UNIVERSITY OF AGDER

Enterprise Content Management: an analysis of contemporary practice and its relationships with Enterprise Architecture

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This Master's Thesis is carried out as a part of the education at the University of Agder and is therefore approved as a part of this education. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn.

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Preface

This master thesis is the final part of the master program in Information systems at the University of Agder. The thesis work was carried out in the period from January to June 2012.

The thesis work has been interesting, but challenging to combine with a half-time job. Nevertheless, it has been a continuous learning process and I have been able to immerse myself in a field I find very interesting and omnipresent.

The thesis focuses on the current enterprise content management issues that organizations are facing, and how these can be related to the concept of enterprise architecture.

I would like to take the opportunity to give thanks to all the contributors to my thesis. I want to thank the ten informants for providing me with insights on the topic in their organizations. Special thanks to my two supervisors, Professor Bjørn Erik Munkvold and Professor Tero Päivärinta. And finally, a special thanks to Kim André for supporting me through five years of university studies, especially in this final semester's thesis work.

Kristiansand, June 5th, 2012

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Oda Rønholt Nilsen

Abstract

Enterprise Content Management (ECM) consists of a wide set of interrelated issues, and previous research on ECM points out that there is a lack of a common understand of the concept itself. Further, there is a lack of a holistic approach to ECM and initiatives are often individual initiatives covering sub-parts of ECM. Organizations seem to have a more functional approach to ECM. Enterprise architecture (EA) is a concept which promises to provide a holistic and long-term view of a company's processes, systems, and technologies so that individual projects can build capabilities – not just fulfill immediate needs. EA also promises to help organizations in complying with external regulations, tackling the increasing complexity of organization, capturing knowledge and guide solution architects. Within both the field of ECM and EA, there is a lack of empirical evidence. Some of the promises of EA seem to address some of the ECM issues that organizations are facing. Research on this relationship between ECM and EA is scarce.

My research question is: **What are key issues in contemporary Enterprise Content Management practice, and how can these be related to the concept of Enterprise Architecture?**

In order to answer the research question, I have reviewed previous literature on ECM and EA. A multiple case study was conducted to investigate current ECM issues in practice, involving interviews with ten people from the following five different: Devoteam, Vest-Agder county municipality, DNV Maritime Partner AS, Aker Solutions and Telenor. The results of the multiple case have been systemized using the major ECM issues framework (Päivärinta & Munkvold, 2005) and a functional ECM framework developed by Grahlmann et al. (2011) has been used to describe the identified ECM functionalities.

The study showed that there is still a lack of a common understanding about the concept of ECM. Organizations seem to lack a holistic approach to their ECM initiatives and are taking a more functional approach to them. A number of ECM issues were identified and systemized according to the major ECM issues framework. Through this systemiziation of the results, previous statements about ECM being about a set of interrelated issues are confirmed. However, the organizations themselves seem only partly aware of this fact. The cases in the study had varying enterprise models. Furthermore, the objectives and impacts sought with the ECM initiatives vary in the cases I studied, but mostly overlap with previously identified objectives and impacts. However, new challenges related to previously identified objectives such as the increasing number of information channel and ECM initiatives involving principles of social media were identified. There still seems to be little focus on the content model although previous research indicates that understanding the role of the content itself is crucial in ECM initiatives. Attention given to the content life cycle was also scarce and focused on the creation and using of content phases which is, according to the cases, because it is in these phases that they generate money. The technological infrastructure did not always fully support the implementation of identified ECM objectives. Administrative issues received varying attention in the different cases and some of the cases had established service organizations to upkeep ECM and support the users. Change management issues were given the least attention of all the interrelated issues. The EA view is not very present in practice according to my findings, and I found no explicit indication that ECM and EA are being related to each other in current practice. However, when relating current ECM issues to previous research on EA, there appears to be some relationships between the two concepts.

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1. Introduction

In the digital economy, organizations are faced with an ever increasing amout of data. E-mails, faxes, text messages, presentations, can all contain content that should be managed from the view of the enterprise. Improved internal and external collaboration and information sharing, reduced search time, fewer errors in products and services, compliance, enabling sustainable knowledge management and cost reductions; these are all objectives that organizations want to achieve through their enterprise content management (ECM) initiatives. ECM consists of a wide set of interrelated issues, and previous research on ECM points out that there is a lack of a common understand of the concept itself (Päivärinta & Munkvold, 2005). In response, Grahlmann et al. (2011) propose a more consistent and comprehensive definition of ECM:

"Enterprise content management comprises the strategies, processes, methods, systems, and technologies that are necessary for capturing, creating, managing, using, publishing, storing, preserving, and disposing content within and between organizations" (p. 5).

There is a lack of a holistic approach to ECM and initiatives are often about more individual initiatives covering sub-parts of ECM. Enterprise architecture (EA) is a concept which promises to provide a holistic and long-term view of a company's processes, systems, and technologies so that individual projects can build capabilities – not just fulfill immediate needs. EA also promises to help organizations in complying with external regulations, tackling the increasing complexity of organization, capturing knowledge and guide solution architects.

The concept of EA lacks a universally accepted definition, but the promise of giving an holistic view is central:

"An Enterprise Architecture creates a helicopter view of the entire company. It serves as a basis for describing both business and IT, as well as the connections between the two, and for rendering explicit mutual dependencies and the impacts of changes in either camp. A common language is created, bridging the gap between business and IT" (Hanschke, 2010, p. 55).

Within both the field of ECM and EA, there is a lack of empirical evidence. Some of the promises of EA seem to address some of the ECM issues that organizations are facing. Research on this relationship between ECM and EA is scarce.

My research question is: **What are key issues in contemporary Enterprise Content Management practice, and how can these be related to the concept of Enterprise Architecture?**

In order to answer the research question, I have reviewed previous literature on ECM and EA. A multiple case study was conducted to investigate current ECM issues in practice, involving interviews with ten people from the following five different: Devoteam, Vest-Agder county municipality, DNV Maritime Partner AS, Aker Solutions and Telenor. The results of the multiple case have been systemized using the major ECM issues framework (Päivärinta & Munkvold, 2005) and a functional ECM framework developed by Grahlmann et al. (2011) has been used to describe the identified ECM functionalities.

The major findings in the study show that there is still a lack of a holistic and common understanding about ECM. Many of the identified issues have been identified in previous research, but there are some new challenges related to these. Presence of the EA view is low in practice and the cases did not currently have explicit relations of ECM and EA.

The structure of this thesis is as follows: Chapter two provides an overview of research related to ECM and EA. Chapter three presents the research methodology used for the study, including a short presentation of the case study organizations. Chapter four presents the case study results. Chapter five discusses the findings. And finally, chapter six presents conclusions and implications.

2. Previous research

This chapter presents previous research on ECM and EA. In order to answer my research question, the concepts of enterprise content management and enterprise architecture are first presented individually. Then, a summary of the previous research and their relationship is presented.

For the literature review, I used several sources of information which mainly can be divided into three parts: 1) reviewing the curriculaof previously attented courses at UiA (IS-406 Enterprise systems I and IS-904 Enterprise Content Management and eCollaboration). 2) Searches using Google Schoolar and in data-bases such as ACM Digital library, IEEE Xplore and Ebscohost. For these searches I used key words such as "ECM", "enterprise content management", "EA", "enterprise architecture", "EA AND ECM", "ECM frameworks", "EA frameworks", "ECM case study", "EA case study" and so on. 3) I used the reference lists in the articles found during search to check for articles that I did not get in the search results.

2.1 Enterprise content management

This section presents the concept of enterprise content management, rationales for ECM and finally presents two ECM frameworks.

2.1.1 What is ECM?

The concept of ECM has emerged over the past 20 years, and ECM as we know it today is much wider in scope than its origins (Usman, Muzaffar, & Rauf, 2009). However, there is still no single clear and common definition of what ECM is, how one should do ECM or who should do it (Dillnut, 2006; Grahlmann, et al., 2011; Smith & McKeen, 2003; vom Brocke, Simons, & Cleven, 2011). Since previous definitions vary and are at times contradictory, Grahlmann et al. (2011) propose a more consistent and comprehensive definition of ECM:

"Enterprise content management comprises the strategies, processes, methods, systems, and technologies that are necessary for capturing, creating, managing, using, publishing, storing, preserving, and disposing content within and between organizations" (p. 5)

The proposed definition was developed after having performed a literature review of ECM and intends to summarize all relevant perspectives of ECM. The aim is to provide *"a common conceptual basis for further research in this field*" (Grahlmann, et al., 2011, p. 5). Further, the definition points out that ECM is not limited to technologies, and it also includes a specification of the content lifecycle (Grahlmann, et al., 2011).

Some has questioned whether ECM actually represents anything new compared to other established constructs of information management such as information resource management, electronic document management and knowledge management (Päivärinta & Munkvold, 2005). Päivärinta & Munkvold (2005) state that *"ECM can be regarded as a modern perspective on information management that integrates the major issues covered in these areas, while also going beyond their individual and collective scopes"* (p. 1).

The concept of ECM has been identified as an important and complex subfield of Information Systems (IS) research (Tyrväinen, Päivärinta, Salminen, & Iivari, 2006), but there is still a lack of research on ECM within the field of IS (Korsvik & Munkvold, 2010; Tyrväinen, et al., 2006; vom Brocke, et al., 2011).

There are different approaches to ECM, but before presenting and discussing these, the rationales for doing ECM are presented.

2.1.2 Why ECM?

The challenges that ECM addresses are many and varying. Here is a list of rationales for why organizations undertake ECM initiatives according to previous research:

- Cost savings in information processing operations (Päivärinta & Munkvold, 2005; vom Brocke, et al., 2011)
    - Reduce cost of discovery during litigations (Sprehe, 2005)
- ECM is an enabler of sustainable knowledge management (vom Brocke, et al., 2011)
- Fulfilling compliance requirements is often mentioned as one of the main drivers of ECM (Dillnut, 2006; Usman, et al., 2009; vom Brocke, et al., 2011)
- Consolidation of redundant content management systems (Usman, et al., 2009)
- In order to deal with the exponential growth of content (Dillnut, 2006; Usman, et al., 2009; vom Brocke, et al., 2011)
    - "information chaos" – Mainly unstructured data (vom Brocke, et al., 2011)
- Reduce time to find information (Dillnut, 2006; vom Brocke, et al., 2011)
- Improved internal and external collaboration (vom Brocke, et al., 2011)
- Fewer errors in products and services (Päivärinta & Munkvold, 2005)

ECM has become a concept of high relevance for all industry sectors because of the wide range of rationales which in varying degree concerns organizations.

2.1.3 ECM frameworks

Moving on to the different approaches to ECM, two different ECM frameworks are presented in detail. First is the functional ECM framework which represents a more functional view on ECM. Secondly, a framework of major ECM issues from the viewpoint of the enterprise. In addition to these two frameworks which is the focus in this study, there are other ECM frameworks such as the ECM blueprinting framework developed by vom Brocke, et al. (2011), a framework of enterprise content management architecture presented by Dillnut (2006), …

The functional ECM framework (FEF)

The Functional ECM Framework (FEF) provides an overview of the potential functionalities of ECM systems (ECMSs) (Grahlmann, et al., 2011) (see Figure 2-1). FEF can be used to systematically describe an organization's ECM efforts and it can help to detect possible overlap in terms of functionalities between different ECM solutions that are in place in the organization. Further, FEF can be used in selecting an ECM solution for an organization. FEF can also be used at an early stage of the ECM implementation process as a reference for describing the ECM requirements. Finally, FEF can also serve as the basis for developing a technical reference architecture for ECMSs (Grahlmann, et al., 2011).

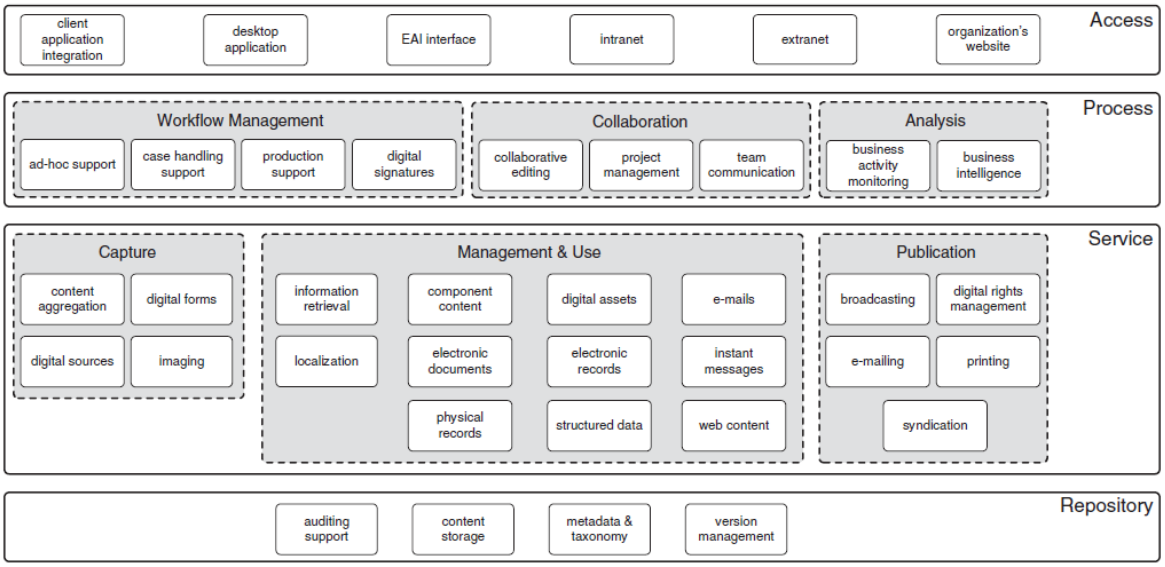

Figure 2-1: Functional ECM framework (Grahlmann, et al., 2011)

FEF has four main categories: (1) Access, (2) Process, (3) Service, and (4) Repository, which are illustrated as four layers in the framework. In the figure, the rectangular boxes represent functionalities, and sub-categories are denoted by enclosing boxes with bold font and dashed lines. 'Access' is the top layer, and it contains, among others, functionalities such as intranet, extranet and organization's website. The second layer is the 'Process' layer which has three sub-categories: (a) 'Workflow management', where we find functionalities that are related to partly or fully automating business processes; (b) 'Collaboration', with functionalities that enable or support team work where users jointly work on content and content needs to be shared; and (c) 'Analysis', with functionalities to analyze content and monitor process flows. In the 'Service' layer, there are three sub-categories: (a) Capture, (b) Management and Use, and (c) Publication. 'Capture' involves functionalities related to inserting content into the ECMS. 'Management and Use' is concerned with functionalities for finding and managing specific types of content. 'Publication' is the functionalities that provide means for content to leave the ECMS. Finally, the fourth layer, 'Repository', contains functionalities such as auditing support, content storage, metadata & taxonomy, and version management (Grahlmann, et al., 2011). Detailed definitions of each functionality is provided in Grahlmann et al. (2011).

Before creating the FEF, Grahlmann et al. (2011) defined five guidelines: *"[…] the FEF is (1) comprehensible and usable, (2) complete, (3) generic enough to be used for making comparisons, (4) distinguishing enough for capturing differences, and (5) future-proof"* (p. 9). To find out whether the FEF actually embraces these guidelines, the authors conducted initial practical tests by applying the FEF in three case studies. These case studies gave some first indications that the FEF follows the defined guidelines (Grahlmann, et al., 2011).

Through the case studies, another practical use of the FEF was identified; *"the FEF is helpful in describing which ECM functionality the different software products support. This can for example help in detecting possible overlaps in the supported ECM functionalities or point out possible omissions in the software products"* (Grahlmann, et al., 2011, p. 10). By combining the FEF with application overlays, creating an ECM application landscape, a helpful tool for portfolio management practices is created. It could also help organizations in highlighting missing functionalities and hence where investments are needed. Furthermore, this application

landscape can be useful in the determination of required interfaces and integrations between different software products. Finally, it can also be useful when upgrading software products (Grahlmann, et al., 2011).

