

Reviewing the Concept of Enterprise Content Management (ECM)

Mohamad Rahimi Mohamad Rosman
Faculty of Information Management
Universiti Teknologi MARA Kelantan Branch, Malaysia
{Malaysiarahimimr@uitm.edu.my}



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ABSTRACT: Content is simply information that is put to use through the process of repackaging and is then published for a specific purpose (i.e. text, image, 3D data, video, etc.). Organisations deal with various information assets, also known as 'content', to run their business operations and make important decisions. Managing content is always a challenge for an organisation. More content, particularly in digital form, that goes beyond the control of organisations is being produced. Enterprise Content Management (ECM) was initiated to help organisations manage their information assets. Over a period of 25 years, ECM has intermittently been the focus of attention due to difficulties in setting a solid research framework and the vagueness of the term ECM. Therefore, this research aims to provide a comprehensive analysis of the ECM literature to identify the current state of knowledge and future research directions. An ECM research framework is proposed to guide the literature review analysis. Based on the analysis, several important observations are highlighted and practical implications for further research are proposed.

Subject Categories and Descriptors

[H.3.1 Content Analysis and Indexing]; [Administrative Data Processing]; [H.5.3 Group and Organization Interfaces]

General Terms:

Enterprise Content Management, Enterprise Management, Literature Search, Enterprise Content Methods

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1. Introduction

Content, particularly in digital forms, is increasing at an incredible speed and extends beyond organisational control. Over 2.5 quintillion bytes of data have been created in the past two years alone (IBM, 2013). Digital content, such as that which resides online, has experienced a tremendous growth rate, from nearly 1,000 pages in the early 90s to over two billion pages in 2001 (Ektron Inc, 2001). Netcraft (2014) reported that the number of websites reached a new milestone of one billion sites in 2014. The rapid growth of digital content has led to the phenomenon of 'content chaos' (Long, 2015; Mancini, 2014). This has caused organisations to become deprived of their information assets as they cannot make effective use of them. Organisations depend on content repositories to help them produce strategic decision-making and analytical processes for market analysis. Subsequently, employees usually waste more than 30% of their time searching for the right information (Burnett, Clarke, Edwards, & Illsley, 2006). It is also important to note that 80% of content within the organisational context is unstructured (EMC Corporation, 2006; MacMillan & Huff, 2009; Mannix, 2010; Marlin, 2005; O'Callaghan & Smits, 2005). This implies that current enterprise applications such as Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), and Supply Chain Management (SCM) only utilise the remaining 20% of the structured content (Kunstová, 2010).

Subsequently, the challenge of managing content has led to the emergence of a new field of Information System (IS). Enterprise Content Management (ECM) was initiated to help organisations manage their information assets, particularly digital content. ECM systems (ECMS) cover Document Management (DM), Web Content Management (WCM), Records Management (RM), Digital Asset Management (DAM), Document Imaging, Business Process Management (BPM), Workflow Management, Repositories, Storage, Backup/Recovery, Search/Retrieval, and Collaboration. The Association for Information and Image Management (AIIM) defines ECM as “technologies used to capture, manage, store, preserve, and deliver content, and documents related to organizational processes. ECMS tools and strategies enable the management of an organization’s unstructured information, wherever that information exists” (Association for Information and Image Management). Enterprise Content Management helps organisations manage their digital content. Organisations view content as an asset that can increase profits and improve productivity (McGovern, 2004).

Research on ECM has spanned a period of 25 years, yet there are still opportunities for further study (Jaffar A. Alalwan, Thomas, & Weistroffer, 2014; Arshad, Bosua, & Milton, 2012; Mohamad Rosman, 2020a, 2020b; Mohamad Rosman & Aziz, 2018; Mohamad Rosman, Aziz, & Salleh, 2018; Mohamad Rosman, Mohd Salleh, Raja Yaacob, & Abdul Aziz, 2011; Paivarinta & Munkvold, 2005; Rickenberg, Neumann, Hohler, & Breitner, 2012; Svärd, 2013). Nevertheless, investment in ECM technologies is on an upward trend, from US\$3.5 billion in 1999 to a global market worth US\$5.4 billion in 2014 (Eid & Granetto, 2015), and USD 6.8 billion in 2018 (Woodbridge, Sillanpaa, & Severson, 2019). In contrast, scientific interest in ECM is still remarkably low (Mohamad Rosman, 2020b; Rickenberg et al., 2012; Tyrväinen, Päivärinta, Salminen, & Iivari, 2006) and has appealed more to practitioners than academics. The literature on ECM is relatively limited compared to other aspects of Enterprise Systems, and researchers have to use conference proceedings as their main source of literature (Rickenberg et al., 2012).

Building upon a number of previous studies on ECM (Jaffar Ahmad Alalwan & Weistroffer, 2012; Rickenberg et al., 2012), this study reviews and analyses the current state of the ECM literature. Previous works show a lack of a comprehensive analysis of the field and a lack of synthesis of existing ECM studies. In particular, there is a lack of understanding of how ECM has been studied, the benefits of ECM that have been identified, and the limitations within the current literature on ECM that can limit our current understanding in the field. Therefore, the research questions addressed in this paper are:

RQ1: How has ECM been studied?

RQ2: What are the benefits that organisations can expect from ECM?

