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Radosław Wójtowicz
Wroclaw University of Economics and Business
e-mail: radoslaw.wojtowicz@ue.wroc.pl
ORCID: 0000-0003-4236-4390

THE DETERMINANTS AND CONCEPT OF EFFECTIVE IMPLEMENTATIONS OF ECM SYSTEMS

DETERMINANTY I KONCEPCJA EFEKTYWNEGO WDRAŻANIA SYSTEMÓW KLASY ECM

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Abstract: The article describes the main factors which directly or indirectly influence the range and pace of IT implementation projects. It analyses the main structural elements and functional procedures of the implementation reengineering in the ECM (Enterprise Content Management) systems area, and presents the outline of managing projects execution. The main objective of this paper is to present the author's general conceptual model of the implementations of the ECM system in an organization, resulting from the preliminary literature review and extensive practical experience.

Keywords: IT projects, IT systems implementations, ECM systems.

Streszczenie: W artykule omawiono główne czynniki wpływające bezpośrednio lub pośrednio na zakres i tempo implementacji przedsięwzięć informatycznych, zanalizowano podstawowe elementy strukturalne i procedury funkcjonalne praktycznej reinżynierii wdrażania systemów, a także przedstawiono zarys zarządzania realizacją projektów.

Słowa kluczowe: projekty informatyczne, wdrażanie systemów informatycznych, systemy klasy ECM.

1. Introduction

IT implementation management is generally defined as a multi-faceted and multi-factor process of the operational managing of complex planning, organizational, executive and control procedures for implementation of information and communication projects of various types.

The effective management of IT implementations, especially in relation to large, complex and costly projects requires a good understanding of the basic implementation factors, both those positively affecting as well as hindering the undertaken actions. This topic is described in the part of this study entitled "Implementation simulators and brakes".

The main goal of the article is to show the conceptual model of implementations of the ECM system in an organization. The effective management of ECM systems implementations requires a process approach (reengineering) in the planning and organising stage as well as in direct project execution. The author addresses this issue in the main part of the article.

2. Implementation simulators and brakes in the ECM systems area

Enterprise Content Management Systems can be defined as a set of technologies used to capture, manage, store, preserve, and deliver content and documents related to the organisation's processes. ECM tools and strategies can also manage the organisation's unstructured information, regardless of where it is located (Kleu, Micheletti, and Roufka, 2013, p. 20; Misiak, 2010, pp. 440-441).

Enterprise Content Management comprises the strategies, methods and tools used to capture, manage, store, maintain and deliver the content and documents related to organisational processes. ECM encompasses information management across the enterprise, whether it is in the form of a paper document, an electronic file, a data stream, or an e-mail (Boehn, 2014).

In principle, ECM systems are used to collect and process information from very different sources, which includes capturing documents with optical character recognition (OCR) mechanisms, parsing (syntax analysis) information from electronic mail, or collecting information from other ECM systems, office software files, as well as audio and video recordings. ECM also allows entering documents by means of built-in mechanisms which enable the flexible modelling of classes of objects entered so that practically all types of information can be stored within the system (Szczepaniak, 2012).

The effective management of IT implementations, particularly with respect to the large, complex, and costly projects that are very often implementations of ECM systems, requires a good understanding of the essential implementation factors, both those having a positive impact and those hindering the actions taken. This results in

the need for a systemic approach, both in planning and organization, as well as in the area of the direct implementation of the project.

This part of the article selects and discusses the most important factors affecting – positively or negatively – the scale and pace of ECM systems implementations in market facilities. In particular, the author is interested in the direct and indirect determinants of technologically efficient and economically effective management of large information and communication projects. This topic analysis is presented through the optics of two types of factors – external and internal.

Firstly, the author describes a group of **internal factors**, i.e. a set which is an inseparable element of market actions directly related to the sector of IT implementation projects.

Increase in practice demand. This element clearly affects the quantitative and qualitative progress in the methods and techniques of effective implementation management, which over time translates into the economic results of a business enterprise. Accelerated growth means an increased demand for new and the latest solutions at the disposal of both management sciences and IT, while, on the contrary, a slow increase in such demand means a natural decrease in attractiveness of supporting tools, and soon results in delays in the realisation of implementation projects.

