

## Class Notes: BPM Research and Education | Jan vom Brocke

# On the Role of Enterprise Content in Business Process Management

*BPM should pay more attention to the role of enterprise content, because the significant effect of how enterprise content is organized on the efficiency and effectiveness of business processes will only increase in the future. This note presents the fundamentals of enterprise content management (ECM) and discusses the interrelationships between ECM and BPM, leading toward a notion of content-aware BPM.*

## Introduction

Gantz and Reinsel (2011) estimated that the worldwide digital data volume created and replicated would exceed 1.8 zettabytes in 2011, which is nine-fold increase in just five years. It would take 57.5 billion iPads (32GB) to back up this amount of data. Eighty percent of this massive volume of information will fall into the liability of an enterprise at some stage of its lifetime (Gantz & Reinsel, 2011). Clearly, how a company organizes content management has a major impact on the effectiveness and efficiency of all kinds of processes, including search times, compliance, data analytics, and process innovations, all of which depend on the availability and quality of underlying data.

A number of management approaches have focused on the **management of data sources**, taking numerous angles and applying a variety of terms. Examples include document management, web-content management, and records management. More recently, the management of social content (i.e., data created through the use of social media) (Herbst & vom Brocke, 2013) and geo-data taken from mobile devices have played an increasing role. Enterprise Content Management (ECM) has emerged in the last decade as an integrated discipline that considers various types of content over its lifecycle. What ECM projects struggle with, however, is getting the people to use ECM systems effectively in their work environments. A wider perspective of ECM's organizational factors is needed in order to support the adoption of ECM functionalities, including factors like governance structures and cultural values, which have been subject to intensive research in BPM over the past years (Rosemann & vom Brocke, 2010).

Clearly, there are good reasons to develop an **integrated view of ECM and BPM**, among them that BPM needs to consider content and effective content management as a factor in process performance, while ECM needs to consider organizational capabilities, which are well understood in BPM. Ultimately, integrating the aspects of

content management into BPM, leading to the notion of content-aware BPM, appears the most promising approach. This note discusses the interrelationships between ECM and BPM in detail based on some fundamentals of ECM.

## Fundamentals of ECM

Concepts related to the management of organizational information, such as document management and content management, are embedded in ECM (O'Callaghan & Smits, 2005). AIIM (2011) defines **ECM** as "the strategies, methods and tools used to capture, manage, store, preserve, and deliver content and documents related to organizational processes." The term "content" plays a constituting and yet problematic role in defining ECM. The term emerged in the mid-1990s in relation to new technical solutions, such as (web) content management (Munkvold et al., 2006). However, it is problematic since it adds to the confusion in differentiating related terms like "data," "information," and "knowledge" (e.g., Budin, 2008). Without delving too deeply the discussion, I can draw some **characteristics of "content"** from the studies in this field.

- One interest in the area of content management has been in the **re-use of content** over various communication channels, also referred to as the differentiation between content and content containers (Budin, 2008; Tyrväinen et al., 2006). Concepts like single-source publishing illustrate this idea, where the notion of composing (and decomposing) information assets like documents by paragraphs and sentences (Rockley, Kostur, & Manning, 2003) is made possible through digitalization and meta-data management (O'Callaghan & Smits, 2005).
- ECM is often referred to as the management of **unstructured information assets** (O'Callaghan & Smits, 2005, p. 1, AIIM 2011), implying that unstructured information is represented through the term "content." However, the term "unstructured information" is problematic itself because documents have structure. Still, there seems to be consensus to refer to content as information assets outside of conventional data bases that store data in rows and columns, as in ERP systems. Examples of such information assets are marketing materials, project reports, presentation files, images, e-mails, and audio and video files (Simons & vom Brocke, 2013).
- An **enterprise-wide focus** on the management of information assets has emerged with the establishment of ECM as an integrated approach (Munkvold et al. 2006). Therefore, "content" refers to many types of information assets, and content management should focus on an integrated view of both structured and unstructured information assets and eventually lead to the integrated management of digital information assets in general. Instead, it is the business relevance of information assets that is of primary interest, followed by considerations about their formats (vom Brocke et al., 2011).