This paper offers contributions in three ways. First, we introduce an ECM research framework to guide academics and practitioners in systematically exploring the fundamentals of ECM. Second, we present a comprehensive analysis of existing studies to identify aspects of ECM that require further attention. Third, we present a number of implications for future studies that will help advance the state of knowledge in this area.

The rest of this paper is organised as follows. In the next section, we provide a brief description of our literature search methodology. To guide our literature review, we propose an ECM research framework adopted from well-established ECM research frameworks (Paivarinta & Munkvold, 2005; Rickenberg et al., 2012; Tyrväinen et al., 2006). Then, we present an extensive review of the ECM literature and discuss the implications for future study. Finally, we conclude the paper and outline a number of the present study’s limitations.

2. Literature Search Process

In order to gain a greater understanding of the field of ECM for further research, a structured and systematic literature search (Webster & Watson, 2002) approach was

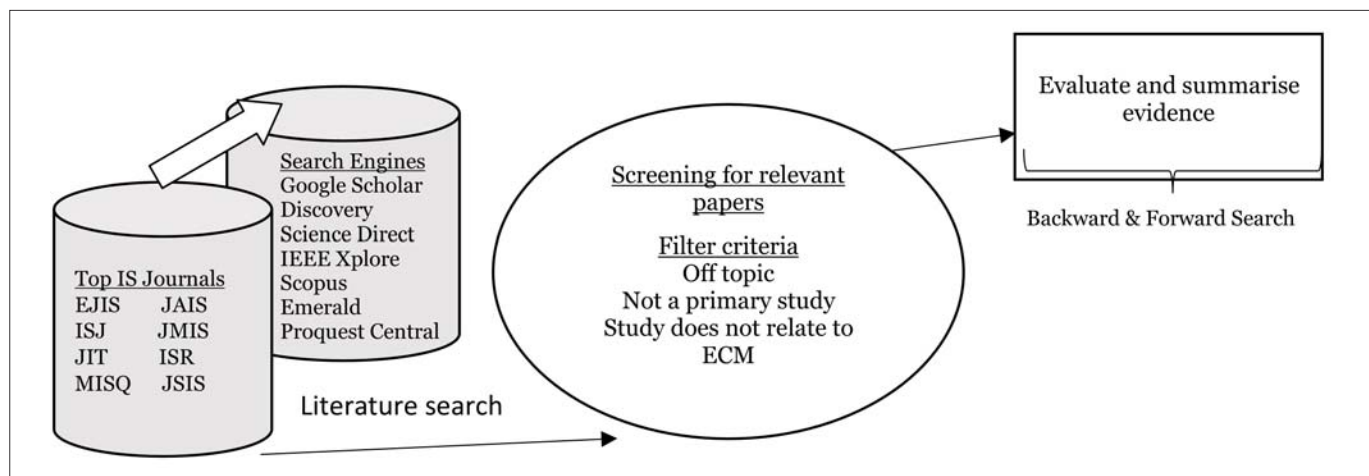


Figure 1. Literature search process

adopted. Webster and Watson (2002) recommend that: (1) a literature search should start with leading journals, it should perform a (2) backward search to consider the relevant literature, and a (3) forward search to determine articles citing the publication. Therefore, we performed a three-phase analysis for our structured literature search. Figure 1 shows the literature search process:

The first phase involves searching the literature for relevant ECM research papers. We used the following tools: leading IS journals' websites (European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of AIS, Journal of Information Technology, Journal of MIS, Journal of Strategic Information Systems, and MIS Quarterly), Google Scholar, Science Direct, IEEE Xplore, Emerald, Proquest Central, Scopus, and the institutional repository of the large academic library in Australia (Discovery). The keywords used were 'enterprise content management' and 'enterprise content management system'. The publications were limited to research papers, books, and theses (masters and PhDs). Some of the exclusion criteria included patent and citation (Google Scholar), non-research and biased publications (general review, technical papers, vendor reports, and white papers), and keywords occurrences within the articles (online databases and journals). The searches also excluded any publications not written in English. The total hits were recorded and exported to the referencing software EndNote X7. A total of 1148 publications were identified. In an attempt to remove duplications, this study utilised the 'EndNote X7 Find Duplicates' function in the referencing software and trimmed the results down to 563 hits. Each reference was then manually checked to remove further duplications and irrelevant topics based on the title and abstract. Finally, 171 papers were selected for a further filtering process in the second phase.

In the second phase, the publications were screened based on several screening criteria; (1) the study does

publication is without clear contributions to academics and practitioners. In the third stage, the publications were evaluated and summarised. The papers were read diligently and summarised based on three steps, adopted from Glaser and Strauss (1967). First, we skimmed each paper to determine the critical issues it was trying to convey. Second, we focused on the abstract, discussions, conclusion, limitations, and future work to determine the challenges and direction of the field. Third, we critically analysed each publication and summarised the potential research gap. Subsequently, Thomson Reuters Web of Science v5.17 was used to perform backward and forward searches. Finally, 135 papers were found relevant for this study, as shown in the following table:

Type of publication	Total
Journals	46
Conferences	59
Books and book chapters	19
Theses	11
* Full list of papers are provided in Appendix A	

