МЕНЕДЖМЕНТ/ MANAGEMENT

Optimizing Business Processes with AI, BPMN 2.0, and Workflow Management Systems

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Abstract. This research discusses the integration of artificial intelligence (AI), workflow management systems (WMS) and business process models and notes (BPMN) to improve the efficiency of modern business processes. Advanced technologies can significantly increase productivity, reduce costs and improve decision-making. The data analysis and automation capabilities of artificial intelligence enable companies to solve problems faster, optimize resource allocation and make better decisions. In combination with WMS, AI optimizes processes, automates workflows and increases operational efficiency.

BPMN 2.0 is a clear, standardized method for visualizing and modeling business processes that helps improve communication and consistency between teams. This structured approach enables companies to effectively document, analyze and improve their workflows.

Research shows the challenges companies face by using technologies, that also includes data quality issues, resistance to change and the need for a skilled workforce. Analyzing article, the authors consider the potential of quantum computing and developments in artificial intelligence algorithms and emphasize the importance of continuous innovation and adaptation for companies to remain competitive in an ever-evolving technology landscape.

Key words: Artificial Intelligence, Workflow Management Systems, BPMN 2.0, Business Process Automation, Digital Transformation.

Introduction

The use of artificial intelligence is rapidly transforming a wide range of industries, that includes the process of automation, prediction and optimization. This change is driven by the growing importance for companies to increase efficiency, reduce costs and make better data-driven decisions. Artificial intelligence is transforming the way businesses operate and offering opportunities for innovation in sectors ranging from finance to logistics. Despite its potential the uptake of AI faces several challenges, including data quality problems, a shortage of skilled professionals and employee resistance to change. The importance of artificial intelligence in modern business can't be overstated, as it's central to optimizing operational workflows, improving forecast accuracy and increasing productivity. The ongoing digital transformation in industries such as finance, manufacturing and retail underlines the importance of integrating AI into business processes. Artificial intelligence is successful implementation that depends on overcoming obstacles such as inadequate data infrastructure, lack of skilled staff and organizational resistance.

The object of the research is the role of artificial intelligence in business process management, with a focus on its integration with workflow management systems and Business Process Model and Notation 2.0. The study will focus on the application of AI in business process automation, specifically in the financial, manufacturing and logistics sectors, and its impact on organizational efficiency. The main objective of this research is to investigate the potential of AI to transform business processes through automation, optimization and improved decision making. The main objective is to analyze using of artificial intelligence on process automation in different sectors, to explore the use of BPMN 2.0 in business process modelling and the integration of AI into these models, and to investigate the challenges companies face in adopting artificial intelligence and how to mitigate them. This study takes a qualitative approach, using case studies and a literature review to explore current applications of AI in business processes. The study also analyses BPMN 2.0 as a tool for representing AI-driven workflows. In addition, it will review strategies for implementing AI in different industries to identify best practices and obstacles to overcome. It is expected that the deployment of AI will significantly increase the efficiency of business processes, improve predictability and reduce operational costs, in the financial and logistics sectors. In addition, the integration of BPMN 2.0 will provide a standardized framework for process automation and optimization.

The importance of this research is that it can guide organizations in using artificial intelligence for process optimization and innovation. By addressing the barriers to the implementation of AI and providing a framework for its integration with BPMN 2.0, this research will contribute to the advancement of business process management strategies and provide insights into the broader implications of artificial intelligence deployment on workforce dynamics and organizational productivity. Many sources show the growing importance of AI in business process management. Wirtz and Weyerer, as example, explore different AI technologies and their applications in enterprises, highlighting the ability of AI to rationalize operations. Gadatsch discusses the potential of AI to improve business process management through automation, while Berg analyses the challenges that companies face when adopting AI technologies. Studies by Jakob

Freund and Bernd Rücker highlight the role of BPMN 2.0 in creating clear and standardized representations of business processes, which can be critical for the effective integration of AI. The growing importance of artificial intelligence in the financial sector is reflected in the work of Büchel, who explores the role of artificial intelligence in optimizing financial processes such as automated coordination and forecasting. AI-based systems such as IBM Watson and SAP are often cited as key enablers for automating and streamlining business operations. At the same time, these studies also highlight the challenges that companies face, such as data quality issues and fear of employee loss of productivity. These barriers can hinder the uptake of artificial intelligence, highlighting the need for a comprehensive strategy to overcome them. Through a review of the existing literature, the aim of this study is to provide a deeper understanding of the role of AI in optimizing business processes and how methodologies such as BPMN 2.0 can support its implementation.