Contrary to related concepts like document management and records management that focus on certain phases of the content life cycle, ECM takes a comprehensive view of the entire **life cycle of the information assets** that are relevant to an organization (Munkvold et al., 2006). At a very basic level, four lifecycle phases of content have been distinguished (Simons & vom Brocke, 2013): creating and capturing, storing and retrieving, editing and reviewing, and retaining and deleting.

The phases of the content lifecycle describe typical content-related process activities (vom Brocke et al., 2011). For example, content often serves as an input for processes and is transformed through a process or is the result of a process. These content-related activities in processes are usually reflected through one or more of the phases of the content lifecycle phases, so they are the interface between BPM and ECM.

**ECM software** is an important enabler of a comprehensive enterprise-wide content management system that supports the design of new and enhanced processes over content's entire life cycle. ECM software can consist of either single ECM suites that provide various functionalities for the management of content or a combination of IT applications that together provide the basis for managing enterprise content.

According to Gartner (2012), core components of ECM suites include:

- **Document management:** check-in/check-out, version control, security, and library services for business documents
- **Image processing:** capturing, transforming, and managing images of paper documents
- **Workflow management:** routing content, assigning work tasks and states, and creating audit trails
- **Records management:** long-term retention of content through automation and policies to ensure legal, regulatory and industry compliance
- **Web content management:** administrating and controlling the content on Web sites based on a core repository, including templating, workflow and change management, and content deployment functions
- **Social content management:** document sharing, collaboration and knowledge management through blogs, wikis, and so on
- **Extended components:** digital asset management, document composition, e-forms, search, content and analytics, email and information archiving, email management, and packaged application integration

Research and practice have investigated the organizational **ECM drivers**, issues, and objectives that induce organizations to engage in ECM initiatives. Many of these issues, drivers, and objectives also have a process perspective. For example, vom Brocke et al. (2011) report on ECM drivers that are related to the content lifecycle, such as the improvement of information quality or paper-based processes and the implementation of efficient reviewing procedures. Similarly, Munkvold et al. (2006) describe organizational issues in the context of ECM (many of which are connected to process performance), such as issues related to routines for e-collaboration across business processes and awareness of relevant routines among content producers. Finally, Päivärinta and Munkvold (2005) refer to efficient, effective, and flexible knowledge work and processes as one of the objectives and impacts of ECM that have been identified through the analysis of practitioner-oriented case narratives of ECM projects and implementations.

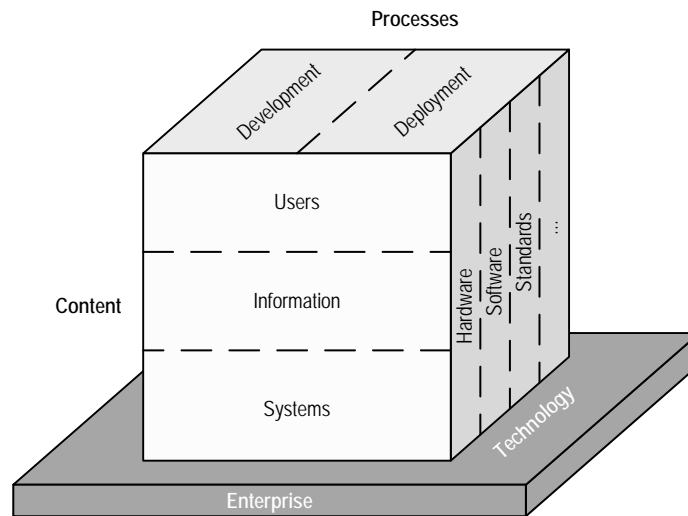
These examples show that many activities in the context of ECM are closely related to business processes and that organizations adopt ECM to improve their processes by improving how they deal with content along its life cycle. This is why we should investigate into the relationships between ECM and BPM further.

## Interrelationships between ECM and BPM

Some argue that content and process are naturally intertwined since processes build

on, create, and manage content. Systems theory distinguishes two phenomena: “states,” which are characterized by content, and “state transitions,” which are characterized by processes. Therefore, content and processes cover what should be considered in designing and managing a dynamic system.

In **ECM** processes have been considered an important element of ECM from early on, as for instance to be seen in Tyrväinen et al.’s (2006) framework of ECM research providing an early conceptualization of ECM (figure x).



