Enterprise Content Management Implementation: An Overview of Phases, Standards and Best Practice Guidelines

Kurumsal İçerik Yönetimi Yapılandırması: Aşamalar, Standartlar ve En İyi Uygulama Rehberleri Üzerine Genel Bir Bakış

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Abstract

The management of digital records has been a subject of numerous scholarly discussions for several years. Discussions on the application systems used to manage these records and other digital content have often used different terminology, frequently interchangeably, with little regard to nuanced differences. In addition, a number of standards and best practice guidelines have been developed in different countries to address the challenges of assessing and implementing these applications. While it may look like a lot of resources are available to records professionals as they tackle the challenges of implementing software applications, there is need to clarify terminology and identify implementation phases, as well, as the appropriate standards and best practice guidelines. This article, using primarily a review of literature, suggests definitional clarity and connectedness of different terms used for Enterprise Content Management (ECM) applications. It identifies the various phases of implementation of ECM applications and offers an overview of standards and best practice guidelines. Lastly it provides an assessment of the connection between phases of implementation in relation to standards and best practice guidelines, providing a gap analysis while also suggesting ways of addressing the variance.

Keywords: *Document management, Enterprise content management, Electronic document management systems, Electronic records management, Standards*

Öz

Dijital belgelerin yönetimi yıllardır pek çok bilimsel çalışmanın konusunu oluşturmuştur. Dijital belgelerin ve diğer dijital içeriğin yönetiminde kullanılan sistemler üzerine gerçekleştirilen tartışmalarda çoğunlukla farklı terminolojiler, sık sık birbirinin yerine geçen terimler ve küçük nüans farklılıkları kullanılmaktadır. Ayrıca birçok ülkede dijital belgelerin yönetimine yönelik sistemleri değerlendirilmesi ve yapılandırılmasına yönelik fırsatları ve tehditleri gösteren standartlar ve iyi uygulama örneklerini ele alan rehberler geliştirilmiştir. Belge yöneticileri için yazılım uygulamalarının yapılandırılmasında karşılaşılan zorluklara yönelik birçok kaynak var gibi görünürken uygun standartların, iyi uygulama örneklerine yönelik rehberler kadar yapılandırma

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aşamalarının tanımlanması ve terminolojinin açıklanmasına yönelik ihtiyaçlar bulunmaktadır. Bu makale öncelikle literatür değerlendirmesinden yola çıkarak, tanımlamalara açıklık getirmeyi ve Kurumsal İçerik Yönetimi (KİY) uygulamaları için kullanılan farklı terimler arasındaki bağlantıları ortaya koymaktadır. Çalışma, KİY uygulamalarının yapılandırılmasındaki çeşitli aşamaları tanımlamakta ve standartlar ve iyi uygulama örneklerine yönelik rehberlere genel bir bakış sağlamaktadır. Çalışma son olarak değişikliklere yönelik öneriler getirirken Gap (boşluk) analizi ile en iyi uygulama örnekleri rehberleri ve standartları doğrultusunda yapılandırma aşamalarına yönelik bir değerlendirmeyi içermektedir.

Anahtar sözcükler: *Doküman yönetimi, Kurumsal içerik yönetimi, Elektronik doküman yönetimi sistemleri, Elektronik belge yönetimi, Standartlar*

Introduction

The management of digital records has been a subject of numerous discussions around the world for several years (McLeod, 2010; Smith, 2007). These discussions have been held in the context of countries with advanced economies such as Australia (Nguyen, Swatman, Fraunholz, & Salzman, 2009; Wilkins, Swatman, & Holt, 2009), New Zealand (Lips & Rapson, 2009), the UK (Adam, 2008; Maguire, 2005; Williams, 2005) and US (Saffady, 2009; Sprehe & McClure, 2005). Additionally there have been case studies from multinational organizations such as the European Central Bank (Garrido, 2008), the International Committee of the Red Cross (Willemin, 2006) and the World Bank (World Bank Group Archives, 2003).

