

Class Notes: BPM Research in Education Jan vom Broke,
Andrea Herbst, Nils Urbach

How to Measure ECM Success

Abstract

In an earlier Column I discussed the importance of enterprise content management (ECM) in Business Process Management (see vom Brocke, 2013). This note follows up on this discussion by presenting recent work on the measurement of ECM success, and I team up with Andrea Herbst from the University of Liechtenstein and Nils Urbach from the University of Bayreuth, with whom I jointly do research in this area. ECM systems are important enablers in designing new and improved processes over contents' entire life cycle. By implementing an ECM system, organizations hope to improve their content-management practices and overall process performance, but the question remains concerning how successful ECM systems are in fulfilling this expectation. This Column presents a tool that can be used to answer this question.

Introduction

Many organizations are challenged with the management of unstructured information that is scattered throughout the organization (Grahlmann, Helms, Hilhorst, Brinkkemper, & van Amerongen, 2012). Resulting information management problems, such as information that cannot be found when needed and inconsistent information, influence the organization's process performance. In order to address these challenges, many organizations invest in enterprise content management (ECM), an approach to the enterprise-wide management of all of an organization's many kinds of information (Smith & McKeen, 2003). ECM systems, which can consist of either a single ECM suite or a bundle of different but integrated IT applications, are important enablers in streamlining an organization's content-management practices.

Implementing and realizing ECM is an arduous, complex, and long-term endeavor that usually consists of a variety of projects. Applications like ECM that are on the enterprise level are often expensive (Mosher Zinck, 2008), but the benefits that ECM promises are significant, including increased productivity, cost reductions, improved internal and external collaboration, and improved compliance (Andersen, 2007; Blair, 2004; Kunstová, 2010; Mancini, 2004; Päiväranta & Munkvold, 2005; vom Brocke, Simons, & Cleven, 2011).

While organizations have good reasons to invest in ECM, the amount they spend on ECM is substantial. In 2012 alone the ECM market reached \$4.7 billion. Because of the large investments that usually go along with an ECM implementation, organizations are keen to measure the impact and success of their investments, but assessing such

success is made difficult by ECM's many intangible benefits such as improved collaboration and information quality and simplification of job routines, none of which can be measured quantitatively.

A tool that can be used to assess ECM success, taking into account exactly such intangible assets, assesses users' subjective perception on an organization's ECM-related performance, rather than focusing on financial figures. However, before we jump to describing this tool, its underlying dimensions, and its application, let us consider some critical factors that organizations should consider before implementing ECM, and two perspectives that can be applied to measuring ECM success.

Ready for ECM?

Given the many benefits that ECM promises, it is not surprising that organizations are increasingly investing in ECM solutions. In 2012 alone the ECM market grew by 7.2 percent (Gartner, 2013), and the trend is rising (figure 1). Naturally, organizations expect their significant investments in ECM to pay off by returning equally significant benefits.

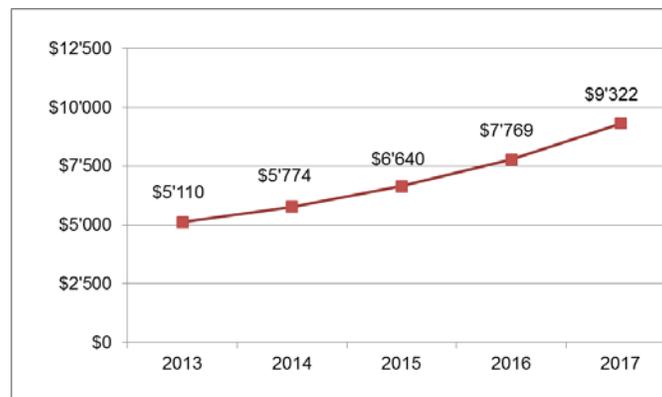


Figure 1. ECM Revenue Forecast, 2013- 2017 (Radicati Group, 2013)

When organizations begin their ECM projects, they are usually eager to realize the expected benefits (Prasad, 2012). However, ECM experts estimate that more than half of ECM projects fail to remain on schedule, on budget, or on specification (e.g., Inglis, 2014; Prasad, 2012).