**Fig. 1: Framework of ECM research (cf. Tyrväinen et al., 2006, p. 628)**

Tyrväinen et al.’s (2006) framework identifies four perspectives of ECM, among them a process perspective, a content perspective, a technology perspective, and an enterprise perspective. These perspectives should be aligned according to the enterprise context (Tyrväinen et al., 2006).

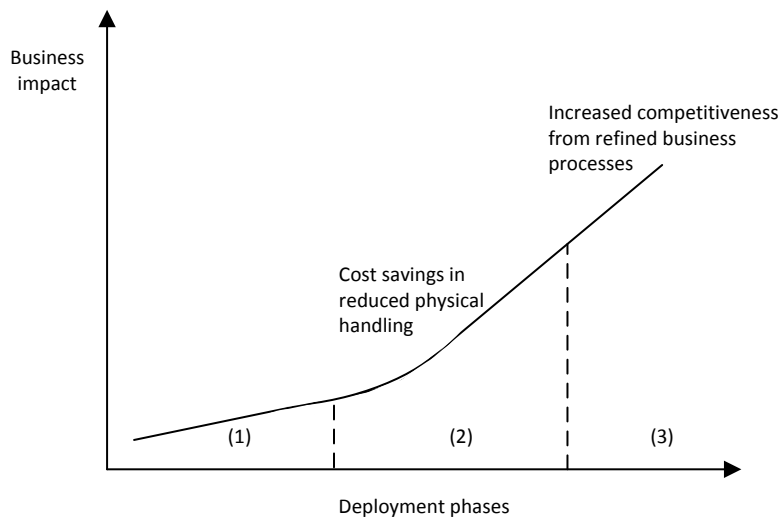
- **Content Perspective:** The creation, identification, and organization of content are referred to in the content perspective.
- **Technology Perspective:** Hardware, software, and standards that support content management are addressed in the technology perspective.
- **Process Perspective:** Development processes that include the development, implementation, and maintenance of ECM systems and the deployment of processes, including the implementation of content lifecycle activities like the creation, capture, or editing of content are part of the process perspective.
- **Enterprise Perspective:** The economic context for ECM, such as its social, business and legal aspects, is the enterprise perspective. The enterprise perspective is often closely related to the process perspective because it includes the evaluation of solutions from an enterprise viewpoint.

Content is both edited and used by processes, and workflow management of software solutions is also considered an important component in ECM (Gartner, 2012). However, so far the consideration of processes has remained on a technical level and has not covered organizational dimensions like governance, skills, and culture, which, according to BPM research, are important facilitators of process (re-)

design.

Likewise **BPM** has considered data since the beginning of the discipline, and types of data representations, such as digital or paper-based data, have been among the essential drivers of process improvements since the early days. The importance of data (as well as information and content respectively) has grown as the ability to manage digital information has evolved as a key driver of process performance and innovative information-processing technology, such as in-memory databases, offers new possibilities for BPM, such as big data analytics and real-time process control.

The possible **impact of ECM on process performance** is also illustrated by Reimers (2002).



**Fig. 2: Impact of ECM on Process Performance (cf. Reimers 2002, p. 17)**

Reimers (2002) distinguishes three phases of ECMS deployment, how they influence business processes, and how ECM's influence on business processes creates business value.

1. The first phase refers to business processes that are built around **handling of physical information goods**. A typical example is business processes that rely on papers and documents, such as paper forms that must be printed and signed, documents that must be forwarded to other people for review, and so on.
2. The second deployment phase refers to the same processes when the **information is handled electronically**, such as a paper form that can be filled out electronically, a review process done electronically, and so on. The change from handling information physically to electronic handling results in reduced costs because it lowers the amount of physical information management and the time and materials required.
3. In the final phase of the ECMS deployment are the processes that are **refined and simplified** in order to exploit the full potential of electronic information management. An example of such a refined and simplified process is automated workflows that provide and handle information automatically to

the extent possible.

A fourth phase may be added considering **processes that are innovated** through ECMS functionalities. For instance, sales processes can be innovated through the availability of real-time data on customer needs and stock availabilities as well as geo-data and social network-data (see for instance the examples discussed on BPTrends in vom Brocke 2013).

As a result of each ECM deployment phase, organizations become more competitive because of improved business processes. If the integration between business processes and content fails, organizations may experience significant inefficiencies because of such content management problems (Jedd, 2008) as content that cannot be found when needed or use of an outdated and/or inconsistent version of content. In addition to inefficiencies, compliance issues related to content can negatively affect organizations (Greenbaum, 2005, p. 2).