Methodology

This study employs a comprehensive, multi-faceted research approach to explore the transformative potential of Artificial Intelligence, Workflow Management Systems, and Business Process Model and Notation 2.0. The research shows practical applications and impact on business process optimization and combines both qualitative and quantitative methods, that aims to provide a holistic understanding of this technology.

The methodology starts with an extensive literature review, including an analysis of academic publications industry reports and technical standards. The study develops a theoretical framework that focuses on the historical development. The basic concepts and current relevance of AI, WMS, and BPMN 2.0. Special emphasis is placed on identifying gaps in existing knowledge as well as challenges and opportunities related to the implementation of this technology.

The case study approach explores real-world examples of successful integration across industries. Selected cases include manufacturing, retail, logistics, and financial organizations, providing a variety of perspectives on strategies and operational outcomes. The analysis assesses tangible benefits achieved such as process efficiency, cost reduction, and improved decision-making capabilities. In addition, challenges encountered during this implementation will be assessed. including technical and organizational barriers. It has been recorded to provide practical insights.

High-quality information was acquired during interviews with industry experts. These interviews, including with technology leaders, workflow analysts and experts in the field of artificial intelligence, examine effective implementation strategies, innovative trends and the interaction between technological innovation and organizational change. At the same time, the collected qualitative data complement the quantitative results and add depth and content to the analysis.

Quantitative data was collected through surveys of various organizations. The survey explores the scope of AI, WMS and BPMN 2.0 adoption, specific use cases. and awareness of benefits and challenges. Statistical analysis of this data will identify patterns and relationships. and provide macro insights into the impact of the technology. The results provide useful information for companies looking to adopt these tools.

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ISSN: 2789-4320. eISSN: 2789-4339

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To assess the usefulness of these tools and platforms in practice, a comparative assessment of the tools and platforms was carried out, the assessment of which included the design of the user interface. To identify strengths and weaknesses, ease of integration with existing systems, scalability, and useful tools such as AI-based automation platforms, BPMN-compatible modeling software, and WMS solutions were considered. This comparative analysis provides recommendations on the selection and implementation of the most appropriate technologies.

The demonstration of the practicality of BPMN 2.0 was replicated through simulated business processes using BPMN-compatible tools. This model demonstrates the standardization of the workflow. The integration of artificial intelligence-based automation and the role of WMS in operations modeling and monitoring confirm theoretical assumptions and provide a realistic picture of how this technology will work in real conditions.

During the development of the conceptual framework, the research results are summarized into guidelines for organizations. This concept identifies the best practices for implementing a strategy to overcome resistance to change and solve various problems such as data quality problems, as well as skill gaps, and takes into account the potential of new technologies such as quantum computing to improve business process management.

The research study explores the topic in depth using this rigorous and multifaceted approach. The results are intended to support academic knowledge, inform industry action and support a variety of organizations to achieve digital transformation through the integration of AI, WMS and BPMN 2.0.

Findings

Analyzing the definition of artificial intelligence, one can single out Marvin Minsky, who described artificial intelligence as the science of how to make machines perform actions that require human intelligence. There are two types of artificial intelligence - weak and strong AI. Weak AI, also known as narrow AI, is designed to perform only a specific task. Strong AI includes artificial general intelligence (AGI) and artificial superintelligence (ASI). Artificial general intelligence can solve problems, learn and plan for the future, while artificial superintelligence can become even better than the intelligence of the human brain.

For companies, artificial intelligence is considered one of the most important technologies of the future, because many companies use artificial intelligence algorithms on a daily basis. Companies can use AI in different ways, as example, AI-based knowledge management software. The use of neural networks in this software makes it possible to analyze, disseminate and share knowledge with others. Next, AI can be used in AI-based process automation systems. This makes it possible to automate standard tasks. [1]

Companies are now using AI in many different sectors. In production, they use it to monitor and automatically adapt production processes. In retail, AI is used to obtain improved forecasts of product demand in order to optimize inventory and delivery management. In transport and logistics, autonomous deliveries and transportation of trucks are carried out using AI. AI is also used in controlling. The most important task of controlling is to determine the forecast values. These forecast values have a major impact on sales and turnover figures. These forecasts serve

as the basis for many planning processes, e.g. for planning production capacity or marketing expenditure. With the help of artificial intelligence, companies can create better forecasts. There are various tools that support companies in the application of AI. These include ChatGPT or IBM Watson, for example. Many companies have been using artificial intelligence in ERP systems for the last few years. AI is used in many modules, such as finance, sales or logistics in the ERP system.

