ZESZYTY NAUKOWE POLITECHNIKI POZNAŃSKIEJ
Nr 91 Organizacja i Zarządzanie 2025

Marta Maria TUTKO[1]

# ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN THE MANAGEMENT OF HIGHER EDUCATION INSTITUTIONS: A SCOPING REVIEW

DOI: 10.21008/j.0239-9415.2025.091.11

The development of artificial intelligence (AI) technologies has brought unprecedented challenges and opportunities for higher education institutions (HEI). The possibilities of using AI technologies in specific areas of HEIs management need to be explored to keep up with the ongoing dynamic changes. For this reason, the objective of this study is to identify management levels and management subdisciplines in HEIs at which AI technologies are used. To achieve this aim, the scoping review method was chosen. Web of Science and Scopus databases were used to identify documents published 1992-2025, from which 11 publications were considered eligible for the review. Research shows that HEIs apply diverse AI technologies (e.g. machine learning, expert systems, chatbots). HEIs also utilize AI technologies at the operational level of management in the subdisciplines of quality management, knowledge management, and managerial decision support. In the case of functional level of management, human resources management and financial management and managerial accounting subdisciplines are mentioned in the sources. However, the findings also reveal that AI technologies are implemented in less than half of the identified subdisciplines. This suggests a limited and uneven adoption of AI technologies. Strikingly, the strategic level of management remains entirely absent from the reviewed literature. This gap might suggest that AI technologies are often deployed in a compartmentalized manner, rather than as part of an integrated institutional strategy. To fully harness AI's transformative potential, HEIs should adopt a holistic approach that embeds AI technologies across all levels of management, namely strategic, operational, and functional.

**Keywords:** management, scoping review, higher education institution, AI, artificial intelligence, AI technologies

[1] Jagiellonian University, Faculty of Management and Social Communication. ORCID: 0000-0002-8359-8081.

## 1. INTRODUCTION

The development of artificial intelligence (AI) technologies has brought unprecedented challenges and opportunities for the management of organizations, including the management of higher education institutions (HEI).

Studying the literature on AI leads to the conclusion that there is no generally accepted definition of the construct. AI is evolving speedily and thus its definition is also changing (Chi-Hang Tsoi, Strønen, 2024). Sheikh, Prins and Schrijvers (2023), after reviewing the literature, pointed to several definitions: 1) AI equals algorithms, 2) AI imitates human intelligence, 3) AI imitates human skills, 4) AI is equated with the latest technologies. These technologies are subject to multiple categorization schemes. For example, the High-Level Expert Group on Artificial Intelligence (AI HLEG, 2018) pointed to several AI "techniques": machine learning (ML), machine reasoning (MR), and robots. In turn, Chedrawi and Howayeck (2019) named three "branches" of AI: robots, natural language processing (NLP), and expert systems (ES), whereas Tobias et al. (2023) listed major "subfields" of AI: ML, deep learning (DL), and NLP. Finally, it is worth noting the list of AI "technologies" in the field of education resulting from Zhang and Aslan's (2021) literature review. This list includes chatbots, expert systems, intelligent tutors, ML, personalized learning systems, as well as visualizations. The above-mentioned categorizations of types of AI show that there is no consensus on this topic. Differences between researchers are visible even in the terms used: some call them "techniques" of AI, others define them as "branches", "subfields" or "technologies". In this article the term "AI technologies" was adopted (Zhang, Aslan, 2021; Chi-Hang Tsoi, Strønen, 2024).

AI technologies are used in various areas of HEIs activity. These domains are education, research, outreach/collaboration, and operations/management (Budzanowska-Drzewiecka, Tutko, Bugdol, 2023). In the area of education, scholars proved successful applications of AI technologies in student learning experience, student support and enrolment management (Hannan, Liu, 2023). AI technologies lead to improvements in the quality of education, administrative service, and public image (Stoyanova, Angelova, 2024). They are currently revolutionizing student interactions, admissions processes, academic support and cross-cultural adaptation (Bansal et al., 2024). In the literature, special attention is paid to generative AI, with research focused on generative AI's impact on teaching in higher education (Gupta, 2024), or on the impact of a training programme on generative AI applications in enhancing lecturers' teaching capabilities (Al-Saiari et al., 2024). Moreover, robots (including chatbots) can enhance the student learning experience (George, Wooden, 2023). Consideration is given to the importance of educational AI agents (Bozkurt, 2023). Finally, integrating AI technologies into education fosters the development of adaptive, personalized, and inclusive learning environments (Jereb, Urh, 2024). Notably, the growing academic interest in