In order to help ensure that ECM projects avoid these pitfalls, some critical success factors—"those few things that must go well"—must be "given special and continual attention" (Boynton & Zmud, 1984, p. 17). Critical success factors and their influence on the success of an IT implementation project in ECM-related fields have received considerable attention by studies that concern, for example, enterprise resource planning (ERP) (e.g., Ngai, Law, & Wat, 2008; Umble, Haft, & Umble, 2003), customer relationship management (CRM) (e.g., Mendoza, Marius, Pérez, & Grimán, 2007; Wilson, Daniel, & McDonald, 2002), or business process management (BPM) (e.g., Ravesteyn & Batenburg, 2010; Trkman, 2010). Critical success factors have also received attention in ECM research (e.g., Herbst, Simons, Vom Brocke, & Derungs, 2014; Wiltzius, Simons, & Seidel, 2011)

Some ECM success factors that have been identified are presented in table 1 based on the four perspectives of the ECM research framework: enterprise, content, processes, and technology (Tyrväinen, Päivärinta, Salminen, and Iivari (2006). Wiltzius et al. (2011) identified the twenty-two factors in an extensive study of the literature and confirmed them through interviews with ECM practitioners. While some of the identified factors (e.g., top management support, user training, functional customization) are more general and are important in many IT implementation projects, other factors are more specific to ECM. These ECM-specific critical success factors mainly concern the content perspective and include topics like the analysis of existing content and its use (content audit and classification), the support of all phases of the content life cycle (content lifecycle implementation), and the collection and definition of appropriate metadata (content tagging) (Wiltzius et al., 2011).

ECM perspectives	ECM acceptance factors
Enterprise level	Top management support, defined purpose of ECM, information and communication, corporate culture, monitoring and evaluation
Process level	Involvement of end users, user training, transition, management, prototyping, business process analysis, project management
Technology level	Functional customization, system interoperability, simplicity, security, collaboration, workflow support
Content level	Content audit and classification, content lifecycle implementation, corporate taxonomy development, content tagging, user tracking

Table 1. ECM acceptance factors (Wiltzius et al., 2011)

The seven critical success factors Herbst et al. (2014) identified correspond for the most part with the ones Wiltzius et al. (2011) presented. Herbst et al.'s (2014) seven critical success factors—top management support, change agent deployment, information and communication, quick win identification, corporate culture appreciation, change management, and vision and mission statements—are the basis for a framework that can help organizations to assess their readiness for ECM projects. ECM readiness, or the fit between the organization and the ECM project, presages the ECM project's success in areas based on the critical success factors (Herbst et al., 2014). The results of an ECM-readiness assessment can help organizations identify areas that do not have the fitness that is required to support ECM success and to take measures to improve these “unfit” areas. The ECM-readiness assessment also considers the relevance of the critical success factors to a particular organization.

Figure 2's exemplary ECM-readiness assessment shows that, for example, corporate culture is highly relevant to ECM success, but the corporate culture's fitness for the ECM project is in the medium range, so the organization should take measures to increase the corporate culture's ECM readiness. Taking such critical success factors into consideration when planning an ECM initiative can substantially improve organizations' chances of succeeding with their ECM initiatives.



Figure 2. Exemplary ECM-readiness assessment

What perspective should an organization take to measure ECM success?

The framework for assessing the organization's ECM readiness should be used *before* initiating an ECM implementation project, yet many companies struggle even more with measuring the success and benefits of ECM *after* implementation. When it comes to what perspective to take on ECM success the opinion of ECM professionals is ambivalent. Some experts argue that statistics and numbers, such as the number of active users, the number of documents added to the ECM system, the number of versions created, system usage, and search times, should be used to measure ECM success. Indeed, such numbers can be helpful in understanding the use and (to some extent) the benefits of an ECM system. However, these numbers may not be helpful in determining the quality of the information produced by the system, the actual use of the system, or the users' use of the information (Clark, 2013). For example, the number of documents uploaded might be a good indicator of how often the system is used and for what purpose, but it does not indicate the correctness, timeliness, or completeness of the uploaded information. Similarly, the amount of time that the system is in use can indicate successful adoption of the system, but it can also indicate that information searches are time-consuming or that workflows for managing content are too complex.

Another perspective from which to measure the success of information systems like ECM is the users' subjective perceptions, which depends to a large extent on the expertise and knowledge of those who provide the feedback (Wohlin, Mayrhauser, Höst, & Regnell, 2000). There are many advantages to this type of success measurement, such as easier and less complex data collection that is available soon after a system's implementation, when objective measures might not be available yet and when user feedback can help to detect the need for system improvements. User satisfaction surveys can help organizations determine whether users are actually using the system, how they are using it, and the areas/functionalities with which they are dissatisfied and why. When combined with objective measures, such subjective measures can help to create a holistic picture of an ECM system's level of success.