The use of AI in finance is also becoming increasingly important. There are already some solutions with AI use in finance, such as the automated reconciliation of invoices. [2] Companies are reducing their costs with this solution.

According to the Federal Statistical Office (Destatis), around one in five companies (20%) in Germany use artificial intelligence (AI) technologies. In 2024, the use of AI increased by 8 percentage points. In 2023, around one in eight companies (12%) used artificial intelligence. Large companies used AI technologies more often than medium-sized and small companies in 2024. Every second large company (48%) uses AI. AI is mostly used to analyze written language or text mining (48%), speech recognition technologies (47%) and natural language generation technologies (34%). These technologies are used for marketing or sales (33%), for production or service processes (25%), for the organization of company administration processes or management (24%) and for accounting, controlling or financial management (24%).
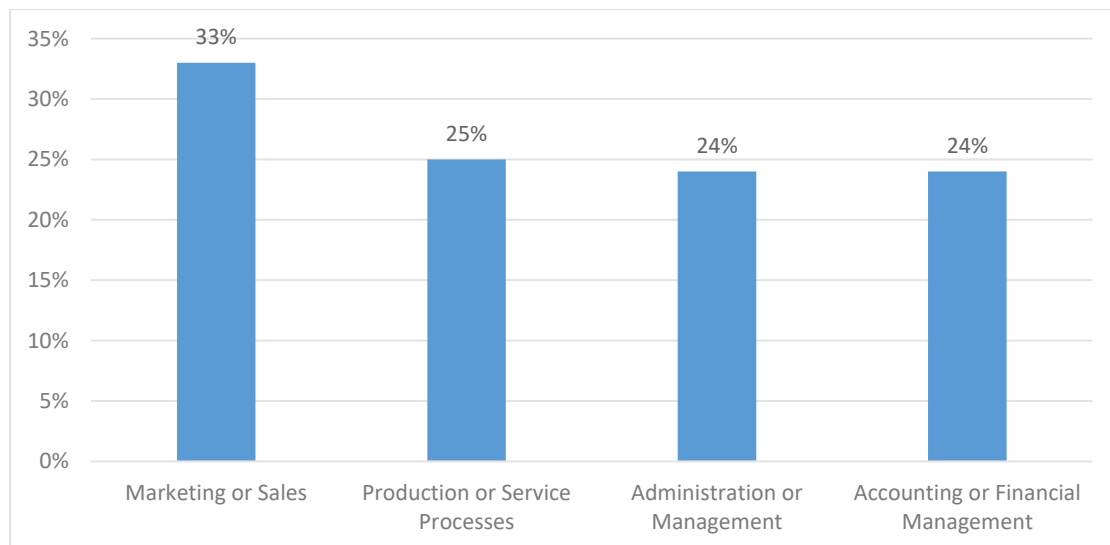

Figure 1. AI Use by Function in 2024

Note: compiled by the authors

Companies are focusing intensively on the use of AI for a variety of reasons. These include lack of manpower, lack of time and scarcity of resources. There are currently many obstacles to the use of AI in companies. These obstacles should be removed in order to support the use of AI. The first step is to increase the availability of data in companies and remove obstacles to data usage. Furthermore, the establishment of AI start-ups is to be promoted. The next step is

to reduce bureaucratic hurdles. Other support measures include the expansion of computing capacities, particularly in quantum computing. Quantum computers are of great importance. They can process large amounts of data quickly and solve complex problems. The following measures should therefore be taken to promote the use of AI in companies. These include financial support for AI projects, exchanges with companies that are further along in AI, the availability of AI experts on the labor market and the expansion of research activities.[3]