AI technologies within the educational context is also evidenced by a substantial body of bibliometric research, for example, bibliometric studies concentrating on the trends and patterns of generative AI research in educational praxis (Bozkurt, 2023), on the influence of AI on teaching practice (Ivanova, Grosseck, Holotescu, 2024), or on the potential of AI in enhancing learning (Sahar, Munawaroh, 2025). Nonetheless, the deployment of AI technology extends beyond educational purposes. It plays an increasingly important role in the research domain of HEIs, especially cloud computing processing technology, internet technology, cloud storage technology brings about great changes (Yongtao, 2019). George and Wooden's (2023) review of the literature shows that AI technologies can be successfully used in: 1) literature reviews, 2) data analysis, 3) predictions and forecasting, 4) experiment design, and 5) collaboration. To this list Pandi and Chinnasamy (2024) add dissemination of academic research information, as part of outreach/collaboration domain. AI technologies can improve the efficiency and effectiveness of academic research by automating repetitive tasks, providing new insights and enabling collaboration (George, Wooden, 2023). A special form of this collaboration are public-private partnerships located in the outreach/collaboration domain (Zawadzki et al., 2019). To sum up, although the potential of AI technologies was investigated in education, research, and outreach/collaboration areas, there are limited studies referring to management domain of HEIs' activity, which may indicate a research gap.

Against the backdrop of existing publications, including bibliometric studies, this article distinguishes itself by addressing the application of AI technologies in the management of HEIs. Importantly, in line with Huang's (2024) call, the possibilities of using AI technologies in the management of HEIs need to be explored to keep pace with the times. This is especially important, since HEIs are increasingly recognizing AI as a source of competitive advantage (Hannan, Liu, 2023). At this juncture, it is necessary to present adopted in this study categorization of management levels and management subdisciplines assigned to them, according to Bełz et al. (2019):

- Strategic level (comprising the subdisciplines: Strategic management; Entrepreneurship);
- Operational level (Managerial decision support; Process and project management; Organizational behaviour; Knowledge management; Innovation management; Quality management);
- Functional level (Production, service and technology management; Financial management and managerial accounting; Logistics management; Human resources management; Marketing management).

Considering the above, this article aims to identify management levels and management subdisciplines in HEIs at which AI technologies are used. The following research question was therefore posed: What is known about the use of AI technologies in the management of HEIs?

## 2. METHOD

Due to the complex nature of the topic and the wide range of studies that might be relevant to the research question, a scoping review method was chosen to refer to the use of AI technologies in the HEI management. Being "a type of knowledge synthesis, scoping reviews follow a systematic approach to map evidence on a topic and identify the main concepts, theories, sources, and knowledge gaps" (Tricco et al., 2018, p. 467). It is worth mentioning that the number of studies using this method is constantly growing (Peters et al., 2021), also in higher education research (e.g. Perez, Brady, 2018; Ritesh, Grose, Macht, 2021; Pwint, Hallinger, 2023; Amorós Molina et al., 2023; Marangell et al., 2024; Rana, Aitken, Chimoriya, 2025), and these include AI-focused studies (e.g. Schei, Møgelvang, Ludvigsen, 2024; Xia et al., 2024). In this study, a scoping review was conducted in accordance with "Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR)" (Tricco et al., 2018) (fig. 1).

The Methods section includes several elements, starting with the protocol (fig. 1). In this study, a protocol was not registered and published in publicly available sources. The eligibility criteria refer to the characteristics of the sources of evidence used in the scoping review. To be included in this review, publications had to relate to the use of AI technologies in the management of HEIs, and peer-reviewed articles and book chapters were also considered. The search was not limited to any certain type of study, thus, all types of studies including quantitative, qualitative, mixed methods studies, conceptual studies, conference papers and literature reviews were included. The publications were selected in two independent searches, based on the keyword criterion.

The first search looked for the keywords "artificial intelligence or AI" and "higher education or universit*" in the titles of publications. Additionally, the search scope was limited to management and related sciences. In the second search, the keywords "artificial intelligence or AI", "higher education or universit*" and "management" were sought in the titles of publications.

In both searches, exclusion criteria, aside from those that are the opposite of the inclusion criteria, were defined as: language of publication other than English and publication status described as "article in press", "early access" and retracted. The publication date was not taken into account.