Table 1. Distribution of publications selected for reviewing process

3. Proposed ECM Research Framework

To guide our review, we adopted three well-established ECM frameworks. Paivarinta and Munkvold (2005) introduce a major ECM issues framework that consists of the Enterprise Model, Objectives/Impacts, Content Model, Infrastructure, Administration and Change Management. The framework posits that an ECM system should support the objective and desired enterprise model of the organisation (process-based, team-based or project-

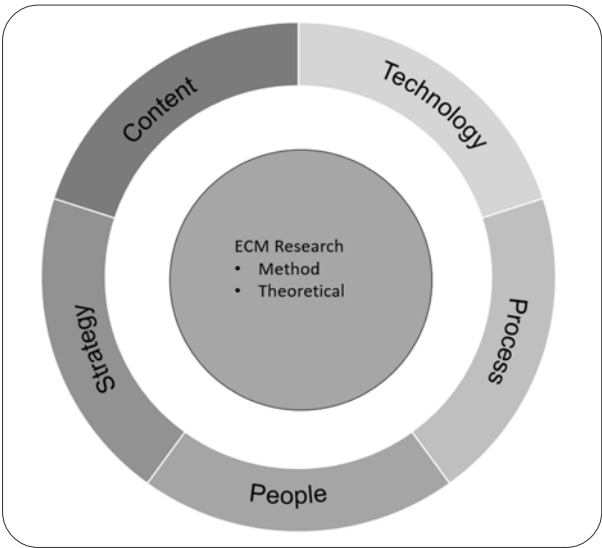


Figure 2. Proposed ECM Research Framework (adapted from Paivarinta and Munkvold (2005), Tyrväinen et al. (2006), and Rickenberg et al. (2012))

based, etc.). Tyrväinen et al. (2006) propose an ECM research framework that consists of four perspectives: content, technology, enterprise, and process, while Rickenberg et al. (2012) introduce an extended ECM research framework to stimulate research on ECM. We reviewed the model extensively and synthesised the key aspects of ECM covered, before categorising them into five dimensions: content, technology, process, strategy, and people. The proposed modified ECM research framework consists of two components: an outer ring that represents general themes (dimensions) of ECM research, and an inner ring that represents specific research aspects of ECM that are of interest. For this particular study, two research aspects are considered: Method and Theory. The following figure illustrates the proposed ECM research framework:

Dimensions: This study has identified five themes (dimensions) for ECM research: content, technology, process, strategy and people. The content dimension deals with managing the organisation's content in various forms (unstructured, semi-structured and structured), content lifecycle (creation, usage, storage, archival, disposal), metadata, and corporate taxonomy (J. Alalwan & Weistroffer, 2011; Bechini & Vetrano, 2013; Iverson & Burkart, 2007; Jan Vom Brocke, Jörg, Alexander, & Stefan, 2008). The technology dimension deals with technological issues and challenges such as integration, design, hardware, software, customisation, personalisation, standards, policies, and security (J. A. Alalwan, 2013; Benevolo & Negri, 2007; Haug, 2012; N. Junco, Bailie, & Ledet, 2005; Munkvold, Päivärinta, Hodne, & Stangeland, 2006; Souer, 2012). The process dimension involves the ECM implementation steps, ECM development, ECM adoption, and ECM lifecycle (Paivarinta & Munkvold, 2005; Thang Le, Rickenberg, Fill, & Breitner, 2014; J Vom Brocke, Simons, Sonnenberg, Agostini, & Zardini, 2010; Wiltzius, Simons, Seidel, & vom Brocke, 2014). The strategy dimension deals with ECM's strategic capabilities, such as incorporating decision-making, the use of ECM systems, justifying investment in ECM technologies, stakeholder identification, and facilitating information sharing (Jaffar A. Alalwan et al., 2014; Arshad et al., 2012; Nordheim & Paivarinta, 2006). The people dimension deals with the administration and management of ECM systems, such as assigning resources, communications among stakeholders, stakeholder involvement, training, change management, project champion, new work roles, and competency development (McNally, 2010; Scott, 2011; Simons, vom Brocke, Lässer, & Herbst, 2014).

ECM Research: This component refers to specific aspects of research that have been carried out in the field of ECM. These aspects were taken from Paivarinta and Munkvold (2005) and Tyrväinen et al. (2006). The method construct concerns the research design (i.e. case study, survey, design science, descriptive, conceptual, and experiment). Theory refers to the underlying causal explanations applied in a particular study.

4. Analysis of ECM Literature

In this section, we apply our proposed framework to assess the existing studies, based on ECM dimensions and selected research aspects (research method and theoretical background).

4.1 ECM Dimensions

ECM Dimension	Coverage (%)
Content	15
Technology	34
Process	14
Strategy	31
People	6

Table 2. Distribution of ECM research based on dimensions

Table 2 shows that a total of 34% of studies concerned the technology dimension, while another 31% were related to the strategy dimension. The process (14%), content (15%), and people (6%) dimensions have not been extensively explored by researchers. The people dimension in particular is often mentioned as the aspect that has been neglected most by scholars and practitioners (Jaffar Ahmad Alalwan & Weistroffer, 2012; Paivarinta & Munkvold, 2005; Scott, 2011; Tyrväinen et al., 2006), even though the success of a technology depend on users' acceptance (Scott, 2011).

