Issues in Information Systems
Volume 23, Issue 1, pp. 117-130, 2022

DOI: https://doi.org/10.48009/1_iis_2022_109

Importance of IT systems in integration of knowledge and business process management

Agnieszka Bitkowska, *Warsaw University of Technology, agnieszka.bitkowska@pw.edu.pl*
Beata Detyna, *Angelus Silesius State University, bdetyna@puas.pl*
Jerzy Detyna, *Wrocław University of Science and Technology, jerzy.detyna@pwr.edu.pl*

Abstract

The article aims to present the results of research on the importance of IT systems in the integration of knowledge management and business process management in organisations operating on the Polish market. We consider this issue in the context of the impact of the elements examined on the quality of the processes carried out, the effectiveness of the business, and customer satisfaction. The research was conducted in Poland in 2020 on a sample of 107 enterprises with a range of international (48%), national (39%), regional (6%), and local (6%). Among the organisations surveyed were manufacturing and service companies operating in various industries. The dominant group of respondents were large enterprises (55%), medium-sized enterprises accounted for 22%, small enterprises – 19%, and micro-enterprises – 4%. The article indicates the industries in which IT systems are used to the greatest extent in business process management and knowledge management. The respondents referred to the role (significance) of improving the availability of knowledge resources for the benefit of improving the quality of processes implemented, optimising key performance indicators (KPIs), costs, and time, as well as increasing customer satisfaction. The results indicate statistically significant relationships between the variables studied – business process management and knowledge management (with the use of IT systems), and the quality of processes, their effectiveness, and the level of customer satisfaction.

Keywords: IT systems, knowledge management, business process management, process quality, process efficiency

Introduction

A review of the literature on the subject and the observation of economic practices indicates that organisations are constantly looking for more effective management and organisational methods and tools. These searches are forced by turbulent reality, including the continuously complicated COVID-19 epidemic situation, emerging new technologies and needs (customers, employees, owners, strategic partners), and so on [Mahdi & Nassar, 2021]. The turbulent environment and the growing interest in external accreditation systems and certification are on the list of reasons for the growing interest of enterprises, including business process management (BPM Business process management) or project management [Albliwi et al., 2014, Bitkowska, 2017a, 2018, 2020, Harmon, 2010, Kerzner, 2001, Niehaves et al., 2014, Rohloff, 2009, Tarhan et al., 2016]. The results of the research indicate that relatively often, the potential benefits expected by the organisation from the implementation of the concepts it chooses do not materialise [Aganette, 2020, Ang, 2017, Benner & Tushman, 2002, Bilas & Adeeb, 2017, Detyna, 2016, Detyna & Detyna, 2015, 2016, Gross et al., 2020, Gudelj et al., 2021, Holzmüller-Laue & Göde, 2011, Klun & Trkman, 2018, Mendling et al.,

2020, Moreno et al., 2015, Reijers, 2021, Segatto et al., 2013, Sobolewska & Bitkowska, 2020, Stravinskiene & Serafinas, 2020, Szelagowski & Lupeikiene, 2020].Therefore, researchers are looking for reasons for the failure to achieve the goals and plans for implementing new management concepts, including business process management.

A review of the latest world literature indicates that serious deficits in knowledge resources are among the reasons for the failure of the implementation and functioning of business process management or project management [Abualoush et al., 2018, Abusweilem & Abualoush, 2019, Bitkowska, 2017b, 2017a, 2020, Cepeda-Carrion et al., 2017, Criado-García et al., 2020, Detyna & Detyna, 2015, González-Valiente et al., 2021, Gromoff et al., 2016, Jayawickrama, 2014, Kir & Erdogan, 2021, Latif et al., 2021, Mandják et al., 2021, Manfreda et al., 2015, Moreno et al., 2015, Raudeliūnienė et al., 2018, Sobolewska & Bitkowska, 2020, Szelągowski, 2020, Szelągowski & Berniak-Woźny, 2019, Zaim et al., 2019]. Even though an increasing number of companies implement the concept of business process management, taking into account the project perspective and based on knowledge resources, processes, projects, and knowledge are treated separately. Therefore, the article presents the usefulness of building links between the processes implemented in the organisation and the knowledge resources. Advanced IT systems, which are increasingly often implemented in organisations, are important in this integration. We article present the results of research that indicate the dependencies between business process management and knowledge management (with the use of IT systems), the quality of processes implemented by companies, the effectiveness of operations, and customer satisfaction.