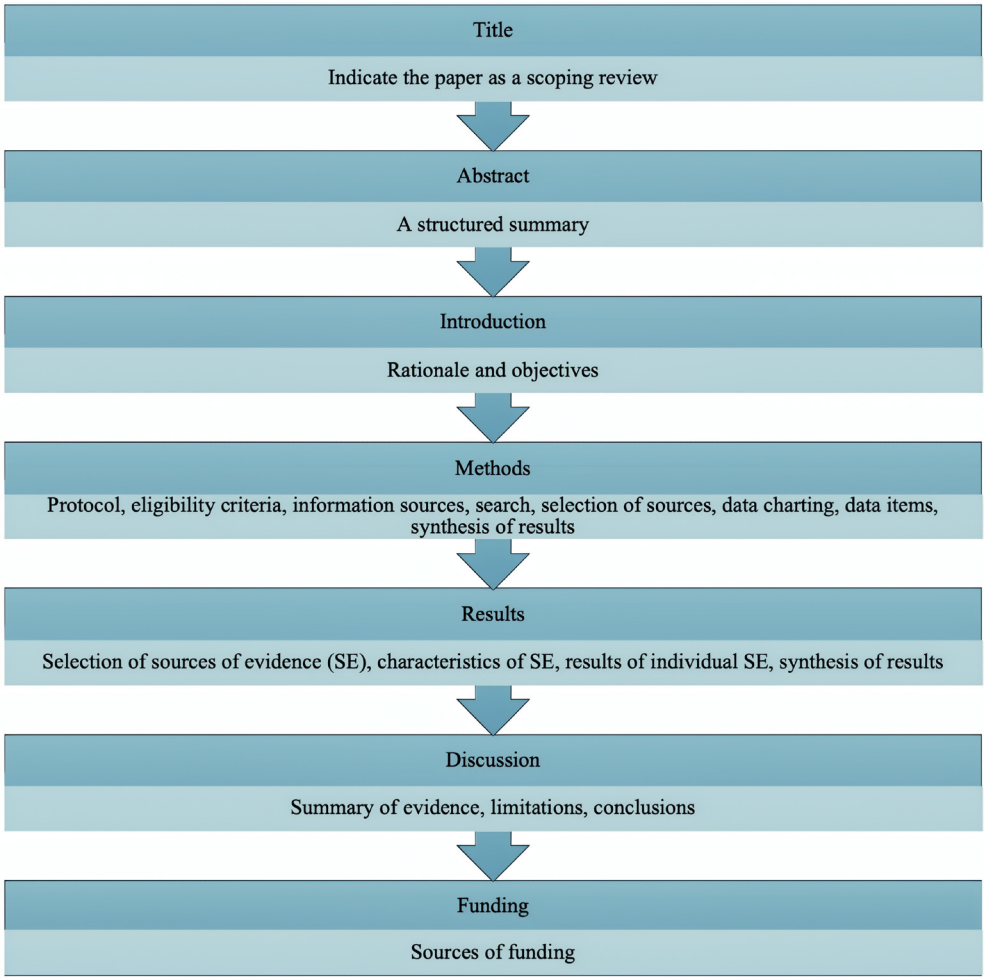


Fig. 1. The stages of the study according to PRISMA-ScR checklist (own elaboration based on Tricco et al., 2018)

Next, Tricco et al. (2018) recommend indicating all information sources used in the search. To identify potentially relevant publications, the Web of Science and Scopus databases were searched on 19 March 2025 (Search number 1) and on 22 March 2025 (Search number 2). The two databases were selected to avoid the journal selection imposed by the database administrator and to gain access to all major international journals. Previously defined eligibility criteria were matched to the names proposed in these two databases (tab. 1).

Table 1. Chosen eligibility criteria as matched to the names proposed Web of Science and Scopus databases

| Database name / Chosen criteria | Web of Science | Scopus |
|---|---|---|
| Document Type (Search 1 and 2) | "Article", "Review article", "Proceeding paper" and "Book chapter" | "Article", "Review" "Conference paper" and "Book chapter" |
| Subject/research area (Search 1) | "Business and Economics" and "Operations Research Management Science" | "Business, Management and Accounting" and "Economics, Econometrics and Finance" |

Source: own elaboration.

In order to avoid errors, the process for selecting sources of evidence involved the present article's author twice screening the records obtained from databases searches. In a scoping review, the process of data extraction is called "data charting" (Arksey, O'Malley, 2005). The present article's author applied data charting form in the working notes. She extracted the relevant information on her own, without other researchers' assistance or reviews. The relevance of the literature was assessed based on the titles and abstracts to identify the publications that focus on the interest area.

Another aspect that needs to be described are data items (fig. 1), i.e. variables for which data were sought, and assumptions were made. The following data were searched for:

- the article characteristics (source of evidence, type of document, aim of the publication, research method used, research subject, and findings/results of the publication),
- the management subdiscipline in which AI technology is used, divided into management levels: strategic, operational and functional,
- the AI technology used.

The Methods section should end with a synthesis of results. The use of inclusion and exclusion criteria in the search resulted in obtaining:

- 50 records from the Web of Science and 136 records from the Scopus database in Search number 1,
- 20 records from the Web of Science and 48 records from the Scopus database, in Search number 2.

This evidence is presented in the form of a table (tab. 2) and a diagram (fig. 2).