There are a few examples in the developing world and emerging economies, such as Iceland (Gunnlaugsdottir, 2008, 2009), Malaysia (Johare, Hussin, & Jamaludin, 2011; Mokhtar & Yusof, 2009), Pakistan (Henriksen & Andersen, 2008), Taiwan (Hsu, Chen, & Wang, 2009), and Turkey (Kulcu, 2009). In the case of African countries, a significant amount of published material has originated from academic research such as theses and dissertations. The literature has covered different countries including Botswana (Moloi, 2006), Kenya (Kemoni, 2007), Lesotho (Sejane, 2004), Namibia (Nengomasha, 2008), South Africa (Abbott, 2000; Katuu, 2012; Kwatsha, 2010; Makhura, 2001) and Uganda (Luyombya, 2010). Additionally there have been studies that have covered more than just one African country within the continent (Katuu, 2004; Keakopa, 2006; Kemoni, 2009; Mutiti, 2002; Wamukoya & Mutula, 2005).

The discussion, whether in Africa or elsewhere around the world, has grown over the years from merely distinguishing issues in electronic records management (Katuu, 2000) to more complex issues of implementing recordkeeping applications (Bailey, 2008b), education professionals on management of digital records (Duranti & Rogers, 2011; Eastwood, 2006), managing records in complex digital environments (Duranti & Thibodeau, 2006), defining authenticity in a digital context (MacNeil & Mak, 2007), and long term preservation of digital records (InterPARES Project, 2012). Discussions on the application systems used to manage these records and other digital content

have often used different terminology, frequently interchangeably, with little regard to nuanced differences. Terms used interchangeably include Electronic Document Management Systems (EDMS), Electronic Records Management Systems (ERMS), Electronic Document and Records Management Systems (EDRMS) and Enterprise Content Management (ECM). This article seeks to provide an overview of these terms and how they relate to each other in an evolutionary manner. The article also provides an outline of standards and best practice guidelines developed in order to manage digital records in different countries around the world. The article provides a suggested set of phases in implementing ECM applications. Lastly, it matches the phases of ECM implementation with the appropriate standards and best practice guidelines in order to provide relevant direction for records professionals.

From EDMS and ERMS to ECM – The Evolution

ECM is a term that has been in competition with others such as Integrated Document Management Systems or IDMS (Shegda, 2001), Electronic Document Management Systems or EDMS, Electronic Document and Records Management Systems or EDRMS, as well as Electronic Records Management Systems or ERMS. Robert Blatt (2011), an ECM industry specialist, argued that terms such as EDMS and ERMS have been used almost interchangeably with ECM for several years.

ERMS applications evolved from early automated techniques for managing hard copy records while EDMS applications evolved from software designed to build concordances and then became automated techniques for managing hybrid collections of largely similar types of documents such as procedure manuals (McDonald, 2011). EDMS applications were also often referred to as Document Imaging Management (DIM) systems since they were used to scan and save images of hardcopy documents for central storage and easy retrieval (Cvision Technologies, 2011). ERMS and EDMS were merged into EDRMS in the mid to late 1990s. According to John McDonald, a world renowned digital records specialist, "since then there have been important add-ons and improvements such as email integration and workflow." He adds that the most important step has been the migration of these tools into the web environment where, in many cases, they have been integrated with web content management tools – hence the name 'content management' to embrace the emerging and wider role of applications thus far known as EDRMS (McDonald, 2011).

For the purpose of this article, ECM is viewed currently as the final point in an evolutionary process, where other concepts such as EDMS and ERMS were predecessor concepts. The evolutionary process accommodates predecessor concepts (Sprehe, 2005) and would help clear any confusion regarding the different concepts (Nguyen, Swatman & Fraunholz, 2007). The evolutionary process is shown in the Figure 1.