Furthermore, employees should be appropriately qualified. The next step is to increase the availability of data in companies and remove data barriers. The use of AI in finance is associated with a number of obstacles. The first problem is the generally poor quality of financial data. The use of AI requires up-to-date and high-quality data. If the financial data is poor, no qualitative analyses can be produced. This is why data cleansing and standardization are important. Data cleansing can also be carried out using the Legacy System Migration Workbench program. Transaction LSMW can be used to replace or completely delete incorrect entries in the master data. This program is a complex tool that is used for data cleansing and data migration. The next big problem is the lack of time and the fear of innovation among employees in the finance department. Experienced employees have to deal with many tasks on a daily basis. It is therefore important to invest in cloud software or tools in order to optimize financial processes and day-to-day business in the company. Furthermore, many employees are afraid to part with their routine tasks and processes and accept that AI will replace part of their work. Another problem is the shortage of specialists in the field of AI and digitalization. [4]

The framework conditions should be created by the government. European countries are endeavoring to support the use of AI by companies. In the EU, the use of AI is regulated by an AI law. [5] With the help of the law, companies are given the opportunity to develop their AI models in their test environment before they are released.

An AI strategy has been adopted in Germany. The most important goals of the AI strategy are to promote the development and application of AI in Germany. The government will provide several billion euros for this purpose by 2025. [6]

Over the next few years, many companies will invest in the development and use of AI. AI will bring many advantages. The advantages of using AI for companies include speeding up processes, increasing productivity within the company, improving communication with customers, reducing resource consumption and enabling faster problem analysis. Furthermore, business decisions can be optimized through AI applications. Companies can use AI to change their processes, products and services. By detecting errors in good time, AI can improve the quality of products and services. AI can also promote the development of innovative solutions and products. With the help of AI, companies can increase their innovative strength.

In the company, processes are viewed as a regularly recurring activity with a defined start and end. There are numerous business processes in the company that are characterized by structured and recurring operations, such as invoice receipt processing, incoming payment processing or vendor payment.

The business process flow is influenced by various events. A business process requires time, resources and consumes costs.

In order to reduce process costs and automate processes, companies use workflow management. Workflow management is seen as the process of digitizing individual processes and managing the results.

Workflow management is divided into three phases such as workflow modeling, workflow execution and workflow monitoring. Before the phases of workflow management are presented, the term workflow and workflow types are first explained.

A workflow is a formally described, fully or partially automated business process. It contains the time, technical and resource-related specifications required for automatic control of the workflow at the operational level.

Workflows are classified into different types. The first type is the general workflow. These are well-structured workflows within the company. There is no degree of freedom for the processor with regard to process control. The second type is the case-related workflow. These are workflows that cannot be fully structured and give the processor more freedom in terms of process control. The third type is the ad hoc workflow. This includes non-structurable workflows and a very high degree of freedom for the processor in terms of process control. [7]

Next, the phases are explained.

In the first phase of workflow modeling, a process is modeled. There are various methods for representing the process. The first method is the data-oriented method. This method describes the data flow and the course of the data in the context of the individual activities.

The second method is the control flow-oriented method. In this method, the sequence of activities is important. Examples are Swimlane diagrams or the Business Process Model and Notation (BPMN).

The third method is the object-oriented method. Here, functions and data are integrated into objects. [8]

Workflow modeling is usually carried out by the process/workflow modeler. The workflow modeler models and analyzes the data.

Furthermore, it is important that the modeling content is written in an error-free and target group-oriented manner.

The "Principles of Proper Modeling" were developed for this purpose. The most important principles are the principle of accuracy, principle of relevance, principle of economy, principle of clarity, principle of comparability and principle of systematic structure. [9]

Workflow modeling is followed by workflow execution. Workflow execution consists of the creation of process objects and the flow of process objects along the intended processing stations under the control of a workflow management system.

The most important tasks of the workflow management system include controlling, monitoring and analyzing the business processes and workflow in the company. These are software solutions with tools for designing workflows. The workflow management system is always based on workflows.

With the workflow management system, employees can model workflows and create them themselves. [10]

There are various workflow management systems on the market, such as Activiti, AristaFlow or Bizagi.

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ISSN: 2789-4320. eISSN: 2789-4339

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In the next phase, workflow monitoring, the process behavior of real processes is monitored. Workflow management is also used in other software, e.g. in ERP systems.

In recent years, various methods for process representation have emerged. These methods include data-oriented, control-flow-oriented and object-oriented methods. An example of the control flow-oriented method is BPMN - Business Process Model and Notation. This is a graphical and XML-based business process modeling.

