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UNDERSTANDING THE USE OF ENTERPRISE CONTENT MANAGEMENT SYSTEMS (ECMS) IN DIVERSIFICATION TYPE OF ORGANIZATIONS

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Abstract

Enterprise Content Management Systems (ECMS) are often introduced in organizations without careful consideration of their support for organizational business processes. This paper explores the use of ECMS in a Diversification type of organization. A Diversification type of organization is characterized by low levels standardization and integration of business processes between business units. We followed a qualitative case study research approach to investigate the information sharing activities in a Malaysian oil and gas organization. The aim was to explore how this organization's ECMS support information sharing within and across business units. Findings suggest that for organizations with low levels process standardization and integration, ECMS can be used (1) as 'middleware' to access centralized and shared services, (2) to manage unstructured information and (3) to share open and restricted standardized processes information. The findings are significant for business and IT managers because it may guide them with ways to use ECMS and gain more benefits from these types of systems.

Keywords: Enterprise Content Management Systems (ECMS), business operating model, information sharing, business process.

1 INTRODUCTION

The benefits of having Enterprise Content Management Systems (ECMS) as promised by their vendors often seem to be endless (Bianco and Michelino 2010; Jenkins 2006; Paivarinta and Munkvold 2005; Smith and McKeen 2003; Vom Brocke et al. 2010). One of the claimed benefits of these technologies is that, they are *"... used to create, manage, customize, deliver and preserve information to support business processes"* (Vom Brocke et al. 2010). Therefore, it is believed that ECM technologies play a key role in the sharing of information that supports the execution of business processes. Despite a range of ECM literature that focus on organizations' business process structure and ECMS success e.g. (Bianco and Michelino 2010; Grahlmann et al. 2010; Reimer 2002; Vom Brocke et al. 2010), it is still unclear how ECMS can actually support the sharing of information about business processes in practice (Grahlmann et al. 2010; Vom Brocke et al. 2010). A number of authors have also expressed their views that there is insufficient case studies that provide the real evidences about how organizations use ECMS to share information that support their business processes (Andersen 2008; Bianco and Michelino 2010; Nordheim and Paivarinta 2004; Paivarinta and Munkvold 2005; Tyrväinen et al. 2006; Vom Brocke et al. 2011). Further, Bouwman et al. (2005) highlight that the study of ICT (including ECMS) use is critical since *"... the use of ICT is not simply the result of the introduction of a new application in an organization."* Therefore, in this paper we claim that there is limited if any guidance for practitioners to understand how ECMS can actually be used for sharing information that support the way organizations conduct its business, and thus it is significant to conduct a study on ECMS use.

The aim of this study is to investigate and provide explanation on how ECMS are used to share business processes-related information in organizations. By this we mean information to complete a business process (e.g., customer profiles, list of order) or information about the process itself (e.g., policies, procedure, guidelines).

We use the business operating model of Ross et al. (2006) to increase our understanding of how ECMS can actually be used to support two organizational business process dimensions namely (1) standardization and (2) integration. Process standardization refers to the exact way in which (or how) a process will be executed. Process integration refers to the linking of organizational business units through shared data and information to enable end-to-end transaction processing. Our study suggests that, depending on the level of standardization and integration of business processes, ECMS may be used in different ways to support the process requirements.

To further explore this idea we conducted a single case study in an organization that employs a low level of business process standardization and integration, that we call a Diversification type of organization. Thus, we address the following research question: *"How does a Diversification type of business operating model influence the way in which ECMS is used to share information?"* It is important to note that this paper is part of a larger research project and future research will cover other types of organizations that emphasize different levels of business process standardization and integration. This study contributes to the ECM research by enriching current understanding of ECMS use and providing new insights about the ways organizations may use ECMS to share business process-related information. Such an understanding has been absent from the literature and in practice.

This paper is structured as follows; firstly, we describe ECMS and previous research on ECM. Next, we present the business operating model of Ross et al. (2006), the research method applied in the case study and followed by the results. We then discussed the findings which followed by a conclusion.

2 RESEARCH BACKGROUND

Grahlmann et al. (2011) describe ECMS as "*.... the strategies, processes, methods, systems, and technologies that are necessary for capturing, managing, using, publishing, storing, preserving, and*

disposing content within and between organizations." They identify four main categories of functions that ECMSs support:

- *Access:* interface functions using the ECMS to retrieve content and use other functionalities
- *Process:* control and coordination functions
- *Service:* functions to capture, manipulate, use and publish content
- *Repository:* functions to store and preserve content

Based on the ECM literature we found that organization use ECMS in several ways that include (Dilnutt 2006a; Dilnutt 2006b; Grahlmann et al. ; Gupta et al. 2001; Paivarinta and Munkvold 2005), using ECMS (1) as 'middleware', (2) to manage the structured data, and (3) for internal and external collaboration. However, this list is not exhaustive. Consequently as indicated, this study is exploring ways ECMS is used and to provide explanation how these technologies can better support business operations. Specifically, it is our intent to focus on organizational processes and provide a deeper understanding of how ECM technologies can support the information sharing that occurs.