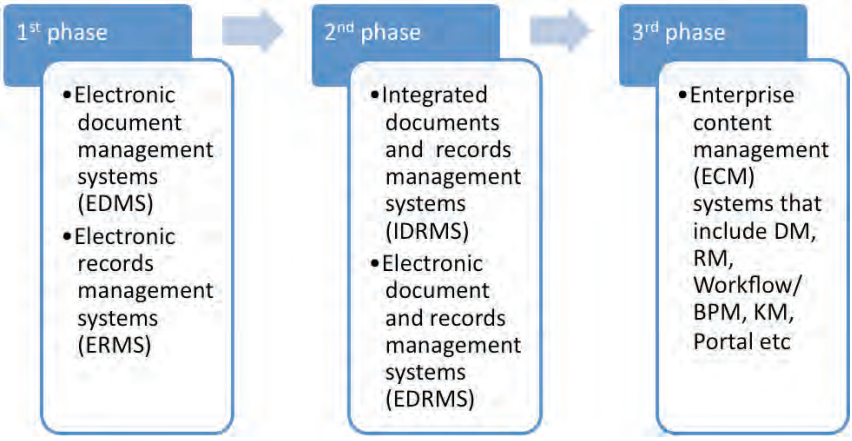

Figure 1. The Evolution of Various Concepts Culminating into ECM

This evolutionary perspective to the concept of ECM is supported by the Association for Information and Image Management (AIIM), a professional group that argues that ECM is all inclusive of strategies, methods, and tools for managing content and will be discussed in some detail briefly (AIIM, 2010).

Additionally, reports by leading research organizations in document and records management have, over the last few years, evolved from using terms such as IDMS and EDMS to ECM. One such research and advisory firm, Gartner published a report in 2003 that used the concept IDMS (Gartner, 2003) but by 2004 was already using ECM as a concept (Shegda, Chin, Logan, & Lundy, 2004). Another firm, Forrester had already used the term ECM in a report published in 2003 (Moore & Markham, 2003) and continued to use the term in subsequent annual reports.

Lastly, research projects in the records and information management field have started using the term in their research projects. One such research project is the International Research on Permanent Authentic Records in Electronic Systems also known as InterPARES, which is arguably the longest running multi-national and trans-disciplinary research project in archives and records management. InterPARES developed at least one case study in the area of ECM (InterPARES 3 - TEAM Canada, 2010).

ECM and Its Constituent Parts

According to Gartner, ECM refers both to "a strategy to deal with all types of enterprise content and a set of software products for managing the entire life cycle of that content" (Bell, Shegda, Gilber, & Chin, 2010).

AIIM's definition of ECM goes beyond just strategy and software products and defines it as "the strategies, methods and tools used to capture, manage, store, preserve and deliver content and documents related to organizational processes. ECM tools and strategies allow the management of an organization's unstructured information, wherever that information exists" (AIIM, 2010).

When these strategies, methods and tools are targeted at organizational processes, they manifest themselves in several components. The precise number and composition of the components remains a subject of debate. For the purpose of this article, the 10 components considered fundamental include: Document Management, Records Management, Workflow or Business Process Management, Collaboration, Portal, Knowledge Management, Imaging, Digital Asset Management, Digital Rights Management, and Web Content Management (CMS Watch, 2010, pp. 21-86; Kampffmeyer, 2004, 2006). Figure 2 shows a graphical representation of these components.

Figure 2. The Modules of a Typical ECM Application

The management of records, generally, and digital records, in particular, have often been discussed in conjunction with standards and best practice guidelines. While there are a number of standards and best practice guidelines, following section below provides an outline of some of the most prominent and how they relate to each other.

Standards and Best Practice Guidelines

Over the last two decades there have been numerous efforts around the world to develop standards and best practice guidelines to manage records (Healy, 2010; McLeod & Hare, 2010; Pember, 2006; Wilhelm, 2009). The standards and best practice guidelines cover the whole spectrum of challenges for records professionals, but for the purpose of this discussion the only ones highlighted are those directly connected to ECM implementation. There are different ways of grouping such standards and best practice guidelines. In this article, they are grouped according to their jurisdictional relevance in two main categories. In the first category the standards and best practice guidelines are termed as open because they jurisdictional restrictions (Type A) while in the second, they have have no jurisdictional limitations (Type B).

Type A or restricted-use standards and best practice guidelines are most relevant within a specific jurisdiction. Over the years several countries have developed such standards and best practice including Australia, South Africa, the UK and the US.

One of the set of standards in Type B category was originally developed by the International Council on Archives (ICA) in 2008 but then eventually approved as a set of ISO standards. Another set of standards was developed under the auspices of the European Union, first published in 2001 as MoReq, revised in 2008 as MoReq2 and the latest revision published in 2011 as Moreq2010. These European standards were developed to serve the multi-jurisdictional and multi-lingual requirements of the continent.

Figure 3 provides a graphical representation of the two categories and their specific examples.