BPMN was developed by Stephen A. White and standardized as a modeling language for processes in 2006.

The new version BPMN 2.0 was presented in 2010. The new version offers a number of enhancements. For example, it is possible to extend BPMN independently or to better visualize the events.

Furthermore, the models can be saved as XML files. The following XML schemes exist for this, such as model exchange and execution semantics. In model exchange, XML contains all the information for transferring a model to another tool. In the case of execution semantics, XML describes how the technical details of the process are saved. [11]

BPMN 2.0 can be used to analyze and uniformly represent business processes. The business process is understood as a goal-oriented, time-logical sequence of tasks.
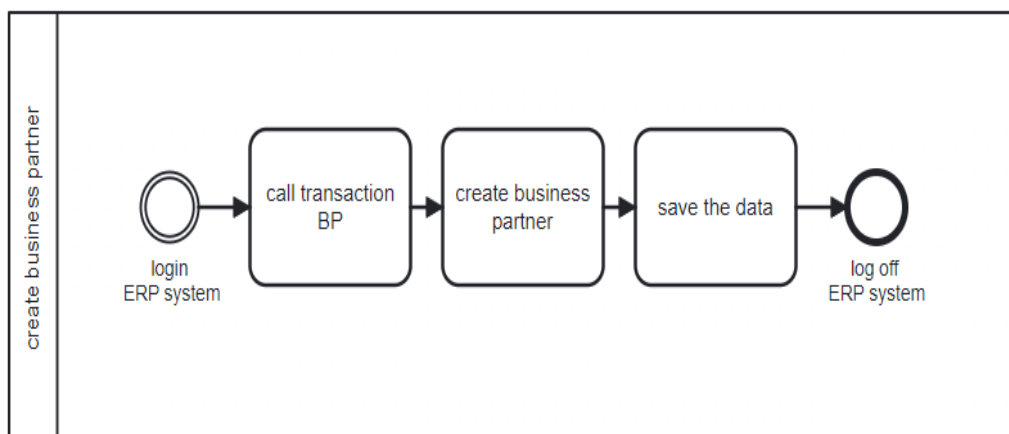
Here is an example.

Figure 2. Example of a business process diagram, created with BPMN
Note: compiled by the author.

In BPMN 2.0, there are different symbols that have their own meaning. The rectangles describe activities, circles different event types, diamonds specific decisions and edges the control and message flow.

The BPMN elements are divided into categories. These are the following categories: flow objects; connecting objects; data; artifacts and swimlanes.

The following symbols belong to flow objects, such as activity, event and gateway. Here are two examples.
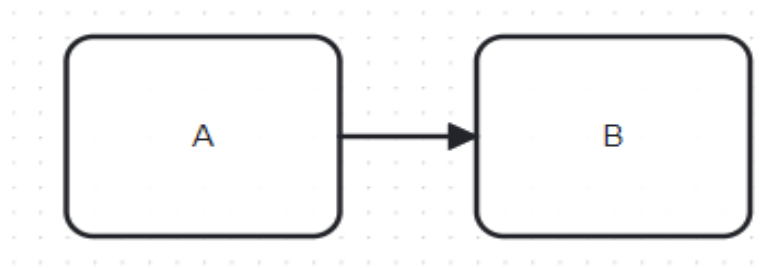
Figure 3. Activity

Note: compiled by the author.

Connecting objects include the following symbols, such as message flow, association, data association and sequence flow.

The following symbols belong to data, such as data object, data input, data output and data memory. Artifacts include the following symbols, such as grouping, annotation and association. Swimlanes include pool and lanes L1 and L2.

More information can be found in the official document Business Process Model and Notation (BPMN), Version 2.0 (omg.org). [12]

Figure 4. Event

Note: compiled by the author.