Paivarinta and Munkvold (2005) and Vom Brocke et al. (2010) explain that organizations use ECMS to share information in different ways. This is because organization share different types of content depending on the nature of their business (Grahlmann et al. 2009; Grahlmann et al. 2010; Paivarinta and Munkvold 2005; Tyrväinen et al. 2006). For example, Paivarinta and Munkvold (2005) found that logistics organizations (e.g. FedEx) often emphasize standardization in their operations. They use ECMS as a tool to ensure that every business unit shares and reuses processes (for instance, each unit follows the same invoice management process). They also found that other organizations (e.g. BOC Gases) emphasize integration across business units. BOC Gases is involved in managing intra-organizational projects to build plants. In their case, ECMS is specifically used as a tool to share documents and other types of information with subcontractors and business partners while completing their plants.

Therefore, Paivarinta and Munkvold (2005) raised the need to consider an organization's enterprise model in explaining how ECMS is used in organizations. Specifically, consideration of organization's enterprise model is crucial because the way in which sharing happens is in turn driven by the model. An enterprise model is (Paivarinta and Munkvold 2005): (1) a shared idea of 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 enterprise operations.

However, (Tyrväinen et al. 2006) argued that a comprehensive enterprise model has not yet been identified in the ECM literature that fully represents all types of organizations. They mention that, *"However, actual examples of how the enterprise aspect has been actually modelled ... remain rare in the field."* (Tyrväinen et al. 2006, p. 631) Thus, the challenge is to find a representation of an enterprise model that is more focused on organizations business processes. Considering this challenge, we selected a mature model that highlights how IT underpins a firm's process architecture known as the business operating model of Ross et al. (2006) as the enterprise model. With this model, *"Management can then organize ... IT responsibilities based on principles about how the company will operate most of the time."* (Ross 2005, p.2). IT in this paper refers to ECM systems.

3 BUSINESS OPERATING MODEL

An operating model is the necessary level of business process integration and standardization (Ross 2005; Ross et al. 2006):

- *Business processes standardization:* refers to how organizations' business processes should be standardized across operational units (e.g., business units, regions, functions). Organizations with a high level of standardization tend to have key business processes that are similar across all business units. Similarly, organizations with a low level of standardization have very few identical key business processes across units.

- *Business process integration:* refers to how organizations' business processes should be integrated across those units. The level of business process integration is evident from the degree of data and information sharing across and between processes and units. A high level of integration is indicated by a high degree of such sharing.

3.1 Types of Business Operating Model

The combination of these two dimensions represents a two-dimensional business operating model with four quadrants, Replication, Coordination, Unification and Diversification (Ross 2005; Ross et al. 2006):

- *Diversification operating model (low standardization, low integration)* – business units pursue different markets with different products and services. Units benefit from local autonomy in deciding how to address customer demands.
- *Coordination operating model (low standardization, high integration)* – Coordination types of organizations focuses on integration and creates single face to its customers or transparent supply chain without forcing specific process standards on its business units.
- *Unification operating model (high standardization, high integration)* – This types of organizations have centralized design. They pursue the need for reliability, predictability and low cost by standardizing business processes and sharing data and information across business units to create an end-to-end view of operations and a single face to the customers.
- *Replication operating model (low standardization, low integration)* – Replication types of organizations focuses on process standardization. Business units perform tasks the same way using the same systems to generate global efficiencies and brand recognition. However, units rarely interact and are not dependant on each other.

Ross (2005, p.1) mentions that *"... company's operating model guides IT..."* However, technologies as mentioned by Ross et al. (2006) differ so widely (e.g. ERP, SCM and CRM). Therefore, it is our intent to narrow the focus to a particular technology, which is ECMS.

The reason for focusing on ECMS is because these technologies can be considered as a new, emerging class of Information System (Grahlmann et al. 2009; Grahlmann et al. 2010; Munkvold et al. 2006; Paivarinta and Munkvold 2005; Vom Brocke et al. 2011; Vom Brocke et al. 2010). Since ECMS is considered as new technologies, there appears to be limited research on ECMS in the Information Systems literature (Grahlmann et al. 2010; Munkvold et al. 2006; Paivarinta and Munkvold 2005). With limited number of research, it is not clear how these technologies can be used. For example, it is not well explained which type of information can be managed by these technologies, functionalities needed and its data capacity (Bianco and Michelino 2010). Therefore, we intend to explore and contribute to this new field of Information Systems.

3.2 Diversification and ECMS Use for Information Sharing

As indicated, Diversification types of organizations' business units offer different products and services to different customers and differ in the ways they conduct their business. For example, Ross et al. (2006) found that the Carlson Company adopts a Diversification operating model. This organization has diversified business units which include Radisson Hotels, TGI Friday's restaurants, Carlson Marketing Group, Carlson Wagonlit Travel, Radisson Seven Seas Cruises and the Gold Points Reward Network. Other organizations that employ Diversification operating model include Johnson & Johnson (J&J), DuPont, Citicorp and General Electric.