### Content-aware BPM

Experience with ECM implementations has shown that, in addition to technical aspects related to ECM systems, certain organizational measures must be implemented in order to support ECM adoption in practice (Munvold et al., 2006; Scott et al., 2004; Smith & McKeen, 2003). Instead of building separate organizational structures for BPM and ECM, organizations should integrate ECM considerations into BPM programs. In line with former contributions, such as creativity-aware BPM, cost-aware BPM, context-aware BPM, and sustainability-aware BPM (see the discussion in Recker, 2011), integrating ECM in BPM can be referred to as content-aware BPM, a term that Silver (2005) used.

BPM Core Elements					
Strategic Alignment	Governance	Methods	Information Technology	People	Culture
ECM-related Capabilities (Examples)					
<ul style="list-style-type: none"> <li>- Understand the role of an organizations content assets</li> <li>- Develop a strategy how to manage specific types of content assets</li> <li>- Develop routines prioritizing ECM-related BPM projects</li> </ul>	<ul style="list-style-type: none"> <li>- Define clear content ownership</li> <li>- Establish routines for evaluating content management practices</li> <li>- Include ECM-related services in the service portfolio of the BPM center of excellence</li> </ul>	<ul style="list-style-type: none"> <li>- Appropriate methods for content modeling</li> <li>- Appropriate methods for content auditing</li> <li>- Define guidelines and conventions for managing enterprise content</li> </ul>	<ul style="list-style-type: none"> <li>- Identify application systems used to manage enterprise content</li> <li>- Integrate enterprise applications over the content life cycle</li> <li>- Appropriate contemporary technologies for ECM</li> </ul>	<ul style="list-style-type: none"> <li>- Identify relevant ECM-related skills and expertise in the organization</li> <li>- Integrate ECM-related content in corporate training programs</li> <li>- Establish networks and learning communities to share experiences</li> </ul>	<ul style="list-style-type: none"> <li>- Measure the cultural fitness of the organization for ECM</li> <li>- Identify measures to further develop specific cultural values</li> <li>- Establish a culture development program to foster ECM-related values</li> </ul>

**Fig. 3: Framework for Content-Aware BPM**

In what follows I characterize this idea based on the **six core elements of BPM** (Rosemann & vom Brocke, 2010) derived from the Rosemann/de Bruin BPM maturity model (de Bruin 2009).

- **Strategic Alignment:** Investigating an organization's content management quickly results in vast amounts of information assets that are potentially relevant to ECM, so organizations must be able to evaluate the strategic relevance of their various content assets. Like process frameworks, content frameworks are helpful in directing content management initiatives. In this regard, integrating both process and content frameworks is advisable, particularly when process frameworks are already in place, as they can be used as a starting point for identifying and evaluating enterprise content.
- **Governance:** Clear content ownership is important in bringing ECM to life in organizations. Given the relationship between content and process, content ownership can be assigned to process owners according to the content assets that are predominant in their processes. Process managers may also be assigned responsibility for content objects that are central to their processes. Process experts should include in their skill sets knowledge about ECM, such as content modeling, ECM software and blueprints, and content-related redesign practices. For an account of governance mechanisms related to BPM see, for example, Spanyi (2010).
- **Methods:** In order to analyze an organization's content situation, content modeling approaches are needed that facilitate the description and communication of enterprise content. Through content modeling the granularity and structure of content can be identified, which helps to determine the process that leads to the information product. Such content modeling approaches are described, by Rockley et al. (2012) and Simons et al. (2013), for example. Comprehensive content models can then be used to determine how content is used in the organization, facilitating a comprehensive content audit, as Rockley et al. (2012) suggest. When describing and analyzing the content situation of an organization, organizations can raise synergies by integrating this approach with methods that are already established in process analysis and process auditing. For instance, the evaluation of the content management's strengths and weaknesses in a process area might be an integral part of the process audit that is already in place in an organization.
- **Information Technology:** The appropriation of contemporary technology is an important driver of ECM success (Böhn, 2013), but practice shows that only a few organizations would actually adopt a single ECM suite that incorporates all functions that are relevant to ECM. Given the enterprise-wide focus of ECM, multiple systems that contribute to ECM, such as ERP systems, collaboration tools, archiving software, and communication software, are usually in place. Instead of selecting an ECM software suite, companies should analyze the existing systems that they apply in business processes in terms of the extent to which they contribute to ECM.
- **People:** Developing ECM practices ultimately relates to changing the established behavior of the people who are using certain technology in their workplaces. In this regard, people's motives and capabilities play an important role in the success of ECM initiatives. The benefits of contemporary ECM software systems often go beyond the imagination and experience of users, so careful skill development is required. For instance, employees need to learn that they can rely on search results and