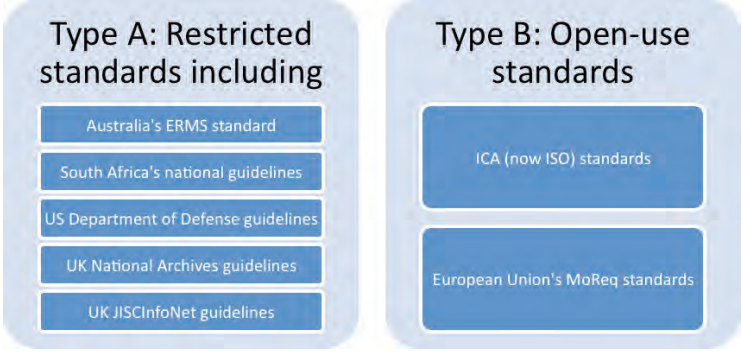

Figure 3. Type A And Type B Standards and Best-Practice Guidelines

Following sections provide a brief outline of each of the standards and best practice guidelines identified in the diagram above, the first four are restricted within national jurisdictions and the last two are open-use standards and best practice guidelines.

Australia

In Australia, the National Archives published a standard for ERM applications in 2007 drawing from the experiences of the European Union and the UK National Archives (National Archives of Australia, 2007). Like the EU's MoReq, it provides functional requirements but unlike the UK National Archives it doesn't offer any mechanism for approved software application vendors. In addition to developing the standard, Australia's National Archives has played a leading role in developing international standards and best practice guidelines in collaboration with the International Council on Archives.

South Africa

South Africa first published national guidelines in 2002 that included an approved list of applications and software providers (State Information Technology Agency [South Africa], 2002). The guidelines and the approved listing were developed jointly by the country's National Archives and the State Information Technology Agency (SITA), an agency that is charged with the responsibility of consolidating and coordinating IT resources for the government.

The SITA and National Archives partnership subsequently revised the guidelines in 2005 (State Information Technology Agency [South Africa], 2005). At the core of the assessment criteria, the documentation had three classes of ECM applications; Class A being fully integrated modules, Class B consisting of a core solution and Class C consisting of standalone solutions such as business process management and e-mail archiving. Figure 4 is a graphical representation of how the ECM applications fit together (National Archives and Records Service of South Africa, 2006).

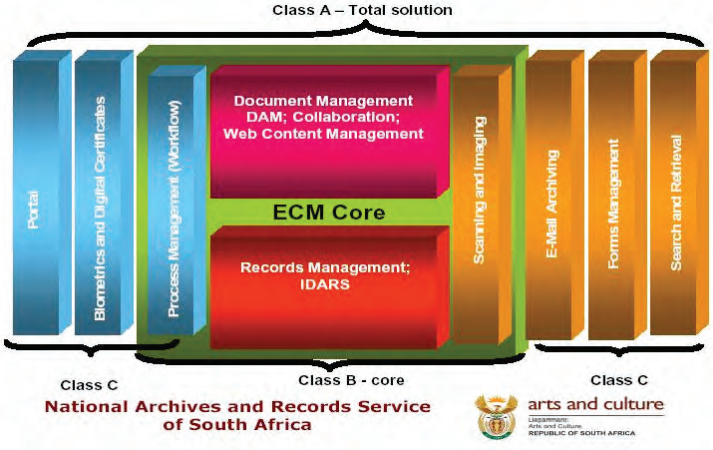

Figure 4. South African ECM Class Solutions Model

The approved listing from 2005 had software application vendors that would be available to bid for projects within the public (State Information Technology Agency [South Africa], 2005). The approved listing was to expire in 2008 and no guidelines for ECM applications have been developed since.

United States

The United States was the first country to develop functional requirements for ECM applications. The principles on which the functional requirements are based were developed through a collaboration between the US Department of Defense and the School of Information, Library and Archival Studies at the University of British Columbia in Canada (Thibodeau & Prescott, 1996; Trace, 2005). In the US, the Department of Defense (DOD) standard 5015.2, even though developed by one department, is generally considered the de-facto functional requirements standard for the country and has been endorsed by the US National Archives (National Archives and Records Administration [United States], 2012). The standard was first published in 1997, and later revised in 2002 with the latest edition being published in 2007 (Department of Defense [United States], 2012; Riofrio & Matsuura, 2004). To date, the approval process undertaken by the DOD remains the most comprehensive seen anywhere in the world and many software vendors have to maintain their certification once approved (Fernandez & Sprehe, 2003; J. Timothy Sprehe, 2004).