The main research question was defined as: how IT systems integrate knowledge and business process management in contemporary organizations? The issues were discussed in both theoretical terms, by analyzing the literature review, and practical terms, by looking into the results of empirical research studies conducted in 2020 in Poland.

The article is organized as follows structure. The first part presents determinants of business process management effectiveness and the need to develop IT systems for the integration of process management and knowledge management in the organization. The second part concerns research (material s and methods) in the field of IT systems in knowledge and business process management in Poland. The third part presents the summary of the article and the theoretical as well as empirical implications.

Determinants of business process management effectiveness

Nowadays, it is recognised that the analysis of processes from the point of view of their impact on value creation and organisational effectiveness is the basic method that allows decisions to be made leading to the improvement of its functioning [Bitkowska, 2018, Grisold et al., 2021, Rohloff, 2009, Sobolewska & Bitkowska, 2020]. At the same time, the process is a specific value chain, and each subsequent activity in the process should add value to the effect of the previous activity. There are many definitions of business process management. It can be assumed that this is a series of interrelated activities (tasks) within the framework of the projects implemented in the organisation, which enable the achievement of the prescribed effects. One of the factors determining their full implementation is the appropriate integration of management, operational, and support processes [Christiansson & van Looy, 2017, Hove et al., 2015, Niehaves et al., 2014, Reijers et al., 2015, Stravinskiene & Serafinas, 2020, Szelagowski & Lupeikiene, 2020]. In the light of the latest research, to improve the efficiency and effectiveness of an organisation, it is crucial to properly design, collect, process and use knowledge resources. On this basis, the article recommends the implementation of innovation by enterprises and integrating processes, projects, and knowledge with IT technology, e.g., Business Intelligence class [El Ghalbzouri & El Bouhdidi, 2022, Larson & Chang, 2016, Mohamad et al., 2022, Muntean, 2018, Szelagowski & Lupeikiene, 2020, Zafary,

2020]. Among the key factors for the effectiveness of business process management, the most frequently mentioned are:
• strategic assumptions, including strategic goals – developing a strategy as a starting point for BPM and the basis for process evaluation,
• decisions – making business decisions by the management for more effectively implemented strategic, tactical, and operational goals, supporting activities in the field of the process approach,
• measurement systems – the use of process measurement methods and results analysis, e.g., BSC, Six Sigma, ABC,
• data – determining essential knowledge resources, including databases and indicators that will be understandable to all employees of a given organisation, with a financial and non-financial dimension, and also being easily measurable results of processes,
• visualisation tools – all employees use the results of analyses and have access to them, the results are presented in a simple form, e.g., graphs and the intensity scale of phenomena, process models,
• organizational culture, management involvement in change processes [Abusweilem & Abualoush, 2019, Battisti et al., 2020, González-Valiente et al., 2021, Gross et al., 2020, Hirzel, 2017, Mendling et al., 2020, Szelagowski & Lupeikiene, 2020, Zaim et al., 2019].

Recognising that knowledge is the most important strategic resource of an organisation implies the contemporary development of systems supporting the creation and application of knowledge [Bitkowska, 2020, Criado-García et al., 2020, Moreno et al., 2015]. At the same time, the identification, acquisition, presentation, and documentation of knowledge are not independent tasks but internal elements of the processes implemented. Therefore, the starting point for the management of knowledge resources in an organisation is understanding and accurately defining them. Previous research shows that creating knowledge management process models in organisations has a positive effect on generating innovation, stimulating the creativity of employees, and supporting internal communication [Anna, 2014, Bitkowska, 2017b, 2020, Kulesza & Rakowska, 2018, Sobolewska & Bitkowska, 2020].

It is essential to use IT tools and an incentive system. Knowledge management in organisations cannot be separated from the management of organisational processes. The benefits for organisations from the proper management of knowledge resources include:

- creating and adapting new ideas,
- making knowledge available to the right people (employees, clients) at the right time and place,
- facilitating the search for and application of specialist knowledge and know-how,
- support for cooperation and good communication,
- sharing knowledge and continuous learning and improvement by individual employees and the entire organisation [Bitkowska, 2016, 2018].