versioning functionality so they do not continue to keep separate copies of files. Since users do not think in terms of systems but in terms of their work environments, it is beneficial to include related topics in programs on modern work practices that might be subject to BPM training already, rather than to plan specific ECM training.

- **Culture:** Appropriating ECM also requires organizational values—such as openness to sharing content and administering it in a way that benefits co-workers—that support ECM objectives. Recent research has identified values like discipline, transparency, systematization, trust, and responsibility as important values in supporting ECM initiatives (Schmiedel & vom Brocke, 2013). Similarly, specific cultural values have been identified that an organization is advised to develop in order to support BPM objectives (Schmiedel et al., 2013). In accounting for the role of content, programs that develop cultural values in support of BPM may also take into account values specific to ECM.

By integrating ECM in BPM initiatives following the notion of content-aware BPM both ECM and BPM objectives can be met. BPM can account for the major role of content (and content management) plays on business process performance. ECM, in turn, can benefit from BPM as an integrated management discipline, also by re-using related structures, which need to be in place for effective process management in today's organizations.

## Summing Up – Lessons Learned

Clearly, the management of content should be integrated further in BPM initiatives. Content management is an important driver of process performance, and given the growing volumes, variances, and velocity of content discussed in the big data debate, we can expect the importance of ECM in BPM to continue to grow. Content-aware BPM is promising for increasing the synergies between ECM and BPM, as the six core elements of BPM provide a suitable frame to structure and plan according initiatives. It will be very beneficial to foster work on content management in BPM research and practice.

## Acknowledgements

Many people and institutions contributed to the findings presented in this note. I thank my colleagues Andrea Herbst and Alexander Simons at the University of Liechtenstein with whom I conducted large parts of this research. Special thanks also go to the many partner organizations and members of our ECM Competence Center at the University of Liechtenstein ([www.uni.li/ecm](http://www.uni.li/ecm)), who have been instrumental in aligning research and practice in this important area over the past five years.

## References

Association for Information and Image Management. (2011). What is enterprise content management (ECM)? Retrieved July 5, 2011, from <http://www.aiim.org/What-is-ECM-Enterprise-Content-Management> (15.08.2013).