Major ECM issues

Based on an analysis of 58 case narratives of ECM projects and implementations, Päivärinta & Munkvold (2005) developed a framework of major ECM issues that require managerial attention in organizations. The framework covers a wide set of interrelated issues for ECM: objectives/impacts sought with ECM; enterprise model to be supported by ECM; content model; technological infrastructure; administrative resources and practices; and change management issues (see Figure 2-2). These categories were formed based on the following question: *"which issues need explicit management in an enterprise to enable ECM?"* (Päivärinta & Munkvold, 2005, p. 2). In the following sections, more details about the different categories are presented.

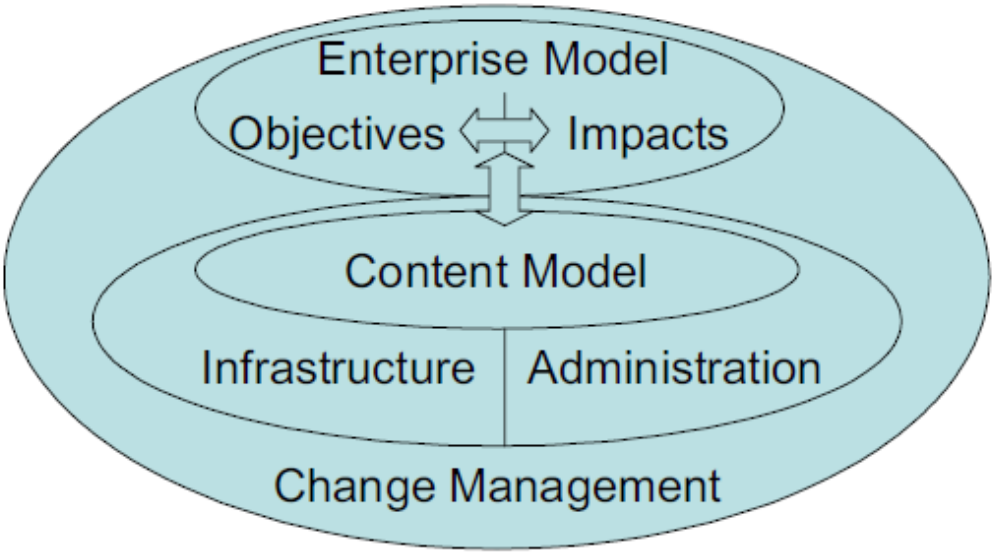

Figure 1. Major ECM Issues

Figure 2-2: Major ECM issues (Päivärinta & Munkvold, 2005)

Objectives and impacts of ECM

According to Päivärinta & Munkvold (2005), ECM should support organizational objectives and actions based on these objectives result in more or less anticipated and desired impacts. In the cases which were the basis for this framework, varying types of organizational objectives and impacts were identified. These objectives for ECM and resulting impacts are (Päivärinta & Munkvold, 2005, pp. 2-3):

- *"Improved internal and external collaboration, involving knowledge creating and sharing through digital content in and among enterprises with commonly enacted practices*
- *Value-added or new customer services and products involving digital content*
- *Reliability and quality of information content resulting in less errors in products and services*
- *Modern and professional image of the enterprise in the eyes of its stakeholders*

- *Efficiency, effectiveness and flexibility of knowledge work and business processes, including reuse of previously created content, metadata, templates, and navigation aids*
- *Meaningful knowledge work, involving easier and less tedious human routines for content management*
- *Organizational memory recording the practice, history, and transactions of the enterprise*
- *Direct cost savings in information processing operations and facilities*
- *Satisfying external regulations and standards, directly or indirectly governing the enterprise's information management*
- *Platforms and capabilities to develop and maintain targeted content management applications quickly for emerging purposes"*

None of the above objects and impacts stood out as the most important across the cases, and the objectives varied a lot between the cases according to their business area or domain in which the enterprise was operating. The direct cost savings was seldom mentioned as the main rationale for the ECM initiative, and compliance was seldom the only justification of ECM (Päivärinta & Munkvold, 2005).

Content model
"ECM is realized through design and implementation of the content model" (Päivärinta & Munkvold, 2005, p. 2). Having an understanding of the content itself and the role of the content in the organizational context is essential for any ECM solution. The content model includes the following sub-areas: 1) content structure, view, and presentation models, 2) content life-cycles, 3) metadata, and 4) corporate taxonomy (Päivärinta & Munkvold, 2005).

However, in the case studies from which the framework emerged, there was no mention of content modeling approaches of content structures, views, presentations and the relationships between them. This appeared to be more implicit knowledge and these models were mainly observable in the actual system implementations afterwards.

Enterprise model
ECM should support the desired enterprise model. *"The concept of enterprise model refers here to the issue that any organization should have, to some extent, a shared idea about what needs to be done in the enterprise (including the idea of the business, required support operations, and reaching out from within the enterprise itself to the selected partner and customer networks), who does what, and who is in charge of what, before it can build meaningful information systems to support the operations"* (Päivärinta & Munkvold, 2005, p. 5). An example of such an idea is that some organizations consider themselves as process-based rather than team- or project-based or an engineering enterprise. The process-based organizations will typically have ECM systems which support workflows for identified business processes. In engineering enterprises, their product may form a conceptual basis for how they choose to organize their content. Building and relating the enterprise model to the content model to build an ECM system is a non-trivial challenge, and there exists little guidance on how to do this in practice (Päivärinta & Munkvold, 2005).

Infrastructure
An enterprise's infrastructure involves a number of challenges in wide-scale ECM initiatives (Päivärinta & Munkvold, 2005, p. 6):

- *"Integration of standardized applications and tools throughout the content life-cycle (integrating production/capture, storage, processing workflow, publication and long-term archival of heterogeneous content). This also includes the challenge to identify and manage business-critical content from personal e-mail boxes to ECM solutions, and integration of content management software with other enterprise-wide applications e.g. to enable cross-application workflows.*
- *Developing user-friendly, intuitive, and integrated user interfaces to content management seamlessly integrated with 'front-end' content production and browsing solutions*
- *Updates in software, hardware and operating system infrastructure were reported throughout the cases. Software updates in ECM were required as the user and content volumes were increasing over time beyond the capacity of previously successful applications*
- *Technology updates for utilizing 'application-independent' content formats such as XML, reducing dependence on vendor-specific content formats or structures, streamlining the updates of application infrastructure, and enabling the smooth sharing of content between organizations*
- *Information security issues".*

In the cases, the needed integration that was mentioned was with ERP, GIS, product data management, CAD systems, search tools, user management tools, etc. (Päivärinta & Munkvold, 2005)

Administration of content management
"Administration of ECM consists of policies, standards, regulations, routines, and administrative procedures for content management, and the organizational responsibilities and resources assigned for facilitating their enactment" (Päivärinta & Munkvold, 2005, p. 6). In order to upkeep ECM and support the users, a service organization can be necessary. New roles emerge, taking over the current roles of archivists, librarians or database managers. It is also necessary to assure the technical administration of ECM and juridical issues also need to be covered by the administration (Päivärinta & Munkvold, 2005).

Change management
"Change management is needed to cultivate an optimized fit between the enterprise and its content model, infrastructure, and administration over time" (Päivärinta & Munkvold, 2005, p. 2). Through analysis of the cases, Päivärinta & Munkvold (2005, p. 7) identified the following issues related to change management:

- *"Justification of ECM investments to gain management support and evaluation of the results […]*
- *Maintaining top management support and development resources throughout large-scale ECM programs*
- *Building competence to develop, maintain, and operate ECM systems […]*
- *Opposition to tool and content standardization and reluctance to adoption of new technology among the users"*

2.2 Enterprise architecture

In this section, the concept of enterprise architecture is presented, why engage in EA initiatives and finally a presentation of EA frameworks.

2.2.1 What is EA?

Architecture can be defined as *"the fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution"* (Borbinha, 2007, p. 180). Thus, an Enterprise Architecture (EA) helps organizations to understand and express their businesses, structure and processes (Borbinha, 2007), and a helicopter view of the entire company is created, bridging the gap between business and IT (Hanschke, 2010). However, the concept of EA lacks a universally accepted definition (Fallmyr & Bygstad, 2011; Janssen & Hjort-Madsen, 2007)

The EA *"[…] serves as a basis for describing both business and IT, as well as the connections between the two, and for rendering explicit mutual dependencies and the impacts of changes in either camp. A common language is created, bridging the gap between business and IT"* (Hanschke, 2010, p. 55).

"The enterprise architecture provides a long-term view of a company's processes, systems, and technologies so that individual projects can build capabilities – not just fulfill immediate needs" (Ross, Weill, & Robertson, 2006, p. 9).

"Enterprise Architecture is an instrument to manage operations and future development in an organization" (Borbinha, 2007, p. 183).

When introducing an EA there are many questions that need to be answered, these can be grouped into three broader categories; why, what, and how. For example, with a working EA in place related mandatory documentation is easier to assemble and produce. EA also makes it easier to pull together the data and information in order to take informed decisions (Hanschke, 2010).

There are several EA-related organizational roles which are important in developing information systems. Such major role commonly includes a chief enterprise architect, enterprise business architects, enterprise IT architects and data architects, according to Shah & Kourdi (2007). The hierarchical structure of these roles and the level of detail characterizing an information system's development at each hierarchical level is illustrated in Figure 2-3.

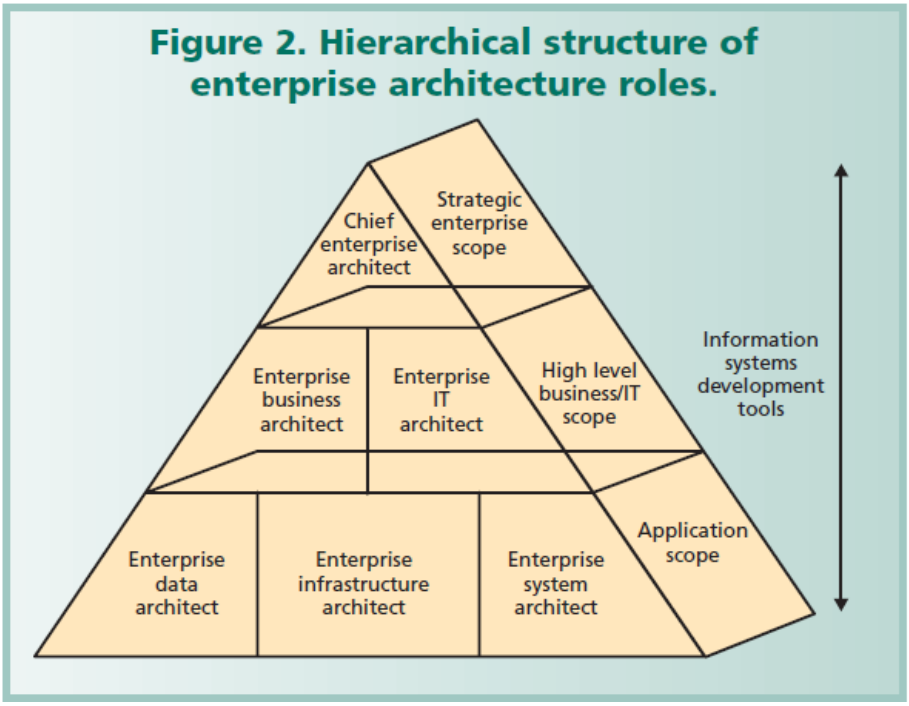

Figure 2-3: Hierarchical structure of EA roles and related level of detail for information system's development (Shah & Kourdi, 2007)

Chief enterprise architects *"must understand the business objectives, drivers, and principles so they can translate the business strategy into the technical vision and business requirements"* (Shah & Kourdi, 2007, p. 39). The enterprise business architect is concerned with analyzing and documenting business processes, scenarios and information flow while the enterprise IT architect analyze and document systems, internal and external interfaces and data flow. The data architect is concerned with databases and setting up data policies. The infrastructure architect is more concerned with the system environment. And finally, the system architect collaborate with enterprise IT architects to select suitable application frameworks and adopting appropriate standards for systems quality assurance (Shah & Kourdi, 2007).

"From an organizational perspective, project teams aren't always aware that an enterprise architecture program exists" (Shah & Kourdi, 2007, p. 40).

There is a lack of empirical evidence on how EA is actually used in practice (Fallmyr & Bygstad, 2011)

2.2.2 Why use EA?

The most important, overall benefit of EA is that it provides a holistic view on the enterprise (Hanschke, 2010; Jonkers et al., 2006)

More specifically, EA promises to deliver both IT- and business-related benefits (Shah & Kourdi, 2007). IT-related benefits are for example 1) gaining an oversight of technical resources which helps to identify and remove redundancy; and 2) complexity management, which a) facilitate the scoping and coordination of programs and information systems projects and b) manage the complexity and describe the interdependencies in a usable manner. Business-related benefits are for example 1) reduction in impact of staff turnover by capturing

knowledge from employees and consultants; and 2) facilitate faster knowledge acquisition necessary for changing systems and adopting new components (Shah & Kourdi, 2007).

Compliance with external regulations is a reason for EA adoption. Organizations are subject to increasing demands of being able to prove that they have a clear insight into their operations and that they comply with applicable laws (Jonkers, et al., 2006).

EA is a basis for the strategic management of the IT landscape. This strategic management includes both the planning and steering aspects of IT management. When it comes to strategic planning, *"IT landscape management embraces all the processes for documenting and analyzing the IT landscape and for the strategic evolution of the application landscape"* (Hanschke, 2010, p. 59).

EA also promises to help *"prepare enterprises to consume software as a service by estimating the technical services that the organization needs to deliver and enable business processes"* (Shah & Kourdi, 2007).

According to Jonkers et al. (2006), having a well-defined EA and good EA practice in place helps organizations innovate and change by providing both stability and flexibility.
Based on a case study of four organizations, Fallmyr & Bygstad (2011) found reasonable evidence for the assumption that ECM increases organizational agility.

The business world is increasingly networked and EA is a valuable asset in getting an overview of all the connection an organization have with its customers, suppliers and other partners (Jonkers, et al., 2006).

"EA guides solution architectures that are defined prior to specific development or implementation projects and which provide finer specifications for operationalising those systems" (Tamm, Seddon, Shanks, & Reynolds, 2011, p. 142).

2.2.3 EA frameworks

Metamodels that define terminology of EA are called Enterprise Architecture Frameworks (AF) (Bernus & Noran, 2010). An AF is *"a communication tool to support the Enterprise Architecture process. It consists in a set of concepts that must be used to guide during that process"* (Borbinha, 2007, p. 181). There is a continuous maturing and evolution of the EA domain due to the complexity and dynamic nature of enterprises. As a consequence, *"existing AFs are adapted and enriched and new AFs are being created to reflect the new business environment's challenges"* (Bernus & Noran, 2010, p. 59). International standards have been developed, also these undergo change processes (Bernus & Noran, 2010). At an overall level, EA frameworks can be used to manage system complexity and align business and IT resources (Jonkers, et al., 2006; Shah & Kourdi, 2007). Many organizations, both private and governmental, have adopted EA frameworks for operational use (Shah & Kourdi, 2007).