The time range of the collected material covered the years 1992-2025. Such a wide time frame was chosen because it was hoped to reflect the evolution of AI technologies in the management of HEIs. AI did not appear in the HEIs suddenly, but has entered the academic environment gradually. The starting point marks the publication of one of the earliest studies addressing the use of AI in HEI (e.g. Behrens,

Steinbart, 1992) and captures the early stages of digital transformation in academia. In turn, the inclusion of studies up to 2025 ensures that the review incorporates the most recent contributions.

## 3. RESULTS REFERRING TO THE USE OF AI TECHNOLOGIES IN THE MANAGEMENT OF HEIS

To answer the research question referring to the use of AI technologies in HEIs' management, sources of evidence were selected and characterized, with the results also being presented. First, sources of evidence, namely 254 records from the Web of Science and Scopus databases, were screened and assessed for eligibility. These are presented in a flow diagram (fig. 2).

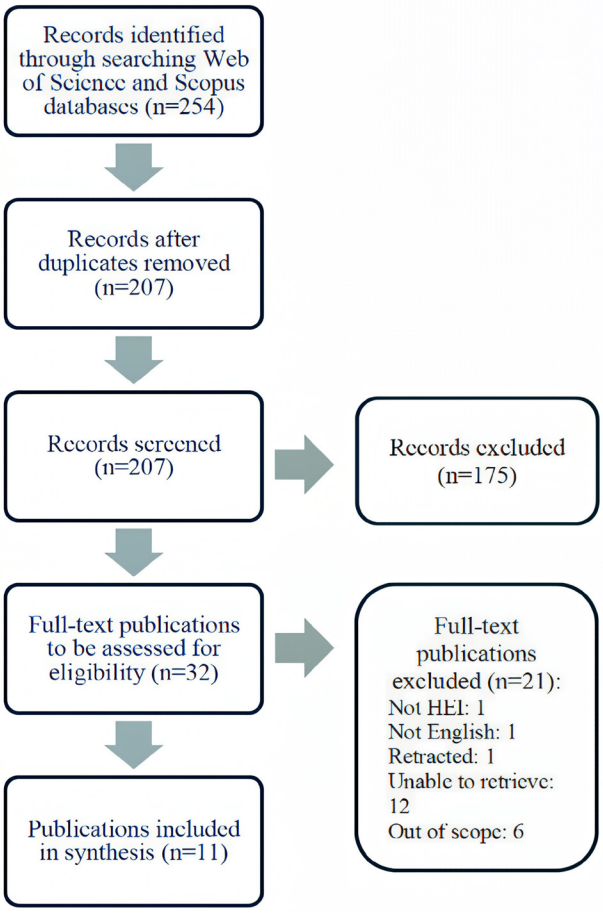


Fig. 2. Selection of sources of evidence (own elaboration based on Tricco et al., 2018)

After duplicates had been removed, a total of 207 publications were identified. Based on screening the title and the abstract, 175 were excluded. 32 articles were assessed for eligibility. From this collection, 21 were excluded because: one concerned a library, one was not written in English, one was retracted and six did not concern management of HEIs. It was impossible to retrieve 12 publications. The characteristics of the 11 sources of evidence included in the review, in alphabetical order, are presented in table 2.

Table 2. Results of individual sources of evidence

| No. | Source of evidence | Document type | Aim of the publication | Research method | Research subject | Findings/results |
|---|---|---|---|---|---|---|
| 1 | Abalos, Palaoag, 2024 | Article | To present utilization of content-based filtering approach and Apriori algorithm to empower the recruitment process | Quantitative--developmental research | Pangasinan State University, Philippines | List of skills based on extracted words and phrases from a resumé file and list of relevant job titles based on input skills provided |
| 2 | Chang, Abdalla, Lasyoud, 2021 | Conference paper | To explore the influence of AI-driven management on the organizations | Literature review | n/a | Managers' approach is key in implementing AI in personnel management |
| 3 | Chedrawi, Howayeck, 2019 | Book Chapter | To propose a model for the implementation of AI through ES within the AACSB accreditation programmes | n/a | n/a | ES reshape the AACSB accreditation process while ensuring more reliable and efficient results and reducing time, cost and errors |
| 4 | Chen, Zhang, 2023 | Conference paper | To explore the process of quality management in talent cultivation through AI | Survey | Nanning University, Guangxi University of Foreign Languages, and Guilin University, China | AI has a positive and significant effect on the quality management of talent cultivation in universities |