The ECM Success Measurement Tool

A survey-based tool to assess the success of ECM systems (www.ecm-success.org) is the subject of ongoing research at the Competence Center for Enterprise Content Management at the BPM Research Group at the University of Liechtenstein. The tool measures users' perceptions of their organizations' specific strengths and weaknesses in managing enterprise content through an ECM system. The survey can be applied to a single ECM suite or to other kinds of IT applications that are at the core of ECM, such as document management and web content management. The results of the assessment can help organizations understand their current ECM situation and its influence on their process performance. In addition, based on the results, measures can be taken to improve their process performance.

The underlying model of the ECM success measurement tool, the ECM success model, is presented in figure 3.

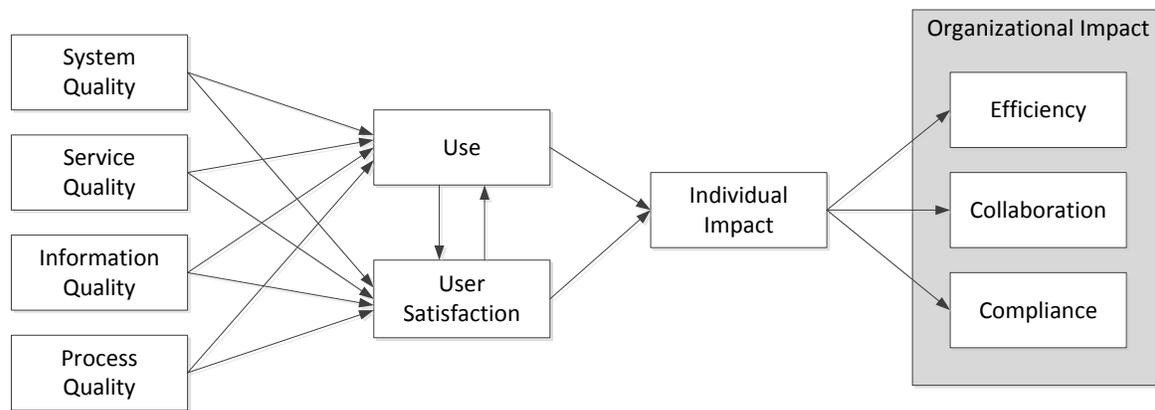


Figure 3. The ECM success model

The ECM success model reflects the characteristics of an ECM system (e.g., systems quality, service quality, process quality, and information quality) that determine its use and its users' satisfaction, both of which are antecedents of ECM's impact. The model assumes that ECM affects individuals as well as the entire organization. The organizational impact is operationalized by efficiency, collaboration, and compliance, which we identified in a systematic study of the literature as the three most common ECM-related goals.

Based on the ECM success model, an online survey tool offers an ad hoc evaluation of an organizations' ECM system. A representative user of the organization is asked to take 10-15 minutes to fill in the survey so the organization can gain information about the success of its ECM system. Although the assessment can be conducted by a single user, a more reliable result can be achieved by rolling out the tool in the organization and asking many or even all users to fill in the survey. Figure 4 provides an example of the tool's generated results from such an ECM assessment conducted by an organization's representative.



Figure 4. Results from an ECM success evaluation (in %)

Figure 4 reflects the organization’s percentage of fulfillment for each of the ECM success dimensions. The values for the systems dimensions of information, system, service, and process quality range between 50 and 73 percent, which can be considered mid-range. User satisfaction, with a value of 53 percent, follows this trend. However, the analysis shows that the individual and organizational impact dimensions have comparably low values, between 16 and 44 percent. The organizational factors of collaboration, efficiency, and compliance are especially important indicators of the overall process performance of an organization, so an examination of the dimensions’ subcategories show potential for improvement (figure 5).

Dimension	Factor	in %	Color
Individual Impact	Job efficiency	33.33	Red
	Job effectiveness	83.33	Green
	Job performance	66.67	Yellow
	Task performance	0.00	Red
	Productivity	50.00	Yellow
	Additional effort (reversed)	33.33	Red
Collaboration	Knowledge sharing	66.67	Yellow
	Comfortable communication	33.33	Red
	External content exchange	16.67	Red
	Joint content creation	16.67	Red
	Avoiding content silos	33.33	Red
Efficiency	Content reuse	16.67	Red
	Content updating	16.67	Red
	Content efficiency	33.33	Red
	Publishing time	0.00	Red
	Search times	66.67	Yellow
Compliance	Content deletion	16.67	Red
	Content storage	16.67	Red
	Change traceability	16.67	Red
	Data protection	16.67	Red
	Tracing organizational practice	16.67	Red

Figure 5. Detailed analysis of the ECM impact dimensions

The individual impact, which is comprised of six subcategories, shows major weaknesses in terms of support efficiency and task performance, and it appears that using the ECM system results in additional effort for the users. Collaboration has only one mid-range value (knowledge sharing), while all other subcategories are below 50

percent. A similar picture is drawn concerning efficiency: while the search times' 66 percent value seems reasonable, all other subcategories' values are between 16 and 33 percent, and the subcategories for compliance are all low at 16 percent.