United Kingdom

In the UK, two different institutions have developed standards and best practice guidelines over the years. First the UK National Archives developed a set of functional requirements in 1999 that were subsequently revised in 2002. Like the US DOD standards, the functional requirements were accompanied by a listing of software application vendors that had been tested and approved. In 2004 however, the testing scheme was terminated (The National Archives [United Kingdom], 2008).

In 2007, JISC InfoNet, an advisory service hosted by Northumbria University, published a set of best practice guidelines known as EDRM Toolkit. The toolkit was aimed at providing "a 'one-stop shop' for impartial, detailed and practical advice during all the stages of a proposed or actual EDRM system implementation that is free from vendor bias" and catering to the needs of UK higher education institutions (JISC infoNet, 2007). Organized in ten different stages, the toolkit draws heavily from the Australian DIRKS guidelines and often refers to them. Figure 5 provides an overview of the ten different stages

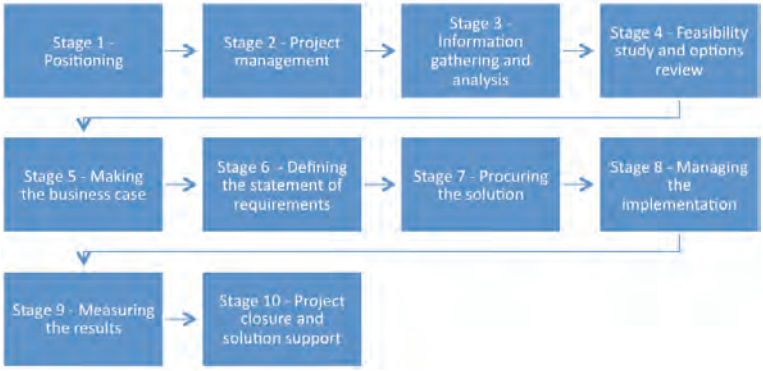

Figure 5. The Ten Different Stages of the EDRM Toolkit

Although there were reports of a revision to the EDRM Toolkit guidelines, none have been published so far (Bailey, 2008a).

European Union

The European Union developed the first set of guidelines for assessing ERM applications in 2001 known as Model Requirements for the Management of Electronic Records or MoReq (European Commission, 2001). Commentators argued that the standard was a great contribution to the profession but also urged further development to keep up with technological trends (Cain, 2002). This saw the publishing of MoReq2 in 2008 (European Commission, 2008) generating discussions about how the standard could be applied in various EU countries such as the UK (Wilhelm, 2009) and Finland (Henttonen, 2009). Further developments on the standards have seen the publishing of the latest iteration known as MoReq2010 (DLM Forum Foundation, 2011). The standard was published in June 2011 introducing a modular approach. This has refined the functional requirements and their underlying information model using a service based architecture that provides the platform for the core requirements, which include interoperability and federation capabilities (DLM Forum, 2011).

International Council on Archives

According to Adrian Cunningham (Cunningham, 2010), one of the key authors of the standards, the ICA was aware that various standards existed around the world but that there was no global harmonization. A project team was constituted under the auspices of the ICA, bringing together participants from various national archival institutions in Australia, Cayman Islands, Germany, Malaysia, the Netherlands, New Zealand, South Africa, the UK and the US. They met first in September 2006 and two years later published three modules (Cunningham, 2010). The first module provides an overview of principles and functional requirements. The second module provides guidelines

for ERMS applications and the third module provides guidelines and functional requirements for records in business systems (Prom, 2011). The standards have since been adopted by the International Standards Organization (ISO) thereby gaining more international adaptation (International Standards Organization, 2010a, 2010b, 2011). In 2011, it was reported that the ICA was developing implementation guidance and training material for the three modules with the aim of releasing the new products in 2012 (Prom, 2011).