The need to develop IT systems for the integration of process management and knowledge management

In the context of the subject of the article, very interesting data has been published on the basis of the BPM Pulse study, in which over 450 organisations actively participated in the period April-May 2021 [*BPM Pulse 2021 Survey Results: What's Next* , 2021]. The respondents shared their experiences in the field of applying business process management in the context of budgeting, planning, reporting, consolidation, or cloud computing, artificial intelligence, and performance management of mobile devices. The largest group of respondents came from North America (83%), followed by Europe (14%). They represented many industries – manufacturing, healthcare, financial services, non-profit organisations, government administration, construction, and higher education. The respondents' structure was dominated by medium-

sized enterprises (63%), large enterprises constituted 30%, and small enterprises – 7%. The largest group (58%) represented financial services, and 15% were senior management [*BPM Pulse 2021 Survey Results: What's Next* , 2021]. The respondents assessed, among other things, their preferences for IT software vendors. The results of the BPM Pulse survey also cover such topics as forecasting methodology, requirements for profitability optimisation, focus on operational analysis, budgeting, and reporting priorities. The survey form also included questions about the use of systems to deal with the economic impact of the COVID-19 pandemic, as well as the necessary capabilities to withstand the next phase of challenges and eventual recovery [*BPM Pulse 2021 Survey Results: What's Next* , 2021]. The conclusions of the report are as follows:

- The key to the success of any BPM / CPM / EPM solution is a solid and well-thought-out database that helps establish and maintain one authorised set of numbers to ensure the credibility of forecasts, budgets, reports, and analyses,
- Having one data processing platform, e.g., financial, irrespective of the source, helps to ensure that the organisation has access to credible and reliable data. This consistent and dependable dataset can then be used to create high-quality reports and ultimately more informed decision-making [*The Data Foundation Your CPM Initiative Needs to Succeed* , 2021],
- Firms often face an obstacle in the form of an incomplete or poorly built database – including knowledge resources. Data quality issues and information silos are common. Data transformation is challenging for companies, and manual information gathering processes require transformation. Without a proper database, different organisational units may not agree on which version of the data is correct. It will be difficult for the organisation to agree on outcomes and performance indicators. Lack of confidence in the numbers makes it difficult to make the right decisions,
- Consolidation is a fundamental element of any corporate performance management solution today. For example, improved management reporting cited as a significant factor in two-thirds of all CPM / BPM projects relies heavily on consolidation. This document recommends a set of ten key criteria for selecting a consolidation solution and presents real examples of several large companies that "took the consolidation to the next level" [*10 Key Requirements for Next Level Financial Consolidation* , 2020],
- In today's environment, it is more important than ever for companies (of all sizes) to effectively manage performance and be flexible and adaptable in an unstable environment. The need for swift action and adaptation requires having IT software that can keep pace with rapidly changing environmental conditions, enabling management to properly anticipate and analyse alternative scenarios in order to choose the best course of action [*Managing Performance in a Tough Economy*, 2020],

BPM applications are, according to the organisations surveyed, very effective in automating routine tasks: budgeting, planning and forecasting, as well as consolidation and reporting. Businesses need measurement, analysis, and visibility into a wide range of management tasks, and many non-finance users are ready to deploy BPM applications in their workplaces [*Extending Performance Management for Company-Wide Benefits* , 2017], Business process management software vendors increasingly recognise the importance of Artificial Intelligence (AI) capabilities in their products. Most software vendors currently have some AI-based features or are in the process of developing them. At the same time, only a few respondents perceive artificial intelligence as a strategic, crucial element in the management system. Financial services companies seem to be most interested in this area [*The Importance of AI in Corporate Budgeting, Planning, and Forecasting*, 2018].

Materials and methods

The source of the data published in this article is a survey conducted in 2020 among 107 organisations operating in Poland. When selecting units for the sample, double randomization was performed: companies

were randomly selected for the study, and then employees in each of these companies were randomly selected. They were territorial enterprises: international (48%), national (39%), regional (6%) and local (6%) – Figure 1. The dominant group of respondents was private companies with mixed Polish-foreign capital (36%), and then private companies with only Polish capital (31%), State Treasury companies (18%), and private companies with only foreign capital (11%) – this structure is presented in Figure 2. The research sample is represented by large (55%), medium-sized enterprises (22%), small (19%), and micro-enterprises employing up to 9 employees (4%) – Figure 3. The organizations surveyed included enterprises operating in various industries: production (18%), logistics (11%), banking (11%), IT (8%), telecommunications / media (7%), public administration (7%), insurance (6%), healthcare / pharmaceuticals (6%), transport (5%), consultancy (4 %), energy (1%), construction (1%) and others (15% in total).

