at present) rather limited group of available case studies – including successes, failures in both the public and private sector and advice from experts in the field – are also worth taking into account:

“Focus on good records management behaviour first. The decade or so gap in corporate records management meant that people no longer knew how to manage their records... No electronic system will change that (Maguire 2005)

“The EDRM project has fundamentally altered staff understanding and behaviour in relation to recordkeeping” (Ellis 2005)

While it is clear that changes to business processes and staff morale are relevant to all major enterprise-wide system implementations (Bingi, Sharma et al. 1999), it is notable that the most important factor in EDRMS projects, as with ERP projects, is people (staff): in particular, how to manage the changes to in their working habits and daily activities. Another major similarity in implementing these two types of system relates to the culture of sharing information which is often considered a personal resource. Especially in situations where recordkeeping has been badly handled over a long period of time (Boisdeffre 2006) or considered a boring job by those in positions of authority (Hughes 2003), it is the “awareness” and “behaviour” of people in relation to recordkeeping which determines the successful uptake of the system – rather than the technology, or any other aspect of the implementation.

Quantitative Analysis

Leximancer Analysis Process

For the quantitative analysis, 107 articles on ERP were collected from a variety of databases using Google Scholar. These articles were tested against the 46 articles on EDRMS identified from professional magazines such as The Information Management Journal, the Records Management journal, books, the state records websites, and systems providers. We focused particularly on articles having an implementation context – generally, these were case studies or articles discussing the issues surrounding the system implementation.

Leximancer was set to automatic mode for both cases. The software package performed an automatic pre-processing of the text entered: identifying concepts², locating concept occurrences; and generating a correspondent concept map. Basically, Leximancer defines a concept as a collection of a word (described by Leximancer as a ‘concept seed’) + its co-travellers (described by Leximancer as ‘terms’).

The concept seed is identified from the list of the words which appear most frequently in the text being analysed. The terms are calculated on how frequently they occur in sentences containing the concept seed vs. their occurrence elsewhere in the text. Because Leximancer’s identification of concepts is based on words and their co-occurrence with their co-travellers within the text it was easy to compare this software package’s results for ERP success factors with those identified for EDRMS.

Leximancer identified a large number of concepts for both collections of sources but, in the interests of clarity, we decided to look only at the 10 most ‘central’ concepts: those with the highest rate of co-occurrence with other concepts (in other words, those which most frequently appear in the collection). The two maps below display a visual illustration of these concepts and their co-occurrence. Each concept is represented by a point and the size of the point indicates its connectedness between a ‘concept seed’ and its ‘terms’. The colour of the concept represents its frequency: the brighter the colour the more frequently it appears in the textual collection. Concepts that frequently appear together with other concepts form a cluster in the map (see Figures 1A and 1B). It is immediately clear that many of these concepts are common to both ERP and EDRMS.

