

## KNOWLEDGE MANAGEMENT AS A TOOL SUPPORTING THE IMPLEMENTATION PROCESS OF AN INTEGRATED ERP SYSTEM

Daniel ZWIERZCHOWSKI

Bydgoszcz University of Science and Technology; d.zwierzchowski@pbs.edu.pl,  
ORCID: 0000-0002-4324-3331

**Purpose:** Identification of knowledge management methods in the process of implementing an integrated ERP class IT system.

**Design/methodology/approach:** The research method was a case analysis, during which two methods of data collection were used (an unstructured interview with a participant of the implementation team, observation of the author of the article). Research on knowledge management in ERP systems implementation projects is justified and necessary to enable more efficient management of these projects.

**Findings:** The study proves that the phases of the life cycle of knowledge are closely related to the phases of the project. During the project preparation phase, the necessary organizational knowledge is identified. During the design phase of the IT solution, knowledge about the organization is transferred (from employees to consultants). In this way, a coherent IT solution project is created, which is implemented in the next phase of the project. From this moment knowledge about the organization is used to create the solution, test it, and then use it.

**Research limitations/implications:** The considerations contained in this study outline further directions for theoretical and practical analysis. The implementation of an integrated ERP class IT system is a strategic decision, the effects of which will be significant for the course of business processes, use of resources and efficiency of management.

**Practical implications:** The implementation process requires diverse, often specialized knowledge from the participants, and also involves multidirectional flows of this kind of knowledge. There is a need to carry out research on knowledge management methodologies in the design environment.

**Originality/value:** Implementation projects require diverse, often specialized knowledge from participants, and involve multidirectional flows of this kind of knowledge. Their subject matter is the organizational, management, business and technological knowledge possessed by all participants (including future users of the integrated system).

**Keywords:** knowledge management, ERP systems, small and medium-sized enterprises.

**Category of the paper:** Case study.

## 1. Introduction

Integrated IT systems of the ERP class constitute one of the most substantively and technologically advanced classes of IT systems that support the overall management of enterprises and institutions. The use of such systems has an influence on the optimization of internal processes as well as those occurring in the immediate environment, e.g. by offering ready-made tools (Miłosz, 2012; Issar, Navon, 2016). The main features of such a system include (Madinios, Chatzoudes, Tsairi, 2012):

- functionality,
- integration of data and procedures,
- functional and structural flexibility,
- substantive and technological advancement.

The implementation and use of integrated ERP class IT systems is nowadays the basis for streamlining business management processes (integrated systems provide a new shape to the organization) (Bytniewski, Matouk, Hernes, 2018). Enterprises operate in conditions of increased competition, which is associated with higher requirements regarding quality, speed and timeliness, e.g. of trade and production. A fast response to the needs of the customer, as well as the possibility of offering an innovative solution and reduction of project costs is a way to achieve a competitive advantage (Malik, Khan, 2021).

Nowadays numerous small and medium-sized enterprises (SMEs) recognise a need for an integrated ERP class IT system to support enterprise resource management. There is a wide range of systems available on the market aimed mainly at SMEs (Estébanez, 2021). The implementation of an integrated system is a strategic decision, the effects of which will be important for the course of business processes, use of resources and efficiency of management (Grochowski, 2020). The success of an integrated system implementation depends on various factors related both to the type of operational activity run by the company as well as to the way of managing the implementation project. The execution of implementation projects involves not only acquiring and launching appropriate IT infrastructure, but also providing knowledge that enables the effective use of this infrastructure to efficiently support business processes (Finnery, Corbett, 2007; Zwierzchowski, Graul, 2016). Projects require diverse, often specialized knowledge from participants and involve multidirectional flows of this kind of knowledge. Their subject matter is organizational, management, business, technological knowledge, etc. possessed by all participants (including future users of the integrated system). During the projects, various implementation and management activities that make up the project actions are used directly to create knowledge and consolidate it in the implementation products, as well as to create its resources, simultaneously becoming the intellectual capital of the entities participating in the projects (Alaskari, Pinedo-Cuenca, Ahmad, 2021; Żółtowski, 2021). The goal of the article is to identify methods of knowledge management in the process of implementing an integrated ERP class IT system.

## **2. Knowledge management in the process of implementing an integrated system**

In the source literature on knowledge management, the importance of key competences of human capital is particularly emphasized, and so is the appropriate implementation of crucial activities for knowledge management. Proper knowledge management allows to foresee the basis of future competitive advantage on the market. In this case, enterprises make a strategic decision, e.g. regarding the implementation of an integrated ERP class IT system (Rodriguez, Molina-Castillo, Svensson, 2020).