4.1.1 Content

The strategic management of an organisation's content is the main focus of the ECM researcher (J. Alalwan & Weistroffer, 2011; Barnes, Goodwin, & Vidgen, 2001; Bechini & Vetrano, 2013). For example, J. Alalwan and Weistroffer (2011) suggest that the proper management of content is crucial for the decision-making process. Content should be managed in a manner that allows for faster data retrieval and analytical processing. Access to quality information helps organisations minimise risk when making decisions. Meanwhile, Barnes et al. (2001) and Bechini and Vetrano (2013) suggest that organisations must manage content based on the content lifecycle; create, review, store, publish/exchange, archive, and destroy.

Researchers have also called for the need to standardise organisational content (Galea, 2007; Gonzenbach, Russ, & vom Brocke, 2014; N. L. Junco & Bailie, 2004; Llorente, Rodriguez, Delgado, & Torres-Padrosa, 2013). Content is now available in various formats; structured, semi-structured, and unstructured. It is undeniable that studies have shown that 80% of an organisation's content is unstructured and in different formats (EMC Corporation, 2006; MacMillan & Huff, 2009; Mannix, 2010; Marlin, 2005; Nadkarni & Yezhkova, 2014; O'Callaghan & Smits, 2005).

Possessing unstructured content prevents organisations from leveraging value from their information assets. Thus, there is a need for a standardised, consistent content type. For example, Galea (2007) introduces the Content Interpreter concept, a system that allows the enterprise to leverage value from their content by making it available in comprehensible formats. The researcher argues that some of the most valuable content is not yet in a format that is accessible by Web 3.0 or the World Wide Web (WWW) database.

Furthermore, the challenges of managing content are also an important issue within the dimension (Benevolo & Negri, 2007; Scott, 2014; Simons et al., 2014). For example, Benevolo and Negri (2007) emphasise that organisations must find an answer to the challenges of managing, modifying and updating large volumes of information, and in particular, the issue of using the same content on different media. Without proper workflow management, organisations are susceptible to excessive redundant information (N. L. Junco & Bailie, 2004). Meanwhile, Scott (2014) and Simons et al. (2014) suggest that there is a need for content ownership, which should be established early, before the deployment of the ECM system.

4.1.2 Technology

The technology dimension is the main focus of ECM research. Two eras define the technology dimension. The first era focused on the development and deployment of ECMS. As content, particularly digital content, has gradually increased over time, organisations turn to ECMS as a solution to the problem of managing their information resources and reducing operating costs. For example, a study by Nordheim and Paivarinta (2006), Paivarinta and Munkvold (2005), and Munkvold et al. (2006) considered the implementation of ECM at a large Norwegian oil company (Statoil) to develop an enterprise-wide platform based on a product acquired by a commercial vendor. They argue that there is a need to investigate the commercial and open-source ECM software acquisition from the viewpoint of customers. There is also a need to integrate ECM with other solutions (portals, e-collaboration, web sources, business intelligence, etc.). Joha and Janssen (2010), meanwhile, have worked on the implementation of shared content management services in the public sector, which require a decision-making approach and a need to balance the management, technology, and content dimensions; this affects the potential benefits of content management.

The second era evolved around the organisational and technical aspects of ECMS. ECMS researchers view technology as an enabler, while a greater emphasis should be given to other aspects of ECMS technology, such as the development of new platforms and infrastructure (Katuu, 2012; Munkvold et al., 2006; Nordheim & Paivarinta, 2004; O'Callaghan & Smits, 2005; Tyrväinen et al., 2006). For example, Dhoub and Ben Halima (2013) have worked on identifying a collaborative ECM platform. They suggest that utilising cloud capability is more efficient than the

execution of a premise. Rats and Ernestsons (2013) also suggest that there is a need for a platform shift for ECMS, and that organisations may benefit from the use of cloud computing. Contrary to previous research, Klegová and Rábová (2013) argue about the possibility of using ECMS without the adoption of cloud technology due to severe risk while making enterprise content available on the Internet.

Researchers have also focused on the impact of ECMS on business processes (J. Alalwan, 2012; Allotey & Ojeabulu, 2011; Arshad et al., 2012; Bandorf, Yoshizawa, Takada, & Merbeth, 2004; Barnes et al., 2001; Haug, 2012; N. L. Junco & Bailie, 2004; Mohamad Rosman, 2020b; Nordheim & Paivarinta, 2006; Jan Vom Brocke, Simons, & Cleven, 2010). For example, Jan Vom Brocke, Derungs, Herbst, Novotny, and Simons (2011) and Jan Vom Brocke, Simons, and Cleven (2008) claim that both ECM and Business Process Management (BPM) are strongly related fields of research. Thus, there is a need to analyse business processes that identify content and its users (Mohamad Rahimi, Mohd Nasir, & Mohamad Noorman, 2019). The implementation of ECMS affects organisations' business processes, as employees are required to acclimatise to new ways of creating, storing, and publishing content. ECMS offers great potential for improving business process efficiency. J. Alalwan (2012) also agrees that the reengineering of business processing and stakeholder involvement are crucial aspects of ECMS implementation. However, several researchers claim that the use of ECMS does not affect organisation business process (Arshad et al., 2012; Nordheim & Paivarinta, 2006). For example, Nordheim and Paivarinta (2006) suggest that ECM involves less organisational adaption of the business process than ERP. Arshad et al. (2012) also claim that the use of ECMS may or may not improve an organisation's business processes.