Market offer size. This is a determinant of the level of competition on a given IT implementation market. The large size of the market offer in the field of computer systems and the possibility of their implementation in business enterprises is stimulating for all market players, enabling negotiation of favourable contracts for customers, and also forcing the implementing companies to ensure high quality and rational costing of projects. The opposite situation, dealing with a small market offer, most often leads to a technological slowdown and, consequently, difficulties in maintaining a competitive advantage.

Team knowledge transfer. The size of the transfer is one of the most important measures of organizational 'maturity' of the IT systems implementing company. The free flow of knowledge between members of the teams implementing the project ensures, among others, great flexibility in reacting to turbulent changes in the project environment. Implementation teams established within a given company, the structures of possible subcontractors, and also the client, should aim at the widest possible transfer and consolidation of knowledge about the projects being carried out, which may result in much more effective implementations in future. The limitation of knowledge transfer is related to, among others, the risk of losing the possibility of full implementation, for example in the event of personnel changes in executive teams.

Another group of described factors are **external factors**, i.e. those which directly affect the entire economy, and, consequently, also the IT implementation project sector.

Centre development strategy. This is a factor closely correlated with practice demand as all strategic decisions of the governing bodies sooner or later result in

selecting specific market priorities. An inspiring strategy of the centre development prompts market enterprises to reveal their needs in the field of computerisation of selected areas or comprehensive business activity. These challenges are eagerly answered by professional consulting and integration institutions that engage their service capacities in various implementation undertakings. It should be noted that if the situation were reversed, the conservative behavior of the decision-making bodies in the field of broadly understood computer science would usually become an evident brake on the progress in the economic environment.

The level of IT development. This element largely determines the effectiveness of implementation projects which are, after all, a consequence of the use of information technology in the management of business enterprises. Therefore, it can be said that it is of fundamental importance for the type of projects in question. It should be expected that a high level of this indicator will have a proportional effect on the pace and quality of implementations, positively stimulating both the management sphere as well as the realisation of the implementation projects. Naturally, the opposite is true of the low level of this element, causing the 'stiffening' of various aspects of the implementation (hardware, software or organizational).

Financial condition of science. This is also an element that strongly corresponds with the level of IT development. Science, if treated as a specific branch of the economy, requires investment outlays in order to produce tangible effects in the form of more and more advanced technologies and solutions. Therefore, a good financial condition of the area which strongly supports IT projects by providing new ideas to practice, as well as organising and developing those derived from practice, will be of significant importance for the realised implementation projects. IT implementations, especially the complex ones, require support from many scientific fields, namely, as noted above, broadly understood computer science and economics, including law, quality management, and change management. For this reason, the poor financial condition of the sphere of science may have a very negative impact on the discussed projects.

As shown, stimulators and brakes of implementation projects may come not only from the internal area, directly related to the IT industry, but also partly from the country's strategic development.

3. The basics of the concept of ECM systems implementations

This part of the study defines the very concept of ECM systems implementation, and then, based on the presented graphic model, describes its structural elements, combining them through functional procedures.

The conceptual model of the implementations of ECM systems, presented in Figure 1, consists of 12 detailed structural components and 6 main functional procedures considered in the context of 3 basic elements of the venture architecture.