The results of an ECM success evaluation can help organizations to identify hot spots concerning the management of enterprise content, but it cannot tell organizations the causes of the problems. Therefore, organizations should follow up on the results through methods like workshops or interviews with users in order to identify the causes of the problems and derive concrete improvement measures.

How well does the Evaluation work?

As part of ongoing research, the tool is publically available in English, German, and French and can be used free of charge at www.ecm-success.org. If you fill in the survey, you will see a broad overview of your results in the form of a spider diagram like that shown in Figure 4. This diagram will reflect only your individual evaluation of your company's ECM system; for an enterprise-wide ECM evaluation, a company-specific version of the ECM success measurement tool should be applied that allows performing separate evaluations for specific business areas (e.g., departments or regions). The evaluation can either involve all users or a representative group of users selected by the company. Accordingly evaluations can be conducted that show differences in the levels of ECM success throughout an organization.

Summing Up – Lessons Learned

Organizations that engage in ECM initiatives usually do so in order to improve their content-management practices and overall process performance. Since ECM implementations are costly endeavors, organizations surely expect a return on their investments, but determining ECM success is difficult because many of the ECM benefits are intangible and difficult to measure. This Column presents a subjective, survey-based tool that assesses an organization's content-management practices related to an ECM system. The results of such an assessment allow organizations to identify weak points in their content-management practices in order to derive concrete measures to improve their ECM-related and overall process performance.

An Invitation to participate

We invite readers to apply the ECM success survey in their organizations and to send us feedback on your experiences. The tool can be accessed free of charge at www.ecm-succes.org. If you are interested in an enterprise-wide success ECM evaluation, please contact us for a company-specific version of the ECM success measurement tool.

Acknowledgements

Many people and institutions contributed to the findings presented in this note. We thank our colleagues from the many partner organizations and members of our ECM Competence Center at the University of Liechtenstein (www.uni.li/ecm) who have been instrumental in aligning research and practice in this important area over the past five

years.

References

- Andersen, R. (2007). The rhetoric of enterprise content management (ECM): Confronting the assumptions driving ECM adoption and transforming technical communication. *Technical Communication Quarterly*, 17(1), 61-87.
- Blair, B. T. (2004). An enterprise content management primer. *Information Management Journal*, 38(5), 64-66.
- Boynton, A., & Zmud, R. (1984). An assessment of critical success factors. *Sloan Management Review*, 25(4), 17-27.
- Clark, G. (2013). Identifying Meaningful metrics for ECM success. Retrieved 28. February 2014, from <http://www.aiim.org/community/blogs/expert/Identifying-Meaningful-metrics-for-ECM-success>
- Gartner. (2013). Market share analysis: Enterprise content management, worldwide, 2012. Retrieved 06 December 2013, from <https://www.gartner.com/doc/2474215?pcp=itg>
- Grahlmann, K. R., Helms, R. W., Hilhorst, C., Brinkkemper, S., & van Amerongen, S. (2012). Reviewing enterprise content management: A functional framework. *European Journal of Information Systems*, 21(3), 268-286.
- Herbst, A., Simons, A., Vom Brocke, J., & Derungs, R. (2014). Critical Success Factors in Enterprise Content Management: Toward a Framework for Readiness Assessment. In J. Vom Brocke & A. Simons (Eds.), *Enterprise Content Management in Information Systems Research: Foundations and Cases*. Berlin: Springer.
- Inglis, N. (2014). We're Still Failing At Implementing SharePoint. Retrieved 11. February 2014, from <http://www.aiim.org/community/blogs/expert/Were-Still-Failing-At-Implementing-SharePoint>
- Kunstová, R. (2010). Barriers and benefits of investments into enterprise content management systems. *Organizacija*, 43(5), 205-213.
- Mancini, J. F. (2004). The Emperor's New Clothes: The Current State of Information Management Compliance. Retrieved 11. July 2011, from www.tasmea.com/pdf/whitepapers/Industry_Watch_Compliance.pdf
- Mendoza, L. E., Marius, A., Pérez, M., & Grimán, A. C. (2007). Critical success factors for a customer relationship management strategy. *Information and Software Technology*, 49(8), 913–945.
- Mosher Zinck, B. (2008). The Cost of Enterprise Content Management. Retrieved 10. February 2014, from <http://www.cmswire.com/cms/enterprise-cms/the-cost-of-enterprise-content-management-003676.php>
- Ngai, E. W. T., Law, C. C. H., & Wat, F. K. T. (2008). Examining the critical success factors in the adoption of enterprise resource planning. *Computers in Industry*, 59(6), 548–564.
- Päivärinta, T., & Munkvold, B. E. (2005). *Enterprise content management: An integrated perspective on information management*. Paper presented at the 38th Annual Hawaii International Conference on System Sciences (HICSS '05), Big Island, HI, USA.
- Prasad, H. (2012). 8 Steps guide to make your ECM project a success. Retrieved 11. February 2014, from <http://www.aiim.org/community/blogs/community/8-steps-guide-to-make-your-ecm-project-a-success>
- Radicati Group. (2013). Enterprise content management market, 2013-2017. Retrieved 21 August 2013, from <http://www.radicati.com/wp/wp->