Further, Ross et al. (2006) mention that although each unit in a Diversification type of organization runs its business independently, however, there can be opportunities for shared services and technologies across the organization. Specifically, organizations adopting this model have a shared technology platform (Ross et al. 2006) that includes services such as data centres, telecommunication networks, centralised vendor negotiations and helpdesks. These shared technologies provide

centralized services to business units within the organization. Further, in these organizations, information sharing between business units may not be necessary. Therefore, IT should allow the sharing of information only when needed. For example, some Diversification type of organizations may require the sharing of some standardized processes that include standard process for financial reporting, risk management and compliance (Ross et al. 2006).

In this study we aim to investigate whether ECMS and also practices associated with this technology can be used to: (1) support standardized processes organization-wide and (2) enable the sharing of information about some standardized processes organization-wide, as depicted in Figure 1. The next section describes the research methodology and case study used in this research.

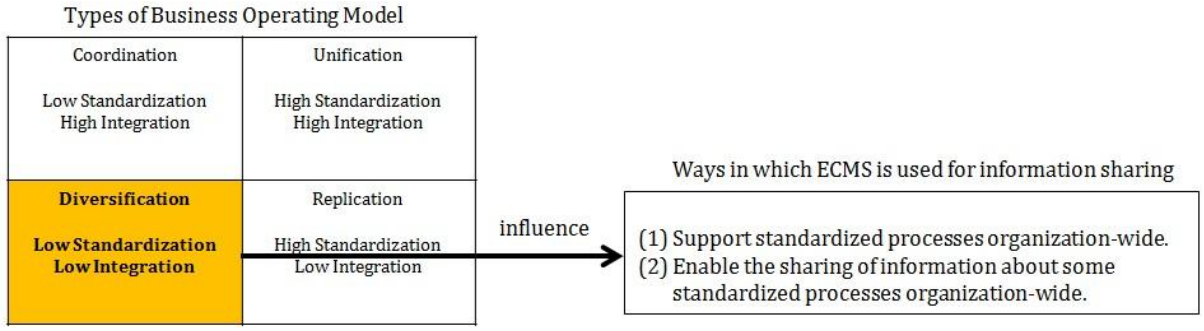

Figure 1. Influence of Diversification type of Operating Model on ECMS Use

4 RESEARCH METHOD

This exploratory research followed a case study approach using methods and approaches detailed by Miles and Huberman (1994) and Yin (2009). A case study approach takes advantage of the natural variations in business processes that would be extremely difficult to simulate in a laboratory environment. Since we were interested in gaining a deeper understanding on how ECMS is used for information sharing in Diversification type of organizations, we selected an oil and gas company and conducted interviews across four business units. The organization and business units were approached through contacts and selective networking based on recommendations from industry partners and colleagues. Personal contact was initiated through phone calls and emails to the IT manager and the human resource officer. This was followed by a brief project description in the form of email that described the purpose and aim of this study. Participants were then approached through contacts, based on the recommendations from the IT and business managers and we also used the 'snowball' strategy (Patton 1990) to select potential informants.

Two stages of data collection were conducted. Stage 1 was conducted in October 2010 for two weeks. Semi-structured interviews were conducted with 15 employees across four business units. A second stage of data collection using observations followed in November 2010 for a week. Over the course of this study, 15 participants were interviewed and some were observed as presented in Table 1. Towards the end of Stage 2, interviews were followed by a series of follow-up interviews and emails. With the consent of participants, all interviews were audio recorded while field notes were taken during observations. In addition, data was also collected using sources such as company newsletters and business presentations during both stages. This data was analysed to triangulate the findings.

Data gathering concentrated on the ways in which ECMS is used for sharing information that support business process executions within each business units. In particular, data collection is focused on the topics of experiences with the ECMS technologies, work processes that associated with the use of ECMS, the way ECMS is used for information sharing, the challenges associated with the use of this technologies and previous experiences in completing their work process before ECMS was introduced. We also sought information on the business operating model employed by the organization, the rationale for adopting ECMS, who implemented the technologies, who handles maintenance and

support, when were the ECMS implemented and the number of years they used the systems as shown in Table 2.

Business Unit	Job Title	Duration of Interview	Other Sources of Data
In-house Consulting	KM Unit Head	1 hour 15 minutes	Observation, informal discussion, email
	KM Unit Executive	1 hour 10 minutes	Observation, informal discussion, email
	KM Unit Executive	30 minutes	-
	KM Unit Executive	1 hour 15 minutes	-
Human Resources	HR Officer		
	HR Officer		
Oil Management Unit	Information Management Manager	1 hour 5 minutes	Observation, informal discussion, email
	Information Management Executive	30 minutes	-
University	Lecturer	1 hour	Observation, informal discussion, emails
	Lecturer	40 minutes	-
	Senior Manager Information Resource Centre	48 minutes	-
	Senior Executive Information Resource Centre	1 hour 10 minutes	Observation and informal discussion
	Information Resource Centre Staff	1 hour 5 minutes	Observation and informal discussion
	IT Officer	58 minutes	Observation, informal discussion, emails
	Manager	30 minutes	Follow up interview

Table 1: Case study details: business units, roles, duration of interview and other sources of data

The interviews are transcribed and detailed summaries and individual case study reports have been created for each business units. These reports also included the results of coding the elements of the research model (See Figure 1). Both the summaries and reports have been checked and authorized by one of the key respondents from each business units who have proven to be reliable and who are in the position to reflect on the case study (Miles and Huberman 1994).

