

Electronic Content Management Systems Use and Implementation in Highly Integrated Businesses

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Abstract: Many organizations have invested large amounts of money in implementing Electronic Content Management Systems (ECMS), which refers to the technologies used to manage, store and deliver business-related information across the organization. However, research indicates that many ECMS implementations fail to yield the kind of information sharing that is useful for business process executions. From the IS literature point of view, this is not because of the technologies, but it is due to ways ECMS is implemented and used which is not aligned with organization's way of doing business. Therefore, this paper explores how organizations that emphasize high integration and low standardization of business processes termed as Coordination use and implement ECMS to support its business operations. We suggest guidelines that explain the ways ECMS should be used and implemented in Coordination organizations that include (1) ways to use ECMS for sharing business process-related information, (2) ECMS infrastructure, (3) ways to manage content and (4) administration of ECMS. These findings are grounded in the analysis of qualitative data from one case study. The finding is significant for business and IT managers because it will guide them with ways to use ECMS and gain more benefits from these types of systems.

Key words: Electronic Content Management Systems (ECMS) • Business operating model • Information sharing • Business process related-information

INTRODUCTION

The need to efficiently managed organization's information is not a new topic in information systems (IS) discipline. Many researchers have investigated various concepts for managing organization's information such as document management [1-3] and records management [4, 5]. Later on, with the adoption of Internet, new concepts for managing digital information are developed for example the web content management [6]. Continuing this, the latest development is now term as electronic content management (ECM) [7]. The Association for Information and Image Management (AIIM) an international industry focusing on ECM define this term which is also known as ECMS as

"the technologies used to capture, manage, store, preserve and deliver content and documents related to organizational processes."

The benefits of having ECMS as promised by the vendors seems endless [7, 8]. One of it is that, it has been claimed that ECMS can facilitate the sharing of information that supports business operations, *"the technologies used to create, manage, customize, deliver and preserve information to support business process"* [7]. Therefore, ECMS is supposed to enable the reuse of previously created business information during business process executions. However, it is still unclear how ECMS can actually handle that in practice [7]. A number of authors also expressed their views that there are no sufficient case studies published in the IS literature that

report on ways in which ECMS are used and implemented for sharing information that support business operations [8-12]. Hence, in this present paper, we claim that there is limited if any guidance for practitioners to understand how ECMS can actually be used and implemented for sharing information that support organization's business operations.

In this paper, we explore the ways in which ECMS is used and implemented for sharing information that supports organizations that emphasize highly integrated business processes. We use a qualitative, exploratory study to address the following research question: *"How does a Coordination type of business operating model influence the way in which ECMS is used and implemented for sharing business process-related information?"*.

In an attempt to find answers to this research question, we structure this paper as follows. First, we explain ECMS and previous research on ECM. Following this, we present the business operating model of Ross *et al.* [13] that explains how business process information can be shared using IT (including ECMS) to support business operations. We then proposed a research model to guide our empirical study and followed by the method used to test this model. Next, we present our findings and discussions followed by a conclusion.

Research Background: ECMS is *"the technologies, tools and methods used to capture, manage, store, preserve and deliver content across an enterprise"* [14]. From this definition, it first explains that ECMS exist as a combination of different technologies to manage content [15-19]. Dillnutt [16] and Jenkins [17] describe a number of components of the technologies that underpin ECMS, which are: content management systems, document management systems, records management systems, collaboration technologies, portal technologies, workflow systems and search and retrieval capabilities.

Although ECMS vendors claimed that ECMS can manage the sharing of business process-related information [19, 20], Vom Brocke *et al.* [7] stressed that, practitioners need to first understand the way their business operates. This is because, sharing using ECMS does not happen by just putting and introducing the technology to the organization. Practitioners need to understand the business process and find ways to how ECMS can support the sharing that occurs. In other words, ECMS use and its implementation needs to be aligned with the nature of the processes of the implementing organization [7, 21] and is further explained below.

ECMS Use and Implementation: Many researchers found that the way ECMS is implemented varied among cases and apparently depends on the business area in which the enterprise is operating [8, 12, 21]. It varies because, the implementation of ECMS support the sharing of different types of content to accommodate different business situations that occur in various types of organizations.