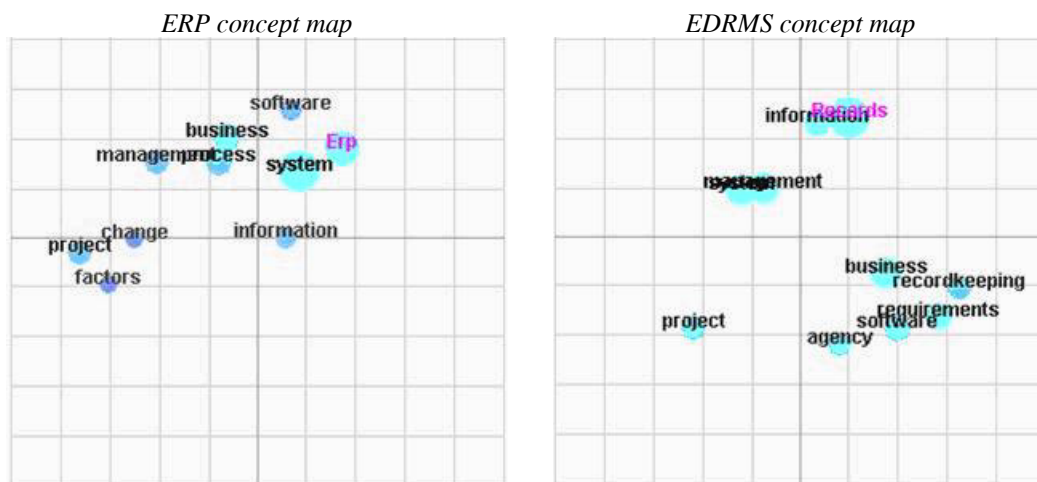


Figure 1A: 10 central ERP concepts

Figure 1B: 10 central EDRMS concepts

Comparing ERP and EDRMS Concepts Derived from Leximancer

Table 2 provides a list of the 10 most central concepts presented in the two maps shown in Figures 1A and 1B. These concepts are listed in alphabetic order in the Table for ease of comparison; and will be discussed in greater detail in the Discussion section of this paper.

² A concept is defined and identified by Leximancer as “a collection of words that travel together throughout the text” Smith, A. E. (2007), *Leximancer Manual*, Available online: <http://www.leximancer.com/cms/>

Table 2: *The 10 central ERP and EDRMS concepts identified by Leximancer*

ERP concepts	EDRMS concepts
Business	Agency
Change	Business
ERP	Information
Factors	Management
Information	Project
Management	Recordkeeping
Process	Records
Project	Requirements
System	System
Software	Software

Discussion and Outlook

The qualitative analysis of success factors in ERP and EDRMS based on a review of the literature (Sections 3.2 and 3.4) suggested that the implementation of EDRMS is influenced by success factors similar to those influencing ERP implementation. The eight most common factors reported to play a major role in the success of ERP projects by a number of authors (and already discussed in detail in those Sections) are: Top management support; Business plan and vision; Education and training; Great implementation team; Project management; Change management; Software development, testing and troubleshooting; and Performance evaluation and management.

Almost all these factors are also mentioned in the EDRMS literature, except for “Software development, testing and troubleshooting”. The omission of this factor might be because ERP implementations often depend upon the development of specialised software sub-systems that meet specific business needs of individual organisations, which frequently require customisation or even the development of bespoke software (Bingi, Sharma et al. 1999). Organisations implementing an EDRMS, by contrast (especially public sector organisations), need to use software solutions which meet legal requirements and have been certified by government agencies (State Records of South Australia 2008). They are therefore more likely to opt for commercial packages provided by specialised companies: in-house development of software is not a viable choice for these organisations.

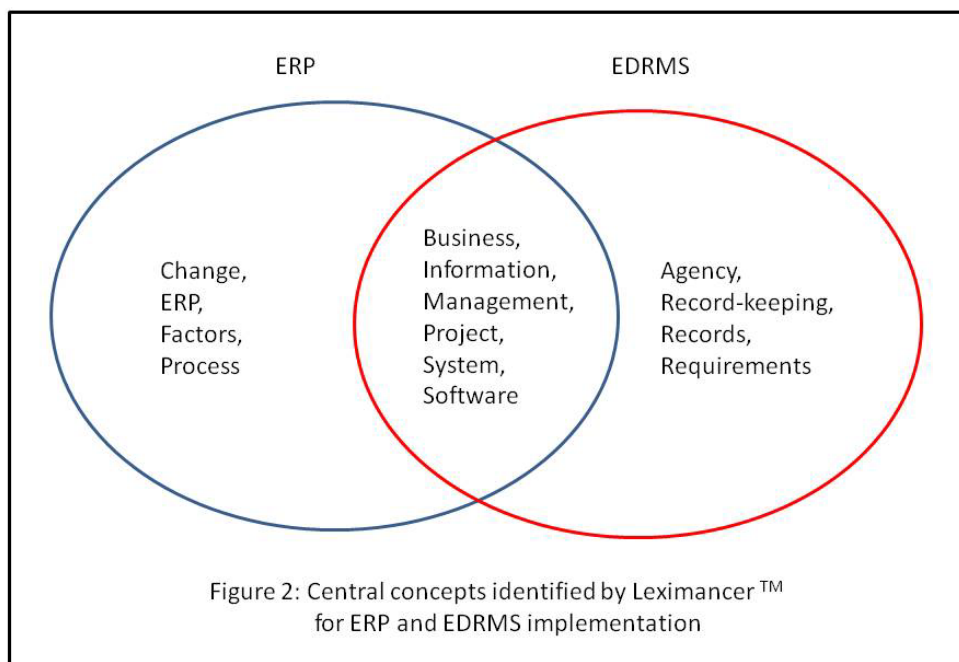
The quantitative analysis conducted using Leximancer enabled an objective comparison of the most central concepts contained in the ERP and EDRMS implementation literature surveyed. The results indicated that, of the ten most central concepts in the ERP and EDRMS articles, six are identical: business, information, management, project, system, and software. Exploring these concepts in context confirms that their meaning is the same in both these analyses. For example, examining the context of the concept ‘Business’ in the ERP context showed that the term refers to business processes, which is similar to the meaning this concept holds in the EDRMS context, e.g.