In addition to symbols, BPMN 2.0 also contains certain rules. These symbols are graphically linked to each other based on these rules. For example, activities can only be linked by sequence flows. Below is an example of a graphical representation of how the activities are linked to the sequence flow.
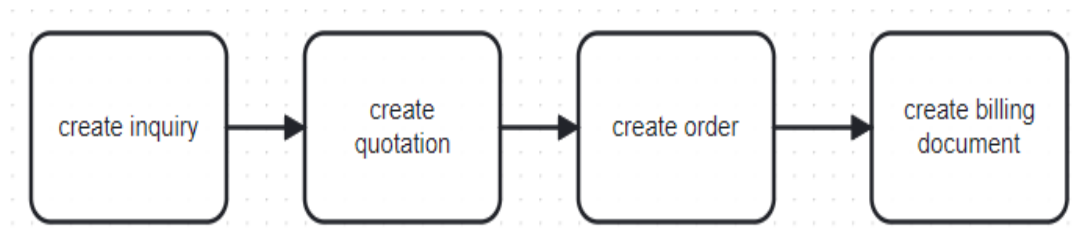

Figure 5. Activities and Sequence flows

Note: compiled by the author.

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ЭКОНОМИКА СЕРИЯСЫ
ISSN: 2789-4320. eISSN: 2789-4339

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It is important that BPMN 2.0 is used syntactically correctly.

It is also important to carry out BPMN modeling with the help of a modeling tool. With BPMN 2.0, it is important to distinguish between the definition of a business process and a process instance. A process instance is an executable process that is created according to the process definition. [13]

Workflow management focuses on structuring, automating, and monitoring business processes. Defined as recurring sets of activities with clear starts and ends, workflows are crucial for reducing operational costs and improving resource utilization.

The three phases of workflow management include:

1. Modeling: Representing processes using data-, control-flow-, or object-oriented methods.

2. Execution: Utilizing Workflow Management Systems (WMS) such as Activiti or Bizagi to automate task flow and manage operations.

3. Monitoring: Analyzing real-time performance to ensure compliance and identify improvement opportunities.

Business Process Model and Notation (BPMN) 2.0 is a widely adopted graphical modeling standard that represents the sequence and logic of business processes. Its symbols and categories, such as flow objects, connecting objects, and swimlanes, allow for a clear, standardized documentation of workflows.

BPMN 2.0 enhances business communication by visually representing processes and integrating XML-based data exchange capabilities. This makes it ideal for documenting current operations and designing improved workflows that align with organizational goals.

Artificial Intelligence revolutionizes business process management by introducing advanced analytics, automation, and decision-making tools. Applications include AI-based process automation, forecasting, and optimization in industries like manufacturing, retail, and logistics.

By leveraging AI, companies can achieve faster problem-solving, better customer communication, and significant cost savings. AI also supports data-driven innovation, enabling the creation of new products, services, and operational strategies.

The synergy of Workflow Management, BPMN 2.0, and Artificial Intelligence offers companies a robust toolkit for operational excellence. While WMS provides automation, BPMN 2.0 ensures clarity and alignment, and AI enables intelligent predictions and innovations.

Future advancements, including quantum computing and refined AI algorithms, will further enhance business process management. Organizations must address challenges such as skill shortages, data quality issues, and resistance to change to fully harness these technologies.

Conclusion

The integration of Artificial Intelligence, Workflow Management Systems, and BPMN 2.0 provides a transformative framework for organizations to achieve operational excellence and adapt to the demands of the digital economy. AI enables advanced analytics, automation, and innovative solutions, while BPMN 2.0 ensures clarity and standardization in process modeling. Workflow Management Systems enhance these capabilities by automating and monitoring business processes effectively.

Despite the challenges, including data quality issues, workforce resistance, and a shortage of skilled professionals, organizations that embrace these technologies can unlock significant advantages, such as cost savings, improved productivity, and enhanced decision-making. Future advancements in AI and quantum computing will further amplify these benefits, creating new opportunities for innovation and growth.

In conclusion, businesses must invest in these technologies and address the associated challenges to remain competitive. The synergy of AI, WMS, and BPMN 2.0 is a strategic imperative for organizations aiming to thrive in an increasingly digital and interconnected world.

Conflict of interest. The authors declare no conflict of interest.

Author's contribution.
Rakayeva A.N. – data collection and processing, results interpretation.
Rakayeva A.N. – theoretical substantiation, results interpretation

References
1. Wirtz, B., Weyerer, J. Künstliche Intelligenz: Erscheinungsformen, Nutzungspotenziale und Anwendungsbereiche.- 2019.- P121-153

2. Berg, A. Künstliche Intelligenz. Wo steht die deutsche Wirtschaft.- 2021.-P.52-69

3. Büchel J. KI-Monitor 2021 Status quo der Künstlichen Intelligenz in Deutschland. Bundesverband Digitale Wirtschaft.- 2021.-P.78-92.