Figure 6 provides a timeline on the development of different standards and best practice guidelines discussed above. Figure 6 helps us visualize the last 15 years of the development of standards and best practice guidelines in relation to ECM applications. It demonstrates that a lot of work has been done in the development of standards, as well as demonstrating that, within this very brief period, many of them have been revised suggesting a fast pace of changes within the ECM environment. One would assume that with all the activities taking place within the standards environment, it is likely there is duplication of effort. In addition, as the preceding discussion has demonstrated, some of these standards have since expired such as, for example, in South Africa and the UK. Records professionals in countries that either do not have any national standards or in countries whose national standards are obsolete would, therefore, rely heavily on international standards such as those developed by the ICA and adopted by the ISO. This aspect puts added pressure on any regional or international efforts in standards development. However, one additional fact has to be considered: how do these standards relate to the practical environment.

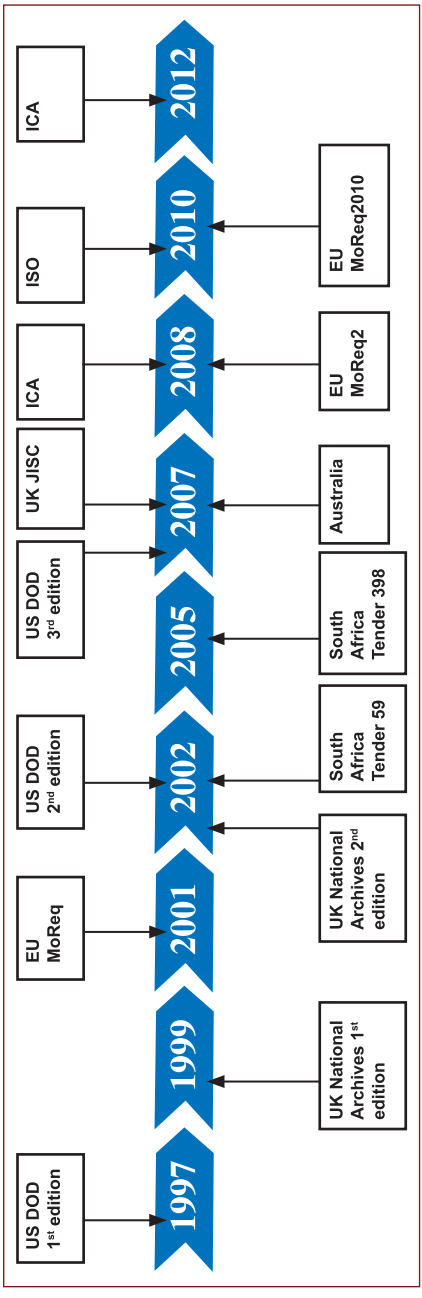

Figure 6. Timeline for Standards and Best Practice Guidelines

Phases of Implementation and Their Relation to Standards

While the process of implementing ECM is often quite complicated, there are possibly three basic phases to the implementation. These phases are pivoted around the point of selection and installation of the ECM applications. For the purposes of this discussion, the first phase, simply titled 'pre-selection' precedes the pivotal selection point and the third phase titled 'post-selection and installation' follows the pivotal point.

As the term suggests, the pre-selection phase relates to activities undertaken before considering any particular ECM applications for an organization. These activities relate to business and technological analyses, as well as, records and information management assessment. The second phase relates to the selection and installation of the ECM application. Activities in this phase include: the development of user and system requirements, the process of calling for and choosing bids and eventual rollout processes. The final phase relates to the activities undertaken after installation is complete in order to ensure that the application continues to add value to the institution. Figure 7 provides a graphical representation of the three phases.