- [content/uploads/2013/05/Enterprise-Content-Management-Market-2013-2017-Executive-Summary.pdf](#)
- Ravesteyn, P., & Batenburg, R. (2010). Surveying the critical success factors of BPM-systems implementation. *Business Process Management Journal*, 16(3), 492-507.
- Smith, H. A., & McKeen, J. D. (2003). Developments in practice VIII: Enterprise content management. *Communications of the Association for Information Systems*, 11(1), 647-659.
- Trkman, P. (2010). The critical success factors of business process management. *International Journal of Information Management*, 30(2), 125-134.
- Tyrväinen, P., Päivärinta, T., Salminen, A., & Iivari, J. (2006). Characterizing the evolving research on enterprise content management. *European Journal of Information Systems*, 15, 627-634.
- Umble, E. J., Haft, R. R., & Umble, M. M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European Journal of Operational Research*, 146(2), 241–257.
- vom Brocke, J. (2013). On the Role of Enterprise Content in Business Process Management. *BPTrends*, 10, 1-11.
- 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*, 9(4), 475-496.
- Wilson, H., Daniel, E., & McDonald, M. (2002). Factors for success in customer relationship management (CRM) systems. *Journal of marketing management*, 18(1-2), 193-219.
- Wiltzius, L., Simons, A., & Seidel, S. (2011). A Study on the Acceptance of ECM Systems.
- Wohlin, C., Mayrhauser, A. v., Höst, M., & Regnell, B. (2000). Subjective evaluation as a tool for learning from software project success. *Information and Software Technology*, 42(14), 983-992.

Authors

Jan vom Brocke

Jan vom Brocke is head of the BPM group in Liechtenstein. He is Professor of Information Systems, the Hilti Chair of Business Process Management, and Director of the Institute of Information Systems. He is Founder and Co-Director of the *International Master Program in IT and Business Process Management* and Director of the *PhD Program in Information and Process Management* at the University of Liechtenstein (see: www.bpm-education.org). Since 2012 he has been appointed Vice-President of the University of Liechtenstein responsible for research and innovation. Jan has over 15 years of experience in IT and BPM projects and he has published more than 200 papers in renowned outlets, including *MIS Quarterly (MISQ)*, the *Journal of Management Information Systems (JMIS)* and the *Business Process Management Journal (BPMJ)*. He has authored and edited 20 books, including *Business Process Management – Driving Innovation in a Digital World* and *Green BPM – Towards the Sustainable Enterprise*, and the *International Handbook on Business Process Management*. Jan is an invited speaker and trusted advisor on BPM serving many organizations around the world.

Jan`s research and publications can be accessed via the [University of Liechtenstein](#) as well as on [Researchgate](#) and [Slideshare](#). You can contact Jan via mail (jan.vom.brocke@uni.li) or [LinkedIn](#) or subscribe to his [tweets](#).

Andrea Herbst

Andrea Herbst is a Research Assistant and PhD Student of Information Systems at the University of Liechtenstein. She holds a diploma in Political Economics from the University of Augsburg in Germany, with a major in Information Systems and in Economics of Information. Her main research areas are enterprise content management and business process management. Her research is published in academic journals and in international conference proceedings.

Nils Urbach

Nils Urbach is Professor of Information Systems and Strategic IT Management at the University of Bayreuth, Germany, as well as Deputy Director of the Finance & Information Management Research Center and the Project Group Business & Information Systems Engineering of Fraunhofer FIT. In his current research, he mainly focuses on the areas of strategic IT management and IT-based collaboration. His work has been published in several international journals and in the proceedings of key international conferences.