4. Künstliche Intelligenz Intelligente Technologien von SAP. - [Electronic resource] – URL: https://www.sap.com/austria/products/technology-platform/artificial-intelligence.html (accessed: 13.11.2024)

5. Artificial intelligence act | Think Tank | Europäisches Parliament. - [Electronic resource] – URL: https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698792/EPRS_BRI(2021)698792_EN.pdf (accessed: 25.11.2024)

6. Home - KI Strategie. - [Electronic resource] – URL: https://ai-watch.ec.europa.eu/countries/germany/germany-ai-strategy-report_en (accessed: 10.10.2024)

7. Gadatsch, A. Grundkurs Geschäftsprozess-Management - Methoden und Werkzeuge für die IT-Praxis: Eine Einführung für Studenten und Praktiker.- 2012.- P.23-52.

8. Gadatsch, A. Geschäftsprozesse analysieren und optimieren.- 2015. – P.1-15.

9. Scheer, AW. Anwendungsnutzen von ARIS. In: ARIS – Vom Geschäftsprozess zum Anwendungssystem. Springer, Berlin, Heidelberg.- 2002. -[Electronic resource] – URL: https://link.springer.com/chapter/10.1007/978-3-642-56300-3_1 (accessed: 13.10.2024)

10. Workflow Management System: Definition, Vorteile und Beispiele. - [Electronic resource] – URL: https://www.personio.de/hr-lexikon/workflow-management-system/ (accessed: 16.11.2024)

11. Jakob Freund, Bernd Rücker. Praxishandbuch BPMN mit Einführung in DMN: 6., aktualisierte Auflage. – 2019.- P.115-203.

12. Business Process Model and Notation (BPMN), Version 2.0, OMG Document Number: formal /2011-01-03, Standard document. – Object Management Group. - [Electronic resource] – URL: https://www.omg.org/spec/BPMN/2.0 (accessed: 13.11.2024)

13. Jochen Göpfert, Heidi Lindenbach. Geschäftsprozessmodellierung mit BPMN 2.0. Business Process Model and Notation. Oldenbourg.- 2013.-P45-68.

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AI, BPMN 2.0 және жұмыс үрдісін басқару жүйелері мен бизнес процестерді оңтайландыру

Аңдатпа. Бұл мақалада заманауи бизнес операцияларын жақсарту үшін жасанды интеллект (AI), жұмыс үрдісін басқару жүйелері (WMS) және бизнес-процесс үлгісі мен нотациясы (BPMN) интеграциясы қарастырылады. Осы озық технологияларды пайдалана отырып, ұйымдар тиімділікті айтарлықтай арттыра алады, шығындарды азайтады және шешім қабылдауды жақсартады. Деректерді талдау және автоматтандырудағы AI мүмкіндіктері бизнеске мәселелерді тезірек шешуге, ресурстарды бөлуді оңтайландыруға және неғұрлым саналы таңдау жасауға мүмкіндік береді. WMS жүйесімен біріктірілген AI жұмыс процестерін автоматтандыру және операциялық өнімділікті арттыру арқылы процестерді жеңілдетеді.

BPMN 2.0 бизнес-процестерді визуализациялау және модельдеу үшін нақты, стандартталған әдісті қамтамасыз етеді, командалар арасында жақсырақ байланыс пен теңестіруді ынталандырады. Бұл құрылымдық тәсіл ұйымдарға жұмыс процестерін тиімді құжаттауға, талдауға және жақсартуға мүмкіндік береді.

Дегенмен, мақалада бизнестің осы технологияларды қабылдауда кездесетін қиындықтары, соның ішінде деректер сапасы мәселелері, өзгерістерге төзімділік және білікті мамандарға деген қажеттілік қарастырылған. Болашаққа көз жүгірте отырып, мақала кванттық есептеулердің әлеуетін және AI алгоритмдеріндегі жетістіктерді зерттеп, ұйымдардың үнемі дамып келе жатқан технологиялық ландшафтта бәсекеге қабілетті болып қалу үшін үздіксіз инновациялар енгізу және бейімделу маңыздылығын атап көрсетеді.

Түйін сөздер: Жасанды интеллект, жұмыс үрдісін басқару жүйелері, BPMN 2.0, бизнес-процестерді автоматтандыру, цифрлық трансформация.