According to Shah & Kourdi (2007), EA frameworks play dual roles (see);

- *"serve as documentation and component-specification tools, and*
- *facilitate enterprise planning and problem solving"* (p. 37)

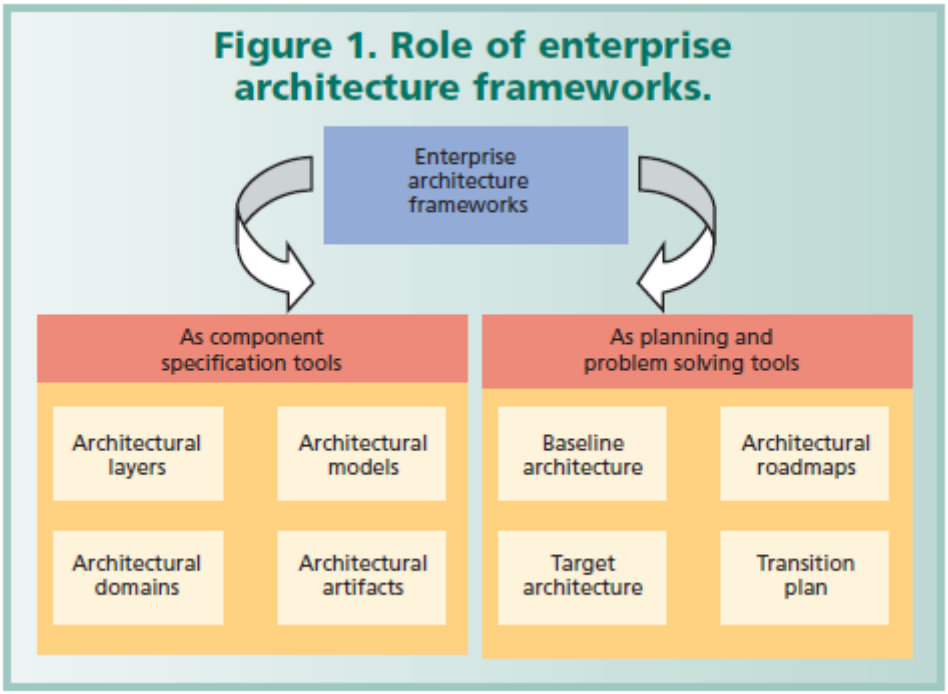

Figure 2-4: The double role of EA frameworks (Shah & Kourdi, 2007)

In order to tackle the complexity of enterprises, many proposals were developed in the 1980s and 1990s. The proposals can be divided into two broad categories; generally applicable 'blueprints' and life cycle architectures (Bernus & Noran, 2010). A proposal developed by John A. Zachman in the 1980s (see XX) laid the foundation for later frameworks. *"The framework is designed to provide a set of artifacts suitable for mapping the variety of interfaces of an application's components and how they integrate into the organization"* (Hanschke, 2010, p. 60). The Zachman framework is presented in more detail latter in this section.

The Open Group Architecture Framework (TOGAF) is another architecture framework. *"TOGAF is based on an iterative process model supported by best practices and a re-usable set of existing architectural assets"* (Josey, 2009, p. 5). TOGAF is presented in more details below.

The selection of these two frameworks is based on Zachman being the one who is considered the foundation for later frameworks. Zachman is also said to be the most famous EA framework (Choi, Kang, Chae, & Kim, 2008). TOGAF was selected because it is one such framework and it is frequently mentioned when reading about EA frameworks on a more general level. There are a number of other established enterprise architecture frameworks such as Federal Enterprise Architecture Framework and Department of Defense Architecture Framework (Hanschke, 2010; Tang, Han, & Chen, 2004).

Zachman framework

The 36 viewpoints in the Zachman framework aid in categorizing architectural information, but it gives no guidance on how to model the information (Koning, Bos, & Brinkkemper, 2009).

	DATA What	FUNCTION How	NETWORK Where	PEOPLE Who	TIME When	MOTIVATION Why	
SCOPE (CONTEXTUAL) Planner	Things important to the Business	Processes Performs	Business Locations	Important Organisations	Events Significant of the Business	Business Goals and Strategies	SCOPE (CONTEXTUAL) Planner
ENTERPRISE MODEL (CONCEPTUAL) Owner	Semantic Model	Business Process Model	Business Logistics System	Workflow Model	Master Schedule	Business Plan	ENTERPRISE MODEL (CONCEPTUAL) Owner
SYSTEM MODEL (LOGICAL) Designer	Logical Data Model	Application Architecture	Distributed System Architecture	Human Interface Architecture	Process Structure	Business Rule Model	SYSTEM MODEL (LOGICAL) Designer
TECHNOLOGY MODEL (PHYSICAL) Builder	Physical Data Model	System Design	Technology Architecture	Presentation Architecture	Control Structure	Rule Design	TECHNOLOGY MODEL (PHYSICAL) Builder
DETAILED REPRESENTATION (OUT-OF-CONTEXT) Subcontractor	Data Definition	Program	Network Architecture	Security Architecture	Timing Definition	Rule Definition	DETAILED REPRESENTATION (OUT-OF-CONTEXT) Subcontractor
FUNCTIONING ENTERPRISE	Data	Function	Network	Organisation	Schedule	Strategy	FUNCTIONING ENTERPRISE
	DATA What	FUNCTION How	NETWORK Where	PEOPLE Who	TIME When	MOTIVATION Why	

Figure 2-5: Zachman enterprise architecture framework (Hanschke, 2010)

TOGAF

The first version of TOGAF was developed in 1995 based on the US Department of Defense Technical Architecture Framework for Information Management (TAFIM). Since 1995, the Open Group Architecture Forum has developed successive versions of TOGAF. The current version is TOGAF version 9 which was first published in 2009 (Josey, 2009). As of version 8.1 TOGAF has been as an EA framework.

The term architecture in TOGAF has two meanings depending on the context:

1. *A formal description of a system, or a detailed plan of the system at a component level to guide its implementation*
2. *The structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time*

(Josey, 2009, p. 5)

The development of four related types of architecture is covered by TOGAF 9:

1. Business Architecture
2. Data (or information) Architecture
3. Application Architecture
4. Technology Architecture

These four types are commonly accepted as subsets of an overall enterprise architecture (Josey, 2009).

Figure 1: TOGAF Content Overview

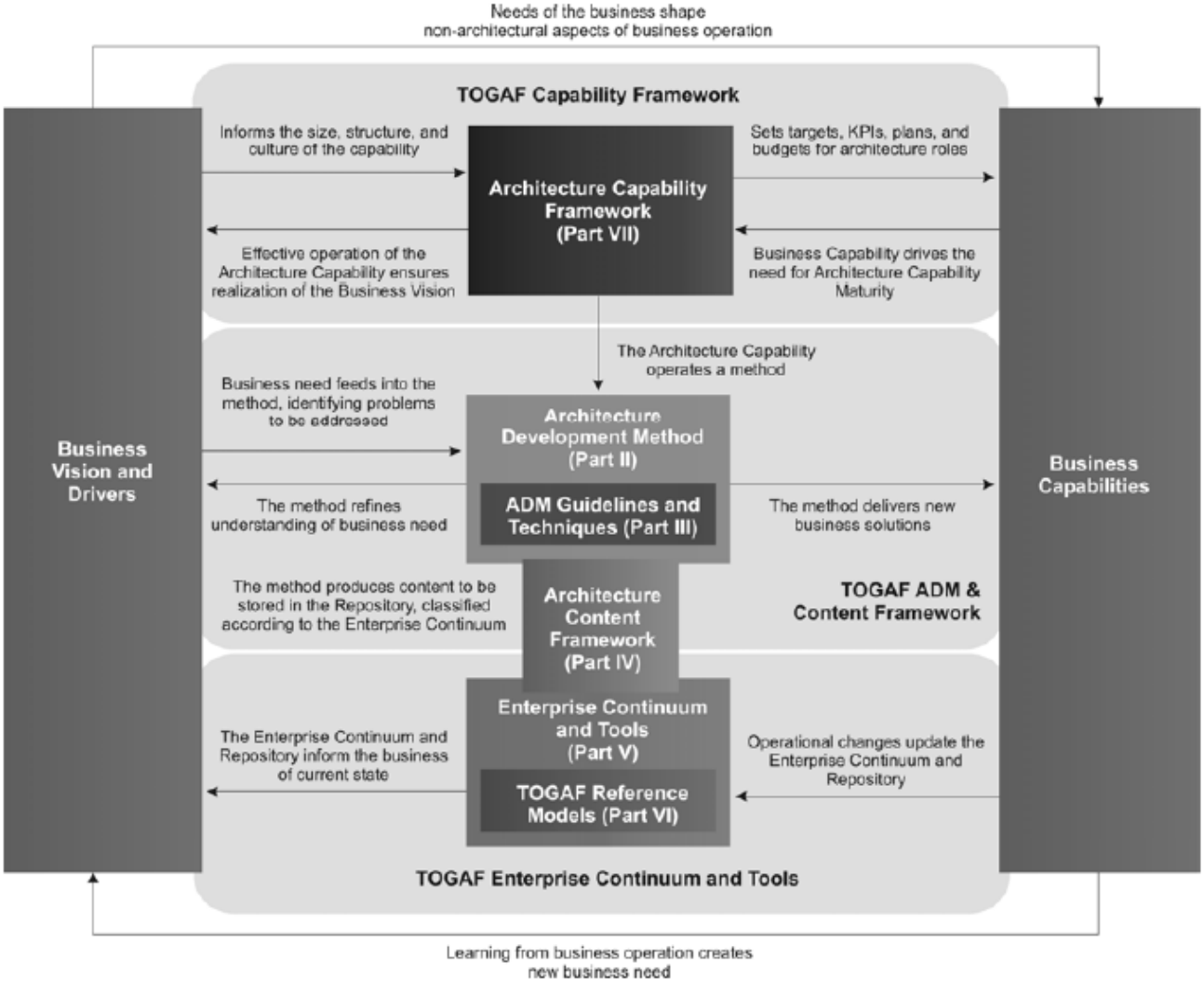

Figure 2-6: TOGAF (Josey, 2009)

"The key to TOGAF is the method – the TOGAF Architecture Development Method (ADM) – for developing an enterprise architecture that addresses business needs" (Josey, 2009, p. 5). The ADM describes how to derive an organization-specific enterprise architecture that addresses business requirements. The ADM is the major component of TOGAF and provides guidance for architects on a number of levels (Josey, 2009; Tang, et al., 2004). ADM is "*a generic method which specifies an iterative approach for architecture development"* (Tang, et al., 2004).

2.3 The relationship between ECM and EA

There is still no common consensus about the concept of ECM, but Grahlmann et al. (Grahlmann, et al., 2011), presents a definition which is more consistent and comprehensive than previous definitions. ECM addresses many challenges that organizations are facing related to information management. ECM has received little attention in related fields of research (vom Brocke, et al., 2011).

Also for the concept of EA, there is a lack of a universally accepted definition, but the overall benefit of providing a holistic view on the enterprise and aligning IT and business seem to be agreed upon.

The development of four EA related architecture types is according to Josey (2009) accepted as a subset of an overall EA. These four architectures are; 1) business architecture, 2) data or information architecture, 3) application architecture, and 4) technology architecture. The business architecture can be related to the enterprise model in Päivärinta & Munkvold's (2005). The data/information architecture can be related to the content model. The application architecture can be related to infrastructure. The application architecture can also be related to Grahlmann et al.'s (2011) FEF though the use of *application overlays* describe in their article. Futher, the technology architecture can be related to the infrastructure element in the major ECM issues framework. This would indicate that ECM frameworks actually could be used as subsets of an overall EA.

Päivärinta & Munkvold highlights the need for guidance on how to build the enterprise model and relate it to the content model. EA frameworks such as TOGAF sometimes provide methods for architecture development. TOGAF provides the TOGAF architecture development method (ADM) which is a generic method which specifies an iterative approach for architecture development. ADM is further described as a comprehensive methodology that addresses architecture at the enterprise level as well as at the individual systems level.

3. Method

This chapter describes the research process used for this master thesis. I start by presenting my philosophical worldview before describing what research strategy and method I have used, including a short presentation of the research sites. Then, more details about data collection and data analysis are presented. Validation of the findings, role of the researcher and limitations in the research design are also discussed.

3.1 Philosophical worldview and research strategy

I have a social constructivist worldview. I see this philosophical perspective as a form of interpretive inquiry in which researchers make an interpretation of what they see, hear and understand (Creswell, 2009).

The thesis follows a qualitative research approach; this fits with my social constructivist worldview. *"Qualitative research methods are designed to help researchers understand people and the social and cultural contexts within which they live. The goal of understanding a phenomenon from the point of view of the participants and its particular social institutional context is largely lost when textual data are quantified"* (Myers, 2010). This choice was motivated by my goal to explore and understand the problem domain as described in the introduction.

3.2 Research design

The research design has emerged since the beginning of my work with this master thesis. An emergent research design is one possible characteristic of qualitative research (Creswell, 2009). Initially, the plan was to conduct a single case study, but when the initial case study organization had to pull out due to lack of available resources to participate in the study, this was changed in order to get a sufficient number of informants covering the requirements for a master thesis. In this and the next sub-chapters the applied research design is described.

The qualitative case study was selected as strategy of inquiry for answering my research question: **What are key issues in contemporary Enterprise Content Management practice, and how can these be related to the concept of Enterprise Architecture?** *"In brief, the case study method allows investigators to retain the holistic and meaningful characteristics of real-life events"* (Yin, 2009, p. 4).

More precisely, a multiple-case (holistic) design (Yin, 2009) was chosen and this was conducted in five organizations. Here, one case corresponds with one organization. The case organizations are presented below under 'Research sites'. A multiple-case study is a variant of the case study method, and the evidence from a multiple-case study, compared to a single case study, is often considered as more compelling (Yin, 2009). There are three main reasons for why I use a multiple case study. Firstly, it was difficult to find one single organization where I could do an in-depth case study. Secondly, performing a multiple case study adds to the validity of the findings. Thirdly, I had the possibility to gain access to multiple cases and it is stated that *"when you have the choice (and resources), multiple-case designs may be preferred over single-case designs"* (Yin, 2009, p. 60). Another reason for selecting multiple-case design is that the analytic benefits may be substantial when having two or more cases (Yin, 2009).

3.3 Data collection

Data were mainly collected during March 2012 through ten semi-structured interviews in five different organizations. In one of the case study organizations, the data collection also included notes from two introductory meetings. This section presents details about the selection of cases and the case organizations, selection of informants and the informants, and the sources of evidence.

3.3.1 Research sites

I performed data collection in five different organizations: Devoteam, DNV Maritime Partner AS, Vest-Agder county municipality, Aker Solutions and Telenor. The selection of cases is mainly based on opportunistic sampling through the researcher's professional and personal connections. In the beginning, the aim was to find organizations where both ECM and EA practices could be studied, but this proved difficult. All organizations had informants who could be interviewed about the organization's ECM practices, but few knew about the concept of EA. Finding informants with EA experience proved more difficult. Thus, the criteria for selecting cases focused more on whether they could provide informants with ECM knowledge rather than finding both in the same organizations. Therefore, when I got access to and the opportunity to interview a consultant with long EA experience I chose to do so in order to get some input on EA in practice.

Moreover, having chosen a multiple-case design, the different cases represent varying contrasting situations, such as public (Vest-Agder county municipality) versus private company, small (DNV Maritime Partner) versus large (Telenor, Devoteam and Aker Solutions) and different sectors such as oil and gas, telecom and IT. In the following I give a brief overview of each organization, based on interviews and company material.

Devoteam

Devoteam is an international ICT consultancy group delivering professional services and system integration. There are approximately 5000 employees working in 35 different independent subsidiary companies in 23 countries across Europe, Middle-East and North Africa. The majority of the business units are in the Western Europe, but they are also present in growing markets in Eastern Europe.

DNV Maritime Partner AS

DNV Maritime Partner AS is an independent subsidiary company of Det Norske Veritas AS (DNV) and they are located in Grimstad, Norway. They have about 13-14 full-time employees. Their main product is DNV Navigator which is an information system for use on ships. Its main purpose is to help the captain with the port clearance process.