To investigate the ways in which ECMS is implemented in different types of organizations, we look at three dimensions of ECMS implementation described by Paivairinta and Munkvold [8]. The three dimensions include the ECMS infrastructure, the way ECMS content is managed and the administration of the ECMS.

Furthermore, to understand how different types of organizations use and implement ECMS for information sharing, Paivarinta and Munkvold [8] mention that there is a need to also look at the organization's enterprise model. This happens because, the ways in which sharing happen is in turn driven by an organization's enterprise model. They mention that an enterprise model is: (1) a shared idea about what needs to be done in an enterprise, (2) represents an idea of the business, (3) specifies required operations within the enterprise, (4) explains how the operations reach selected partners and customer networks and, (5) describes the user roles and rights in the operations.

However, a literature gap exists where there is no enterprise model identified in the ECM literature that can fully represent all types of organizations [8, 12]. Considering this challenge, we select a mature model that highlights how IT underpins a firm's process architecture known as the business operating model of Ross *et al.* [13] as the enterprise model for explaining how ECMS is used for sharing business process-related information. The Business Operating Model is further explained in the following sub-section.

The Business Operating Model: Two dimensions are used to classify the business operating model [13] of firms, (1) the level of standardisation of business processes and (2) the level of integration of business processes. The standardization of business processes and related systems means defining exactly how a process will be executed. The result of standardization is a reduction in the variability of processes. On the other hand, the integration of business processes links the processes between business units through shared data and information. This sharing of data and information between processes enables end-to-end processing.

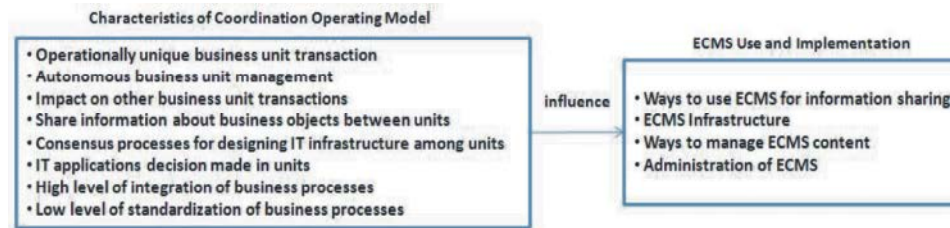


Fig. 1: Influence of Coordination Operating Model on ECMS Use and Implementation

The combination of these two dimensions represents a two-dimensional business operating model with four quadrants namely *Replication*, *Coordination*, *Unification* and *Diversification*. Every operating model has its unique characteristics [13, 22]. Relating to this, we argue in our prior work that the four types of operating model will use and implement ECMS in unique ways for sharing information that supports the organization's particular type of business processes and its unique characteristics [22]. In the following subsection we focus and explain about the characteristics of *Coordination* operating model.

Characteristics of Coordination Operating Model: *Coordination* calls for high levels of integration but little standardization of processes. In this type of organizations, the business units share information about business objects such as customers account history, products information and suppliers and partners contact details. It is important for the business units to share these types of business information because the organization's processes are mostly integrated and linked between units. The examples of integrated processes are integrated customer service, cross-selling and transparency across supply chain processes. In this type of organization, any technology that allows information sharing between units is crucial in order to complete the inter-units integrated processes.

As mentioned, we intend to explore the relationship between the characteristics of *Coordination* operating model and the way ECMS is used and implemented in this type of organizations. Therefore, we build a research model to explain the link and are discussed in the next section.

Research Model and Method of Study: Based on the preceding key concepts discussed in the previous section, an initial research model in Figure 1 is developed to guide our empirical study. The model is used to explore

the relationship and to explain the link between *Coordination* operating model and the ways in which ECMS is used and implemented for sharing information that supports this type of organizations' way of doing business.

This exploratory research followed a case study approach using methods and approaches detailed by Yin [23] and Miles and Huberman [24]. A case study protocol has been developed which included the questions for the semi structured interviews and the coding schemes for the data analysis. The initial research model shown in Figure 1 has guided the data collection and the analysis phases [25].