| No. | Source of evidence | Document type | Aim of the publication | Research method | Research subject | Findings/results |
|---|---|---|---|---|---|---|
| 5 | Chi-Hang Tsoi, Strønen, 2024 | Conference paper | To explore the application of knowledge management (KM) focusing on AI technologies | Case study research | Georgia State University, United States | Integrating AI into KM practices can support HEIs' mission to provide high--quality education and increase their competitive advantage |
| 6 | George, Wooden, 2023 | Article | To evaluate the strategic adoption of AI in the framework of "smart universities" | Literature review | Historically Black colleges and universities, United States | AI is capable to revolutionize both academic and administrative facets of educational institutions |
| 7 | Han et al., 2024 | Article | To explore the relationship between AI-driven financial integration and its impact on financial positions | Not specified | Qiqihar University, China | AI has the transformative potential to streamline financial operations and free finance staff from routine tasks |
| 8 | Ivanov, 2023 | Article | To identify the negative aspects of AI implementation and outline some possible solutions to them | Not specified | Not specified | The negative aspects of AI implementation in identified and possible solutions to them outlined |
| 9 | Tobias et al., 2023 | Conference paper | To present AI-enabled Quality Management System (QMS) | Content analysis | HEI, Philippines | AI-enabled QMS can match audit findings with the respective clauses of ISO 9001 |

| No. | Source of evidence | Document type | Aim of the publication | Research method | Research subject | Findings/results |
|---|---|---|---|---|---|---|
| 10 | Vinichenko, Melnichuk, Karácsony, 2020 | Article | To identify the possibilities of using AI technologies in the process of motivating employees | Survey, content analysis | HEIs, Russia | The possibilities of using AI technologies in the process of motivating employees identified |
| 11 | Vorontsova et al., 2025 | Article | To identify the key trends, knowledge gaps, and opportunities for further research on AI technologies | Systematic literature review | n/a | Key trends, knowledge gaps, and opportunities for further research on AI technologies identified |

Source: own elaboration.

Six documents were published in scientific journals and one in a book. As many as four of the 11 documents were published as conference papers. Scholars used both qualitative and quantitative research methods. Literature review was chosen in three studies, and content analysis twice. Among the quantitative methods, a survey was applied. At least twice, the research was conducted at HEIs located in the United States, China and the Philippines.

In the scoping review, the last part of the results section is the synthesis of results (fig. 1) referring to the use of AI technologies in the management of HEIs. For each individual source of evidence, data that relate to the research question are presented in table 3.

Table 3. Synthesis of results

| No. | Source of evidence | AI technology | Management subdiscipline in which AI technology is used | |
|---|---|---|---|---|
| | | | Operational level of management | Functional level of management |
| 1 | Abalos, Palaoag, 2024 | AI-based skills extraction systems, content-based filtering (CBF), Apriori algorithms | n/a | Human resources management: Recruitment process |
| 2 | Chang, Abdalla, Lasyoud, 2021 | Not specified | n/a | Human resources management: Personnel management |
| 3 | Chedrawi, Howayeck, 2019 | Expert system (ES) | Quality management: Accreditation | n/a |

| No. | Source of evidence | AI technology | Management subdiscipline in which AI technology is used | |
|---|---|---|---|---|
| | | | Operational level of management | Functional level of management |
| 4 | Chen, Zhang, 2023 | Not specified | Quality management: Talent cultivation | n/a |
| 5 | Chi-Hang Tsoi, Strønen, 2024 | Robots, specifically chatbot: Conversational AI | Knowledge management: Knowledge creation, sharing, and application | n/a |
| 6 | George, Wooden, 2023 | Machine learning (ML), multimodal learning analytics (MMLA) | Knowledge management: Data management systems | n/a |
| 7 | Han et al., 2024 | Machine learning (ML), "Algorithm Design of University Financial Decision-Making System", AI-driven financial information-sharing platforms | n/a | Financial management and managerial accounting: Financial service functions |
| 8 | Ivanov, 2023 | Not specified | n/a | Human resources management: Hiring of employees, remuneration, appraisal and wellbeing of employees |
| 9 | Tobias et al., 2023 | Machine learning (ML), specifically tools of deep learning (DL): Long short-term memory (LSTM), deep neural network (DNN) | Quality management: Audit process | n/a |
| 10 | Vinichenko, Melnichuk, Karácsony, 2020 | Expert system (ES), specifically AI-based expert programmes | n/a | Human resources management: Motivating employees |
| 11 | Vorontsova et al., 2025 | Not specified | Managerial decision support: Decision-making support | n/a |

Source: own elaboration.

Many AI technologies are utilized in specific subdisciplines of HEI management. Machine learning (ML) was mentioned three times and expert systems (ES) twice. Chatbots were indicated once. Apart from that, HEIs employ algorithms (e.g. Apriori algorithms, "Algorithm Design of University Financial Decision-Making System"). These AI technologies are used at the operational and functional levels of HEIs' management. No studies referred to the strategic management level. The most frequently indicated management subdisciplines in which AI technologies are applied at the operational level are quality management (three studies) and knowledge management (two papers). Furthermore, managerial decision support was mentioned once. In the case of functional level of management, apart from one example of the use of AI technologies in financial management and managerial accounting, HEIs utilize it in the human resources management subdiscipline (four cases).