Vest-Agder county municipality

Vest-Agder county municipality (VAF) is the regional political level management in Vest-Agder, Norway. There are two levels in the county municipality; the political, which is lead by the county mayor and the administration, which is lead by the county executive. Their main office is located in Kristiansand and there are about 1650 employees. One of the major parts of VAF's business concerns all the high schools in Vest-Agder county which count about 7-8000 students.

Aker Solutions

Aker Solutions is a leading provider of oilfield products, systems and services with approximately 18 500 employees in more than 30 countries. There are currently nine main

business areas in the company: Engineering, Drilling technologies, Subsea, Umbilicals, Process systems, Mooring and loading systems, Maintenance, modifications and operations, Oilfield services and marine assets and Well intervention services.

Telenor
Telenor is one of the largest telecom operators in the world and their core business is services such as mobile subscriptions, broadband and so on. The entire Telenor group counts about 33000 employees around the world and consists of many subsidiary companies.

3.3.2 Informants
After having selected the organizations as described above, I started to search for candidates for the interviews. One to four informants per organization were identified. This was done through the initial contact person through whom I gained access to the different organizations. I explained the topic of my thesis and then the person suggested candidates for the interviews. Table 3-1 provides an overview of and information about the informants. The numbering of the informants corresponds with the sequence in which the interviews were conducted. All the informants agreed to being referred to with either their job title or role in the organization for anonymization.

3.3.3 Sources of evidence
The main source of evidence in this study is semi-structured interviews. In total, ten interviews were conducted; the number of interviews per organization varies from one to four.

Company presentations, brochures presenting the organizations' strategies and web sites were also used for gathering information about the organizations. Additionally, one phone meeting and one face to face meeting were with one of the organizations. The information given through these meetings are also relevant and helps create a better understanding of the ECM initiatives in this organization and is therefore considered a part of the data collection.

A single interview guide was created for use in all the semi-structured interviews. The interview guide was developed based on the two main elements of the research question; ECM and EA. The interview guide is included in Appendix 1. The interview guide was written in english. All the interviews follow the interview guide except the interview with informant 10. In the interview with informant 10, only the EA related questions were used as basis.

The interviews were audiotaped and later transcribed. Eight of the interviews were performed in Norwegian and two in English. Transcriptions were done in the language the interviews were conducted in (see Table 3-1) and citations from the interviews performed in Norwegian have been translated to English for further presentation and use in the thesis. All informants accepted the recording of the interview. The researcher also took hand-written notes during the interviews which were used in the analysis phase when writing the case descriptions.

Before the final version of the thesis, the informants got the possibility to comment on the sections of the method and results chapter that concern their organization.

Table 3-1: Overview of the informants

Informant #	Organization	About the informant	Type of data collection	Duration	Other
1	Devoteam	Working as a consultant within project and program management for 7 years at Fornebu Consulting in Norway, a Devoteam subsidiary. Especially with IT-driven change management. Has been working at group level in Devoteam for since February 2011 inlcuding as project manager for the final part of the Weez implementation project.	Interview via video conference	50 minutes	Interview performed in Norwegian
2	Vest-Agder county municipality	CIO/IT manager for the last 12 years. Reports to the county executive. Attended a seminar on Enterprise Architecure in general and TOGAF in specific.	Face-to-face interview	1 hour	Interview performed in Norwegian
3	DNV Maritime Partner AS	Has been working in DNV Maritime Partner AS for the last 6 years, first as technical manager and currently as CIO with responsibility for their main product, DNV Navigator.	Face-to-face interview	50 minutes	Interview performed in Norwegian
4	Vest-Agder county municipality	Has been working in the county municipality for the last 15 years and in the current position as Manager for the information and service unit since 2005. Reports to the county executive.	Face-to-face interview	55 minutes	Interview performed in Norwegian
5	Aker Solutions	Manager for an IT service delivery department called documents and content management in Aker Business Services. Initially worked in Kværner.	Face-to-face interview	1 hour, 10 minutes	Interview performed in Norwegian
6	Telenor	Has been working as an architect since May 2011 in Telenor Shared Services, for the Way of Work service line with focus on SharePoint.	Face-to-face interview	45 minutes	Interview performed in Norwegian
7	Telenor	Has been working in Telenor since 2004 including being a records manager, compliance manager, project manager in various projects and currently in Telenor Shared Services as director for the Way of Work service line.	Face-to-face interview	45 minutes	Interview performed in Norwegian
8	Telenor	Has worked in Telenor for two periods; employed in Telenor from 2000 to 2003, then hired as an external consultant since 2006. Worked in the WoW implementation project in from 2007 to 2010, and is currently working as a senior consultant for WoW at Telenor Group level.	Face-to-face interview	1 hour	Interview performed in English
9	Telenor	Hired as an external consultant for the last 3 months of the WoW implementation project (in 2010). Has worked as an external consultant in the role of BRAIN Program Administration Manager for the last 2 years.	Phone meeting, face-to-face meeting and interview via Lync	50 minutes	Interview performed in Norwegian. Read the thesis proposal.
10	Devoteam	Currently works as principal director of Enterprise Architecture in Devoteam in Denmark. Has worked in Devoteam for seven years with focus on EA. Is TOGAF certified and is a TOGAF instructor.	Interview via video conference	50 minutes	Interview performed in English. Read the thesis proposal.

3.4 Data analysis

The data analysis process presented by Creswell (2009), see Figure 3-1, was the basis for the data analysis process for this master thesis.

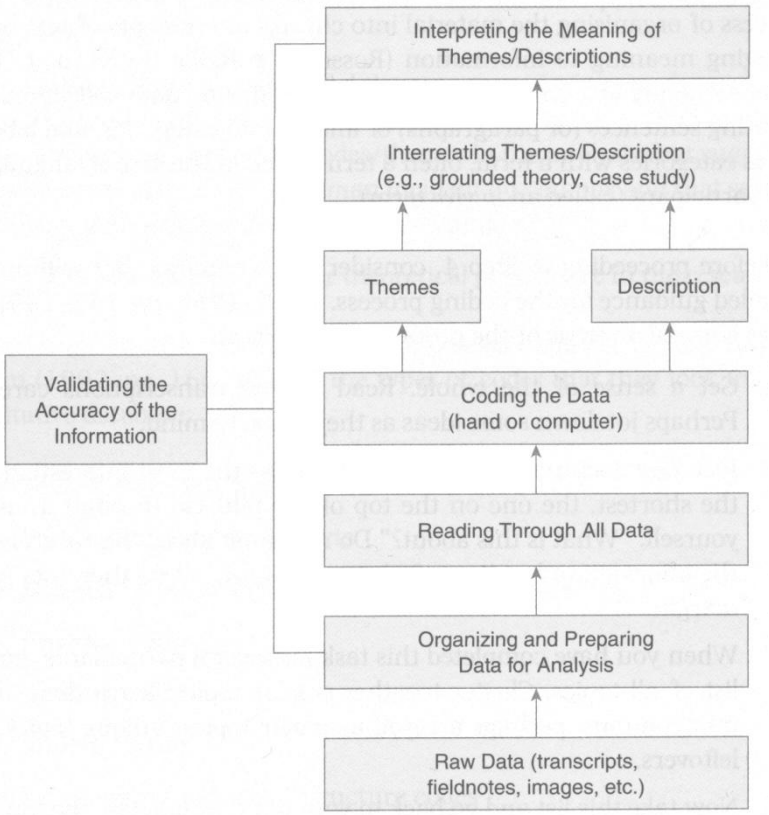

Figure 3-1: Creswell's (2009) data analysis process

All interviews were transcribed and the handwritten field notes were reviewed and computerized. I then read through all the transcripts and started making some tables to get an overview of the different cases, such as Table 3-1. I then wrote detailed case descriptions based on the transcriptions and notes (reported in 'Results'). Since the cases vary both in terms of scope and described solutions, I chose to write detailed descriptions for each individual case.

The description of each individual case follows a structure based on the framework of major ECM issues and FEF. Then, based on these descriptions, I did a cross-case analysis. First, I made a summarizing table of the identified ECM issues, see Table 4-1. I then used this table as a basis to identify similarities and differences between the cases. I further made a matrix of all the functionalities in FEF (see Table 4-2) and all the cases in one in order to see if there were some patterns across the cases regarding the functionalities aspect.

Data from the interview with the EA consultant in Devoteam is presented as a summary of the topics that were discusses and is separated from the other cases.

Finally, I reviewed my findings against previous research in order to discuss to what extent my findings corroborate previous findings and to relate them to EA.

3.5 Validation of the findings

Creswell (2009, p. 190) defines qualitative validity as follows: *"[…] the researcher checks for the accuracy of the findings by employing certain procedures"*. There are several possible such procedures that can contribute to the validity of a study, and the use of multiple strategies is recommended (Creswell, 2009). This master thesis has employed the following

strategies adding to the validity of the findings: by doing a multiple case study, triangulation of data from the different cases was enabled and themes were built by converging several perspectives and data sources. The findings are conveyed to the reader by using a rich description which may help the reader understand the setting and add perspectives about a theme, and this also adds to the validity of the findings (Creswell, 2009). Furthermore, by clarifying the bias the researcher brings to the thesis through self-reflection, an open and honest narrative is created (Creswell, 2009). This was especially important for this thesis since the researcher works in one of the case study organizations.

3.6 Role of the researcher

According to the social constructivist worldview *" researchers recognize that their own backgrounds shape their interpretation"* (Creswell, 2009, p. 8) and therefore I include this section about the researcher's role to clarify the possible bias for the research work.

The researcher works in one of the target organizations, Devoteam and is a user of the described ECM solution Weez. Since doing such *backyard research* where the researcher's own organization or immediate work setting is studied often leads to compromises in the researcher's ability to disclose information and raises difficult power issues (Creswell, 2009), multiple strategies of validity are employed to create reader confidence in the accuracy of the findings. These strategies are described in the previous section.

3.7 Limitations related to the research design

The data collection relies primarily on one source of evidence, semi-structured interviews so there has not been any corroboration of data from interview with information from other sources. The screening process for selecting cases and informants could have been more extensive. The cases were mainly selected through opportunistic sampling using the researcher's personal and professional connections. Only one informant had EA experience.

4. Results

This chapter presents the results of the multiple case study. First, case descriptions for each of the cases are presented. Second, a summary of what the consultant with EA experience said. And finally, a cross-case analysis based on the findings in the case descriptions.

4.1 Case descriptions – ECM issues

This section provides rich, thick descriptions of the cases in this study. I've chosen to use two frameworks to structure the descriptions; the framework of major ECM issues and the FEF. These frameworks are presented in detail in 2.1.3 ECM frameworks.

The major ECM issues framework is developed by Päivärinta & Munkvold (2005) and is based on experience from practice. The following case descriptions are structured according to the six main categories in this framework; 1) enterprise model, 2) objectives and impacts, 3) content model, 4) infrastructure, 5) administration and 6) change management (see Figure 2-2).

One of the uses of FEF is to systematically describe an organization's ECM efforts. Here it is used to provide a more functional view on the infrastructure issues in the major ECM issues framework. Identified functionalities are illustrated by a circle around the particular functionalities.

Eventual findings on EA related to each case are integrated in the previously explained structure of the case description.

4.1.1 Devoteam

Devoteam is an international group where the subsidiary companies are not very integrated; it's more a federation. They finished the implementation of an initiative to create a common platform for collaboration and information sharing in October 2011. This initiative is named Weez and it is the first and only ECM initiative on group level in Devoteam.

There are other ECM initiatives in the Devoteam entities, but these are local initiatives which typically support more entity-specific needs related to local laws and regulations. These individual solutions are necessary to cover more specific ECM needs that may vary from business unit to business unit. The informant explains that *"Weez is a much more powerful tool than most other storage solutions. So at the moment, we live, at least that's my opinion, we live very well in parallel with the more pure archival solutions"* (informant 1).

The ECM issues reported in the following sections are all related to the Weez initiative except the description of the functional scope illustrated in FEF (see Figure 4-1) which also covers functionalities provided by other tools in use by Devoteam. FEF also includes identified functionalities provided by the local solutions.

Enterprise model

Devoteam is a very dynamic group of companies where people start and finish projects all the time and where new work groups are organized frequently. Another characteristic is the entrepreneurial spirit in the company, and this underpins the desire to be agile.

"Our hypothesis in Devoteam was that as a consultancy company you have very little needs for a process supported documentation and you have a very high need for real-time information, or just-in time, current[1] *documents"* (informant 1).

Objectives and impacts
One of the major objectives with Weez was to create a common platform for information and knowledge sharing and collaboration across the Devoteam entities, but also across the Devoteam group borders.

The implementation of Weez has made Devoteam a more integrated group than before they had this common platform.

They wanted a solution which supports their dynamic nature and entrepreneurial spirit and a place where people could easily create work spaces whenever needed.

They depend on having a constant flow of information into the solution for it to be an effective tool based on their knowledge that the majority of the information that they want to manage, from a group level perspective, is what the informant calls just-in-time information.

Being agile is very important for Devoteam and one objective with Weez was to find a platform which allowed them to maintain agility.

They want to reduce the use of e-mail for internal communication and sharing of information.

The next step Devoteam wants to take with Weez is to build it more into the daily business practice.

Content model
The content which is given the most attention in Weez is what the informant calls current or just-in-time information. So, they emphasis having a structure which allows them to find the newest information faster than older information.

Related to building Weez more into the daily business practice, some practices are starting to emerge. The informant explains that more and more people are using it for meeting purposes. They create the meeting agenda directly in a Weez document, then, during the meetings, they write the meeting minutes directly in Weez. This is normally stored either in some file share or even locally on someone's computer, but using Weez you no longer need to send out the minutes of meetings afterwards because it's already available, which reduces unnecessary use of email and capture more of the business information in the same place.

Infrastructure
Weez is based on Jive Software and is delivered as Software-as-a-Service (SaaS). *"Jive is very unique… it's very social, but at the same time very professional"* (informant 1). This supports their objective of having a common platform for information sharing and collaboration. Jive also supports their objective of managing just-in-time information.

The informant describes Weez as a blanket that just adds to the organization and which adapts to all forms that are already there, so there is no need for change management. This means

[1] Informant 1 uses "ferskvare"

that for example, when a project manager of a large project with over 100 people in various sub-projects, needs to facilitate a place where the participants can collaborate on and share information he can just do it: *"And then, in just one hour, I have created a custom tool that all these groups and sub-groups can use and do use in their daily work, without me needing to talk to IT or without talking to… without receiving a 'go' from someone, I can just do it"* (informant 1). This is not only valuable for larger projects, but also if a smaller group of people either in the same business unit or across business units wants a place to collaborate and share information, they can just do it. Not needing to contact IT or any other administrator in order to facilitate such work spaces is considered very valuable for Devoteam.

Weez also supports the wish to build more and more of their daily business practices into one place. For example, when they use it for writing meeting minutes, the document instantly becomes available and people can comment on the document or make changes to it. The fact that Weez supports this practice, is an advantage highlighted by the informant: *"…in many cases you can directly do small changes without asking anyone. You can just go in and change it, you don't need to ask the author if you discover typos, potentially, that could create five emails out of a single thing. Here there is a lot of freedom, then, potentially"* (informant 1).

Devoteam has chosen to integrate with Active Directory, Microsoft Outlook and Microsoft Office. The Office integration allows publishing Office documents directly in Weez without having to log in or even starting the browser: "*You can just publish your document to any group you want and that is very effective"* (informant 1).

Weez is also available on mobile devices through an app (for iPhone) or as a web page (for all devices).

The fact that Weez is delivered as SaaS makes the processes related to upgrade much easier. This is highlighted by the informant.

The informant explains that the Jive platform is actually very well suited for use across also across a company's borders, but in compliance with their clear objective that it is for internal use the platform is configured accordingly.

Figure 4-1 systemizes the identified functionalities of ECM systems in Devoteam (including the local solutions).