This article uses data based on the questions contained in the questionnaire form. The respondents' answers concerned the assessment of the level of business process management development, knowledge management, and the use of IT systems in organisations. The selection of the research methodology, including the methods and tools of statistical analysis, made it possible to assess the relationship between the variables under investigation and the quality of processes implemented in companies, the effectiveness of the activity conducted, and customer satisfaction. The research results clearly indicate the critical role of IT systems in the integration of knowledge management and business process management.

Results

At the beginning of the research results, we give data on the relationship of individual industries (represented by respondents) with the use of IT tools to support business process management. Detailed analysis in this context concerned the use of IT systems for identification, modelling, optimisation, simulation, monitoring, reporting, and process improvement. The statistical connection of the use of IT tools by the companies surveyed (supporting business process management) with a given industry is presented in Table 1. Due to the size of the tables (in parentheses), the maximum value of the contingency coefficient for the studied variables is Cmax (5x2) = 0.800.

The results in Table 1 show the relationship between the use of IT systems in the surveyed organisations for various areas of business process management with the industries represented by these companies. All the connections listed in the table are negatively verified – rejection of the null hypothesis on the independence of the variables (chi-square independence test at a significance level of 0.05). The values of the adjusted contingency coefficient indicate the strength of this relationship. Bearing in mind the indicated maximum value of the contingency coefficient, it can be said that in most cases, we are dealing with a moderate degree of association, and in some cases a relatively high degree (coefficient value above 0.5).

In the case of using IT systems to identify processes, the greatest strength of connections was recorded for the IT (C * = 0.516) and energy (C * = 0.502) sectors. In the case of process modelling, the insurance industry shows the greatest strength of connections (C * = 0.515), while in the area of process simulation – the IT industry (C * = 0.586). The relatively high value of the contingency index for the use of IT systems for process improvement was obtained for the telecommunications/media industry (C * = 0.503).

A similar study was conducted with regard to knowledge resources. The statistical description includes the responses of respondents regarding stored knowledge resources, which most often have the results of process audits, a database of good process practices, KPI performance indicators assigned to appropriate processes, procedures, and instructions assigned to processes, as well as other documents from processes or process risk registers. The statistical connection between the storage and use of knowledge resources (supporting business process management) by the companies studied with a given industry is presented in

Table 2. In this case, the maximum value of the contingency coefficient for the studied variables is Cmax (2x2) = 0.707.

One of the answers in the questionnaire: "Process models and their successive versions" was not associated with a statistically significant relationship (chi-square test of independence) with any industry – i.e., for all industries, a statistic value was obtained for which the significance level was higher than the adopted rejection level of the null hypothesis (which speaks of the independence of the variables).

In the case of storing knowledge resources as a base of good process practices, the greatest strength of connections was recorded for the IT industry (C * = 0.554), while in the case of recording process risks it was the banking sector (C * = 0.518). In most of the remaining cases, the adjusted contingency rates show a moderate degree of association.

Table 1. Statistical link between the respondents' use of IT tools and the represented industry (Cmax (5x2) = 0.800)

IT systems supporting process management	**Industry**	**Significant dependencies, Chi-square test, p<0.05**	
		p-value	contingency coefficient C*
Use of IT systems to identify processes	Logistics	0.00539	0.433
	Energy	0.00038	0.502
	IT	0.00020	0.516
	Telecommunications/Media	0.03873	0.337
	Insurance	0.01910	0.393
Use of IT systems for process modeling	Production	0.04446	0.361
	Logistics	0.03807	0.348
	Banking	0.00251	0.445
	IT	0.00400	0.405
	Insurance	0.00018	0.518
	Other	0.00041	0.482
Use of IT systems for process optimization	Production	0.03291	0.307
	Banking	0.01097	0.412
	Telecommunications/Media	0.00047	0.497
	Other	0.04407	0.362
Use of IT systems to simulate processes	Production	0.01252	0.363
	Banking	0.00072	0.487
	IT	0.00000	0.586
	Telecommunications/Media	0.03566	0.370
Use of IT systems for **process monitoring**	Telecommunications/Media	0.04101	0.361
	Insurance	0.00874	0.420
	Other	0.00099	0.410
Use of IT systems for **process reporting**	Telecommunications/Media	0.00288	0.452
	Other	0.00265	0.455
Use of IT systems for **process improvement**	Production	0.00031	0.458
	Logistics	0.02775	0.357
	Energy	0.02666	0.381
	Banking	0.03166	0.362

Table 1 (Continued)