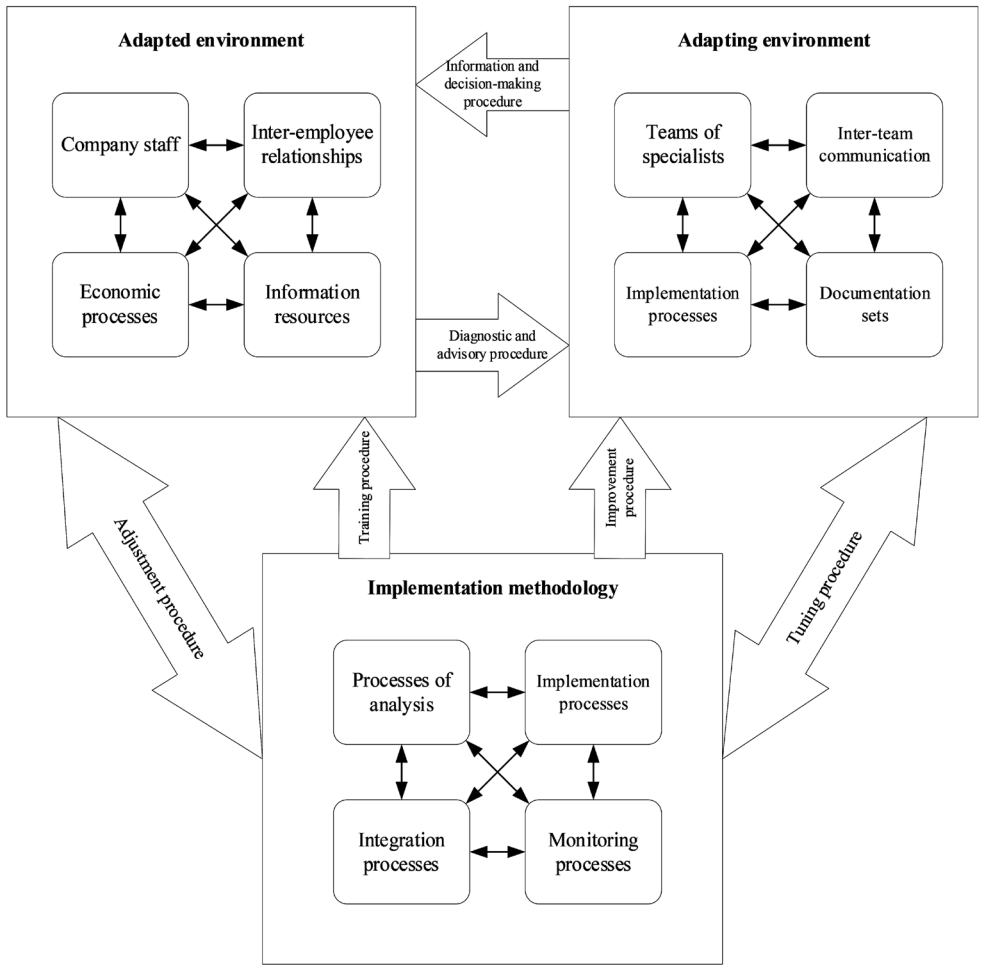

Fig. 1. The conceptual model of the implementations of ECM systems

Source: own work.

One starts the synthetic characteristics of the model from the **adapted environment** which is a business enterprise subjected to the intended restructuring processes forced by the implementation of specific IT solutions.

In the adapted environment one distinguishes, first of all, such a component **as the company staff**, which, from the point of view of the implementation project, are the employees of the institution both directly and indirectly involved in the realisation of the project.

The second structural component – very closely related to the previous one – is **inter-employee relationships**, i.e. the formal and informal relations between

employees resulting from professional activities, hierarchical relationships and friendships.

Another component of implementation in IT systems is constituted by **economic processes**, i.e. all activities carried out in an economic enterprise resulting from its business profile and allowing for its proper functioning.

Finally, the last one, directly dependent on the previous one – **information resources** – is the knowledge (accumulated on various carries and in various forms) in the field of the current activity and long-term strategy for the realisation of economic processes taking place in the enterprise, along with their interrelationships.

The second element of a basic nature **is the adapting environment**, i.e. a team of specialists undertaking the implementation project on behalf of the tenderer, who is also often a producer of a specific IT solution (application, system), along with the components accompanying the performed tasks.

The first structural component here are **teams of specialists**, i.e. employees, directly and indirectly involved in implementation of the offered IT system, who constitute the main substantive, consulting and partly executive force of the project.

The second component, inextricably connected with the previous one, is **inter-team communication**, i.e. information flow, processes of cooperation and communication among all employees involved in the carried out project, along with the internal relationships resulting from hierarchical subordination.

The third component **– implementation processes** – can be defined as all activities carried out by a team of specialists aimed at ensuring the correct and effective implementation of the project being a subject of the contract between the counterparties.

The last component of the adapting environment is made up by **documentation sets**, i.e. a kind of a log of experiences gathered earlier during the implementation of an IT system in other enterprises, enriched with a record of current observations (and analyses) obtained in the course of the project works.

To conclude this part of the commentary on Figure 1, a certain remark needs to be added, namely that the separately discussed adapted and adapting environments, in fact create a common organisational and technological space that can be referred to as the adaptive environment.