One of the most complicated IT projects in business organizations is the implementation of a standard integrated system. Such a project covers the majority of the key economic processes and involves significant resources of the organization, as well as simultaneously causes the necessity to manage different types of knowledge (Sedera, Gable, 2010; Rupcic, 2021). Some authors postulate the formulation of specific knowledge management procedures in projects for the implementation of integrated systems, or at least the inclusion of knowledge management procedures in existing practices of project management of the implementation of ERP systems (Chaudhry, Nawab, Shafi, 2021; Mohd Zamhari, 2020). It should be noted that research on knowledge management in IT projects, and ERP implementation projects in particular, is justified and necessary to enable more efficient management of these projects.

The aim of the article is to identify methods of knowledge management in the ERP system implementation project. Therefore, it is necessary to describe the implementation process in detail. Esteves et al. propose to divide the project in accordance with the ASAP methodology of the system implementation into the following phases (Esteves et al., 2003):

1. Preparation of the project – in which the scope of the project, its budget and schedule are specified, project structures and teams are formed as well as project infrastructure is prepared.
2. Business concept – during which the organizational structures as well as economic processes of the organization are analyzed, and then a project of their reproduction in the IT system is developed, along with the concept of data migration from previous systems.
3. Implementation – during which the system configuration occurs, programming extensions, reports, interfaces as well as data migration tools are developed, and then the system is tested and corrected.
4. Preparation for project launch – when the production environment is prepared and real data are migrated, as well as end users are trained.
5. Launch and post-launch support – the system is launched and its stabilization phase takes place, errors are corrected, as a result of which the system goes into normal operation.

There are also other approaches to the structuring of an IT project in the source literature (Lech, 2011). In the case analyzed in the empirical part of this article, a methodology similar to the ASAP methodology was used, therefore, the division of the project into the above-mentioned phases was adopted.

The knowledge management model in the ERP project should give answers to the questions on how appropriate knowledge (about the project, about the product, about the organization, business, technical, project management, communication) is identified, acquired/created, saved/stored, transferred/disseminated and used in the particular phases of this project in order to enable its implementation in compliance with the assumed scope, budget and schedule (Usman, Ahmad, 2012; Ranjan, Jha, Pal, 2016).

In this article, further considerations will be limited to one type of knowledge, namely knowledge about the organization because of its crucial role in designing a dedicated solution based on the standard functionality of the ERP class system.

### **3. The process of implementing an integrated ERP class IT system in a trade and production enterprise**

#### **3.1. Characteristics of the problem in the company's practice**

Contemporary enterprises are aware of the fact that the implementation of integrated ERP class IT systems plays a significant role in the process management. Such IT solutions have become one of the most efficient tools for increasing the effectiveness of activities in the enterprise.

A trade and production company from the small and medium-sized enterprises (SMEs) industry, in which the implementation of an integrated system had been undertaken, has been operating on the Polish market since 2003. The company deals with wholesale and retail sale of electronic products. The headquarters of the company is located in Bydgoszcz and operates mainly throughout the entire country. The main direction of the company activity is to ensure customer satisfaction by guaranteeing the provision of a complete range of high-quality goods at a competitive price. Heading in this direction allows for daily sales of up to 1000 pieces of goods.

Since 2009 the company has also been engaged in manufacturing activities, and over the last year, it has placed great emphasis on the development and modernization of its production plant. All offered products can be purchased directly at the company, from sales representatives, as well as at points of sale and via the Internet.

Over time, the company has begun to face problems that had not been experienced before. The increase in the assortment, as well as the continuous increase in the number of customers, contributed to problems with the processing of orders. It has generated a large number of

incorrect handing over of goods (it was necessary to issue corrective documents). The increasing number of orders and the lack of ergonomics of work in the warehouse significantly extended the time of completion of all orders. The system which has been used so far did not adequately support the work of traders, among others, it did not take into consideration automatic changes in price lists. The occurrence of the above-mentioned problems forced the company's management board to decide to implement the Tisoft Work Manager system. The most important criterion for selecting the appropriate system was to integrate all spheres of the company's activity into one system, as well as support for the quality assurance system.

From the beginning of its activity, the trade and production company used separate IT systems for each area of the enterprise, supporting the sales department, accounting department as well as production department. This has led to inconsistencies within the enterprise. As the company kept developing, problems, that nobody from the board had previously been able to predict, began to occur.