Business Operating Model	Initial goal for implementing ECMS	Who handle the implementation	Who maintain the ECMS after implementation	When was ECMS implemented
Diversification - PT focus on oil and gas business and it has many other business units that venture into other areas that include transportation, maritime, education, research and trainings and automotive. It was evident that PT has diversified business units in many fields.	- To provide a single, standard and unified place for sharing information and knowledge. - To collaborate across business units. - To gather individual's and units' information and making it centrally available.	Internal ECMS team (act as in-house consultant) and they work with an external consultant ECMExpert (a pseudonym).	- ECMExpert - handled technical support (e.g., maintaining hardware, network and servers). - The internal ECMS team handled non-technical support (e.g., on-going user trainings, continuous enhancement) and maintained PT's centralized ECMS. - Every unit (e.g., ad hoc team, a small team, appointed staffs) maintained its local ECMS.	April 2006

Table 2: Background data for case study site

Reliability of the research process was ensured by a combination of steps including immediate transcription of all interviews and keeping a record of the process of data analysis and interpretation. Further, the transcribed interviews were sent back to the participants for checking to improve the validity of the results.

5 CASE DESCRIPTION

PT (a pseudonym) is a large Malaysian oil and gas organization and is ranked among the FORTUNE Global 500® largest corporations in the world. The organization was founded in 1974 and has its headquarters in Kuala Lumpur. PT has several diversified business units that include marketing and trading, oil management unit, fertilizing centre, research and training centre, a private university, in-

house consulting, exploration and production unit, automotive engineering, maritime transportation and logistics provider.

5.1 PT employs Diversification Operating Model

According to the initial 1971 plan, PT focuses on petroleum activities. PT's initial goals among others were (1) to safeguard national oil and gas reserves, (2) to plan for both present and future national need for oil and gas, (3) to take part in distributing and marketing petroleum and petrochemical products, (4) to produce nitrogenous fertilizers and (5) to spread the benefits of the petroleum industry throughout the nation.

After sometimes, PT decided to venture in other areas that include transportation, education, research and trainings, maritime and automotive. The organization decided to diversify its business to other areas besides oil because of the possibilities that there would be depletion in oil resources and their determination to expand their efforts. At the time the interviews were conducted, PT has more than 30 businesses and it would be impossible to conduct case study in all of PT's business units. Case studies were conducted at four of PT's business units described as follows:

1. *In-house Consulting:* PT's in-house consulting unit provides consultancy support and services to all units in the organization. The consultants were experienced PT staffs who have worked for more than 20 years in the organizations, have involved in a number of projects and met other criteria. They were experts in various fields that include chemical engineering, health and safety, drilling and technology. Apart from conducting research, experts developed standard operating procedures and guidelines. These standard operating procedures are related to some of PT's key operations that include engineering value and improvement guidelines and operational capability standards. These experts also gave advice and provide guidance through phone calls, emails and meetings when needed by any other units.

2. *The Human Resource Unit:* The human resource (HR) unit of this organization is divided into two major divisions: one central HR located at the headquarters and dedicated HR divisions in each business unit. These HR sub-divisions have the responsibility of implementing policies introduced by the central HR division at each business unit levels.

3. *Oil Management Unit:* PT oil management unit is the resource owner who manages the organization's oil, gas and hydrocarbon resources. As the custodian and resource owner, the unit responsibilities among others include (1) managing the oil, gas and hydrocarbon resources, (2) plan and secure long term development of those resources, (3) develop incentives and arrangements to attract investment, and (4) managing all exploration and production activities.

4. *The University:* The University was established in 1997 when PT was invited by the Malaysian government to set up an academic institution. The university offers engineering and technology courses at undergraduate and postgraduate levels. The programmes offered include mechanical engineering, civil engineering, petroleum geosciences, information and communication technology and business information systems.

Other PT's businesses that are not covered in the case study include the trade unit, gas management unit, maritime transportation and logistics provider and properties management unit:

- *Trade unit:* involved in the distribution and sale of finished petroleum products. This unit is also responsible in managing the operations of PT service stations.
- *Gas management unit:* involved in the provision of gas processing and managing the transmission service. The unit owns and operates the gas pipeline for gas transmission.
- *Maritime transportation and logistics provider:* involved in ship-owning, ship-operating and other logistics and maritime transportation services and activities.
- *Properties management unit:* involved in the development and management of office buildings, shopping complexes and parks.

Therefore, it was clearly evident that PT has diversified its business not only focusing on oil and gas business but in other fields. This illustrates that the company satisfies the criteria of a Diversification type of organization.