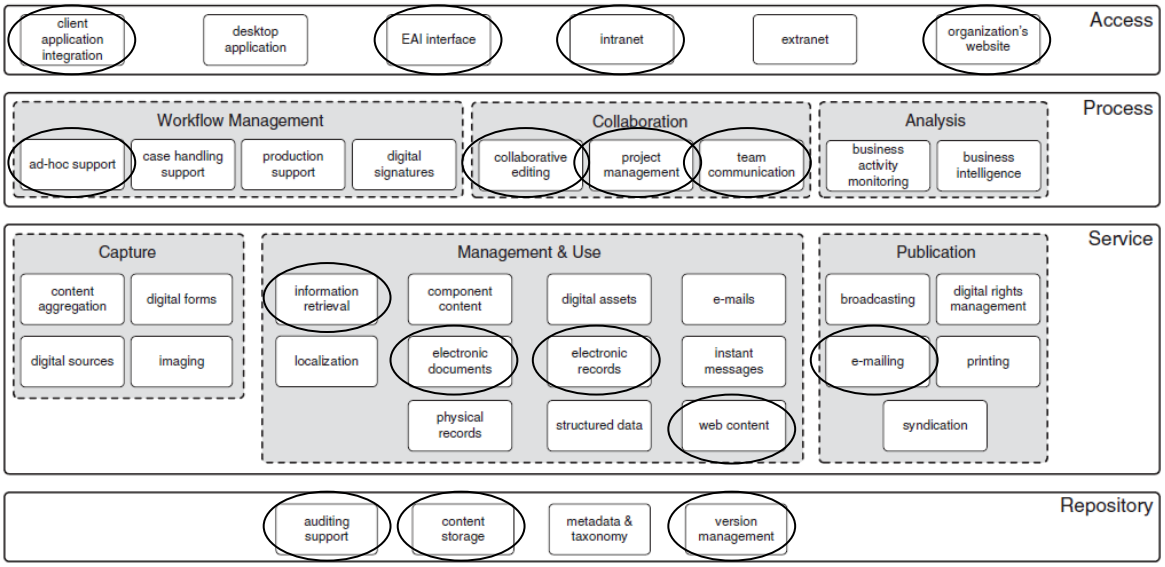

Figure 4-1: Functional scope of the ECMS at Devoteam

Administration

There are no formal policies about what information to put in Weez and not, and as informant 1 states; *"everything basically is supposed to be put in Weez, we try not to limit it at least"* (informant 1). Issues related to organizational responsibilities and resources were not identified.

Change management

Weez being a social network, some actions were made in order to ensure its adoption and to ensure a critical mass of users and information from the beginning. They put a lot of efforts into branding Weez in the group so that all employees know about Weez. The informant gives some example of such actions: *"So, in the beginning, we were very strict in order to ensure this critical mass and we basically forced all business units to make some very simple tasks in this… We strongly encouraged the management to conduct its top-down communication, we forced back-office staff to make available documents that people need on an ongoing basis, time sheet templates and other templates and all sorts of things like that. We did a lot of things like that just to get a critical mass, both the content and users"* (informant 1).

In addition to encouraging certain types of information to be communicated on Weez from the beginning, they also try to use it for more social things such as planning team buildings, organizing payday beer, etc.

Devoteam's objective is to use Weez internally and the informant explains the basis for that decision: *"… 'social' involves such a big cultural change that it is very important not to scare people. So we thought that it would be easier to just say that this is only internally, instead of trying to explain a lot of boundary issues and gray zones"* (informant 1).

4.1.2 Vest-Agder county municipality

There are three large ongoing projects; new intranet, new web site and enhancing quality of employee information.

IT department
There are 14 employees in the IT department. The CIO/IT manager is corporate responsible for IT in the whole county municipality.

In addition to the employees in the IT department, there are IT responsibles spread around on all the high schools which report to the management of their school. So, the IT department has no direct personnel responsibility for the IT responsible on the schools, but they are responsible for the IT professional[2] parts. The IT department is in control and they decide in what cases it is appropriate to give more local freedom to the schools.

"There is less difference between public and private than I would think many people believe. Because there are not very many issues or constraints that the political level provides, it is more about political causes; should we introduce student PCs to all students in high school; yes? No? the politicians decide it, but then, when it comes to, I mean, how all this it handled and what kind of PCs should be bought and the whole handling of operations and infrastructure and organization, that is an administrative decision" (informant 2).

Information and service department (IS department)
The IS department is also part of the central administration. The IS department owns the intranet and the case and archival system.

VAF does not use any EA framework, but they know about TOGAF and others. Their perception of such frameworks is that it's too big and heavy for them.

When it comes to linking VAF's strategies with IT initiatives the informants refer to the "Regionplan 2020" which have some statements they need to take into account in their respective departments. *"But it is basically the managers at different levels who are responsible to operationalize these in their sole discretion, in the best possible way within the plans and projects that we initiate"* (informant 2). Informant 2 further explains that *"it's more about making a check out on what we are thinking about now, it is to make sure that we're not doing anything which is contradictory with the 'Regionplan'"* (informant 2).

Enterprise model
The point of contact between the political level and the administration is mainly the county executive. The county executive is in charge of the administration which consists of three departments; the staff units where the IT department, Finance, Accounting, Payroll department, Procurement, Construction and so on are found. Then there is the Education department, who deals with the high schools, and the Regional department, who deals with a lot of different things, from roads and public transport to culture and industrial development. The broad guidelines for these units come from the political level.

Since VAF is a public organization, they are responsible for communicating certain information to external audiences and for much of that information they need to be sure that the right people gets it. Therefore they have much focus on how the information flows and what information channels there are.

Objectives and impacts

[2] "det IT-faglige"

The current overall objectives for VAF are stated in the "Regionplan Agder 2020". This plan is the first common plan for both Aust- and Vest-Agder county municipalities and was adopted by the two county councils.

There are ongoing initiatives to get a more holistic information structure at enterprise level in VAF. Traditionally there have been challenges with information silos within Vest-Agder fylkeskommune where information has been spread around in the organization in different systems and databases which are not connected to each other.

Information is getting more and more visible along with internet and intranet initiative where information is being published and the bad information quality becomes very visible. The first goal is to clean up all information related to the employees.

Since VAF have a responsibility for getting information to the right people and make sure that they get it, they are currently running a survey in the organization about what information channels that currently are being used, what channels that the currently use for information sharing, but that doesn't reach the right people and what information channel where their users (both internal and external such as Vest-Agder county inhabitants, potential and current high school students and so on) are present and that VAF should consider as an information sharing channel.

The objective with new intranet is to create a platform for use throughout the organization because the precedent intranet was only used by the administration and not by e.g. the high school teachers.

Being a county municipality, there is a lot for laws and regulations that VAF need to comply with, for example, the NOARK standard which concerns archiving.

However, they are experiencing that the laws and regulations do not take into account the increasing amount of information channels and thus also the systems which claims to be support these

In 2009, VAF decided that all case management will be done electronically. This also includes distributing all documentation electronically to the politicians who have their own iPad.

Since they decided to go over to a fully electronic solution, it is important that people can access this information easily, and at any time, for example when they are working from home or are out of office.

Content model

Besides what content they are bound by laws and regulations to manage, there are no specific policies on what content should be managed and how it should be managed. For example should all e-mails and other content related to cases be put in the case and archival system? Their rule of thumb when it comes to cases at least, is that everything shall be kept. With the decision to have fully electronic case management, they see an increase in the amount of information in each case folder.

On the intranet there is currently a lot of static information such as helath, environment and security (HMS) information, information about routines, internal policies and so on. What

content they will have on the intranet in the future will be decided in relation to the ongoing survey and to what extent the intranet is considered the best internal communication channel or not. Probably it will still be mostly static information which has information owners in charge of keeping it up to date and relevant.

Infrastructure

In order to achieve a more holistic view of information in VAF, there are several infrastructure-related issues that need to be solved. To deal with these issues and getting a more holistic approach is a great challenge and they have chosen to divide it up into smaller projects. At the moment there are three such ongoing projects; a new intranet, a new external website and information integration project with focus on employee information.

Information silos have been one of the greatest issues; information is spread throughout the organization in different field-specific systems and databases. The information integration project involves a change it technology where they start to use an integration hub solution with BizTalk. This approach was chosen because they want to avoid making direct integrations between the systems and they have had some challenges with existing direct integrations: *"… and then when you want to upgrade the system and the person who knew something about that integration has quit and then you do the upgrade and then there is something that doesn't work and then no one even notice it until six months later"* (informant 2).

The new intranet is based on SharePoint. The goal of having a role-based intranet depends on the information integration project to succeed. Their vision is that the intranet becomes the new desktop in a way, so that when you log on to a computer, according to who you are, you get an adopted view with relevant information and links to applications.

To support the compliance requirements and the objective of having fully electronic case management, VAF has a case and archival system from Software Innovation called 360. This system is currently only being used by the central administration, but the intention is to implement the same system at the high schools in the future. At the high schools, 360 will be seamlessly integrated with the specific systems such as Skolearena and It's learning. Access to this system will be provided as a web part in the new intranet.

The fully electronic solution provides access to the information at all times, which supports their objective of better information sharing and accessability.

The case and archival system is integrated with the Outlook e-mail solution. However, they do not have integrations which allow management of newer information channels such as Facebook, SMS, etc.

There are also a lot of information security issues that they need to take into account.

Figure 4-2 systemizes the identified functionalities of ECM systems in VAF.

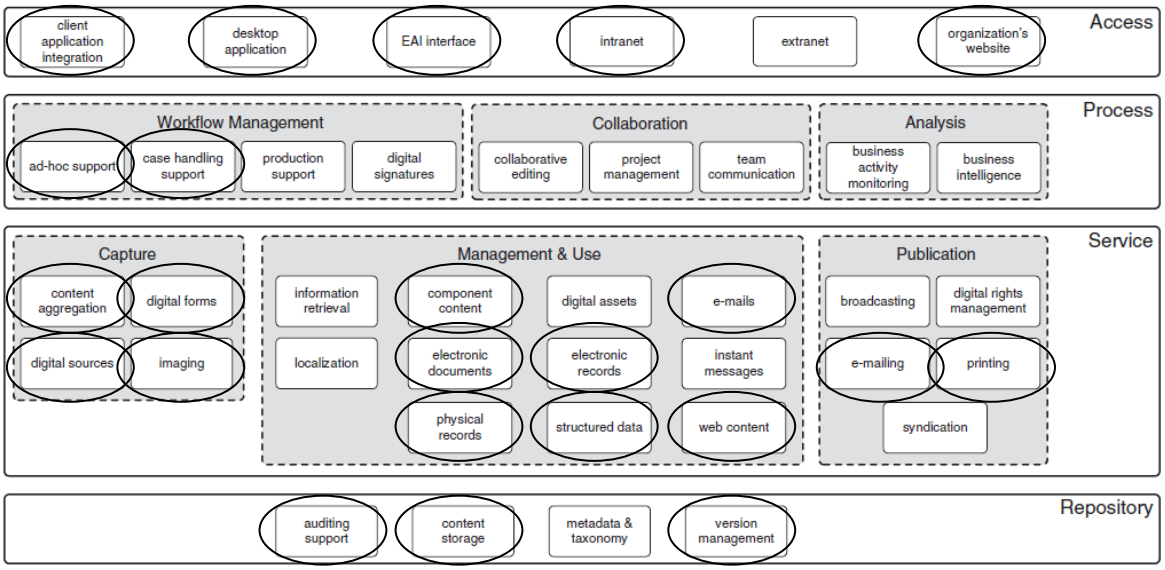

Figure 4-2: Functional scope of the ECMS at Vest-Agder county municipality

Administration
There is an ongoing process of establishing a central document center for the whole county municipality. The center belongs to the information and service unit and up to now, all so-called archival resources which were already a part of the central administration have been moved to this central unit. The next step is to bring in also all the archival resources which are spread around in the rest of the organization.

Change management
In relation to the new web site and intranet initiatives, they have done efforts to clarify the expectations up-front with all the units in the county municipality.

4.1.3 DNV Maritime Partner AS

DNV Maritime Partner AS (DNV MP) is a subsidiary company of Det Norske Veritas AS (DNV). Being a subsidiary company of DNV, they benefit from the portfolio of IT systems that DNV have and can use these as any other DNV unit. DNV MP also share IT infrastructure with DNV. Even though most IT functions are centralized, DNV MP has a local IT manager. One of the ECM systems that they share with DNV is SharePoint. Additionally, support functions such as HR, payroll department, etc. is shared with DNV. The informant states that *"so, in a way, we work as a department in a large corporation, even though we are a private limited company"* (informant 3).

Internally in DNV MP there is a nautical group, a technical group, a support group, a marketing group and a leader group.

DNV MP does not use any specific enterprise architecture framework.

Enterprise model
DNV MP's products highly influence the way they choose to organize their content. Their main concern is on the workflow for the information that they gather, buy, put together and deliver to their customers through their products. Each of the internal groups in DNV MP is responsible for different types of content at different steps of the process.

Many of their deliveries are organized as projects.

DNV MP often collaborates with employees in other DNV units spread around different geographical locations.

Objectives and impacts
They strive to be proactive in staying updated on upcoming laws and regulations that will influence the information related to their products.

The information that they use in their products needs to be verified by external authorities or authorized organizations.

DNV MP is not formally ISO9001 certified, but their objective is to always have a description good enough to pass a certification audit.

There are external laws and regulations that they need to be in compliance with.

They want to share information about their products in an efficient manner both internally in DNV MP, with DNV and externally. This objective derived when they started to collaborate more and more with other employees in DNV, but outside DNV MP, and also with people not being a part of DNV at all. Before they started using a common platform provided by DNV about 6 months ago, they only used local databases for DNV MP. The informant describes the situation before moving to the common platform: *"We ended up with having a lot of documents being updated by a lot of different people and this lead to…we didn't get a holistic view of the document anymore and therefore we saw the need for having one common place and that this place had to be easily accessed regardless of where in the world you are. So that was… it was decided to start using SharePoint"* (informant 3).

Since they are a part of DNV, an objective is to share information about customers and sales with the other DNV units.

Content model
The way they structure their content is highly related to the content's role in their products and to which department is responsible for that particular content. The nautical department is responsible for providing all necessary forms either by making these themselves, or finding them online or by contacting different authorities. Then, the technical people are responsible to populate the forms and verify that they collect the right information. The support people provide input from the end-users about what they want and need. The final instance is a steering committee which is responsible for putting it all together and approves it before releasing it.

DNV MP has their own pages in the DNV intranet where they publish information about their products so that others in DNV can get information about them. The same product information is also published on the external web pages. On the intranet there is also sales-specific content which is not published on the external pages.

The sales-specific content is only stored in SharePoint and when you want to edit this information it follows a standard check out/check in routine. The informant explains that they have defined and integrated work processes in SharePoint. One such process in the approval process when checking in new or updated content before a new version gets published.

Infrastructure
DNV MP shares intranet with the rest of DNV. The intranet is based on a SharePoint platform and it is also used to manage the external web pages. The SharePoint solution supports easy publishing of product information and marketing information for both internal and external purposes from one single place. The content which is defined to be published also on the external web pages is automatically made available from all the other DNV units other web pages and the content is automatically translated to the correct local language.

To support information related to sales opportunities, leads and customer information, DNV MP use the CRM system provided by DNV.

There is no integration between the e-mail system and an enterprise content management system. All employees have a personal mailbox and then there is a common mailbox which everybody has access to. So to capture business-critical content which is communicated by e-mail, the routine is to put the address of the common mailbox on carbon copy.

All the maintenance requests and orders and so on are stored in local databases in DNV MP.

Whenever information is being moved between different systems, it is in compliance with the safety protocols defined by DNV.

Microsoft Project is used to support the projects.

Figure 4-3 systemizes the identified functionalities of ECM systems in DNV MP.