Case study was conducted in one *Coordination* types of organizations. The case organization uses ECMS as a platform for sharing information. Seven semi-structured interviews were conducted in October 2010 with the employees that include business managers, HR personnel, IT managers and executives who use ECMS in their daily work. Each interview lasted approximately 60 to 120 minutes and was followed at a later stage by a series of observations, follow-up interviews and emails. In addition, other sources of data were also collected and analysed for example company newsletters and business presentations to triangulate the findings.

With the consent of the participants, all interviews were audio recorded while field notes were taken during observations. Data was transcribed after the interviews. The transcribed data was analysed by finding common themes and descriptive codes to generate general and specific themes using the Atlas.ti software tool [24]. Themes and sub-themes were then linked to the initial research model (Figure 1). The next section describes the case in more depth and reveals how participants actually use and implement ECMS for sharing information.

Case Study Analysis and Findings: The case study was conducted in one of the private university in Malaysia.

At the point when the interview was conducted, ECMS has been introduced in the university for 9 months. However, one of the managers admitted that staffs are still reluctant to use the ECMS, *"We hardly see people use the system. Many staff just hates to learn how to use the new system."* One of the staff explains why this happens, *"First we were introduced to the EduPortal then the EduNet and now the management wants us to use the content management system. How can you expect us to use so many systems?"*.

Ways in Which ECMS Is Used for Sharing Business Process-Related Information: First, we studied their 'application for research grants' process. It is found that, if academic staffs want to apply for a research grant from the university, they have to send their application to the Research Enterprise Office. One of the academic staff explained about the process,

"To apply for a research grant, staffs have to fill in the form and attached it with other supporting documents such as the research proposal and budget for the entire project and submit it to the Research Enterprise Office in EduShare [ECMS]. The application will be reviewed by the head of department. Then, it will be reviewed and endorsed by panels from different academic departments. After the application is endorsed by the panels, it will be reviewed and approved by the Research Enterprise Office manager, the finance manager and the head of the academic"

This process illustrates the way the ECMS is used for sharing information related to a work process known as the 'application for research grants' between business units. However, it was mentioned that, not all staff use the system to apply for research grants. This happens because,

"Mrs A. and Mr Az who are the Research Enterprise Office leaders still accepts hardcopy submissions and at the same time they asked for the same grant application to be send via email. These are redundant of work and this is what staff hates doing."

Second, we investigated another process which is known as the 'auditing'. During this process, academic staff will share their course portfolios in the ECMS. This is crucial for the Quality Assurance department's staff to

audit all courses offered to students. One of the Quality Assurance staff explained about the audit process,

"Lecturers share their course portfolios in EduShare [ECMS]. The portfolios has information such as student's assessments, assignments, exam questions, activities involved, attendance, marks and so on. It is reviewed and approved by the head of department. Our task is to ensure that these courses adhere to the guidelines stated by external bodies such as the Malaysian Qualification Agency, Quality Management System, Jabatan Audit Negara, EAC and Washington Accord. When auditors from these agencies visit us, I will show them the course portfolios in the system."

This process illustrates the way in which ECMS is used for sharing business objects related to courses offered between business units. However, many academic staffs are reluctant to use the system and one of the reasons is that, *"The auditor still wants to see the hardcopy evidences. Since there are a lot of documents, I rather make the hardcopies version and not another version in the system. It's too much."*

ECMS Infrastructure: Following this, we investigate the design of their ECMS infrastructure.

Centralized ECMS Space and Sites for Business Units: We found that the ECMS has a centralized space accessible to all staff in the university. Besides this, there are also sites for each academic and management department for sharing information within the department. However, the IT executive explains that staff in certain department has not started using the ECMS since *"Currently, we have a few sites ready for some departments. We are in the midst of completing it. Since we have not created sites for many departments, they can still share documents in EduPortal and EduNet [other application]."*

Integration with Other Business Applications: The ECMS are not integrated with some of the business applications, as one of the staff explained, *"In EduShare we share our publications, in e-prints [another application] we also share our publications, we also have CV online [another application] and that is where we share our publications too. It is annoying to key in our publications details many times in different systems!"*.