4.1.3 Process

Within the process dimension, three main issues are identified. First, researchers have focused on the development of a comprehensive evaluation method for ECM adoption. For example, Munkvold et al. (2006) claim that there is a need to study the challenges of justifying and evaluating large-scale investments in ECM platforms and development programs. Thus, J Vom Brocke et al. (2010) utilise the IS profitability analysis framework to assess the economic value of ECMS. They claim that this framework can serve as a suitable means of assessing ROI of ECM implementation and its impact on business process efficiency.

Second, researchers have focused on the guidelines for selecting an appropriate ECM system (Ankoud & Hmimida, 2013; Naik & Shivalingaiah, 2009; Nath & Arora, 2010; Paivarinta & Munkvold, 2005). For example, Naik and Shivalingaiah (2009) suggest that there is a need for specific selection criteria for software selection. Nath and Arora (2010) conducted a study to find out the best available open-source applications for implementation. They

suggest that the availability of different features is an important determinant for software selection. In similar work, Ankoud and Hmimida (2013) produced an evaluation model for the selection of ECMS systems. They provide some criteria for selecting ECMS based on field analysis and customers' needs. They suggest that future analyses should consider the experiences of the individual, group, or organisation in question.

Third, researchers have focused on the guidelines for ECMS implementation (Nordheim & Paivarinta, 2004; Zykov, 2006). For example, Zykov (2006) presented a problem-oriented approach for the implementation and adoption of ECM by considering content management in web portals and embracing a heterogeneous enterprise information system. The author introduced an ECM construction methodology with lifecycle support. Subsequently, the author's methods, models and tools have been widely used for the development of portals, and he argues that his approach can help organisations reduce their costs whilst offering advanced personalisation and reducing the risk of metadata damage. Jan Vom Brocke, Alexander Simons, et al. (2010) introduced an ECM-blueprinting framework, which is crucial for ECM rollout or implementation. ECMS implementation usually affects an organisation's business process and structure. The successful adoption of ECM depends on a thorough analysis of content, and yet the key challenge is organisational rather than technological.

4.1.4 Strategy

The strategy dimension is becoming an increasingly prominent dimension within ECM research. This shift in focus is caused by researchers viewing the ECMS through other lenses, such as from managerial or organisational perspectives (J. Alalwan, 2012; Arshad et al., 2012; Gonzenbach et al., 2014; Katuu, 2012; Munkvold et al., 2006; Paivarinta & Munkvold, 2005). The first focus of this dimension is the development of a strategy for managing ECMS implementation and challenges. For example, Nordheim and Paivarinta (2006) investigate the implementation of ECMS at the Norwegian oil company, Statoil. They presented the implementation process in seven stages: strategy, feasibility study, solution scenarios, RFI, FP, design specification and custom components, and pilot implementation. Kunstová (2010), meanwhile, investigated the barriers to and benefits of investment in ECM. It is argued that knowing the critical success factors is crucial for the successful implementation and adoption of ECM. It is also possible that some organisations are reluctant to implement ECM because implementation failure in other organisations has discouraged them.

The second focus has evolved around the use of ECMS. Researchers claim that there is lack of evidence and understanding of the use of ECMS within the enterprise context (Munkvold et al., 2006) and its contribution to organisations (Andersen, 2007). Responding to this issue, Arshad et al. (2012) claim that there is insufficient research investigating how ECMS is used to support

information-sharing within organisations. They propose an ECMS-use framework that consists of minimal-use, standard adoption-use, customised-use, and leveraged-use. Meanwhile, Jaffar A. Alalwan et al. (2014) have investigated the use of ECMS to support strategic decision-making. The authors claim that the use of ECMS helps organisations produce better decisions, improve the speed and quality of their decision-making, and provide management with better resources to assist decision-making. Consequently, many researchers claim that the use of ECMS is underutilised (Arshad et al., 2012; Munkvold et al., 2006). For example, Arshad et al. (2012) pointed out that organisations are very reluctant to change their business processes. Some organisations force employees to use systems that are unsuitable for their environment, leading to user resistance and lack of cooperation. There are also companies that spend millions of dollars implementing ECMS as a single point to link various other independence systems. This reluctance to change the business process undermines the strategic goal of ECMS implementation.

The third focus of the dimension is the strategy of achieving benefits from ECMS. For example, Smith and McKeen (2003) have proposed content stewardship practices to govern the management of an organisation's content throughout its entire lifecycle. Their study concerns the development of good information practices for the implementation of ECM. They argue that organisations only focus on short-term benefits (work process simplification, ease of navigation, branding, reduced costs of materials, time saving, improved access to materials, and accuracy) whilst neglecting long-term benefits (competitive intelligence, decision-making, content utilisation). Jaffar A. Alalwan et al. (2014) supports this argument and emphasises that long-term benefits, and especially strategic benefits, have not been thoroughly studied. The authors claim that ECMS positively influences decision-making analysis, decision quality, and decision-making speed. ECMS also reduces the time needed to identify problems, allowing decision-makers to react faster, increase their number of information sources, examine more alternatives, and test wider assumptions. Contrary to earlier beliefs, some researchers claim that the benefits of ECMS have not been thoroughly studied (Andersen, 2007; Riley, 2014; L. T. P. Salamntu & Seymour, 2014; Jan Vom Brocke et al., 2011). For example, Jan Vom Brocke et al. (2011) claim that there is a vague understanding of what organisations strive to gain through implementing ECM systems and what results they can expect from it. Moreover, researchers claim that most organisations adopt ECMS because of vendors' influence (Riley, 2014) and unproven claims about the benefits of ECMS (Andersen, 2007; Walker, 2014).