5.2 Description of the ECMS in Use

The purpose of implementing ECMS in this organization was to provide a single and unified platform for employees to collaborate, share and manage information. These technologies were implemented and introduced in this organization since 2006 and rolled out to all its business units in 2007. The ECMS was built on a Microsoft Office SharePoint 2007 platform and was chosen for its flexibility and ability to be integrated with the organization's existing IT architecture. There was one overall centralized ECMS and several dedicated ECMS for each business unit. The content shared in the centralized ECMS was accessible by all staff regardless of the unit they are located in. The objective of having the centralized ECMS was to enable organization-wide collaboration and information sharing across all business units. On the other hand, content shared in each dedicated unit ECMS are restricted to its staff thereby supporting information sharing and collaboration within each unit.

6 RESULTS

This section reports the ways in which ECMS were used in the four business units namely: In-house Consulting, Human Resources, Oil business unit and the University.

6.1 Business Unit 1: In-house Consulting

As indicated, Business Unit 1 provided in-house consultancy support and services to all units in the organization. From observations, it was seen that this unit used the centralized ECMS to share information. The consultants created revised and shared standard working procedures or guidelines in the ECMS, as explained by one of the participant, *"...engineers must follow the standard way of setting up the compressor or setting up the pipeline. This ECMS is where we share the standard procedures and it is for staff's [engineers] reference."*

Furthermore, observations indicated that there was a link in the central ECMS to 'Business Solutions'. This link provided a quick pathway from the central ECMS to other business applications. These applications handled various types of centralized services that can be used by all business units. One centralized service shown to us during observation was the "Request for Technical Services" application. This application was used by all employees to request for technical assistance from Business Unit 1. When someone submitted a request, he/she can view the status of the request through the system. One participant confirmed that having this application improved the way they work. She said that, *"We no longer had to answer calls, reply emails and keep records of each technical service that we attend. Just log-on to the ECMS, you'll get it."*

6.2 Business Unit 2: Human Resources

As mentioned before, the central HR division was responsible for the implementation of HR policies that include claims policies, collective agreements for non-executives, leave and other entitlements. From the interviews, we learnt that when the central HR division creates, revises or abolishes a policy, outcomes are shared with all HR at the unit levels. One of the HR executive at the headquarters mentioned that it was crucial to deliver any information to units' HR through the central ECMS,*" In our department (HR) having an ECMS is very crucial. It is important because we produce a lot of information that employees refer to most of the time. Before we use ECMS, we were having trouble in keeping track of all the versions of policies. Upon revising a policy, there is no proper place to keep track of the documents. So it becomes haywire! When the small HR units ask for the latest version of a policy, it takes some time for us to find which one is the updated or latest version. So, that is when we started using the central ECMS to share all HR related information especially HR policies and*

business forms. HR from every business units can easily grab the latest policies and forms without having to email or call us at the HQ."

We also learnt that HR at the headquarters provided HR shared services to all business units through a technology platform known as 'eCC6'. The 'eCC6' employed SAP technology and integrated HR modules including employment, career movements, benefits, compensation, exit management and many more. The HR officer highlighted that ECMS acted as a middleware that provided links to each of these SAP-based HR modules. We also noticed that they provided other types of shared services such as the helpdesk and training system of which some of these systems are NextG applications. We were told that the organization introduced shared services to cut cost and to reduce the number of HR staff. Finally, interviewees indicated that these shared services were actively used and most staff found that it was easy to access these services via the ECMS.

6.3 Business Unit 3: Oil Business Unit

This unit was responsible in managing PT oil assets as well as processing it into petroleum products for both domestic and export markets. This unit operated four refineries with a total refining capacity of more than 448,000 barrels per day. The petroleum products from these refineries were marketed to several countries including Indonesia, South Africa, Sudan and Thailand.

Unlike the aforementioned business units that used the central ECMS, we found that Business Unit 3 managed its own core business through a dedicated ECMS. Business Unit 3's ECMS was seen to be mainly used to share business-related information between divisions within the unit. The unit manager mentioned that unlike Business Unit 1 and 2, there were no need for them to share information organization-wide or with another unit. Therefore, having a dedicated ECMS was the best way to share restricted information within the unit.

From the interviews, we learnt that Business Unit 3's dedicated ECMS was used as a platform to share information about the unit's standardized processes. The manager showed us how they used the ECMS to share and published each division's business process workflows which were integrated into a complete business process framework. We were told that one of the main purposes of sharing the business process workflows was to achieve consistency across all divisions,*" These are the workflows. We can click the boxes and it will tell us what to do next and what need to be completed and such. That is how we create consistency in doing our work."*

Further, from our observations it was evident that the unit ECMS was also used to share information to complete a process between or across divisions. For example, to duly complete a staff recognition tracking process in a standardized manner, information about staff profiles, staff performance, and procedures to rate staff performance were shared among divisions' leaders within Business Unit 3. By sharing this information, leaders from various divisions could rate their staff who often worked in multiple projects headed by different leaders. Upon completion of such a staff rating, staff performance information will then be transmitted automatically through the ECMS to leaders in different divisions where particular staff served.

6.4 Business Unit 4: University

Part of this organization is a private university that offered engineering and technology programs at the undergraduate and postgraduate levels. This university has a dedicated ECMS similar to Business Unit 3 that served the University's different sets of customers (e.g., students), stakeholders (e.g., academic staffs and mentors) and business operations.