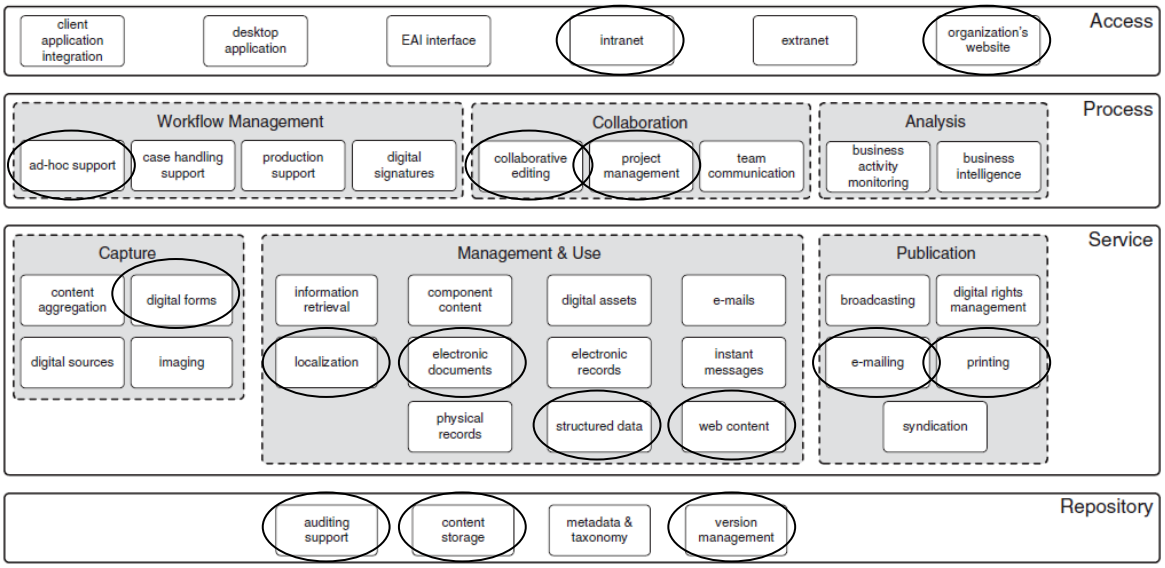

Figure 4-3: Functional scope of the ECMS at DNV Maritime Partner

Administration
The office manager at DNV MP is responsible for transmitting relevant information for the employees in DNV MP which is published on the intranet.

The marketing manager is responsible for publishing all product information and marketing materials on the intranet and when he publishes something, he can at the same time define if it is only for internal use or for both internal and external purposes.

Change management
No issues related to change management were identified.

4.1.4 Aker Solutions

Aker Business Services (ABS) is a part of Aker Solutions and this is where informant #5 belongs in the organization. ABS sells services to all the Aker Solution companies. In addition, ABS also sells their services to Kværner, which formerly was a part of Aker Solutions. Their area of business is engineering, procurement and construction contracts.

In Aker Solutions, they have a small group of people in a staff function called 'Enterprise architecture'. These people are involved in most roadmap projects and play an important role in them. For instance in the larger initiatives such as the SharePoint project, and the enterprise search, the enterprise architects are represented in the planning phase. In smaller initiatives, they are not necessarily that present. An overall IT architecture is under development covering the scopes of both Aker Solutions and Kværner. This IT architecture follows a detailed framework.

Enterprise model
Aker Solutions is a complex corporation with a long history. The different companies in Aker Solutions have slightly different characteristics, but the parts of the organizations relevant for this case consider themselves project-based. The operational phase, when you generate money, is the focus. When one project is finished, or even before, you move on to the next. At the same time, there is also the corporate level in Aker Solutions which is not typically project-based, and they have other needs when it comes to content management.

More and more, the projects are run in cooperation with other companies, and this influences the enterprise model because it is not only about your company anymore, but about two or more who collaborate.

Objectives and impacts
Most of Aker Solution's project are very large and have high demands for document management. This requires strict governance of documents and keeping audit trails. There are also external rules and regulations that they have to comply with, especially the product liability act. *"I want to highlight this as an important element, which commits us to store for ten years the information about these technical products that we sell. And this involves that we keep very much and probably, we keep too much in relation to the responsibility we have according to the product liability act"* (informant 5). Therefore, both traditionally and currently, the main focus area has been on what they categorize as *document management*.

The impact of having to comply with e.g. the product liability act and contract obligations is that this prevents them from having an effective lifecycle management because it is too costly.

The informant explains that they have clear obligations to keep some data due to legislation and conceptual terms, but he also highlighted the objective of keeping data for experience sharing in future work.

Related to an ongoing initiative to get more timely knowledge management, work is being done up-front in the different business areas to create templates and do standardization.

Developing a better and more efficient enterprise search which not only searches within the intranet, but also in the more specific applications is an objective in 2012. These applications can be both more specialized ECM applications, business management systems and product lifecycle systems such as SAP, engineering design systems, procurement systems, file shares and so on.

A clearly stated objective is to replace all the file shares with a content management system.

They have a high focus on protecting especially personal, health and other sensitive information.

They often collaborate with other companies in their projects, and therefore it is important that they have good systems in place to facilitate also external collaboration.

A future objective is to become more conscious about what content to keep and what not to keep, in order to make direct cost savings.

The type of content and information that they deal with every day is changing. For example, administrative information was earlier more about telexes, faxes, letters, minutes of meetings, etc., but today they are facing more and more diversified digital channels such as e-mails, Communicator, SMS, and at the same time, there still are letter.

Content model

One of the largest of the nine business areas in Aker Solutions is engineering. Since Kværner is a recent demerger from Aker Solutions, projects in this area often still work closely with Kværner. This has implications for the information sharing since they are two individual companies. Even though the two companies work closely on a lot of matters, there is information which must not be shared across company borders.

All information has an owner and the information type depends on the area of business it relates to and the life cycle stage.

The informant explains that the time limited and project specific requirements and the fact that the organization is geared on project work where large temporary organizations are blossoming up in high speed and scaling down rapidly as projects moves to a close for again to spread staff to new projects with different requirements, prevent them from having an effective lifecycle management where you have, what the informant calls an intention, on each specific information element and a removal process. Even though they have some standards for information management, each project client insists on own specialties deeply rooted in the customer's own organizational tradition. Key words for improvement that the informant mentions are international standards that are observed by as many parties as possible and compiled in a consistent manner. This means that Aker Solutions have for example project databases and content storing facilities alive much and unabridged much longer than necessary. There are defined processes on how to find information in old archives, but this is very time consuming mostly because they don't have content standards which last more than 2-3 years, the typical time of a project. *"In 2-3 years time, there can be four projects running at the same time which use different standards. When you're going back in*

old archives to find content, then you have bigger issues with finding the content. And there is very little indexed content. We simply do not have enough time to index everything. That is a well-known issue for us" (informant 5). The informant also explains that there are more challenges to this because electronic content relies on old software version to be retrieved and read. Not all data is scanned or kept as PDF or TIFF and this content is in danger of not being usable after only a few years explains the informant. They have considered long time formats such as PDF/A, but this would require major investments.

In the lifecycle, it is especially the disposing and getting rid of information which is not given a lot of attention from the information owners, they just keep everything: *"No one dares to delete anything"* (informant 5). This is to some extent because people are not conscious about how to manage it, what to keep, and what to delete. The fright of having deleted something that according to some rule needs to be kept is too great. The informant estimates that it is only about 10% of the information that they keep which they are required to keep. *"The trick is to know, when you start a project or start a process, how long should this data be kept, right, which date it can be deleted, when can it be deleted according to the law, right, when should you be notified about deletion of old thing and such, we are not good at that, I would say"* (informant 5).

The phase in the life cycle which gets the most attention is what the informant calls the operational phase, which is the phase where you generate money.

The lack of indexing routines is also a challenge related to their ongoing enterprise search initiative.

The content structure is different depending on whether it is mostly related to the corporate part of the company or to the project part. In the projects there are high demands for structure and the customers express through a kind of framework what content they want to be kept in the projects.

Infrastructure

There is a range of systems in the ECM portfolio that Aker Business services supports; intranet, external web sites and more specific ECM solutions. In addition, fileshares are also used in some settings, mostly for the less formal information.

To handle the fileshares, they use a system called Promap in order to get access to the fileshares for your project from your computer. Promap maps projects or departments to dedicated storage volumes.

Both Aker Solutions and Kværner have their own web site where the content is managed by ABS. It is further divided into content ownership groups and editors. The informant describes the intranet as *"very traditional I would say, it may include news bulletins, service messages, a wide variety of applications, some projects and initiatives and information about them, and it is of course becoming more and more dynamic in the sense that users can customize their interface and see what they will see, right? It's very different according to what business area you are in, what you want to see"* (informant 5). SharePoint is the most widely used content management system in whole Aker Solutions with more than thousand team sites spread around the different business areas. There are no specific constraints on how to use it and they do as little tailoring as possible to keep the upgrade costs down. Currently, there is a large ongoing initiative to upgrade the intranet platform from SharePoint 2007 to SharePoint 15.

This upgrade is also aligned with the objective to have more timely knowledge management with more social and collaboration functionalities. The enterprise search also relies on this new technology in order to perform search within the intranet and also in other applications containing content.

Anyone who has a budget cost code to pay for it can order a site on SharePoint to use in their project, but some of the projects are so large and complex and have so strong requirements when it comes to document management, that SharePoint is far from being sufficient. For these cases, there is a variety of more specific solutions, either ECM systems in their own right such as ProArc and Documentum or systems providing some sort of ECM functionality together with Project management control and Manufacturing & Construction management that ABS offers (Comos, ProjectWise, Mips, Risk dashboard and SAP). The most used is ProArc and Documentum and SAP share second place for most used ECM application. By whom these systems are used varies both in terms of location and in terms of business area. ProArc for instance is used mostly by the engineering units in Norway, but also other use ProArc, such as in Malaysia where they get accees through Citrix. Documentum is mostly used in North America, Australia and India.

SharePoint is typically used at corporate level, while the other more specialized systems such as ProArc and Documentum are used by the parts of the organization which are mostly project-based. Therefore, these more specific systems are typically closely integrated with other project management systems.

All e-mails and other communication on Exchange Server are issue to backup and archiving, but it is not seamlessly and automatically integrated with the document management systems though some e-mails are being stored as documents. This is becoming more and more automatic and they have functionality supporting mass import of e-mails from Exchange to document management systems. A challenge here is that not everyone is using the same version of Outlook, there is currently a mix of users with 2003, 2007 and 2010. And more, some have Windows XP and some have Windows 7. This limits the options for a lot of people, but those who run the newest platforms have better integration when it comes to capturing e-mails.

The realization of the enterprise search has many security challenges, especially when it comes to access control.

There is a high focus on how to secure information. Both the sensitive information related to personnel but also information related to for instance bidding or procurement processes. An issue related to the security is to have control; *"there are so many players in the picture and people changing workplace and comes in and out, a lot of external consultants who work here for shorter periods and so on, and all have, in some sense, the potential to violate the laws and regulations, and we don't manage to control all the details, but it's a big challenge. Firstly to get an overview, right, and secondly, have continuous communication so that people can relate to it just to be aware of it"* (informant 5). The main issue is not the externals, but it is about keeping track internally about who should have access to what.

To support the need for information sharing across the company borders, there have been quite a few test projects. The focus has been on how to set up such an environment, maintain it and decommission it or transfer to a post project corporate access when the project is finished and it is time to share the project information correctly among the project partners.

These projects have resulted in a lot of design but often stranded because of very high costs and high risks related to information governance and security issues.

Figure 4-4 systemizes the identified functionalities of ECM systems in Aker Solutions.

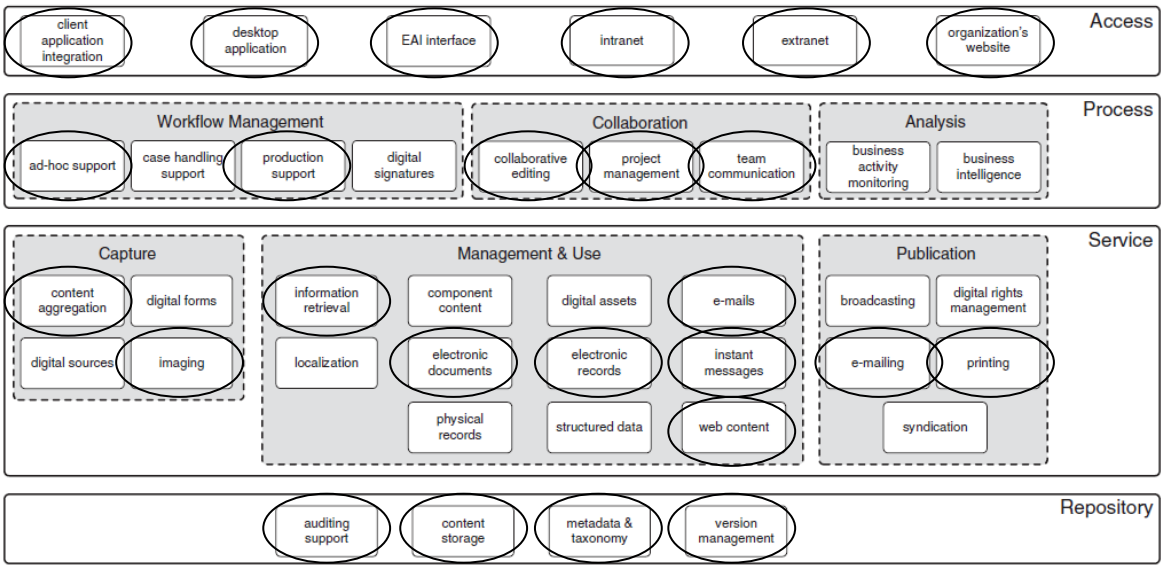

Figure 4-4: Functional scope of the ECMS at Aker Solutions

Administration
In Aker business services, informant 5 is responsible for the document and content management services department, which is a relatively small department under the IT manager and IT service delivery manager. Among other departments within ABS IT service delivery are the engineering systems services, the project execution services and the business service management services. *"All this need to work together in many ways, so we have great challenges getting a good cooperation and there are constantly reorganizations and making improvements and everything changes very quickly and you… it's a challenge to know when a change is relevant to you, get the information when a change is relevant to you. Often we… we struggle with being a bit behind and there are incidents in production because we weren't aware what there had been a change somewhere, right, so we are very concerned about having open information channels and good team work and good communication. It's a really big challenge"* (informant 5).

There are also dedicated people who keep up compliance with external laws and regulations in all the different countries where Aker Solutions operates to assure compliance.

Change management
There are efforts to reduce the use of fileshares and replace the use with more structural approaches and systems, in most cases try to get them to use SharePoint instead of the fileshares.

4.1.5 Telenor
Telenor is one of the largest telecom operators in the world and is a complex corporation. There is the group or corporate level of the company, then, there are many subsidiary companies spread across the world as well as a support organization.

Telenor Shared Services is the support organization for Telenor group. They provide services within HR, finance, IT and so on to support Telenor's core business.

Telenor Norge is one of the business units in Telenor.

In 2010, they finished the implementation of a large group-view initative named Way of Work (WoW). Collaboration was the focus of the initiative, including an ECM solution provided by SharePoint and a communication tool which currently is Lync. The WoW initiative is the first group-wide initiative in Telenor and it was initiated by the group executive management. Telenor group is the owner of the WoW solution and Telenor Shared Services is responsible for operating and maintaining WoW.

In addition to the global solution, there are local ECM systems, especially archival solutions in the different business units. They also have an extranet for sharing information with external parties.

Enterprise model
A lot of Telenor's business is organized in projects.

Objectives and impacts
The key word for the WoW initiative is collaboration. The informants explain that the objective is to create a common platform where people can connect, establish networks and collaborate on information and share knowledge across and within business units. An expected impact of having a shared platform was reduced use of e-mail to share information internally.