4.1.5 People

The people dimension is rarely mentioned in the literature and some researchers argue that it is neglected by the ECMS community (Jaffar Ahmad Alalwan & Weistroffer, 2012; Rickenberg et al., 2012). The focus in this dimension

is the study of the impact of ECMS on people, groups, and organisations. For example, Scott (2011) underlines that users' perceptions determine their acceptance of new technology, highlighting the importance of cognitive engagement in the acceptance of technology. In another study, Jan Vom Brocke, Seidel, and Simons (2010) investigate the effect of ECMS on organisational creativity. These researchers produced an ECM creativity research framework, suggested that other researchers study the impact of ECM tools on the creative performance of the individual/group/organisation, and identify key factors to consider when implementing ECM in order to support the creative process. Contrary to previous research, McNally (2010) investigated the relationship between content management and employee skills, claiming that although technology (ECM systems) may be more productive and cost effective, it can deprive workers of learning new skills and their ultimate productive achievement, tacit knowledge.

Second, researchers have focused on the critical success factor of ECMS implementation (Haug, 2012; Herbst, Simons, vom Brocke, & Derungs, 2014; Lie & Pardamean, 2014). For example, A. Herbst et al. (2014) developed an ECM readiness assessment to help organisations successfully implement ECMS. They suggest that top management support, change agent deployment, and change management are among the most important success factors. Paivarinta and Munkvold (2005) also suggest that top management support, building competence in maintaining ECMS, and the justification of ECMS investment are important change management issues and serve as critical success factors in ECMS implementation.

4.2 Methods

In terms of research methods, we agree with Rickenberg et al. (2012) that ECM is lacking in quantitative research design. Our analysis of the literature shows that 35% of publications were conducted using design science. Case study research is also a popular choice, accounting for 30% of the total distribution. Conceptual papers, meanwhile, represented 16% of the literature, whilst quantitative methods (i.e. survey) only represented 6%. Briefly, it

publications reviewed lacked empirical data, especially in terms of primary sources. Some of the publications were excluded because of poor quality (lack of references, poor formatting, etc.). Table 3 shows the distribution of research design based on ECM dimensions. Since most publications encompassed more than single dimensions (multi-dimensions) and multiple research design (mixed method), we have ranked the distribution of research based on the number of theme occurrences within the research design. The following table shows the distribution of the research design in ECM research:

Based on Table 3, it can be summarised that: (1) the technology dimension is the focus of most ECM research and design science is the popular choice of research design for this dimension, (2) most ECM researchers of the strategy dimension adopt the case study design, (3) the people dimension has received the least attention and can only be found implicitly in the literature, (4) quantitative methods (i.e. survey) are rarely adopted, particularly compared to the case study method.

4.3 Theoretical Perspective

In summary, only 26% of publications were found to include rigorous theory, while 74% are presented without or with only a weak theoretical base. This supports Jan Vom Brocke et al. (2011) argument that ECM lacks a theoretical base. One of the theories worth noting is Braverman's deskilling thesis (1974) which was adopted by McNally (2010). McNally researched how technology can deprive workers from learning new skills, argues that even though technology (i.e. ECM system) is productive and cost effective, it does somehow deprived worker from their ultimate productive achievement, which is tacit knowledge. The Technology Acceptance Model (TAM) was adopted by Scott (2011) to investigate user perceptions and acceptance of ECMS. The business operating model of Ross et al. (2006) was adopted by Arshad et al. (2012) to investigate the use of ECMS in different types of organisations. The following table shows the distribution of theories based on ECM dimensions:

Research Design	ECM Dimension					Total
	Content	Technology	Process	Strategy	People	
Case Study	9	11	13	35	7	75
Conceptual	5	11	2	14	3	35
Descriptive	3	13	3	6	1	26
Design Science	16	41	14	9	2	82
Survey	1	2	0	5	1	9
Experiment	2	2	1	1	0	6

Table 3. Distribution of Research Design based on ECM Dimensions

Theory	ECM Dimensions				
	Content	Technology	Process	Strategy	People
Braverman's deskilling thesis	-	-	-	-	1
Information life-cycle	-	2	-	2	-
Content stewardship	-	-	-	2	-
Van de Ven and Poole (1995) review on literature	-	-	1	1	-
Institutional Theory	1	-	1	-	-
Contingency Theory	1	-	1	-	-
IT Business Alignment	1	-	1	-	-
Orlikowski's Practice Lens Theory	-	-	-	3	-
Record Continuum Model	-	-	-	2	-
Ross' Business Operating Model	-	-	-	3	-
Technology Acceptance Model	1	1	1	1	2
TOE Framework	-	-	-	1	-
Transaction Cost Theory	-	1	-	-	-
Mintzberg's (1976) Decision Support activities	1	-	-	3	-

Table 4. Distribution of theories used in ECM research

Table 4 shows that the theoretical foundation is generally strong in strategy dimension studies while other dimensions have a fair share of distribution. The Technology Acceptance Model (TAM) is identified as the most prominent theory used in ECM research. Due to this lack of theoretical contributions, researchers have called for more fundamental contributions to the field (Jan Vom Brocke, Alexander Simons, et al., 2010).