IT systems supporting process management	Industry	Significant dependencies, Chi-square test, p<0.05	
		p-value	contingency coefficient C*
	IT	0.01172	0.397
	Telecommunications/Media	0.00035	0.503
	Insurance	0.03991	0.330
	Other	0.00007	0.538

Table 2. Statistical connection between the storage and use of knowledge resources by the respondents and the represented industry (Cmax (2x2) = 0.707)

Knowledge resources	Industry	Significant dependencies, Chi-square test, p<0.05	
		p-value	contingency coefficient C^*
Results from process audits	Banking	0.00331	0.358
	Other	0.00793	0.348
Database of good trial practices	Banking	0.01019	0.341
	Transport	0.03984	0.219
	IT	0.00000	0.554
	Telecommunications/Media	0.00869	0.280
KPI performance indicators assigned to appropriate processes	Production	0.00116	0.380
	IT	0.02847	0.293
	Other	0.03725	0.260
Procedures and instructions assigned to processes	Banking	0.01430	0.313
	IT	0.01223	0.314
	Telecommunications/Media	0.00079	0.376
	Consulting	0.01482	0.281
Other documents from the processes	Logistics	0.03435	0.273
Risks registers of process	Production	0.01761	0.293
	Logistics	0.04044	0.249
	Banking	0.00005	0.518
	Transport	0.04724	0.211
	Insurance	0.00702	0.369
	Other	0.00024	0.389

Conclusion

An important aspect of the functioning of enterprises is the appropriate project and process approach. Business process management means full use of knowledge, tools, techniques as well as concepts or systems that can be helpful in defining, measuring, visualizing or controlling processes. This management covers the final customer, recipient, and also an employee who is a customer within the organization. The process approach is process-oriented with dominant horizontal communication and free flow of information. The company's activities focus on process management to maximize customer satisfaction. Process organizations are oriented towards both external and internal customers. Process orientation enables systematic introduction of changes, and also assumes flexible operation of the company and anticipates

fluctuation of processes. According to theoreticians, this state of affairs does not exclude the use of the concepts- process management and project management together. The concepts presented are intended to increase competitiveness and improve the company's operations. Process organization increases quality, shortens the time of task completion and increases the satisfaction of external and internal customers. Project management of the enterprise allows maintaining the appropriate time frame, properly use human, material, and financial resources.

By comparing the results of the research we carried out with the reports of the literature on the subject, the significant connections between the use of IT systems, the level of business process management development and knowledge management, and the quality of processes implemented in companies, their effectiveness and the level of customer satisfaction have been confirmed.

The aim of the article, which was to analyse and present the research results on the importance of IT systems in the integration of knowledge management and business process management in organisations operating on the Polish market, has been fully achieved. The authors have statistically shown the dependencies between the methods of business process management and the storage and use of knowledge resources (with the use of IT tools), the quality of the processes performed, the effectiveness of the activity conducted (including costs and time), as well as customer satisfaction. The group of respondents was relatively (considering the specifics of the study) large (107 companies), and its representation included companies operating on the international, national, regional, and local markets. The broad cross-section of the research sample is also evidenced by the fact that active participants in the research were both production and service organisations, representing various industries and sectors (private and public). Due to the essence of the research, which focused on the IT tools used in enterprises, it is significant (from the point of view of the results obtained) that large enterprises were the dominant group of respondents (constituting approx. 55%). Medium-sized enterprises accounted for approx. 22%, and small enterprises for 19%. The smallest micro organisations accounted for only 4%.

The research methods applied allowed industries in which IT systems are used to the greatest extent in business process management and knowledge management to be identified. And so, in the case of using IT systems to identify processes, the greatest strength of connections was recorded for the IT and energy industries, and in the case of process modelling – for the insurance industry. As for the use of IT systems in the area of process simulation, as expected, the greatest strength of connections was recorded in the IT industry. A relatively high value of the contingency rate for the use of IT systems for process improvement was confirmed in the telecommunications / media industry. In most industries, these links were relatively moderate.

In the course of the research, it was found that the knowledge resources stored by respondents most often include the results of process audits, databases of good process practices, KPI performance indicators assigned to appropriate processes, procedures and instructions assigned to processes, and other documents from processes or process risk registers. Statistically, the strongest links between the storage and use of knowledge resources by companies and a given industry concern the IT sector and the banking sector.