From our initial observation (day 1 at the university), we noticed that not many staff used the ECMS. We also noticed a few staff logging-on the ECMS for less than 5 minutes. One of the manager confirmed that many staff were reluctant to use the ECMS, *"We hardly see people using the system. Most of the staff just hates it [to use the ECM system]."* Another participant explained the reason why she felt reluctant to use the ECMS, *"I don't understand why we have to use the system. I know that it*

is the direction from the top management of this organization. It may be useful to other units but not to us in the university. We use the e-learning systems to share most of our stuff like teaching portfolios, student attendances, student assignments, student performance and so forth. I don't see the need to use the ECMS."

From interviews we learnt that the technology was introduced to the university just because PT top management wanted to promote a standardized ECMS across all business units. In addition, one of the senior managers admitted that there was no proper ECMS implementation planning. Due to these reasons, the ECMS did not suit the way the academic staff works. Further interviews revealed that most lecturers criticized the rigidity and cumbersomeness of some of the ECMS user interfaces. They preferred other systems e.g. e-learning which is clearly less problematic. One our final day at the site, the senior manager concluded that bringing in ECMS which is not carefully customized to lecturers' need had caused the implementation to be a failure.

The senior manager believed that these problems could be eliminated if the ECMS was customized to support the way the university operated. However, this was in direct contrast with PT top management's direction which was to implement and use standardized ECM systems across all business units. Although their in-house programmers tried to customize the ECMS to match academic staff way of doing work, it was difficult to modify the systems since it was implemented as a complete package. One of the managers was frustrated with the overall ECM project, he mentioned that,*" If I wanted to do some customization, the top management will be thinking whether the other business units will be using it too. So, we can't just request for any customization that suits our business needs. When the customization only meets our needs, management will see the cost of doing it as not worth it. However, not all units are exactly the same. We are unlucky, because in our case, it seems that the ECMS is not useful."* The manager also highlighted that there were a small number of other business units that requested for customization. However, he admitted that their requests were overruled by the top management's decision which was to introduce standardized ECM technologies throughout all business units.

7 FINDINGS AND DISCUSSIONS

This paper has addressed the research question: *"How does a Diversification type of business operating model influence the way in which ECMS is used to share information?"* Based on our case study findings, we found strong evidences which indicate that the way PT operates its business has influenced the way they used their ECMS. We found that PT has used their ECMS in three ways: (1) for sharing information about some standardized processes within business unit, (2) for sharing information about some standardized processes organization-wide, and (3) for sharing information to complete a process within business unit. This is further discussed in the following paragraphs.

First, as indicated in Section 3.2, we understand that some Diversification organization's business unit may need to standardize their processes within the unit. Thus, this has influenced the way in which ECMS is used where evidence shows that staff used their unit ECMS to share information about their unit standardized processes. For example, we found that in Business Unit 3, staff used their unit ECMS to share departmental business process workflows to achieve consistency across all divisions.

Second, we also understand that in some Diversification organizations, there are processes that need to be standardized organization-wide. Thus, this has also influenced the way ECMS is used where evidence indicates that PT central ECMS was used to share standardized engineering work processes and standardized HR processes (e.g., claim process) organization-wide.

Third, we found evidences which show that staff used dedicated unit ECMS to share information between/across divisions to complete a process. We found that in Business Unit 3, local ECMS was used to share data and information about staff's performance across divisions. With the sharing of this information, division heads could easily keep tracked and reviewed their staff performances.

Further, considering the unique ways in which ECMS were used across the four of PT business units, we found five key uses that emerge from the findings. Therefore, we suggest for Diversification type of organizations to use ECMS:

As middleware to access centralized and shared services: It was evident that ECMS can be used as a middleware that allowed seamless integration with other business applications that (1) automate processes, or (2) handle process workflows, or (3) provide centralized services. Although Grahlmann et al. (2011) mention that ECMS can partly or fully automate processes and handles process workflows, we did not find any evidences that show ECMS were used in that way.

To manage unstructured information: In our case, the centralized and localized unit ECMS were heavily used to manage unstructured information instead of structured information. This finding supports previous work that claim, *"ECM focuses on unstructured information that is free-form content that exists outside the confines of databases or system ..."* (Blair 2004). This can be attributed to the fact that structured information remains in its 'native' systems (e.g., ERP) and is only linked to unstructured information (i.e. invoice, business forms) stored in the ECMS when there is a need to do so. Typical examples of unstructured information managed by the case study's ECMS were standard working procedures, policies and procedures and manuals. Our findings clearly indicate that ECMS use in this organization was centred around activities to capture, manage, retain, store and deliver these types of information.

For sharing open and restricted standardized process information: Our findings clearly indicate that ECMS is a useful platform to share business process-related information that includes standardized process information. Two types of standardized process information were identified: (1) organization-wide standardized process information and (2) unit-specific standardized process information. A centralized ECMS is particularly useful for sharing organization-wide standardized process information (e.g., standard operating procedures and standardized HR procedures) and should be accessible to everyone in the organization. On the other hand, localized unit ECMS were found useful for sharing unit-specific standardized process information (e.g., internal document management procedures). In our case, most business unit leaders had very little interest in sharing their unit's standardized process information with other business units. Therefore, content in the unit ECMS should be restricted to unit staff only, as to keep the ownership of units' information.