*“Organizations need to understand their current business structure and **business processes** associated with their existing IT systems, and relate this to the business processes contained within the ERP system” (Holland and Light 1999)*

*“Conducted a functionality requirement study to determine any agency-unique requirements not contained in DOD 5015.2-STD (v.2), Design Criteria Standard for Electronic Records Management Applications. This includes a review of existing **business processes** and the development of a plan for improving those processes as you explore the ERM solution” (National Archives of US 2006)*

The six common concepts refer to issues in the implementation process which include business-related factors (business information, business processes, business support, business activities business requirements etc.), management-related factors (project management, change management, information management, staff management etc.); and system-related factors (software, system implementation, system design, system functionality etc.).

The four ERP-related concepts not frequently found in the EDRMS literature include: ‘Change’, ‘ERP’, ‘Factors’ and ‘Process’, while the four EDRMS-related concepts not common to the ERP literature include ‘Agency’, ‘Recordkeeping’, ‘Records’ and ‘Requirements’. Figure 2 illustrates these distinctions visually.



Looking at the ERP-only factors, it is clear that the eponymous concept ‘ERP’ must be central, as the articles reviewed deal specifically with the implementation of ERP systems. Similarly, ‘Recordkeeping’ and ‘Records’ are absolutely central concepts for any records management system, but are rarely considered in other business information systems – so it is not surprising to see these terms included in the EDRMS-only factors. ‘Change’ and ‘Factors’ in the ERP-only group and ‘Agency’ and ‘Requirements’ in the EDRMS-only group therefore remain the major differentiators in the quantitative analysis of the literature relating to these two system types.

- i. When 'Factors' is examined in context, it becomes clear this is a generic term referring to all the factors affecting ERP implementation, rather than being a specialist term relating to ERP itself, e.g.

*"We must ask ourselves two critical questions, "How can ERP systems be implemented successfully?" and "What are the critical success **factors** for ERP implementation?" (Holland and Light 1999)*

- ii. Similarly, the term 'Agency' refers to those organisations implementing EDRMS, rather than being intrinsic to EDRMS itself, e.g.

*"The general field of RM and ERM is strewn with issues, competing views, policies, and standards, and a number of conundrums related to **agency** organization and resource support. To identify exemplary practices in a context of rapidly evolving information technology and software applications, major reorganization of a significant portion of the federal government, differing needs and requirements for RM in different **agencies**, and growing awareness of the importance of RM in a time of war and concern over national security is a difficult task" (US General Accounting Office 2003)*

It is reasonable, then, to ignore these two terms when considering the essential differences of ERP and EDRMS systems. Any ERP implementation in a public sector agency would also include the concept 'Agency', just as any discussion of critical success factors for EDRMS would be likely to include the concept 'Factors'. The three remaining concepts of 'Process', 'Requirements' and 'Change' are thus the only ones requiring any detailed discussion.