This research confirms that we are dealing with great interest and the actual use of the concept of knowledge management in business process management with the use of IT tools as an approach significantly influencing the functioning of modern organisations. Further research should concern the maturity model of the integration of both concepts and the extension of the scope of the work carried out, and the broader use of modern technological solutions in the field of Industry 4.0.

References

10 Key requirements for next level financial consolidation. (2020).

Abualoush, S., Masa'deh, R., Bataineh, K., & Alrowwad, A. (2018). *The role of knowledge management process and intellectual capital as intermediary variables between knowledge management infrastructure and organization performance*. Interdisciplinary Journal of Information, Knowledge, and Management, 13. https://doi.org/10.28945/4088

Abusweilem, M. A., & Abualoush, S. (2019). *The impact of knowledge management process and business intelligence on organizational performance*. Management Science Letters, 9(12). https://doi.org/10.5267/j.msl.2019.6.020

Aganette, E. C. (2020). *Process mapping from the information science perspective*. Perspectivas Em Ciencia Da Informacao, 25(SI).

Albliwi, S. A., Antony, J., & Arshed, N. (2014). *Critical literature review on maturity models for business process excellence*. 2014 IEEE International Conference on Industrial Engineering and Engineering Management, 79–83. https://doi.org/10.1109/IEEM.2014.7058604

Ang, S. H. (2017). *Research design for business & management*. In Research Design for Business & Management. https://doi.org/10.4135/9781473909694

Anna, Č. (2014). *Process management in modern organization. Vision 2020: Sustainable Growth, Economic Development, and Global Competitiveness* - Proceedings of the 23rd International Business Information Management Association Conference, IBIMA 2014, 1.

Battisti, E., Shams, S. M. R., Sakka, G., & Miglietta, N. (2020). *Big data and risk management in business processes: implications for corporate real estate*. Business Process Management Journal, 26(5). https://doi.org/10.1108/BPMJ-03-2019-0125

Benner, M. J., & Tushman, M. (2002). *Process management and technological innovation: A longitudinal study of the photography and paint industries*. Administrative Science Quarterly, 47(4). https://doi.org/10.2307/3094913

Bilas, L., & Adeeb, M. (2017). *Innovation management: The importance of leadership and teamwork in business organisation*. Business Economics, 2(100).

Bitkowska, A. (2016). *Knowledge management vs business process management in contemporary enterprises*. Engineering Management in Production and Services, 8(2). https://doi.org/10.1515/emj-2016-0014

Bitkowska, A. (2017a). *Business processes modelling in knowledge management perspective*. Research on Enterprise in Modern Economy, 2/2017.

Bitkowska, A. (2017b). *Knowledge management in production enterprises.* Production Engineering Archives, 15(15). https://doi.org/10.30657/pea.2017.15.06

Bitkowska, A. (2018). *Business process management centre of excellence as a source of knowledge*. Business, Management and Education, 16(0). https://doi.org/10.3846/bme.2018.2190

Bitkowska, A. (2020). *The relationship between business process management and knowledge management - selected aspects from a study of companies in Poland*. Journal of Entrepreneurship, Management and Innovation, 16(1). https://doi.org/10.7341/20201616

BPM Pulse 2021 survey results: What's next. (2021).

Cepeda-Carrion, I., Martelo-Landroguez, S., Leal-Rodríguez, A. L., & Leal-Millán, A. (2017). *Critical processes of knowledge management: An approach toward the creation of customer value*. European Research on Management and Business Economics, 23(1). https://doi.org/10.1016/j.iedeen.2016.03.001

Christiansson, M., & van Looy, A. (2017). *Business process management forum*. In J. Carmona, G. Engels, & A. Kumar (Eds.), Business Process Management Conference Business Process Management Forum (Vol. 297). Springer International Publishing. https://doi.org/10.1007/978-3-319-65015-9

Criado-García, F., Calvo-Mora, A., & Martelo-Landroguez, S. (2020). *Knowledge management issues in the EFQM excellence model framework*. International Journal of Quality and Reliability Management, 37(5). https://doi.org/10.1108/IJQRM-11-2018-0317

Detyna, B. (2016). *Integrated management system of local administration against modern challenges of the economy*. Economic and Regional Studies, 9(1), pp. 18–32.

Detyna, B., & Detyna, J. (2015). *The importance of integration in hospital quality management*. In Current trends in management: business and public administration, pp. 31–42.

Detyna, B., & Detyna, J. (2016). *Multidimensionality of management efficiency – measurement proposal in public administration*. In A. Świrska & K. Wąsowska (Eds.), Effectiveness of management: micro and macro level, p. 68. Siedlce University of Natural Sciences and Humanities Publishing House.