To complete end-to-end transaction processes: Since Diversification type of organizations have low levels of process integration, it was obvious that there was no sharing of information to complete end-to-end transaction processing across/between units occur in our case organization. This can be attributed to the fact that each unit runs its own core business and there is no transactions being processed in one unit that needs completion in another. Consequently, there was no need to use ECMS to exchange information across and between units to complete specific processes. However, this may not be the case for other types of organization (i.e. Coordination and Unification). Therefore, in some other cases, ECMS may be used for sharing information to complete a process that starts in one unit and ends in another.

Allowing local use of ECMS: Business units in Diversification type of organizations may adopt other types of operating models that focus on different levels of business process standardization and integration (Ross et al. 2006). Consequently, they may use ECMS in different ways to suit its business operations. Thus, in some cases unit may require ECMS customization to accommodate their operations. Thus, we recommend for practitioners to implement ECMS with the ability to allow for required customization and configuration. Local tailoring that meets idiosyncratic needs of a differentiated unit can then be done either in-house or by a third party.

In summary, organizations are recommended to first analyze their specific levels of process standardization and integration. If the organization employs a Diversification model, a centralized and dedicated ECMS should be customized and/or rolled-out targeting any of the uses illustrated in Figure 2. In addition, if the dedicated ECMS requires specific customization, the ECMS should be designed and implemented to allow for this.

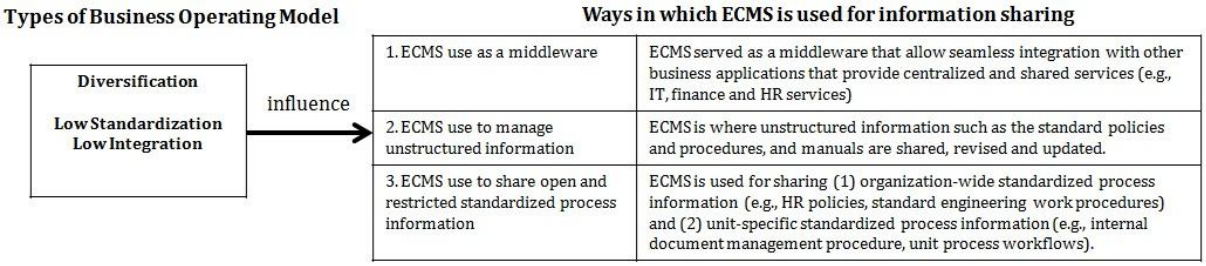

Figure 2. Influence of Diversification type of Operating Model on ECMS Use

7.1 Limitations

This paper uses the levels of business process *integration* and *standardization* (Ross et al. 2006) aspects to understand the ways ECMS is used for sharing information. Understanding the *integration* and *standardization* of business processes requires the study of information sharing that happens between processes and units. Thus our focus was at these processes and units levels. Although we did gather some data at the corporate level, we did not concentrate our efforts here. Therefore, we are missing some interesting findings that may emerge at the organizational level.

This study has two other limitations. First, we used a single case study of a Malaysian Oil and Gas organizations with four business units. Consequently, the results may not necessarily apply to other business environments. Second, the case organization studied was a large organization. Therefore, the findings may not apply to smaller and medium sized organization.

8 CONCLUSION

Recall that our study examines the research question *"How does a Diversification type of business operating model influence the way in which ECMS is used to share information?"* We found that in order to support low levels of business process standardization and integration, Diversification type of organizations can use ECMS in three specific ways: 1) as middleware that links to other frequently-used systems 2) as systems that manage unstructured information and 3) for the sharing of open and restricted standardized process information. However, certain business units may require ECMS to be used in different ways to support the specific process standardization and integration requirements adopted by the unit.

This study makes three contributions to the ECM literature. First, we demonstrate that the business operating model of Ross et al. (2006) is a worthwhile lens to understand how ECMS can be used to support organization's process requirements. Second, our case study provides evidence that the notion of business process standardization and integration may guide the understanding of ways to use ECMS to share business process-related information. Third, the case study provides a rich description and evidence on the ways a Diversification type of organization use ECMS.

This study also provides insights to practitioners on the specific value that ECMS may add in the sharing of information in different types of organizations (Replication, Coordination, Unification and Diversification). This is important especially for IT managers since they need to understand how ECMS use can be embedded in their firms' business processes to improve information sharing which in turn supports the way their organization operates. In addition, this may also guide business managers to understand ways in which they can gain more benefit from these types of technologies. This may call for specific governance activities and may dictate how ECMS are managed.

However, it is important to note that this paper has not covered other types of organizations that emphasize different levels of process standardization and integration. Specifically, this paper is part of a larger project and future research will address the other three types of organization (i.e. Coordination, Unification, and Replication).