Design of the ECMS Infrastructure: The ECMS is built on the Local Area Network and is accessible to all staff when they are in the university. However, some staff mentioned the need to have access from outside the university for example from home and anywhere else, *"It is better if I can access the system from anywhere and not only in office, which means I don't have to wait till I am back to office to be able to upload a document."*

Ways Content Is Managed: Next, we looked at the ways their content is managed in the system.

Open and Closed Content: Information in the centralized space is accessible to all academic and management staff. In this centralized space, staffs share information such as university news, updates and calendar of events. They also share knowledge for example tips and lesson learnt on how to secure a research funding from private organizations and government bodies.

On the other hand, in the unit's sites, content are mostly meant for sharing within a particular department. For example, in the finance department's ECMS site, they share information such as the procurement requests and items-to-order listing with staff within the department. Besides this, in the unit's site, there is also information to be shared organization-wide. For example, in the IT & Media department's site, they share information about the services they provide to all staff in the university.

However, one of the staff mentioned that, there is a need to have a space for special interest groups that combines people from various departments to share information and collaborate,

"Knowledge Management [KM] course is offered to staffs. Facilitators that teach this course share teaching materials and presentation slides in a site known as KM. This course is also offered to students. However, the lecturers teaching this course cannot access the KM site because they are not the facilitators. There are also staffs from the HR department who are interested to read KM articles, but they can't do that because they are not the facilitators."

Taxonomy: During the interviews, staff explained that the taxonomy structure is not well designed. As one of the staff said, *"Whenever I enter EduShare and wanted to find a document, I fail to get what I am looking for! It is very confusing to search for a document inside here."*

They pointed out that it is very crucial to have a good taxonomy structure, *"People don't mind using a new technology, provided that the content needed is there, useful and need to have a well-structured taxonomy and meaningful folder naming."*

Access Rights to Information: It is found that there is no one responsible for managing the access rights and permissions to documents. Further, most of the respondents does not know how to set the access right permission to a document and is not aware of it, *"I thought I should just upload the document and it is not my responsibility to set whether it is for public view or not. I guess it is the IT department's responsibility or maybe I am wrong"*

Administration of the ECMS: We also look at the administration of their ECMS to further understand why staffs are not utilizing the technologies.

Roles and Responsibilities: From the interviews, we learnt that there is only one person managing and supporting the ECMS. When we interviewed the person managing and supporting the ECMS, he mentioned that, *"We seriously need to have a unit handling ECMS with clear responsibilities. For example there should be a dedicated staff handling data and information management. It will be better if there is one manager and few executives."*

Policies and Guidelines for ECM: From the interviews and as explained in Section 4.1 we noticed that there is no clear standards and procedures for content management introduced to users, for example it was mentioned that, *"There is no clear policies and guidelines about what needs to be shared in the system. For example, there is no clear policy on how staff should share their research grant application in the ECMS. Since there is no policy, the heads of the Research & Innovation Office can't force staff to submit their application in the system and reject any hardcopies and email submission."*

Proper Planning for ECM: In this case, it was apparent that there is no proper planning for content management, as explained by one of the senior executives, *"Our project has started 6 months earlier before EduShare was introduced to us. So the 6 months documentation is not in the EduShare yet. That is one of the reasons why EduShare is not being heavily used. EduShare should be introduced earlier."*

Table 1: Guidelines for implementing and using ECMS in Coordination organizations