El Ghalbzouri, H., & El Bouhdidi, J. (2022). *Integrating business intelligence with cloud computing: State of the art and fundamental concepts*. Smart Innovation, Systems and Technologies, 237. https://doi.org/10.1007/978-981-16-3637-0_14

Extending performance management for company-wide benefits. (2017).

González-Valiente, C. L., Costas, R., Noyons, E., Steinerová, J., & Šušol, J. (2021). *Terminological (di) similarities between information management and knowledge management: a term co-occurrence analysis*. Mobile Networks and Applications, 26(1). https://doi.org/10.1007/s11036-020-01643-y

Grisold, T., Groß, S., Stelzl, K., vom Brocke, J., Mendling, J., Röglinger, M., & Rosemann, M. (2021). *The five diamond method for explorative business process management*. Business and Information Systems Engineering. https://doi.org/10.1007/s12599-021-00703-1

Gromoff, A., Kazantsev, N., & Stavenko, J. B. (2016). *An approach to knowledge management in construction service-oriented architecture*. Procedia Computer Science, 96. https://doi.org/10.1016/j.procs.2016.08.161

Gross, S., Stelzl, K., Grisold, T., Mendling, J., Röglinger, M., & vom Brocke, J. (2020). *The business process design space for exploring process redesign alternatives*. Business Process Management Journal, 27(8). https://doi.org/10.1108/BPMJ-03-2020-0116

Gudelj, M., Delic, M., Kuzmanovic, B., Tesic, Z., & Tasic, N. (2021). *Business process management model as an approach to process orientation*. International Journal of Simulation Modelling, 20(2). https://doi.org/10.2507/IJSIMM20-2-554

Harmon, P. (2010). *The scope and evolution of business process management*. In Handbook on Business Process Management 1 (pp. 37–80). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-45100-3_3

Hirzel, A. K. (2017). *A systematic review on the role of human resources for process innovation*. In International Journal of Business Environment, Vol. 9, Issue 4, https://doi.org/10.1504/IJBE.2017.092222

Holzmüller-Laue, S., & Göde, B. (2011). *Agile business process management in research projects of life sciences*. Lecture Notes in Business Information Processing, 90 LNBIP. https://doi.org/10.1007/978-3-642-24511-4_26

Hove, M., von Rosing, G., & Storms, B. (2015). *Business process management governance*. In The Complete Business Process Handbook (pp. 603–616). Elsevier. https://doi.org/10.1016/B978-0-12-799959-3.00029-X

Jayawickrama, U. (2014). *An ERP knowledge transfer framework for strategic decisions in knowledge management in organizations*. International Journal of Innovation, Management and Technology. https://doi.org/10.7763/ijimt.2014.v5.530

Kerzner, H. (2001). *Strategic planning for project management using a project management maturity model*. John Wiley & Sons, New York.

Kir, H., & Erdogan, N. (2021). *A knowledge-intensive adaptive business process management framework. Information Systems*, 95. https://doi.org/10.1016/j.is.2020.101639

Klun, M., & Trkman, P. (2018). *Business process management – at the crossroads*. In Business Process Management Journal (Vol. 24, Issue 3). https://doi.org/10.1108/BPMJ-11-2016-0226

Kulesza, P., & Rakowska, E. (2018). *Improving public sector performance by using business process modelling and measurement: a case study analysis*. Sinergie Italian Journal of Management, 102. https://doi.org/10.7433/s102.2017.09

Larson, D., & Chang, V. (2016). *A review and future direction of agile, business intelligence, analytics and data science*. International Journal of Information Management, 36(5). https://doi.org/10.1016/j.ijinfomgt.2016.04.013

Latif, K. F., Afzal, O., Saqib, A., Sahibzada, U. F., & Alam, W. (2021). *Direct and configurational paths of knowledge-oriented leadership, entrepreneurial orientation, and knowledge management processes to project success*. Journal of Intellectual Capital, 22(1). https://doi.org/10.1108/JIC-09-2019-0228

Mahdi, O. R., & Nassar, I. A. (2021). *The business model of sustainable competitive advantage through strategic leadership capabilities and knowledge management processes to overcome covid-19 pandemic*. Sustainability (Switzerland), 13(17). https://doi.org/10.3390/su13179891

Managing Performance in a Tough Economy. (2020).