- iii. 'Process' is a major focus for ERP implementations and therefore plays a similar role to 'Recordkeeping' and 'Records' for EDRMS. Currently, we are unable to identify why 'Process' does not show up as a central concept in EDRMS: the only possible explanation is that the significantly larger body of literature in ERP, almost all of which includes this term, has affected the outcome of the content analysis. Clearly, further investigation will be required before a definitive answer can be given on this point.
- iv. 'Requirements' refers to all types of requirements for any EDRMS implementation, e.g. recordkeeping requirements, system requirements, training requirements, or business requirements. In addition, 'Requirements' is a term that refers to project management, for example:

*"Users may be required to complete additional mandatory fields to meet the agency's specific business needs and **recordkeeping requirements**." (National Archives of Australia 2006)*

*"After a procurement exercise, TRIM Captura was chosen as it met the National Archives (then Public Records Office) **requirements for an electronic records management system**" (Maguire 2005)*

*"Ongoing **training requirements** are covered in the Managed Service Contract under additional services, which would need to be funded by departments on an individual basis" (Northern Ireland Civil Service 2006)*

These examples, with their very general application, highlight the oddness of not finding this concept included in the ERP literature, since ERP system implementations have exactly the same need for detailed requirements (system, training, and business) as to EDRMS systems.

- v. It is perhaps even more curious not to find 'Change' as a common factor for both ERP and EDRMS, particularly since the qualitative analysis showed this to be an essential element of any successful EDRMS implementation. In Section 3.1 we noted that a key similarity of ERP and EDRMS system implementations is the need for cultural change

within the implementing organisation. One would therefore expect to find the 'Change' concept also present on the EDRMS concept map.

It should be noted, however, that a number of factors might contribute to this curious omission:

- As for 'Process', the significantly differing number of articles analysed (107 for ERP vs. 46 for EDRMS)
- The difference in content of these articles: ERP implementation has been researched since the 1990s, while EDRMS is an emerging research interest which has only generated literature since 2000, leading to an extensive resource base of ERP case studies and success factors compared to the still very limited number of reported case studies on EDRMS.

It is clear that more detailed analysis will be required to understand why these three concepts do not appear in both groups. Despite these comparatively minor differences, however, both the qualitative and quantitative analyses undertaken for this study present a strong case for claiming that that factors important to the successful uptake of EDRMS are indeed very similar to those of ERP.

What does this result mean for researchers in the field of EDRMS? It strongly suggests that EDRMS implementation as an enterprise-wide information system shares a significant number of characteristics with those of ERP. The important factors determining effective uptake of EDRMS can be categorised into two major groups: project management and change management (both were examined in detail in Section 3.4).

Based on this evidence, it can now be argued that it is reasonable to explore, if not exploit, the substantial and well established "knowledge" of the ERP domain as a guide for the new field of EDRMS. As demonstrated above, there are some important lessons learned, success factors, etc. from ERP which might well form the foundation for an EDRMS model—although this adjustment must be undertaken with considerable caution.

The next step in this research project is the development of an initial framework for effective uptake of EDRMS, which involves the examination of existing frameworks and models of ERP; and the adaptation or combination of these for use in an EDRMS context. To date, a number of models for ERP implementation have been proposed, ranging from the Technology Acceptance Model (TAM), to Critical Success Factors (CFSs) or Diffusion of Innovation theories (Nah and Lau 2001; Amoako-Gyampah and Salam 2004). Since these two groups of enterprise-wide systems share a number of common factors, as presented in this paper, further research will analyse a number of the "better-known" ERP implementation models with the aim of identifying their relevance to a suitable EDRMS implementation and uptake model.