<p>Ways to use ECMS for sharing business process-related information</p> <ol style="list-style-type: none"> 1. Use the ECMS for sharing information about work processes between business units. Information about work processes can be documents related to work for example project documentations. 2. Use the ECMS for sharing information about business objects between units. Examples of information about business objects are student marks, item-to-order list and vendor listing.
<p>ECMS Infrastructure</p> <p>Have a centralized ECMS space, sites for business units and space for specialized projects/groups</p> <ol style="list-style-type: none"> 1. A centralized ECMS space to share information organization-wide. 2. Dedicated site/space for each business units for sharing information within the business unit. 3. Space for specialized groups/projects - This space is for staff from different units to collaborate and share information related to projects or special interest. <p>The ECMS should be seamlessly integrated with other business solutions with a single sign-on.</p> <p>The infrastructure of the ECMS should cover all business units and accessible via the Internet.</p>
<p>Ways Content is managed</p> <ul style="list-style-type: none"> • Open and Closed Content <ol style="list-style-type: none"> 1. Content in the centralized space should be available to all staff for sharing information such as HR policies and business forms (i.e.: travelling request form, claim forms). 2. Content in the unit's site should be available to staff within the unit to share documents such as department's minutes of meetings and status reports. Staff from other units may be granted access to some of this information if found necessary. 3. Content in the group/project space is meant for specialized project or group to share information and to collaborate. For example, project team members from various departments can share information related the projects (i.e.: reports, timelines and activities). <ul style="list-style-type: none"> • Taxonomy - There should be a logical and conceptual structuring of both the organization and business unit's content resources. Taxonomies are necessary for users to navigate through structured content collections and to conduct effective searches. • Access Rights to Shared Information <ol style="list-style-type: none"> 1. There should be a person who understands and manage the access rights to organizational and unit's information. 2. Authors should be aware of how to set the access rights permission and who should be given access to read that piece of document before uploading it to the ECMS.
<p>Administration of ECMS</p> <ul style="list-style-type: none"> • Clear Roles and Responsibilities for ECM - New roles for administering the ECMS should be created for example content managers, technical support staffs, administrators for the centralized space and for each unit's site/space and custodian for every application that links to the ECMS. • Policies and Guidelines for ECM - There should be policies and guidelines for ECM and staff should understand the policies and adhere to it. If found necessary, each departments can create policies for their unit's site and include policies such as ECMS usage, access rights and copyright policies. • Adequate resources for ECMS - Staff should be introduced to ECMS platform which is completely ready for use. For example, there should be proper folder structure, space for sharing and technical support staff. • Proper planning for ECM - There is a need to plan for the ECMS implementation and include phases such as pilot testing, user acceptance test, introduction to the ECMS and user training stage.

Adequate Resources for ECM: As mentioned in Section 4.2, the ECMS is not fully ready to be used by every department. Due of this, many staff are reluctant to use the system.

Based on the results from this case study, the evidences indicate that, to make ECMS works in Coordination types of organizations, ECMS should be used and implemented in certain ways for sharing information that supports Coordination organizations' way of doing business (Table 1). These elements will be discussed in further detail in the next section.

DISCUSSIONS

Based on our findings, it is apparent that the ECMS was underutilized. It is believe that it is not because of the technology but it is due to the way the ECMS is implemented and used which is not aligned with the

organization's way of doing business [12]. Therefore, our study suggests that the way ECMS is used and implemented needs to be aligned with the nature of the processes of the implementing organization, supported by other studies [7, 8, 21]. Having said that, we analyse the way ECMS is implemented and used in the case organization and recommend solutions that can improve the way ECMS is used, as presented in Table 1. It is hoped that companies suffering from underutilization of ECMS can follow these guidelines. Other *Coordination* companies which are about to use and implement ECMS may also benefit from these guidelines.

CONCLUSION

In this paper, the research question, "*How does a Coordination type of operating model influence the way in which ECMS is used and implemented for sharing*

business process-related information?" is addressed. In an attempt to answer this question, a case study was conducted in an organization. Findings indicate that to implement and use ECMS to support highly integrated business processes, carefully consideration should be given to these areas: (1) ways to use ECMS for sharing business process-related information, (2) ECMS infrastructure, (3) ways to manage content and (4) administration of ECMS.

It is hoped that the guidelines presented in this paper can help IS researchers to understand about the use and implementation of ECMS from the business process perspective. It is also hoped that practitioners can use the guidelines for planning and implementing ECMS in any Coordination type of organizations. Practitioner may also use the guidelines to understand why ECMS is underutilized and thus solve the problems.

However, there are some limitations to the presented findings. First, data was collected from only one ECM-adopting Coordination organizations. Consequently, the guideline may not necessarily apply to other Coordination types of organizations in different business environments. Besides, it is very likely that some other ECMS use and implementation dimensions other than presented in this paper remained unexposed during the study. Other researchers may thus further explore more ECMS use and implementation dimension in the future. It is also important to note that this paper has not covered other types of organizations that emphasize different levels of standardization and integration of business processes. Since this paper is part of a larger research endeavor, future research will address these shortcomings.

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