- Böhn, M. (2013), The market for ECM software, in: Enterprise content management in Information Systems research. Foundations, Methods and Cases, Eds. J. vom Brocke, A. Simons, Springer 2013.
- Budin, G. (2008). Global Content Management - challenges and opportunities for creating and using digital translation resources. In E. Yuste Rodrigo (Ed.), Topics in language resources for translation and localisation (pp. 121–134). Amsterdam: John Benjamins Publications.
- De Bruin T (2009) Business process management: theory on progression and maturity. PhD Thesis, Queensland University of Technology, Brisbane, Australia.
- Gartner. (2012). Magic Quadrant for Enterprise Content Management. Retrieved 10. April 2013, from <http://www.gartner.com/technology/reprints.do?id=1-1CKT443&ct=121022&st=sb>
- Herbst, A., & vom Brocke, J. (2013). Social Content Management Systems: Challenges and Potential for Organizations. In F. Piazzolo & M. Felderer (Eds.), Innovation and Future of Enterprise Information Systems (Vol. 4, pp. 19-28). Heidelberg et al.: Springer.
- Jedd, M. (2008). "ECM MEETS BPM: Getting Content in Process." AIIM E - Doc Magazine 22(4): 20-26,28.
- Munkvold, B. E., Päiväranta, T., Hodne, A. K., & Stangeland, E. (2006). Contemporary issues of enterprise content management: The case of Statoil. Scandinavian Journal of Information Systems , 18 (2), 69-100.
- O'Callaghan, R., & Smits, M. (2005). A strategy development process for enterprise content management. In Proceedings of the 13th European Conference on Information Systems (pp. 1271-1282). Regensburg.
- Recker, Jan C. (2011) X-Aware Business Process Management. BP Trends, 8(12), pp. 1-7.
- Reimer, J.A. (2002). Enterprise Content Management. Datenbanken Spektrum, 2(4), 17-35.
- Rockley, A., Kostur, P., & Manning, S. (2003). Managing enterprise content: A unified content strategy . Indianapolis, IN: New Riders.
- Rosemann, M., & vom Brocke, J. . (2010). The Six Core Elements of Business Process Management. In J. vom Brocke; M. Rosemann; (Eds.), Handbook on Business Process Management: Introduction, Methods and Information Systems (International Handbooks on Information Systems) (Vol. 1, pp. 107-122). Berlin: Springer, Berlin/Heidelberg.
- Schmiedel, T., vom Brocke, J. (2013), Cultural values matter: The role of organizational culture in ECM, in: Enterprise content management in Information Systems research. Foundations, Methods and Cases, Eds. J. vom Brocke, A. Simons, Springer 2013.
- Schmiedel, T., vom Brocke, J., & Recker, J. (2013). Which cultural values matter to business process management? Results from a global Delphi study. Business Process Management Journal, 19(2), 292-317.
- Simons, A., vom Brocke, J (2013), Enterprise content management in Information Systems research, in: Enterprise content management in Information Systems research. Foundations, Methods and Cases, Eds. J. vom Brocke, A. Simons, Springer 2013.
- Simons, A., vom Brocke, J., Fleischer, S., Becker, J. (2013), Conceptual modeling of electronic content and documents in ECM systems design: Results from a modeling project at Hoval, in: Enterprise content management in Information Systems research. Foundations, Methods and Cases, Eds. J. vom Brocke, A. Simons, Springer 2013.

- Spanyi, A. (2010), Business Process Management Governance, in: Handbook on Business Process Management 2, Eds. J. vom Brocke, M. Rosemann, International Handbooks on Information Systems 2010, pp 223-238.
- Tyrväinen, P., Päivärinta, T., Salminen, A., & Iivari, J. (2006). Guest editorial: Characterizing the evolving research on enterprise content management. *European Journal of Information Systems*, 15 (6), 627-634.
- vom Brocke, Herbst (2013), Der Content Audit. Ein Diagnoseinstrument für erfolgreiches Enterprise Content Management (in German), Comarch White Paper, <http://www.comarch.de/ecm/whitepaper/der-content-audit/> (15.08.2013).
- vom Brocke, J. (2013). In-Memory Value Creation, or now that we found love, what are we gonna do with it? *BPTrends*, 10, 1-8.
- vom Brocke, J., Simons, A. (2014). *Enterprise Content Management in Information Systems Research, Foundations, Methods and Cases*, Springer 2014.
- vom Brocke, J., Simons, A., & Cleven, A. (2011). Towards a Business Process-Oriented Approach to Enterprise Content Management: The ECM-Blueprinting Framework. *Information Systems and e-Business Management (ISeB)*, 9(4), 475-496.
- vom Brocke, J., Simons, A., Herbst, A., Derungs, R., & Novotny, S. (2011). The business drivers behind ECM initiatives: A process perspective. *Business Process Management Journal*, 17(6), 965-985.
- 



### Jan vom Brocke.

Jan vom Brocke is the Hilti Chair of Business Process Management at the University of Liechtenstein, Director of the Institute of Information Systems and President of the Liechtenstein Chapter of the AIS. Jan has more than ten years of experience in BPM projects and has published more than 170 refereed papers in the proceedings of internationally perceived conferences and established IS journals, including the *Business Process Management Journal (BPMJ)* and *MIS Quarterly (MISQ)*. He is author and co-editor of 16 books, including Springer's *International Handbook on Business Process Management* and the recently published Springer book *Green BPM - Towards the Sustainable Enterprise*. He is an invited speaker and trusted advisor on BPM around the globe. His research and publications can be accessed at <http://www.uni.li/bpm>. You can contact Jan via mail ([jan.vom.brocke@uni.li](mailto:jan.vom.brocke@uni.li)) or LinkedIn or subscribe to his tweets ([www.twitter.com/janvombrocke](http://www.twitter.com/janvombrocke)).