## 4. DISCUSSION

The scoping review allowed the following research question to be answered: What is known about the use of AI technologies in the management of HEIs?

Summarizing the sources of evidence, it is worth emphasizing that in the individual subdisciplines of management, HEIs apply diverse AI technologies (e.g. machine learning, expert systems, chatbots). If the types of AI that are specific for education were removed from Zhang and Aslan's (2021) list of AI technologies (i.e. intelligent tutors, personalized learning systems), it can be observed that the results obtained in this study are largely consistent with Zhang and Aslan's list.

HEIs utilize AI technologies at the operational level of management in the subdisciplines of quality management, knowledge management, and managerial decision support. In quality management, expert systems (ES) and machine learning (ML) enhance audit accuracy and streamline accreditation processes by reducing time, costs, and errors (Tobias et al., 2023; Chedrawi, Howayeck, 2019). AI technologies support talent cultivation through personalized learning and reflective teaching practices (Chen, Zhang, 2023). Within knowledge management, conversational AI and ML improve data management systems and knowledge creation and sharing, thereby optimizing administrative workflows and educational support systems (George, Wooden, 2023; Chi-Hang Tsoi, Strønen, 2024). For managerial decision support, AI technologies provide valuable data-driven insights that strengthen institutional decision-making (Vorontsova et al., 2025).

In the case of functional level of management, human resources management and financial management and managerial accounting subdisciplines are mentioned in the sources of evidence. AI technologies enhance human resource functions by automating the recruitment process and enabling personnel planning (Abalos, Palaoag, 2024). They play an important role in personalizing employee

motivation strategies and improving the objectivity of performance appraisals, remuneration, and wellbeing monitoring (Vinichenko, Melnichuk, Karácsony, 2020; Ivanov, 2023). In financial management, ML streamlines routine service functions, increases data accuracy, and supports more strategic and cost-effective resource allocation.

Collectively, AI technologies empower HEIs to operate more efficiently and maintain competitive advantages (Hannan, Liu, 2023). Nonetheless, it is striking that their implementation remains limited across the full spectrum of HEIs' operational and functional management subdisciplines. The evidence indicates that out of six subdisciplines at the operational level, AI technologies are applied in only three; at the functional level, they are present in just two out of five subdisciplines. Notably, the strategic level of management remains entirely unaddressed in the reviewed literature. This highlights the need for AI technologies to be integrated not in isolation, but holistically, across operational, functional, and strategic levels of management. Strategic management may be a particularly promising area, as AI technologies are increasingly used in a wide range of strategic tasks and its relevance for strategic management in business environment is growing (Keding, 2021).

Although the research question was answered, the study has several limitations. These concern a single authorship, selected inclusion and exclusion criteria, adopted keywords, and a small number of sources of evidence.

Firstly, solo research does not provide the opportunity to discuss all stages of the research process with members of the research team. In a scoping review, this is especially important at the stage of extracting the relevant information, when other researchers' reviews are needed. Secondly, the selected inclusion and exclusion criteria resulted in works written in other languages than English and monographs not being analysed. Thirdly, the adopted keywords, namely "artificial intelligence or AI" have been defined too narrowly, which lead to a reduced number of sources of evidence. Finally, the above limitations resulted in only 11 studies being considered eligible for the review, a relatively small number. However, it is likely that this limited amount of evidence means that research on the use of AI technologies in the management of HEIs is still in its infancy. It may also confirm an existing research gap, a point mentioned in the introduction to this article.

To translate these limitations into success, further studies are needed. It would be valuable to conduct research in a larger research team, to include scientific monographs in the analyses, and also to open up the study up to publications in other national languages. Furthermore, it would be necessary to expand the keywords to include the names of individual AI technologies (e.g. chatbot, machine learning, conversational agent, generative AI, GPT, etc.), in addition to the names of management subdisciplines. Such an approach would certainly yield a larger number of sources.

## 5. CONCLUSIONS

In recent years, AI technologies have also garnered widespread attention in higher education settings. As they become increasingly integrated into higher education, it is crucial to study their application not only in education, research, outreach/collaboration, but also in the management domain of HEIs.

The results of this scoping review provide a broad overview of how AI technologies are currently applied in the management of HEIs. One of the findings is that different subdisciplines of management within HEIs tend to adopt diverse AI technologies, such as machine learning, expert systems, and chatbots. This variety indicates that AI implementation is often shaped by the specific functional needs of each management subdiscipline. The findings also reveal that AI technologies are implemented in less than half of the identified operational and functional areas of HEI management. This suggests a limited and uneven adoption of AI technologies, with many areas remaining underexplored or lacking integration. Strikingly, the strategic level of management remains entirely absent from the reviewed literature. This gap might suggest that AI technologies are often deployed in a compartmentalized manner, rather than as part of an integrated institutional strategy. To fully harness the transformative potential of AI, HEIs should adopt a holistic approach that embeds AI technologies across all levels of management, namely strategic, operational, and functional.