The third – and last of the basic categories – element of the architecture **is the implementation methodology**, which consists of formalised and documented processes, thanks to which the implementation of the IT system has its defined goals, specific assumptions, established appropriate solutions and an orderly course.

The first component of the methodology are **processes of analysis**, i.e. reconnaissance activities carried out in the adapted environment (mainly in the initial phase of the project), constituting the starting point for subsequent processes. The requirements analysis is part of a comprehensive pre-implementation analysis of ECM systems which should cover areas including the analysis of business processes and the manner of their implementation, determination of the functional

and organisational scope of the project, description of functional requirements with respect to business processes analysed, method of implementing functional requirements, measurable benefits from implementation, implementation work schedule, as well as the cost of the project, ideally allowing for several variants of functional requirements and the number of licences (Wójtowicz, 2019, p. 94).

The second component of the implementation methodology are **implementation processes** – namely the tasks realised by both contractors (employees and specialists) in the area of the implemented system (supporting company management) and the business enterprise itself.

Another component are **integration processes**, i.e. activities consisting in the full connection of the components of the IT system with each other and with external programs, so that the system forms a fully compatible whole, with properly implemented economic processes of the enterprise.

The last of the distinguished components – **monitoring processes** – is the sphere of work related to observation, testing and verification of the correct functioning of economic processes implemented in the IT system.

The second part of the commentary to the model presented in Figure 1 is devoted to the issue of the implementation from a dynamic perspective. The basis of this approach are six functional procedures that indicate the interconnection of all elements of the presented diagram. First, the author describes the procedures in the adaptive environment (i.e. adapted and adapting).

The first, **the information and decision-making procedure,** is a fundamental part of the entire undertaking, a targeted activity aimed at explaining in detail all the rules of the enterprise's organization and functioning, and – binding both parties – specifying the expectations related to the course of the project.

The diagnostic and advisory procedure is a supplement and consequence of the previous one, although it has the opposite direction. It consists in the full identification of the components of the adapted environment in order to organize them in such a way that it corresponds directly to the needs of the realized IT project and enables the parametrisation of the implemented system.

Another group of procedures expresses the interaction between the adapted environment and the implementation methodology.

Firstly, the **training procedure** is discussed. This consists in fully informing the company's staff – along with the progress of the realised tasks – about the assumptions and solutions available within the implementation methodology.

The other item under discussion is **the adjustment procedure**, which is of a bidirectional nature; it constitutes the entirety of activities on the part of the enterprise, the aim of which is to harmonize the available solutions of the adopted methodology with the adapted environment.

The last part of the characteristics of Figure 1 is an indication of the relationship between the adapting environment and the implementation methodology.

The author begins with the **improvement procedure**, i.e. a forced process which the adapting environment should be subjected to, so that the developed methodology is skilfully applied and brings measurable results in the form of effective implementations.

The last one – **the tuning procedure** – concerns the interaction of two elements of the architecture in the course of planning, organising and controlling of all eight distinguished structural components.

The application of the proposed model in practice is not easy. The success of the task depends on at least two factors: the very good cooperation of both contractors (the company and the tenderer who may also be a manufacturer), and the use of solutions supporting efficient and effective management of the entire implementation process. This approach also allows applying the EVA/EVM (Earned Value Analysis/Earned Value Management) method, which consists, among other things, in measuring and tracking the progress of the work using concepts related to costs, time, and achieved results, and then comparing the values obtained with the structurally defined scope of the project (Dudycz and Dyczkowski, 2006, pp. 55-56).

4. Conclusion

The considerations regarding effective management of ECM systems implementations are concluded with three summarising remarks.

The analysis of the model of the main implementation factors showed that any significant progress in the discussed field requires: an accelerated growth of practice demand, large size of the market offer, free transfer of team knowledge – on the scale of microscopic solutions, along with a simultaneous, inspiring center strategy, high level of IT and a good financial condition of science, captured in macroscopic optics.

Reengineering treated as a new approach to managing implementations, especially undertakings (systems, projects) of an integrated nature, deserves attention not only from the theoretical and research point of view, but, above all, due to its direct practical usefulness.

Compliance with the methodological patterns for realising IT projects supported by various technological tools, for example electronic systems of documentation, in implementation practice should, over time, result in a much higher indicator of the implementation's final success than currently observed in practice, especially in relation to complex and long-term projects, usually requiring very high financial outlays.

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