References

Andersen, R. 2008. "The Rhetoric of Enterprise Content Management: Confronting the Assumptions Driving Ecm Adoption and Transforming Technical Communication," *Technical Communication Quarterly* (17:1), March, pp 61-87.

Bianco, F., and Michelino, F. 2010. "The Role of Content Management Systems in Publishing Firms," *International Journal of Information Management* (30:2), April, pp 117-124.

Blair, B.T. 2004. "An Enterprise Content Management Primer," *Information Management Journal* (38:5), October, pp 64-66.

Bouwman, H., Hooff, B.v.d., Wijngaert, L.V.D., and Dijk, J.V. 2005. *Information and Communication Technology in Organizations : Adoption, Implementation, Use and Effects*. Great Britain: Sage Publications.

Dilnutt, R. 2006a. "Enterprise Content Management: Supporting Knowledge Management Capability," *International Journal of Knowledge, Culture and Change Management* (5:8), pp 73-84.

Dilnutt, R. 2006b. "Surviving the Information Explosion [Knowledge Management]," *IEE Engineering Management* (16:1), March, pp 39-41.

Grahlmann, K., Helms, R., Brinkkemper, S., Hilhorst, C., and Amerongen, S.v. Accepted for publication. "Reviewing Enterprise Content Management: A Functional Framework," *Forthcoming European Journal of Information Systems*).

Grahlmann, K., Hilhorst, C., Amerongen, S.v., Helms, R., and Brinkkemper, S. 2009. "Categorizing Impacts of Implementing Enterprise Content Management Systems," Technical report from Utrecht University, Department of Information and Computing Sciences.

Grahlmann, K., Hilhorst, C., Amerongen, S.v., Helms, R., and Brinkkemper, S. 2010. "Impacts of Implementing Enterprise Content Management Systems," in: *Proceedings of the 18th European Conference on Information Systems (ECIS2010)*. South Africa

Grahlmann, K.R., Helms, R.W., Hilhorst, C., Brinkkemper, S., and Amerongen, S.v. 2011. "Reviewing Enterprise Content Management: A Functional Framework," *European Journal of Information Systems*), pp 1–19.

Gupta, V.K., Govindarajan, S., and Johnson, T. 2001. "Overview of Content Management Approaches and Strategies " *Electronic Markets* (11:4), pp 281-287.

Jenkins, T. 2006. *Enterprise Content Management Technology*. Canada: Open Text Corporation.

Miles, M.B., and Huberman, A.M. 1994. *Qualitative Data Analysis*. Sage Publication.

Munkvold, B.E., Päivärinta, T., Hodne, A.K., and Stangeland, E. 2006. "Contemporary Issues of Enterprise Content Management," *Scandinavian Journal of Information Systems* (18:No. 2), pp 69-100.

Nordheim, S., and Paivarinta, T. 2004. "Customization of Enterprise Content Management Systems: An Exploratory Case Study," in: *Proceedings of the Proceedings of the 37th Annual Hawaii International Conference on System Sciences (HICSS'04) - Track 4 - Volume 4*. IEEE Computer Society.

Paivarinta, T., and Munkvold, B.E. 2005. "Enterprise Content Management: An Integrated Perspective on Information Management," in: *Proceedings of the 38th Annual Hawaii International Conference on System Sciences (HICSS'05) - Track 4 - Volume 04*. IEEE Computer Society.

Patton, M.Q. 1990. *Qualitative Evaluation and Research Methods*, (2nd ed. ed.). Newbury Park, California: Sage Publications.

Reimer, J.A. 2002. "Enterprise Content Management," *Datenbanken Spektrum* (2:4), pp 17-35.

Ross, J. 2005. "Forget Strategy: Focus It on Your Operating Model," CISR Research Briefings. MIT Sloan CISR.

Ross, J., Weill, P., and Robertson, D.C. 2006. *Enterprise Architecture as Strategy: Creating a Foundation for Business Execution*. Boston: Harvard Business School Press.

Smith, H.A., and McKeen, J.D. 2003. "Developments in Practice Viii: Enterprise Content Management," *The Communications of the Association for Information Systems* (11), pp 647-659.

Tyrväinen, P., Paivarinta, T., Salminen, A., and Iivari, J. 2006. "Characterizing the Evolving Research on Enterprise Content Management," *European Journal of Information Systems* (15:6), December, pp 627-634.

Vom Brocke, J., Derungs, R., Herbst, A., Novotny, S., and Simons, A. 2011. "The Drivers Behind Enterprise Content Management: A Process-Oriented Perspective," in: *Proceedings of the 19th European Conference on Information Systems (ECIS2011)*. Helsinki, Finland.

Vom Brocke, J., Simons, A., and Cleven, A. 2010. "Towards a Business Process-Oriented Approach to Enterprise Content Management (Ecm): The Ecm-Blueprinting Framework," *Information Systems and e-Business Management*).

Yin, R.K. 2003. *Case Study Research: Design and Methods*. Sage Publications.

Yin, R.K. 2009. *Case Study Research Design and Methods*, (4th ed.). California, USA: SAGE Publications, Inc.