Given the exploratory nature of the scoping review methodology, the conclusions drawn are intentionally general. Furthermore, the limited number of studies included constrains the depth of analysis. Nevertheless, the review highlights research gaps – both in the overall application of AI technologies in HEI governance and in its use within specific management subdisciplines. For example, promising areas of empirical research concern the application of AI technologies in the innovation management, marketing management and strategic management.

Finally, it is worth adding that AI technologies are like a "tsunami", and it might be too late for HEIs' authorities to take action if there is no AI strategy prepared in advance. HEIs' leaders should therefore adopt a more proactive attitude using AI technologies in all management subdisciplines.

**FUNDING**

Institute of Economics, Finance, and Management, Faculty of Management and Social Communication, Jagiellonian University.

## LITERATURE

Abalos, P.N.S., Palaoag, T.D. (2024). AI-based Resume Skills Extractor and Recommender Modules for State University Human Resource Analytics System. *Proceedings on Engineering Sciences*, 6(4), 1473-1480.

AI HLEG (High-Level Expert Group on Artificial Intelligence) (2018). A definition of AI: Main Capabilities and Scientific Disciplines. European Commission. Retrieved from https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=56341 (12.03.2025).

Al-Saiari, M.A., Al-Mughairi, Y.M., Al-Mashaikhi, B.N., Mudhsh, B.A. (2024). Investigating the Impact of Training Program on Generative AI Applications in Improving University Teaching. *Qubahan Academic Journal*, 4(3), 315-332.

Amorós Molina, Á., Helldén, D., Alfvén, T., Niemi, M., Leander, K., Nordenstedt, H., Rehn, C., Ndejjo, R., Wanyenze, R., Biermann, O. (2023). Integrating the United Nations Sustainable Development Goals into Higher Education Globally: A Scoping Review. *Global Health Action*, 16(1).

Arksey, H., O'Malley, L. (2005). Scoping Studies: Towards a Methodological Framework. International *Journal of Social Research Methodology*, 8(1), 19-32.

Bansal, S., Rathi, P., Agarwal, R., Ahluwalia, R. (2024). Leveraging AI to Enhance the Global Mobility Experience: Trends in Indian Higher Education. In: D. Singh, G. Malik, S. Aggarwal (eds.). *Transforming the Financial Landscape with ICTs*. Hershey, PA: IGI Global Scientific Publishing, 108-133.

Behrens, M.L., Steinbart, P.J. (1992). Integrating Expert Systems and Artificial-Intelligence in Accounting – A Description of the Academic Program at Memphis-State-University. *Expert Systems with Applications*, 4(2), 219-223.

Bełz, G., Cyfert, S., Czakon, W., Dyduch, W., Latusek-Jurczak, D., Niemczyk, J., Sopińska, A., Szpitter, A., Urbaniak, M., Wiktor, J. (2019). Subdyscypliny w Naukach o Zarządzaniu i Jakości 2.0 [Subdisciplines in Management and Quality Sciences 2.0]. Komitet Nauk Organizacji i Zarządzania Polskiej Akademii Nauk. Retrieved from https://oldknoiz.pan.pl/ (12.04.2025).

Bozkurt, A. (2023). Unleashing the Potential of Generative AI, Conversational Agents and Chatbots in Educational Praxis: A Systematic Review and Bibliometric Analysis of GenAI in Education. *Open Praxis*, 15(4), 261-270.

Budzanowska-Drzewiecka, M., Tutko, M., Bugdol, M. (2023). Commitment of Universities in Poland to Sustainable Development. In: W. Leal Filho, M.A.P. Dinis, S. Moggi, E. Price, A. Hope (eds.). *SDGs in the European Region*. Cham: Springer.

Chang, K., Abdalla, Y.A., Lasyoud, A.A. (2021). Artificial Intelligence in Personnel Management: Opportunities and Challenges to the Higher Education Sector (HES). *Lecture Notes in Networks and Systems*, 239 LNNS, 278-289.

Chedrawi, C., Howayeck, P. (2019). Artificial Intelligence a Disruptive Innovation in Higher Education Accreditation Programs: Expert Systems and AACSB. In: Y. Baghdadi, A. Harfouche (eds.). *ICT for a Better Life and a Better World. Lecture Notes in Information Systems and Organisation*, 30. Cham: Springer.

Chen, Y., Zhang, M. (2023). Improving Quality Management in Talent Cultivation Through Artificial Intelligence in China's Private Universities. Proceedings of the 2023 14th International Conference on E-business, Management and Economics (ICEME '23). New York: Association for Computing Machinery, 476-488.