References

- Al-Mashari, M., A. Al-Mudimigh and M. Zairi (2003). "Enterprise resource planning: a taxonomy of critical factors." *European Journal of Operational Research* **146**(2): 352-364.
- Alexa, M. and C. Zuell (2000). "Text Analysis Software: Commonalities, Differences and Limitations: The Results of a Review." *Quality and Quantity* **34**(3): 299-321.
- Amoako-Gyampah, K. and A. F. Salam (2004). "An extension of the technology acceptance model in an ERP implementation environment." *Information & Management* **41**(6): 731-745.
- Barry, R. (2006). "Managing Electronic Records." *Records Management Journal* **16**(1): 57-66.
- Bingi, P., M. K. Sharma and J. K. Godla (1999). "Critical issues affecting an ERP implementation: Enterprise computing." *Information systems management* **16**(3): 7-14.
- Boisdeffre, M. (2006). "The importance of records management in France." *Records Management Journal* **16**(2): 76-80.
- Bradford, M. (2003). "Examining the Role of Innovation Diffusion Factors on the Implementation Success of Enterprise Resource Planning Systems." *Information Systems* **4**: 205-225.

- Davies, I., P. Green, M. Rosemann, M. Indulska and S. Gallo (2006). "How do practitioners use conceptual modeling in practice." *Data & Knowledge Engineering* **58**(3): 358-380.
- Ellis, J., Ed. (2005). *Implementing a solution for electronic recordkeeping in the public sector. Managing electronic records.* London, Facet Publishing.
- Esteves, J. and J. Pastor (2001). "Enterprise Resource Planning Systems Research: An Annotated Bibliography." *Communications of the Association for Information Systems* **7**(8): 1-52.
- Fuzeau, P., Ed. (2005). *Records management: two case studies from the French private sector. Managing electronic records.* London, Facet Publishing.
- Graneheim, U. H. and B. Lundman (2004). "Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness." *Nurse Education Today* **24**(2): 105-112.
- Gupta, M. and A. Kohli (2006). "Enterprise resource planning systems and its implications for operations function." *Technovation* **26**(5-6): 687-696.
- Holsti, O. R. (1969). *Content analysis for the social sciences and humanities,* Addison-Wesley.
- Hong, K. K. and Y. G. Kim (2002). "The critical success factors for ERP implementation: An organizational fit perspective." *Information and Management* **40**(1): 25-40.
- Hughes, C. (2003). "Opportunities for records managers working in the private sector " *Records Management Journal* **13**(3): 117-122.
- Jeffrey-Cook, R. (2005). *Preparing to Implement a Corporate EDRMS.* NCCFire Information Management Workshop, Inform Consult Ltd.
- Johnston, G. P. and D. V. Bowen (2005). "The benefits of electronic records management systems: a general review of published and some unpublished cases." *Records Management Journal* **15**(3): 131-140.
- Kassarjian, H. H. (1977). "Content Analysis in Consumer Research." *The Journal of Consumer Research* **4**(1): 8-18.
- Krippendorff, K. (1980). *Content analysis,* Sage Publications Beverly Hills.
- Lewins, A. and C. Silver (2007). *Using software in qualitative research: a step-by-step guide.* London, SAGE Publications.
- Maguire, R. (2005). "Lessons learned from implementing an electronic records management system." *Records Management Journal* **15**(3): 150-157.
- Marzano, G. and N. Scott (2006). *Consistency in destination branding: the impact of events.* Global events congress. Brisbane.
- McDonald, J. (2005). *The wild frontier ten years on. Managing electronic records.* J. McLeod and H. Catherine. London, Facet Publishing: 1-17.
- McPhee, I. (2007). *An ANAO perspective of records in government. National Archives of Australia Seminar Check-up: Audit issues and electronic records solutions,* Parliament House, Canberra.
- Meridio Ltd (2006). *Why introducing Enterprise Document and Records Management (eDRM) should be addressed as a Strategic Issue.* UK.
- Middleton, H. (2005). *The long and winding road - EDRMS at Highlands & Islands Enterprise.*
- Miller, J. M. (2005). *User's Issues Arising from EDRMS Implementation,* Performance Psychology Ltd.
- Miller, M. M. and B. P. Riechert (1994). "Identifying themes via concept mapping: A new method of content analysis." Paper submitted for presentation to the Theory and Methodology Division, Association for Education in Journalism and Mass Communication Annual Meeting, <http://excellent.com.utk.edu/~mmmiller/pestmaps.txt>.
- Morgan, D. L. (1993). "Qualitative Content Analysis: A Guide to Paths not Taken." *Qualitative Health Research* **3**(1): 112.
- Nah, F. F. H. and J. L. S. Lau (2001). "Critical factors for successful implementation of enterprise systems Fiona Fui-Hoon Nah, Janet Lee-Shang Lau, Jinghua Kuang The Authors." *Business Process Management Journal* **7**(3): 285-296.
- Northern Ireland Civil Service (2006). *Electronic Document and Records Management (EDRM) Lead Implementation 2nd Lessons Learned Report.*
- Parr, A. N. and G. Shanks (2000). "A taxonomy of ERP implementation approaches." *System Sciences, 2000. Proceedings of the 33rd Annual Hawaii International Conference on:* 10.
- Public Record Office of Northern Ireland (2005). *Preparation and Implementation of an Electronic Document and Records Management System (EDRMS). PRONI.*