5. Benefits

ECM benefits drive organisations toward ECMS adoption. Studies of ECM benefits have been conducted by several ECM researchers (Allotey & Ojeabulu, 2011; Grahlmann, Hilhorst, Van Amerongen, Helms, & Brinkkemper, 2010; L. T. P. Salamntu & Seymour, 2014; Jan Vom Brocke et al., 2011). The following table shows a number of ECM

Category	ECM Benefit	Frequencies
Managerial	Information quality	9
	Improved decision making	5
Operational	Governance and compliance	14
	Cost reduction	10
	Integration	8
	Task efficiency	8
	Improve search and retrieval	7
	Facilitate information sharing	5
	Continuity	4
	Customization	4
Strategic	Collaboration	7

Table 5. Frequencies of ECM benefits

benefits that were identified in our literature analysis and the number of studies addressing each benefit:

It can be concluded that meeting governance and compliance is the main benefit that organisations seek to gain from ECM. Cost reduction and integration were also found to be strong drivers for the implementation of the system. It is necessary to point out that some studies were conducted based on a case study produced by an ECM vendor, thus there is the possibility of bias as vendors tend to produce good case studies to encourage new customers.

6. Possible Future Study Directions

In order to revitalise research into ECM, further investigation and exploration must be conducted to add knowledge to the field. The following are a number of implications for further studies based on our literature analysis.

6.1 Content Dimension

The management of content should become a primary objective for ECM research. Therefore, we suggest that researchers study and classify the types of content that should be managed in the enterprise context and how the proper management of content can bring short and long-term benefits to organisations (Bandorf et al., 2004; Befa, Kontopoulos, Bassiliades, Berberidis, & Vlahavas, 2010; Gonzenbach et al., 2014; Munkvold et al., 2006). In addition, researchers also argue over the format of content stored in organisation repositories (Benevolo & Negri, 2007; Munkvold et al., 2006); whether the content can outlast the technology or if it will become out-of-date (Munkvold et al., 2006). Hence, there is a need to study the standardisation of content and how it can be independently stored without being limited by technology (technology independent) (Galea, 2007; Munkvold et al., 2006). Moreover, researchers should also focus on technical aspects of content management such as metadata, workflow management and content taxonomy (Munkvold et al., 2006; Scott, 2011; Smith & McKeen, 2003; Wiltzius et al., 2014).

6.2 Technology Dimension

The technology dimension is the most popular topic within ECM research. With issues such as big data and cloud computing, there is a need to study the new platforms and architecture of ECM systems (Dhouib & Ben Halima, 2013; Mohamad Rosman, 2020a, 2020b; Munkvold et al., 2006; Rats & Ernestsons, 2013). Researchers also suggest the study of the impact of cloud technology on ECMS architecture and how it could change business processes (Jaffar Ahmad Alalwan & Weistroffer, 2012; Gonzenbach et al., 2014; Klegová & Rábová, 2013). There is also a need to revise the challenges of ECMS implementation due to the rapid growth of Information Technology (IT) (Jaffar Ahmad Alalwan & Weistroffer, 2012; Korsvik & Munkvold, 2010; Nilsen, 2012). Organisations also depend on analytical solutions to assist them in making strategic deci-

sions. Therefore, the study of other elements of technology, such as business intelligence, competitive intelligence, and business/IT alignment process is necessary so that organisations can remain competitive (Jaffar Ahmad Alalwan & Weistroffer, 2012; Scott, 2014). Other than that, there is a crucial needs to respecify and simplify the technical difficulties in communicating the technological term of Information Technology (IT) to other non-IT personnel in the organization (Daza & Hargiss, 2020) in the attempt to improve the decision-making process. Belkadi et al. (2020) also mention that there is a scarcity of knowledge on the decision-making process to adopt the ECMS concerning high-end technology such as context-aware knowledge-based system.

6.3 Process dimension

In terms of the process dimension, researchers argue that there is a need for a comprehensive evaluation method to justify the adoption of ECM from three perspectives: the individual, group, and organisation (Jaffar Ahmad Alalwan & Weistroffer, 2012; Munkvold et al., 2006; J Vom Brocke et al., 2010). Furthermore, there are few guidelines available to help organisations select appropriate ECM systems to meet their organisational needs (Ankoud & Hmimida, 2013; Arshad et al., 2012; Iverson & Burkart, 2007). Organisations are drawn to specific ECM systems through vendor promises, but there is no clear empirical data to conclude whether these technologies are actually used in the enterprise context (Andersen, 2007; Munkvold et al., 2006; Walker, 2014). Moreover, researchers also argue that ECM systems are not aligned with the way businesses work and so do not bring many changes to the business process (Arshad et al., 2012; Nordheim & Paivarinta, 2006). Therefore, researchers are urged to study the impact of ECM systems on the business process (N. Junco et al., 2005) and cross-examine the similarities and differences between ECMS and the implementation of ERP.