Mandják, T., Szalkai, Z., Hlédik, E., Neumann-Bódi, E., Magyar, M., & Simon, J. (2021). *The knowledge interconnection process: evidence from contract manufacturing relationships*. Journal of Business and Industrial Marketing, 36(9). https://doi.org/10.1108/JBIM-01-2020-0052

Manfreda, A., Buh, B., & Indihar Štemberger, M. (2015). *Knowledge-intensive process management: a case study from the public sector.* Baltic Journal of Management, 10(4). https://doi.org/10.1108/BJM-10-2014-0170

Mendling, J., Pentland, B. T., & Recker, J. (2020). *Building a complementary agenda for business process management and digital innovation*. In European Journal of Information Systems (Vol. 29, Issue 3). https://doi.org/10.1080/0960085X.2020.1755207

Mohamad, A. K., Jayakrishnan, M., & Yusof, M. M. (2022). *Thriving information system through business intelligence knowledge management excellence framework*. International Journal of Electrical and Computer Engineering, 12(1). https://doi.org/10.11591/ijece.v12i1.pp506-514

Moreno, V., Cavazotte, F., & Lapa, E. (2015). *Integrating Knowledge Management Practices and Business Processes: A Case Study*. Academy of Management Proceedings, 2015(1). https://doi.org/10.5465/ambpp.2015.18915abstract

Muntean, M. (2018). *Business intelligence issues for sustainability projects*. Sustainability (Switzerland), 10(2). https://doi.org/10.3390/su10020335

Niehaves, B., Poeppelbuss, J., Plattfaut, R., & Becker, J. (2014). *BPM capability development – a matter of contingencies*. Business Process Management Journal, 20(1), 90–106. https://doi.org/10.1108/BPMJ-07-2012-0068

Raudeliūnienė, J., Davidavičienė, V., & Jakubavičius, A. (2018). *Knowledge management process model*. Entrepreneurship and Sustainability Issues, 5(3). https://doi.org/10.9770/jesi.2018.5.3(10)

Reijers, H. A. (2021). *Business process management: The evolution of a discipline*. Computers in Industry, 126. https://doi.org/10.1016/j.compind.2021.103404

Reijers, H. A., Mendling, J., & Recker, J. (2015). *Business process quality management*. In Handbook on Business Process Management 1 (pp. 167–185). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-45100-3_8

Rohloff, M. (2009). *Process management maturity assessment*. AMCIS Proceedings, pp. 1-12.

Segatto, M., de Pádua, S. I. D., & Martinelli, D. P. (2013). *Business process management: A systemic approach?* In Business Process Management Journal (Vol. 19, Issue 4). https://doi.org/10.1108/BPMJ-Jun-2012-0064

Sobolewska, O., & Bitkowska, A. (2020). *Selected aspects of evaluating knowledge management quality in contemporary enterprises*. Information (Switzerland), 11(5). https://doi.org/10.3390/INFO11050244

Stravinskiene, I., & Serafinas, D. (2020). *The link between business process management and quality management*. Journal of Risk and Financial Management, 13(10). https://doi.org/10.3390/jrfm13100225

Szelągowski, M. (2020). *The knowledge and process dimensions*. VINE Journal of Information and Knowledge Management Systems, 51(2). https://doi.org/10.1108/VJIKMS-09-2019-0150

Szelągowski, M., & Berniak-Woźny, J. (2019). *The knowledge and process continuum*. Knowledge and Process Management, 26(4). https://doi.org/10.1002/kpm.1611

Szelagowski, M., & Lupeikiene, A. (2020). *Business process management systems: Evolution and Development Trends*. Informatica (Netherlands), 31(3). https://doi.org/10.15388/20-INFOR429

Tarhan, A., Turetken, O., & Reijers, H. A. (2016). *Business process maturity models: A systematic literature review*. Information and Software Technology, 75, 122–134. https://doi.org/10.1016/j.infsof.2016.01.010

The data foundation your CPM initiative needs to succeed. (2021).

The importance of AI in corporate budgeting, planning, and forecasting. (2018).

Zafary, F. (2020). Implementation of business intelligence considering the role of information systems integration and enterprise resource planning. Journal of Intelligence Studies in Business, 10(1). https://doi.org/10.37380/JISIB.V1I1.563

Zaim, H., Muhammed, S., & Tarim, M. (2019). Relationship between knowledge management processes and performance: critical role of knowledge utilization in organizations. Knowledge Management Research and Practice, 17(1). https://doi.org/10.1080/14778238.2018.1538669