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Оптимизация бизнес-процессов с помощью искусственного интеллекта, BPMN 2.0 и систем управления рабочими процессами

Аннотация. В этой статье рассматривается интеграция искусственного интеллекта (ИИ), систем управления рабочими процессами (WMS) и модели и нотации бизнес-процессов (BPMN) для улучшения современных бизнес-операций. Используя эти передовые технологии, организации

могут значительно повысить эффективность, сократить затраты и улучшить процесс принятия решений. Возможности искусственного интеллекта в области анализа данных и автоматизации дают предприятиям возможность быстрее решать проблемы, оптимизировать распределение ресурсов и делать более осознанный выбор. В сочетании с WMS ИИ оптимизирует процессы за счет автоматизации рабочих процессов и повышения операционной эффективности.

BPMN 2.0 предоставляет четкий стандартизированный метод визуализации и моделирования бизнес-процессов, способствующий улучшению коммуникации и согласованности внутри команд. Такой структурированный подход позволяет организациям эффективно документировать, анализировать и улучшать свои рабочие процессы.

Однако в статье также рассматриваются проблемы, с которыми сталкиваются предприятия при внедрении этих технологий, включая проблемы качества данных, сопротивление изменениям и потребность в квалифицированных специалистах. Заглядывая в будущее, в статье исследуются потенциал квантовых вычислений и достижения в области алгоритмов искусственного интеллекта, подчеркивая важность для организаций постоянных инноваций и адаптации, чтобы оставаться конкурентоспособными в постоянно развивающемся технологическом ландшафте.

Ключевые слова: искусственный интеллект, системы управления рабочими процессами, BPMN 2.0, автоматизация бизнес-процессов, цифровая трансформация.

References

1. Wirtz, B., Weyerer, J. Künstliche Intelligenz: Erscheinungsformen, Nutzungspotenziale und Anwendungsbereiche, 121-153(2019)

2. Berg, A. Künstliche Intelligenz. Wo steht die deutsche Wirtschaft, 52-69(2021)

3. Büchel J. KI-Monitor 2021 Status quo der Künstlichen Intelligenz in Deutschland. Bundesverband Digitale Wirtschaft, 78-92(2021)

4. Künstliche Intelligenz Intelligente Technologien von SAP. Available at: https://www.sap.com/austria/products/technology-platform/artificial-intelligence.html (accessed: 13.11.2024)

5. Artificial intelligence act | Think Tank | Europäisches Parliament. - Available at: https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698792/ EPRS_BRI(2021)698792_EN.pdf (accessed: 25.11.2024)

6. Home - KI Strategie, Available at: https://ai-watch.ec.europa.eu/countries/germany/germany-ai-strategy-report_en (accessed: 10.11.2024)

7. Gadatsch, A. Grundkurs Geschäftsprozess-Management - Methoden und Werkzeuge für die IT-Praxis: Eine Einführung für Studenten und Praktiker, 23-52(2012).

8. Gadatsch, A. Geschäftsprozesse analysieren und optimieren, 1-15(2015)

9. Scheer, AW. Anwendungsnutzen von ARIS. In: ARIS - Vom Geschäftsprozess zum Anwendungssystem. Springer, Berlin, Heidelberg, (2002) Available at: https://link.springer.com/chapter/10.1007/978-3-642-56300-3_1 (accessed: 13.10.2024)

10. Workflow Management System: Definition, Vorteile und Beispiele, Available at: https://www.personio.de/hr-lexikon/workflow-management-system/ (accessed: 16.11.2024)

11. Jakob Freund, Bernd Rücker. Praxishandbuch BPMN mit Einführung in DMN: 6., aktualisierte Auflage, 115-203(2019).

Л.Н. Гумилев атындағы Еуразия ұлттық университетінің ХАБАРШЫСЫ.
ЭКОНОМИКА СЕРИЯСЫ
ISSN: 2789-4320. eISSN: 2789-4339

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12. Business Process Model and Notation (BPMN), Version 2.0, OMG Document Number: formal /2011-01-03, Standard document. – Object Management Group Available at: https://www.omg.org/spec/BPMN/2.0 (accessed: 13.11.2024)

13. Jochen Göpfert, Heidi Lindenbach. Geschäftsprozessmodellierung mit BPMN 2.0. Business Process Model and Notation. Oldenbourg, 45-68(2013).

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