Additional problems occurring in the analyzed company, before the implementation of the integrated system, include:

- stock records - inconsistent with the facts,
- incorrect handing over of goods,
- extended time of order processing,
- "paper" records,
- running a company in several databases,
- use of out-of-date database technologies.

Among other things, the problems did not allow for streamlining of decision-making processes and focusing on increasing production. The risk of entering incorrect data into the system was still increasing. The solutions used in the enterprise have become insufficient. Therefore, the implementation of an integrated IT system was a key element for maintaining market position and the development of the company.

### **3.2. Methodology**

The research question formulated for the purposes of this article referred to how knowledge about the organization was managed in different phases of the project of implementing an integrated ERP class IT system. The following data collection methods were used as a research method:

- an unstructured interview with a participant of the implementation team,
- an observation of the author of the article.

The method of data collection was an unstructured interview with a member of the implementation team. The interview lasted 2 hours and it was recorded. The respondent was asked if/what method was used/what effect it brought? individual stages of the knowledge

life cycle were implemented in subsequent phases of the project. During the interview, additional questions were asked as a reaction to the individual answers of the respondent. The results of the interviews were established in the form of a narrative.

### **3.3. Results of the study**

The respondent was a member of the implementation team of the entire system. The knowledge he represented resulted from several years of work experience in a managerial position. Moreover, this person was distinguished by the ability to think analytically and connect facts in cause and effect relationships, which turned out to be very useful in designing a business concept (implementing knowledge about the organization into the functionality of the ERP system).

1. Preparation of the project – the project preparation phase took place at the project management level and the respondent participated in it. The result of this phase was the formal establishment of a project team. On this basis, it can be concluded that the knowledge has been identified, which has resulted in the appointment to the project team of persons who had already possessed it. The method of identifying knowledge and knowledge resources was not known to the respondent.
2. Business concept – at the stage of the business concept, the respondent did not need to identify additional knowledge. There was also no need to acquire additional knowledge about the organization. The main activities related to knowledge at this stage of the project were all about creating a detailed business concept during which knowledge was transferred from individual participants representing various departments of the company to the consultant and among one another. This transfer took place in the form of workshops (also online), run by a consultant who determined the topic which was the subject of discussion. Then, the knowledge about the organization was integrated with the knowledge about the system and it was possible to create a detailed business concept. This document was created by the consultant, based on his own knowledge of the system and knowledge of the organization provided to him by the members of the project team.
3. Implementation – during the implementation phase, the consultant configured the integrated system in compliance with the guidelines contained in the detailed business concept (configuration based on the integrated knowledge from the relevant areas, knowledge about the enterprise and the functionality of the system). In this way, the knowledge transferred in the previous phases was used to build the system.
4. Preparation for project launch – the main activities in the phase of preparation for launch were verification of the correctness of the system configuration as well as end-user training. Preparations for the tests, which were all about generating test scenarios, required the members of the project team to use knowledge about the organization in order to predict all possible variants of the course of business processes as well as the

most common errors. Simultaneously, system operation training took place, i.e. knowledge transfer from the consultant to the end user.

5. Launch and post-launch support – in the launch phase, all team members as well as end users use their knowledge about the organization. The respondent stated that all possible solutions were predicted here, i.e. the connections of knowledge about the organization with the functionality of the system.

**Table 1.**

*Summary of the test results*

<b>Phase of the project:</b>	<b>Result</b>
Preparation of the project	– appointment of team members who possess the required knowledge about the organization to the team.
Business concept	– knowledge about the organization transferred to consultants, – creating an IT solution project (detailed business concept), – development of design documents, e.g. workplace instructions.
Implementation	– system configuration for users.
Preparation for project launch	– preparation and verification of test scenarios.
Launch and post-launch support	– working with a new system, – use of new solutions based on the functionality of the system.

Source: personal analysis.

## 4. Conclusions

The project of implementation of an integrated ERP class IT system covers most crucial business processes and involves significant organizational resources, while creating a necessity to manage various types of knowledge. The case study presented in this article showed the role of knowledge management in the project of implementing an integrated system. Proper management of knowledge about the organization is an essential prerequisite for the success of the implementation project. The proper reproduction of this knowledge in the system ensures that the solution is consistent with the economic objectives of the organization.

Most studies regarding the success factors of IT projects (including ERP projects) mention user involvement in the first place. The introduction of the knowledge management aspect to research on the success of IT projects shows what one of the main effects of this involvement should look like. It is the management of knowledge about the organization so that it can be integrated into the emerging IT solution.