A related objective to creating a common platform is that they want to break down the information silos in the group. The ability to find information across the different business units is an objective.

One objective was to capture more business-critical information in one place across the group.

Another objective behind the WoW initiative was to have a group-wide approach to knowledge management.

There is an overall objective for compliance with laws and regulations. Since the law and regulations vary from country to country, the objective is not to provide a global solution which fulfills the compliance requirements of all the business units. For Telenor Norway for example, to be in compliance with the NOARK-standard is a local objective.

A more specific compliance objective is that WoW will be in compliance with the group information policies. That is currently not the case.

They had an objective to save time and money related to traveling by introducing a global collaboration platform where people can connect without being in the same geographical location.

Related to process support, the objective with WoW is not close integration of local processes. The focus is on having some generic global processes to maintain flexibility in the solution.

Telenor has some security policies for how to classify information and how information can be distributed according to its classification.

A future objective is to have a global solution for records management.

Content model
The content structure in WoW consists of three main elements; project sites, community sites and team sites. With this structure, the informants say that people have become more aware about putting content in these different sites instead of storing it locally on their computers or on fileshares. According to the informants, the general guideline is that everything should be put in WoW.

In addition to the project, team and community sites, all employees have their own personal profile site called MySite. The informants compare this profile page with the profile page you can have on Facebook. This is intended for less formal information such as personal interests, competencies, etc.

The structure in SharePoint is flat, there is no hierarchy of folders where content is stored.

In the perspective of content lifecycle, the phase which is given the most attention is the creation and use of content.

They are mainly concerned with content inside the corporate borders, but they also share content with externals through the extranet.

Infrastructure
The WoW initiative is based on mainly two Microsoft products; SharePoint and Lync. These support Telenor's objective to have a group-wide solution for information and knowledge sharing as well as collaboration.

The built in search engine in SharePoint supports to some extent the objective to search and find information across the different business units.

The SharePoint solution provides project support and they have integrated business processes to some extent. Detailed local processes are not integrated, they have rather focus on integrating some global processes

All communication by Lync and e-mail is stored on Exchange. However, the Exchange servers are locally installed and operated by the local business units. This makes integration with the global SharePoint solution, which is centrally operated a challenge and currently there is no integration with Outlook to capture business-critical content from personal mailboxes in an efficient manner.

Site creation is centrally governed. So, in order to create a new site on SharePoint, a request needs to be sent to the Telenor Shared Services and the request is then passed through a governance process before the site is created. They have chosen to manage this centrally to avoid losing control and structure.

To ensure that information sharing by e-mail is in compliance with the security policies, each time a user wants to send an e-mail, he has to classify the content of that e-mail as open, internal, confidential or secret, explains informant 7. If the content is secret, then the system forbid sending that e-mail. If the content is confidential, then the system only allows sending to other e-mail adresses within Telenor.

Since SharePoint does not support the required records management functionalities, there are locale ECM initiatives which support this and the overall compliance objective. The external web pages of each business unit are also locally managed.

Figure 4-5 Figure 4-4systemizes the identified functionalities of ECM systems in Telenor.

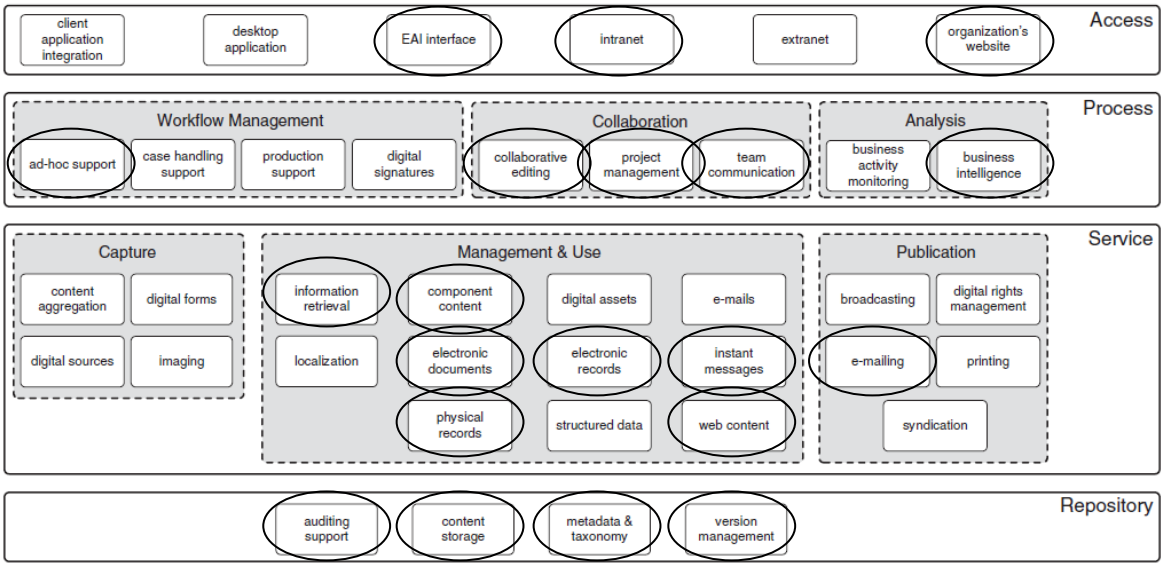

Figure 4-5: Functional scope of the ECMS at Telenor

Administration

At group level, there is an IT organization which has the overall responsibility of information policies and strategies. The information policies defined by the group are applicable for all entities. Then, each business unit has its own information policies which includes the local laws and regulations.

Besides the explicit information policies, there is no policy on what content that should be put in WoW. However, all the informants explains that people have an implicit awareness that all information that relates to the project or department they are working in, should be put in SharePoint.

In Telenor Shared Services there is a WoW service line which is responsible for SharePoint and Lync. Their overall strategy is decided by Group IT and the business requirements come from networks. They represent the more technical aspect of WoW and are responsible for operating and further developing WoW. This service line deals with all that related to the WoW solution. So for instance, when people order a new SharePoint site, this is created by someone in the WoW service line. The service line also offers services related to helping people configurating their sites. The WoW service line communicates information about the solution to end-users through established networks. Internally in Telenor Shared Services, there is an approval process for major changes. Informant 6 explains that there is an

architecture board where are major changes and new projects need to be discussed and approved before they are executed.

There are three main networks that represent the business in relation to WoW; collaboration, portal, and information management. This governance structure was established when the WoW implementation was complete. The networks are not organized as departments but consist of teams with members from a range of different department. Who the members are is related to specific roles in the different department. Each of these networks owns the business processes in WoW.

The c*ollaboration* network is owned by a department at group level called Group industrial development. This network responsible for Lync.

Portal is a network owned by the manager for internal communication at group level. The members in this network consist of one person from each business unit who is the business unit communication manager. Each business unit has a portal which is specific to their unit and which is the home page for all employees in that business unit.

The i*nformation management* network is owned by the group information manager and deals with compliance, document lifecycle and the overall information architecture.

In all the business units, there are people who have advanced knowledge of SharePoint and which are available to help others in the same business unit setting up the SharePoint sites.

Change management
Some time before the implementation was finished they started training and preparing users for the new solution.

They also put a lot of efforts into make visible the possibilities in WoW to encourage use. One example informant 9 who worked in Telenor Norge mentioned is that they typically got a top manager to set up their personal MySite to set an example for others to start using it as well.

In Telenor Norway they had an intranet solution which was used to promote WoW before it was launched. Informant 9 explained that this involved publishing articles about the rationales behind getting a common platform and promoting the benefits with using it.

4.2 EA consultancy experience

This section provides a summary of what the consultant with EA experience recounted.

Misunderstanding about the concept *enterprise architecture*
A common misunderstanding in Denmark is that people think that enterprise architecture is the same as IT architecture according to informant 10. When they describe and talk about their own enterprise architecture or enterprise architecture in general, they talk a lot about the technologies and the applications, but very little about the business. This is often related to the fact that they have very complex systems and applications and old platforms. There often is an immediate need to consolidate and simplify in IT.

"For any kind of project you should be able to connect it directly to business drivers and business goals to achieve new business capabilities. So you don't buy any kind of software,

any kind of server, you don't buy any kind of iPad, iPhones, unless it's a part of the business goals and business drivers" (informant 10).

Enterprise architecture is about connecting IT and business. In very many cases, the company has invested in a lot of different applications and systems over the last 10-15 years without thinking about this connection and therefore many of these are silo solutions.

A reason why organizations do not invest in enterprise architecture initiatives is because it is difficult to measure the value of EA.

Role of the enterprise architect

Related to the misunderstanding of EA as a concept, the informant thinks that there is also a misunderstanding about what the role of the enterprise architect should be in an organization. Where the architect is put in the overall organization of the enterprise determines what kind of architect he is. If the person is placed in the IT department, the he is most likely an IT architect rather than an enterprise architect. In order to say that a person is an enterprise architect, in the appropriate sense of enterprise architecture, then he should be somewhere on the C level and reporting to typically the CFO or CEO. In this case, it will be easier to get in contact with and communicate with the line of business. If the architect is in a position where he is not able to get in contact with and in dialogue with the line of business, then that person is not an enterprise architect.

In order to bring value to the business, the enterprise architect needs to be able to properly understand the business and support the business and to be proactive towards the business. A danger if you are in the IT department is that you have a more reactive role towards the line of business. To be successful with enterprise architecture, having a true *enterprise* architect is a key element according to the informant. The IT architects are often more problem solvers types who want to work on specific systems and develop programs and they are not necessarily able to communicate with the line of business and understand how IT can help the line of business achieving their goals, to direct them in the right direction and so on. If the architect is not on the right level in the organization, then they will most probable build silo solutions which are not connected to the business goals and drivers. And when organizations build such application silos, the create information silos.

In 99% of the cases, the person who has an enterprise architect role is coming from IT and this is important to be aware of says informant 10.

TOGAF

According to informant 10, TOGAF is much about having a cross enterprise view based on the business drivers and business goals. But, in many projects where informant 10 has worked, it has been more about solving problems related to the IT architecture. The organizations typically need help with consolidation and simplification of IT in the enterprise, and since informant 10 is familiar with TOGAF methodology, the informant chooses to use it also in IT or application architecture projects. After having used TOGAF for the more technical aspects, customers often would like to use the other parts of TOGAF as well and connect what they have already done with the business.

4.3 Cross-case analysis and summary of the findings

The cases I have studied have varying enterprise models; three of them are mainly project based, one is more product-centric though still also focusing around projects and the last has no single clear enterprise model.

The objectives and impacts sought with ECM initiatives vary among the studies cases, some of them however are recurring in the majority of cases. These are ‘common platform’, ‘compliance’ and ‘facilitate information sharing’.

In none of the cases there was a complete picture of the content model. No modeling methods were identified. The focus on the content life cycle was generally low, and attention was mainly given to creating and using content.

Issues related to infrastructure were how information was integrated across the different systems, integrations of the ECM systems with other applications and security.

Identified issues on administration vary from having no formalized information policies to having service organizations in place.

There seems to be little focus on change management in relation to ECM initiatives. Both at the point of introducing a new solution and continuously support and encourage ECM use. The identified issues for change management are mainly in the organization who introduced a social intranet where they rely on a critical mass of users and content to succeed.

A summary of identified ECM issues is provided in Table 4-1.

Related to the infrastructure issues, I used FEF to describe the identified ECMS functionalities case by case. Table 4-2 provides a matrix to compare the identified functionalities across the cases. I did not identify any functionality that was not present in FEF. The matrix highlights that some functional areas are more present that others. On the access level, all organizations had intranet and website functionalities.

Table 4-1: Summary of identified ECM issues in the case study organizations

	Devoteam	VAF	DNV Maritime Partner	Aker Solutions	Telenor
Enterprise model	Mainly project-/team-based	No clear model, but both team- and process-based characteristics	Engineering enterprise/ product centered, some project focus	Mainly project-based	Mainly project based
Objectives and impacts	Common platform, Internal collaboration and information sharing, Agility, Just-in-time information	Reduce information silos, Enhance information quality, Role-based intranet, Compliance, Misfit complian ce and actual information channel, Electronic case management, Information sharing	Up-to-date information, Proactive information gathering, Compliance, Information sharing.	Compliance, Knowledge management, Enterprise search, Reduce use of fileshares, Security, Information sharing across company borders, Cost savings, Information channgels	Collaboration, Common platform, Knowledge/info rmation sharing, Compliance, Cost savings, Global processes
Content model	No explicit structure, but support just-in-time info	No explicit structure	Product-related content needs, but no explicit structure	Life cycle management, Information owners	Life cycle management, Different sites, No folder structure
Infrastructure	SaaS, Agile platform, No governance on site creation, Integration with Active Directory, Outlook and Office, Mobile interface	Information integration, Intranet, Case and archival solution, Outlook integration, Information security	Fileshares, databases, intranet, web site, CRM, No Outlook integration, Project support tool	Intranet, Web site, Portfolio of specialized ECM solutions, Governance for site creation, Many integrations, Access control.	Intranet, Governance process for site creation, Business process integration, No Outlook integration, Security
Administration	No formalized information policy	Central document center, System ownership	Some explicit responsibilities	Service organization	Information policies, Service organization, Process ownership, Advanced users
Change management	Adoption rate, Communication channel, Internal use	Clarification of expectations	No identified issues	Change habits of file share use	Training up-front, Promotion of the solution

Table 4-2: Summary of identified functionalities

	Devoteam	VAF	DNV Maritime Partner	Aker Solutions	Telenor
Access					
Client application integration	x	x		x	
Desktop application		x		x	
EAI interface	x	x		x	x
Intranet	x	x	x	x	x
Extranet				x	
Organization's website	x	x	x	x	x
Process					
Workflow management					
Ad-hoc support	x	x	x	x	x
Case handling support		x			
Production support				x	
Digital signatures					
Collaboration					
Collaborative editing	x		x	x	x
Project management	x		x	x	x
Team communication	x			x	x
Analysis					
Business activity monitoring					
Business intelligence					x
Service					
Capture					
Content aggregation		x		x	
Digital forms		x	x		
Digital sources		x			
Imaging		x		x	
Management & Use					
Information retrieval	x			x	x
Component content		x			x
Digital assets					
E-mails		x		x	
Localization			x		
Electronic documents	x	x	x	x	x
Electronic records	x	x		x	x
Instant messages				x	x
Physical records		x			x
Structured data		x	x		
Web content	x	x	x	x	x
Publication					
Broadcasting					
Digital rights management					
E-mailing	x	x	x	x	x
Printing		x	x	x	
Syndication					
Repository					
Auditing support	x	x	x	x	x
Content storage	x	x	x	x	x
Metadata & taxonomy				x	x
Version management	x	x	x	x	x

5. Discussion

In Chapter 4, the results of the multiple case study are presented and a cross-case analysis was performed. A summary of the findings is provided in Table 4-1. Based on these findings and in accordance with my research question, I will:

- Discuss identified ECM issues in relation to previously identified ECM issues
- Discuss how the EA perspective could potentially contribute to address some of these identified ECM issues

5.1 Findings related to previously identified ECM issues

According to previous research (Dillnut, 2006; Grahlmann, et al., 2011; Päivärinta & Munkvold, 2005; Smith & McKeen, 2003; Usman, et al., 2009), there is a lack of common understanding about ECM. At an overall level, this is also the true for the cases I studied. I identified that the use of the concept ECM under that name is not wide-spread; most cases rather talk about individual concepts such as document management, case management, records management, intranet, web sites and so on. Thus it appears that organizations have a more functional perspective on ECM. Based on this, using FEF to describe an organization's ECM efforts, help detecting potential functionality overlaps of existing systems, help selecting new solutions and describing ECM requirements which are suggested usages of the FEF by Grahlmann et al. (2011) seem an appropriate approach.