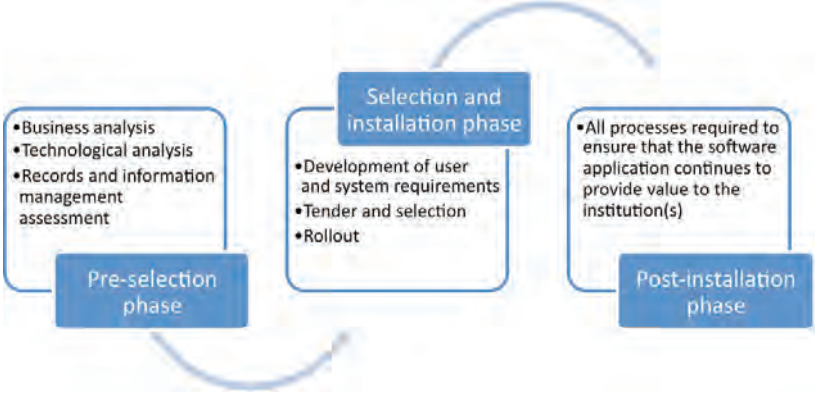

Figure 7. The Three Phases in ECM Implementation

The preceding sections provided a basic outline of the standards and best practice guidelines around the world. When one juxtaposes the phases of implementation against the standards and best practice guidelines, an interesting picture emerges of the gaps that exist. The Table I provides an outline of this comparison.

Table I: Implementation Phases and Related Standards

Phases	Standards and guidelines
Pre-selection phase	• UK's EDRM Toolkit (JISC infoNet, 2007) provides information in Stages 1 to 5 of implementation that is relevant for this phase. • Australia's functional requirements standard • European Union's MoReq best practice guidelines provide information on functional requirements. • ICA/ISO Standards provide an overview of principles, as well as, functional requirements for ERMS applications.
Selection and installation phase	• South Africa's now expired standard would provide functional requirement guidelines • The United States DOD functional requirement standards and approval process. • The United Kingdom's National Archives now expired standard would provide functional requirement guidelines. • UK's EDRM Toolkit (JISC infoNet, 2007) provides information in Stages 6 to 8 of implementation that is relevant for this phase.
Post-installation phase	• UK's EDRM Toolkit (JISC infoNet, 2007) offers very minimal assistance in Stages 9 and 10 that would be relevant for this phase.

As Table I shows, most of the standards and best practice guidelines relate to the second phase of ECM implementation while only one, the EDRM Toolkit, straddles all the three implementation phases. In the first implementation phase, the EDRM Toolkit dedicates five stages of the ten stage guideline. In the second implementation phase, it dedicates three stages and in the third implementation phase dedicates only two stages. It is very clear from the table above that both the first and third implementation phases have received very little attention compared to the second implementation phase. Post-installation phase may last many years, for instance, in the 10 institutions surveyed in South Africa, most of their ECM applications had been in place for five years or more (Katuu, 2012). And for this reason, it is troubling that there is only one standard that covers this aspect and, even more disconcerting, only provides very minor support.

Conclusion–Combining Phases and Best Practice Guidelines

Institutions involved in ECM implementation would want to ensure they get a good return on their investment. The financial resources and human effort invested in the implementation process, however, does not always bear fruit and there have been a considerable number of projects that have failed (Bailey, 2008b; McLeod, 2010). Implementation failure has been observed, not just with ECM applications, but also in many other technology areas (Gargeya and Brady, 2005; Yeo, 2002). This is not only common in developing countries that would, presumably, have less technological

resources and skills (Hawari & Heeks, 2010; Heeks, 2002), but also in developed countries (Molla & Loukis, 2005). While there are many different reasons why implementations fail and, therefore, many ways of trying to address these failures (Stanforth, 2010), the preceding discussion shows that there are obvious gaps in standards and best practice guidelines in ECM implementation.

Considering the pace at which standards have been developed and revised, there is no doubt much energy and many innovative approaches being incorporated. However, this preliminary assessment has demonstrated that, at practical level, records professionals are getting assistance in the areas of greatest weakness and, at this point, it is the post-installation phase. Considering that this assessment has been preliminary, there is need for a more detailed crosswalk of the standards and best practice guidelines. A crosswalk is a table that compares elements of one standard or best practice guidelines mapped against other elements. Scholars have conducted have conducted such crosswalks on different kinds of metadata standards (Godby, Young, & Childress, 2004; Baca, Harpring, Ward, & Beecroft, 2008) as well as in digital preservation (Inefuku, 2010) but are yet to be conducted with ECM implementation. Additionally, there is a need to conduct empirical research on how standards and best practice guidelines have been used for purposes of ECM implementation because these will reveal, in greater detail, where the weaknesses exist.

Acknowledge

The views expressed in this article are those of the author and should not be attributed to the International Monetary Fund, its Executive Board, or its management.

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