The study shows that the phases of the life cycle of knowledge are related to the phases of the project. During the project preparation phase, the necessary organizational knowledge is identified. Then, in the phase of designing an IT solution, there is a transfer of knowledge about the organization - from employees to consultants (responsible for the implementation of the system, its storage in the form of business concept documents as well as integration with knowledge about the system). In this way, a coherent IT solution project is created, which is

put into practice in the next phase of the project. Ultimately, knowledge about the organization is used to create the solution, test it, and then use it. It indicates an extremely significant role of knowledge management in projects implementing integrated systems and the need to carry out research on knowledge management methodologies in the design environment.

## References

1. Alaskari, O., Pinedo-Cuenca, R., Ahmad, M. M. (2021). Framework for implementation of enterprise resource planning (ERP) systems in small and medium enterprises (SMEs): A case study. *Procedia Manufacturing*, pp. 424-430.
2. Bytniewski, A., Matouk, K., Hernes, M. (2018). To ERP IV class systems. *Informatyka Ekonomiczna. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 1(47), pp. 43-57.
3. Chaudhry, M., Nawab, S., Shafi, K. (2021). Enterprise Resource Planning Systems and Knowledge Management: A Review of the Literature and Conceptual Framework. *Journal of Management and Research*, 8(1), pp. 179-211.
4. Estébanez, R.P. (2021). Assessing the Benefits of an ERP Implementation in SMEs. An Approach from the Accountant's Perspective. *Scientific Annals of Economics and Business*, pp. 63-73.
5. Esteves, J., Chan, R., Pastor, J., Rosemann, M. (2003). *An Exploratory Study of Knowledge Types Relevance Along Enterprise Systems Implementation Phases*. 4-th European Conference on Organizational Knowledge and Learning Capabilities, pp. 13-14.
6. Finnelly, S., Corbett, M. (2007). ERP implementation: a compilation and analysis of critical success factors. *Business Process Management Journal*, 13(3), pp. 329-347.
7. Grochowski, K. (2020). Barriers to implementing the strategic management in transport services SMEs. *Organization and management series*, no. 144, pp. 147-154.
8. Issar, G., Navon, L.R. (2016). Enterprise Resource Planning (ERP). In: *Operational Excellence. Management for Professionals* (pp. 33-36). Cham: Springer.
9. Lech, P. (2011). Knowledge Transfer Procedures From Consultants to Users in ERP Implementations. *Electronic Journal of Knowledge Management*, 9(4), pp. 318-327.
10. Maditinos, D., Chatzoudes, D., Tsairidis, C. (2012). Factors affecting ERP system implementation effectiveness. *Journal of Enterprise Information Management*, 25(1), pp. 60-78.
11. Malik, M.O., Khan, N. (2021). Analysis of ERP implementation to develop a strategy for its success in developing countries. *Production Planning & Control*, 32(12), pp. 1020-1035.
12. Miłosz, M. (2012). ERP Implementation at Polish Enterprises - from Business and End-Users Perspectives. *Actual Problems of Economics*, no. 6(132), pp. 414-421.



13. Mohd Zamhari, N.E.S. (2020). Knowledge Management System Implementation: Enterprise Resource Planning (ERP). *Journal of Information and Knowledge Management (JIKM)*, 10(1), pp. 23-29.
14. Ranjan, S., Jha, V.K., Pal, P. (2016). Literature review on ERP implementation challenges. *International Journal of Business Information Systems*, 21(3), pp. 388-402.
15. Rodriguez, R., Molina-Castillo, F.-J., Svensson, G. (2020). Enterprise resource planning and business model innovation: process, evolution and outcome. *European Journal of Innovation Management*, Vol. 23, No. 4, pp. 728-752.
16. Rupcic, N. (2021). Implementing Enterprise Resource Planning in SMEs: The consultants' perspective. *International Journal of Business Information Systems*, 37(4), pp. 467-490.
17. Sedera, D., Gable, G.G. (2010). Knowledge Management Competence for Enterprise System Success. *The Journal of Strategic Information Systems*, 19(4), pp. 296-306.
18. Usman, U.M.Z., Ahmad, M.N. (2012). Knowledge Management in success of ERP systems. *International Journal of Advances in Engineering & Technology*, 3(1), pp. 21-28.
19. Żółtowski, D. (2021). Determinants of microentrepreneurs' decision to start work on their own ERP software for the SME sector. *Procedia Computer Science*, pp. 4478-4485.
20. Zwierzchowski, D., Graul, C. (2016). *Evaluation of legitimacy of teaching and quality of students education in the area of ERP systems application*. EDULEARN2016 Proceedings, Barcelona, Spain, pp. 2517-2523.