This more functional approach to ECM confirms the impression in the cases that organizations have more focus on the individual initiatives rather than on the holistic concept of ECM. Using Grahlmann, et al.'s (2011) proposed definition of ECM as a basis, none of the cases proved to address all the elements of this definition at the same time. The element that lacked attention or got the least attention is all the cases is on is the life cycle perspective.

Based on the ECM initiatives described in the cases, the concept of collaboration appears as a highly related concept to ECM. For instance, one of the major elements in Telenor's WoW initiative was collaboration including technologies such as Lync.

An interesting observation then is that when they talk about all these individual initiatives and solutions in general, what their objectives are and what they do to meet these, the issues are actually interrelated and match what previous research categorize as ECM issues.
Relating it to Päivärinta & Munkvold's (2005) explanation of how the different elements in the major ECM issues framework are interrelated, my findings indicate that organizations do not have a clear and holistic view of these issues and how they are interrelated.

There are some examples where they speak about interrelated issues. In Devoteam the informant talked a lot about what kind of company Devoteam is and that that kind of company need a solution which fits with their view of the enterprise.

In the following sections, I discuss the identified issues relating them to Päivärinta & Munkvold's (2005) framework of major ECM issues and to issues identified by previous research.

Enterprise model
According to Päivärinta & Munkvold (2005), any organization should have a shared idea about the enterprise and typically consider themselves as either process- or project-based.

This issue was indentified in the cases and in accordance with the previous findings that for instance engineering enterprises organize their content around their products.

The cases in my study had varying enterprise models such as project-based, process-based and engineering enterprise. The organizations were to some extent clear about this and that their type of enterprise and way of doing business influenced their ECM initiatives.

Objectives and impacts

The organizations had varying objectives for their ECM implementations. This may be related to the fact that some were currently in the pre-project/implementation phase and that some finished their last ECM implementation 1-2 years ago.

The identified objectives and impacts that organizations are currently having with regards to ECM, are for many the same as identified in previous studies (Päivärinta & Munkvold, 2005; Usman, et al., 2009; vom Brocke, et al., 2011).

In my cases, compliance is frequently mentioned as a rationale for their ECM initiatives. Satisfying external regulations and standards have been identified as a rationale for ECM initiatives in several previous studies (Päivärinta & Munkvold, 2005; Usman, et al., 2009; vom Brocke, et al., 2011). What is new compared to previous mentions of compliance is that the ever increasing number of information channels is that organizations face today poses great challenges. This is something that Vest-Agder county municipality highlighted and saw as a great challenge. The laws and regulations simply do not keep up and take into account these new channels. And when taken into account, such as capturing content from e-mails, current routines and technologies to support the capturing are not sufficient. One of the informants from VAF gave an example of a recent case which got a lot of attention in national media. In that particular case, it turned out to be a challenge to find all relevant information, which was "hidden" in e-mails in personal mailboxes that had not been managed and put into the relevant ECM system. A lot of resources had to be put in to search for the "lost" content that potentially could have, if properly managed from the start, been a lot faster and less resource demanding to find.

Other identified objectives are to improve information sharing, with an emphasis on internal sharing, and breaking down information silo by providing a common platform. Both the small and large case organizations mention this as an objective. This was also identified as objectives in previous studies (Päivärinta & Munkvold, 2005)

Three of the organizations highlight that their common platform initiatives involves elements of social media principles. Telenor for example has a personal profil page which they compare with the profile page you can have on Facebook. Devoteam highlights the need to manage current, or just-in-time, information and that the social media approach is very well suited for this kind of information and also matches their dynamic organization and entrepreneurial spirit. This objective is related to the previously related objective of giving a modern and professional image of the enterprise in the eyes of its stakeholders (Päivärinta & Munkvold, 2005)

One objective identified by Päivärinta & Munkvold (2005) that was not directly identified in my study, is the objective of value-added or new customer services and products involving The case whose objectives are closest related to this, is DNV Maritime Partner who focuses a lot on all information related to the product they deliver. This is also related to the previously

identified objective of reliability and quality of information content resulting in less errors in products and services. This was also mentioned as an important objective in Aker Solutions.

Content model
There are incomplete content models in all the cases and no explicit use of modeling content structure, view or presentations was identified in the cases. This is in line with Päivärinta & Munkvold's (2005) findings. However, there were some approaches on how to organize the content. In WoW, Telenor defined three major site types with some related policies on what information to put where. For example, all templates that are relevant for later projects should be put in the community or department sites and not in the project site which is archived when the project is finished. Only project-specific information should be put in the project sites.

When asking the organizations whether they were conscious about what content they manage and why, there is no clear answer and the answer in most cases said that basically "everything" should be put in their ECM solution. However, when viewing this in relation to their infrastructure capabilities, there is a mismatch.

Very little attention is given to the content life cycle, especially the disposing of content. Handling the exponential information growth is one of the challenges that organizations struggle with (Usman, et al., 2009; vom Brocke, et al., 2011), and not having a good life cycle management does not exactly help reducing the issues related to the information growth. Aker Solutions highlight this issue and relates this to unnecessary storage and back up costs.

The part of the content life cycle which is given the most attention is the creation and usage, which is according to several of the informants related to the fact that it is during these phases that the generate an income.

Infrastructure
As viewed in relation to the content model, organizations do not have a clear statement about what content to manage and why. However, their infrastructures do not support their statement that "everything" should be managed. Examples are that they do not have sufficient infrastructure capabilities to support extended capturing of information in channels such as e-mails, SMS and Facebook.

Integration-related issues were identified by Päivärinta & Munkvold (2005). This study has identified that especially the capturing of business-critical content from personal mailboxes in an efficient and integrated manner is not a widespread practice. Some of the organizations have integration between one of the ECM systems and the mail system, but none state that their current practices are optimal. Considering that they related to the content model claims to wanting to capture "everything", the descriptions of what their infrastructure actually supports, unveils that they cannot capture everything.

In some of my cases, the infrastructure was spread around the organization in different countries. Parts of these infrastructures were locally operated and governed and parts, like the common platform WoW in Telenor, is operated and governed centrally. This was especially the case in the larger and more fragmented organizations such as Telenor and Devoteam where the need for some more common solutions has emerged linked to the objectives of information and knowledge sharing.

Administration
In the cases in this study, there was a lot of variation related to the administration issues. For some of the cases, there was no explicit mention of issues in this category. Others, like Telenor and Aker Solutions for example, had formal information policies in place, service organizations had been established and there were defined process ownership. Also in Vest-Agder county municipality, some administration related issues were identified; the establishment of a central document center involved new roles taking over the old roles of archivist and librarians.

Change management
According to Päivärinta & Munkvold (2005), change management is needed in order to cultivate an optimal fit between the enterprise and its content model, infrastructure and administration over time. However, few change management issues were identified in this study.

In my cases, the change management issues were mostly about getting people to reduce the use of fileshares and local information storage. Devoteam and Telenor had some change management issues particular for their more social approach; the put in actions to obtain a critical mass of content and users in their platforms because they viewed this as a critical success factor for their Weez and WoW initiatives.

5.2 Relating ECM issues to the concept of EA

EA promises to help organizations understand and express their businesses, structure and processes (Borbinha, 2007). It further promises to serve as a basis for describing both business and IT and the connections between the two and for rendering explicit existing mutual dependencies and the impacts of changes in either camp (Hanschke, 2010). EA could potentially help in making the enterprise model clearer and thus making it clearer what the ECM initiatives need to support from the point of view of the enterprise.

Based on my finding in the case studies, the EA view is not very present in practice. It might be related to the fact that EA initiatives may exist without the knowledge of project teams (Shah & Kourdi, 2007). Further, I found no indication that the concepts of ECM and EA are related in current practice.

As viewed above, ECM is a set of interrelated issues and it is important to have a basis that supports and make visible what needs to be done in the overall picture when changes happens. Both Aker Solutions and VAF mention challenges related changes in one place which leads to unexpected changes in other places because they do not have an overview of all existing interconnection and are unable to predict the impacts of all changes.

A challenge with ECM is that there is no single clear and common definition of the concept, how to do ECM and who should do ECM (Dillnut, 2006; Grahlmann, et al., 2011; Smith & McKeen, 2003; vom Brocke, et al., 2011). According to Hanscke (2010), EA has a similar challenge because the questions of why, what and how are essential to answer when introducing EA. Informant 10 highlighted the misunderstanding of the concept of EA; from his experience, EA is often used as a term when talking about IT architecture.

In addition to the lack of a universally accepted definition of EA, there is confusion related to the related organizational roles. EA involves a set of organizational roles (Shah & Kourdi, 2007). Based on the EA consultancy experience, in practice there is a misunderstanding about

the role of enterprise architects. Using the hierarchical model of different architect roles related to EA could help clarify.

Using EA frameworks can help organizations tackle the increasing complexity of today's enterprises. In my cases, this is especially related to the fact that they often have projects in close collaboration with other companies and that the complete pictures of all stakeholders and how to facilitate information sharing in such cross-company projects is very challenging. EA can be a useful tool when planning to develop or implement specific solutions. According to Tamm et al. (2011), an EA guides solutions architect in providing them with finer specifications for operationalizing the specific systems they develop or implement. Some Enterprise architecture frameworks include methods for how to develop an enterprise architecture that addresses business need. Päivärinta & Munkvold (2005) highlight the lack of practical guidance on how to build the enterprise model and relating it to the content model when building ECM systems. Methods such as the ADM in TOGAF appear as a possible approach to close this gap.

According to Hanscke , having a working EA in place makes it easier to pull together data and information in order to take informed decision. This is related to some of the identified objectives in my cases.

EA can contribute to maintaining agility in organizations (Fallmyr & Bygstad, 2011). Some of the cases in my study mentioned this maintaining agility aspect as a rationale for their choice of ECM initiative.

6. Conclusions and implications

This master thesis investigated current ECM issues in practice and its relationships with EA and adds to the scare body of previous academic research on ECM in practice.

Major findings
The study showed that there is still a lack of a common understanding about the concept of ECM. Organizations seem to lack a holistic approach to their ECM initiatives and are taking a more functional approach focusing on individual initiatives like intranet, case and archival systems, web sites and so on.

A number of ECM issues were identified and systemized according to the major ECM issues framework. Through this systemiziation of the results, previous statements about ECM being about a set of interrelated issues are confirmed. However, the organizations themselves seem only partly aware of this fact. The cases in the study had varying enterprise models. Furthermore, the objectives and impacts sought with the ECM initiatives vary in the cases I studied, but mostly overlap with previously identified objectives and impacts, e.g. compliance, enhanced internal and external collaboration, information sharing and so on. However, new challenges related to previously identified objectives such as the increasing number of information channel and ECM initiatives involving principles of social media were identified. There still seems to be little focus on the content model although previous research indicates that understanding the role of the content itself is crucial in ECM initiatives. Attention given to the content life cycle was also scarce and focused on the creation and using of content phases which is, according to the cases, because it is in these phases that they generate money. The technological infrastructure did not always fully support the implementation of identified ECM objectives. Administrative issues received varying attention in the different cases and some of the cases had established service organizations to upkeep ECM and support the users. Change management issues were given the least attention of all the interrelated issues. The EA view is not very present in practice according to my findings, and I found no explicit indication that ECM and EA are being related to each other in current practice. However, when relating current ECM issues to previous research on EA, there appears to be some relationships between the two concepts.

Implications for research
My findings indicate that current ECM issues can be related to EA. Further research should put more focus on EA in relation to ECM. Does EA provide organizations with a more holistic view of their ECM initiatives? Can using an EA framework method help organizations develop their enterprise model and relating it to the content model when building ECM system? Research on the more social initiatives and what issues these involve compared to more traditional ECM initiatives should be studied. The content life cycle is given little attention and further research should look into how organizations can optimized their content life cycle management because of its relation to several of the objectives sought with ECM. The new challenges of how to handle the increasing number information channels, especially related to the content life cycle should be given more attention. More studies using the FEF related to ECM initiatives should be conducted.

Implications for practice
Gaining a more holistic approach to ECM and is recommended. Since organizations appear have a more functional approach to ECM, the FEF can be used as a tool to talk about ECM initiatives with the same approach as the organizations already appear to be think about it.

Combining FEF with application overlays is a good way for organization to get an overview of the ECM application landscape. Having such an overview could help highlighting missing functionalities providing the organization with valuable information about where efforts need to be done. The FEF combined with application overlays could also help organization determine required interfaces and integration between their different applications. Further, more attention should be given to the change management issues in order to optimize the fit between the fit between the different ECM issues. Organizations should consider EA initiatives in order to get a long-term view of the organization's processes, systems and technologies so that their individual initiatives can build capabilities and not just fulfill immediate needs. Using EA should also be considered used to guide solution architects in their development and implementation of ECM solutions.

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Appendices

Appendix 1: Interview guide

Who	
Organization	
When	
Where	
Duration of interview	
Type of interview (individual/group, telephone/face-to-face/e-mail)	

Introduction

About the master thesis
Part of a master degree in Information Systems at UiA Krs.
The deadline is in June 2012.

Important concepts

ECM - ***"Enterprise content management comprises the strategies, processes, methods, systems, and technologies that are necessary for capturing, creating, managing, using, publishing, storing, preserving, and disposing content within and between organizations"***

EA

- ***"The enterprise architecture provides a long-term view of a company's processes, systems, and technologies so that individual projects can build capabilities – not just fulfill immediate needs"***
- EA is basis for the strategic management of the IT landscape.
- *"EA guides solution architectures that are defined prior to specific development or implementation projects and which provide finer specifications for operationalising those systems"*

Research design
Just 2-3 sentences covering:

- Qualitative approach
- Case study – multiple organizations
- Semi-structured interviews

Other

Record the interview – get approval from the informant

Transcribe – inform the informant about that the interview will be transcribed

Confidentiality – clarify with the informant (potentially to be followed up after the interview if the informant can't answer about confidentiality…)

- Can I use the name of the organization?
    - If no, can you approve an anonymized description?
- Can I use the name of your role?

<other?>

Questions

# (time)	Topic	Question	Key words
1. (5 min)	About the informant	**Could you introduce yourself?**	- Name - Education - Previous relevant experience - Current position in the organization - Number of years in the current position - Number of years in the organization
2. (5 min)	About the organization	**Could you tell a bit about the organization/company?**	- Name of the organization - Industry/sector - History
3. (5 min)	ECM – definition	**Describe what you consider as ECM**	- How do you define ECM in your organization

4.
(20 min)
	ECM – initiatives	**What ECM initiatives do you have? / Describe the different ECM initiatives**	- What types (intranet, information searching, web content management)?
			- Why?
			- Strategies? (overall strategy?)
			- What roles are related to ECM in your organization?
			- Who were involved (what parts of the organization)
			- Are you conscious about what content you manage and why?
			  o What content do you manage? Why?
			  o What content do you not manage? Why?
			- Would you say that you have an integrated approach to managing all the organization's information assets? (cf. tools, processes and skills needed to deal with different forms of info.)
			- Bottom-up or top-down approach?
			- What information sources do you have (internal? External?)?
			- What parts of the ECM lifecycle is given most attention?
			- Do you have any taxonomy?
			- Policies?
			-

5. **(5 min)**	EA - definition	- How do you define EA in your organization?	- *Virksomhetsarkitektur* - *Helhet*
6. **(10 min)**	EA – use/initiatives	- Do you use an EA framework?	- What EA initiatives do you have? - Why do you use EA? - How do you use EA? - How is involved with EA? - If you don't use an EA framework, have you considered any? - No EA: what do you do? (related to EA issues...) -
7. **(10 min)**	ECM&EA	**Do you see a relationship between EA and ECM? What? Why?**	- Was the EA considered for the ECM initiative(s)? - Was the enterprise architect a part of the ECM project? - What was the role of the enterprise architect in the ECM project? -

8. **(2 min)**	Wrap-up	**1. Do you want to add something?** **2. If necessary, are you available for answering follow-up questions by email or phone?**	