6.4 Strategy Dimension

The strategy dimension is quickly becoming a popular focus among ECM researchers. It is suggested that new researchers continue exploring the fundamentals of ECM. For example, there is lack of research on the determinants that influence the benefits of ECM systems (Grahlmann et al., 2010). This knowledge gap contributes to the failure of an enterprise-wide implementation of ECMS. In contrast, the ERP literature shows that extensive studies have been conducted on this issue. Therefore, ECM researchers are encouraged to look at the ERP literature as a basis for further exploration. Moreover, researchers are also encouraged to explore the strategy of evaluating and implementing an open-source solution for ECM (Kunstová, 2010). The use of open-source solutions help organisations reduce their costs and utilise various content management capabilities. However, it also exposes them to security and confidentiality issues. Therefore, there is a need for a proper strategy for the adoption of open-source solutions (Kunstová, 2010).

6.5 People Dimension

This dimension has received less attention from researchers. It is suggested that researchers study how ECMS can change the work scope of employees (McNally, 2010). There is a need to study whether ECMS contribute to the enhancement of employee skills or their deskilling due to technicality of the information system (McNally, 2010). Alongside this, researchers could also explore training types and skills that could help mitigate the challenges of and resistance against adoption (Jaffar Ahmad Alalwan, 2013; Andersen, 2011; Hullavarad, O'Hare, & Roy, 2015). Change management issues and changing work roles could also be investigated in future studies (Arshad, Bosua, & Milton, 2010; N. Junco et al., 2005; Paivarinta & Munkvold, 2005). The role of 'project champion' in ECM implementation could be another possible research area. Researchers are encouraged to study how 'project champions' can contribute to the success of ECMS implementation and the skills that are critical to the achievement of success (Scott, 2014).

6.6 Research Method and Theoretical Background

In terms of research methods, it is suggested that researchers focus more on quantitative methods, as the majority of the publications found adopted qualitative methods. A mixed method approach is also preferable as it can further improve the validity of the results. In terms of theoretical background, there is lack of theoretical foundation in each dimension, apart from the strategy dimension. Therefore, it is suggested that researchers view ECM from other perspectives to improve their theoretical contribution to the field of ECM.

6.7 ECM Benefits

Organisations are struggling to gain benefits from ECMS implementation. Some researchers even question whether the system actually does anything in the enterprise context (Arshad et al., 2012; Munkvold et al., 2006). Many studies have been conducted on ECMS benefits, but despite this, many organisations are still unaware of or are confused about the potential benefits of ECMS. It can be argued that organisations do not actually know how to get the best from their investments. Therefore, we suggest that researchers study the pathway of benefits achievement, since benefits do not occur instantly. Most benefits usually become apparent a year after the deployment of the technology (Shang & Seddon, 2002). Thus, by investigating the factors that lead to benefits, the organisation can ascertain why certain benefits do or do not occur, and can devise appropriate strategies to address this (Gattiker & Goodhue, 2005). Moreover, most of researchers nowadays have shifted their interest towards the other parts of benefits achievement, mobbing away from traditional operational and non-operational benefits (Abdurrahman, Owusu, & Bakare, 2020; Harr, vom Brocke, & Urbach, 2019; Katuu, 2016; Mohamad Rosman, 2020b; Mohamad Rosman & Aziz, 2018; Mohamad Rosman et al., 2018). For example, Mohamad Rosman and Aziz (2018) and Mohamad Rosman and Aziz (2018) developed an ECMS benefits framework consist of opera-

tional, managerial, and strategic benefits by adopting the work of Shang and Seddon (2002). Besides, Laumer, Maier, and Weitzel (2017) suggested that there is a need to identify the information quality dimension of ECMS as a predeterminant of the organizational decision-making process. In another work, L. T. Salamntu (2016) investigate the achievement of ECMS benefits in the context of public sector organisations. In her research, she concludes that one significant factor to achieve benefit is constant user engagement. The user of the ECMS needs to interact with the implementation of ECMS to realise the benefit from its implementation (Mohamad Rosman, 2020b).

7. Conclusion

In this paper, we have conducted an extensive, structured literature review on ECM to discover the current state of this field. Two research questions were asked at the beginning of the paper. To answer the first research question, we analysed 135 publications related to ECM, guided by our proposed ECM research framework. We categorised publications into five distinct themes: content, technology, process, strategy, and people, and explored two specific research aspects: method and theory. To answer the second research question, we listed the possible benefits of the implementation of ECMS and their frequencies. Finally, we suggested some directions for further studies in the ECM research.

This study is not without limitations. First, due to the complex nature of ECM and the different levels of analysis in the papers reviewed, it is hard to make fair comparisons across various studies (i.e. knowledge management, enterprise system, information management, etc.). Second, despite our claim that this is a comprehensive literature search, it is still possible that some publications may be missing from our review. Nonetheless, we believe our literature search has been more comprehensive than that of earlier work on ECM (Jaffar Ahmad Alalwan & Weistroffer, 2012; Rickenberg et al., 2012), and that these findings are useful guides for future research in this area.

In terms of future work, we will investigate further the possible pathways for achieving ECMS benefits. Organisations implement ECMS on the basis of the mere promises of vendors or in imitation of their competitors, rather than the advantages and benefits that the system yields. Therefore, investigating the benefit drivers and the possible mechanisms behind the achievement of these benefits will enhance the existing understanding in this area.

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