- Ryan, D. (2005). "The future of managing electronic records." *Records Management Journal* **15**(3): 128-130.
- Shanks, G., A. Parr, B. Hu, B. Corbitt, T. Thanasankit and P. Seddon (2000). "Differences in Critical Success Factors in ERP Systems Implementation in Australia and China: A Cultural Analysis." *Proceedings of the European Conference on Information Systems*: 537-544.
- Shehab, E. M. (2004). "Enterprise resource planning An integrative review EM Shehab, MW Sharp, L. Supramaniam, TA Spedding The Authors." *Business Process Management Journal* **10**(4): 359-386.
- Smith, A. E. (2007). "Leximancer manual." from <http://www.leximancer.com/cms/>.
- Smith, A. E., M. Grech and T. Horberry (2002). "Application of the Leximancer Text Analysis System to Human Factors Research." Unpublished manuscript. The University of Queensland at Brisbane.
- Smith, H. W. (1975). *Strategies of Social Research: The Methodological Imagination*, Prentice Hall.
- Smyth, Z. A. (2005). "Implementing EDRM: has it provided the benefits expected?" *Records Management Journal* **15**(3): 141-149.
- State Records of South Australia. (2007). "Glossary of Records Management Terms." Retrieved June 8th 2007, from <http://www.archives.sa.gov.au/management/glossary.html#E>.
- State Records of South Australia. (2008). "EDRMS Functional Compliance Requirements." Retrieved February 12th, 2008, from <http://www.archives.sa.gov.au/management/edrms.html>.
- Stephens, D. O. (2005). "The Sarbanes-Oxley Act Records management implications." *Records Management Journal* **15**(2): 98-103.
- Stringer, M.-R. (2006). *Chart of Software & System Integrators/Solution Providers*.
- Umble, E. J., R. R. Haft and M. M. Umble (2003). "Enterprise resource planning: Implementation procedures and critical success factors." *European Journal of Operational Research* **146**(2): 241-257.
- Wilkins, L., D. Holt, P. M. C. Swatman and E. S. K. Chan (2007). *Implementing Information Management Strategically: an Australian EDRMS case study*. 20th Bled eMergence: Merging and Emerging Technologies, Processes and Institutions. Slovenia.
- Williams, D. J. (2005). "EDRM implementation at the National Weights and Measures Laboratory." *Records Management Journal* **15**(3): 158-166.
- Yin, R. K. (2003). *Case Study Research: design and methods*. California, Sage Publications Inc.