Chi-Hang Tsoi, J., Strønen, F. (2024). Integration of Conversational AI Capabilities in Knowledge Management Processes for Higher Education. *European Conference on Knowledge Management*, 25, 1026-1033.

George, B., Wooden, O. (2023). Managing the Strategic Transformation of Higher Education Through Artificial Intelligence. *Administrative Sciences*, 13(9), 196.

Gupta, A. (2024). Impact of Generative AI in Transforming Higher Education Pedagogy. In: R. Bansal, A. Ngah, A. Chakir, N. Pruthi (eds.). Leveraging ChatGPT and Artificial Intelligence for Effective Customer Engagement. Hershey, PA: IGI Global Scientific Publishing, 285-300.

Han, X., Xiao, S., Sheng, J., Zhang, G. (2024). Enhancing Efficiency and Decision-Making in Higher Education Through Intelligent Commercial Integration: Leveraging Artificial Intelligence. *Journal of the Knowledge Economy*.

Hannan, E., Liu, S. (2023). AI: New Source of Competitiveness in Higher Education. *Competitiveness Review*, 33(2), 265-279.

Huang, D. (2024). Artificial Intelligence Driving Innovation in Higher Education Management and Student Training Mechanisms. *Applied Mathematics and Nonlinear Sciences*, 9(1), 20240835.

Ivanov, S. (2023). The Dark Side of Artificial Intelligence in Higher Education. *Service Industries Journal*, 43(15-16), 1055-1082.

Ivanova, M., Grosseck, G., Holotescu, C. (2024). Unveiling Insights: A Bibliometric Analysis of Artificial Intelligence in Teaching. *Informatics*, 11(1), 10.

Jereb, E., Urh, M. (2024). The Use of Artificial Intelligence among Students in Higher Education. *Organizacija*, 57(4), 333-345.

Keding, C. (2021). Understanding the Interplay of Artificial Intelligence and Strategic Management: Four Decades of Research in Review. *Management Review Quarterly*, 71, 91-134.

Khalil, H., Alazawi, N., Khatiry, A.R. (2025). Exploring the Role of Artificial Intelligence in Education: A Survey-Based Study at University of Technology and Applied Science. *Studies in Systems, Decision and Control*, 568, 63-73.

Marangell, S., Venturin, B., Baik, C., Baker, S., Croucher, G., Arkoudis, S. (2024). Students' Attitudes Toward Diversity in Higher Education: Findings from a Scoping Review. *Issues in Educational Research*, 34(1), 97-122.

Pandi, P., Chinnasamy, B. (2024). Exploring the Usage of Artificial Intelligence Research Tools on Social Media Platforms for Academic Research Information Among Social Science Scholars at Tamil Nadu Universities. *Proceedings on Engineering Sciences*, 6(2), 565-576.

Perez, E., Brady, M. (2018). A Preliminary Scoping Review Study of the Progress of Social Media Adoption as an Educational Tool by Academics in Higher Education. *DBS Business Review*, 2.

Peters, M.D.J., Marnie, C., Colquhoun, H., Garritty, C.M., Hempel, S., Horsley, T., Langlois, E.V., Lillie, K., O'Brien, K.K., Tunçalp, Ö., Wilson, M.G., Zarin, W., Tricco, A.C. (2021). Scoping reviews: reinforcing and advancing the methodology and application. *Systematic Reviews*, 10(263).

Pwint, N.A., Hallinger, P. (2023). Research on Sustainability Leadership in Higher Education: A Scoping Review. *International Journal of Sustainability in Higher Education*, 24(3), 517-534.

Rana, K., Aitken, S.J., Chimoriya, R. (2025). Interdisciplinary Approaches in Doctoral and Higher Research Education: An Integrative Scoping Review. *Education Sciences*, 15(1), 72.

Ritesh, C., Grose, R., Macht, S.A. (2021). Social Media Usage by Higher Education Academics: A Scoping Review of the Literature. *Education and Information Technologies*, 26(1), 983-999.

Sahar, R., Munawaroh, M. (2025). Artificial Intelligence in Higher Education with Bibliometric and Content Analysis for Future Research Agenda. *Discover Sustainability*, 6(401).

Schei, O.M., Møgelvang, A., Ludvigsen, K. (2024). Perceptions and Use of AI Chatbots Among Students in Higher Education: A Scoping Review of Empirical Studies. *Education Sciences*, 14(8), 922.

Sheikh, H., Prins, C., Schrijvers, E. (2023). *Artificial Intelligence: Definition and Background. In Mission AI. Research for Policy*. Cham: Springer.

Stoyanova, T., Angelova, M. (2024). Good Practices of Using Artificial Intelligence in the Digitalization of Higher Education. *Entrepreneurship and Sustainability Issues*, 11(4), 44-62.

Tobias, R.R., Minglana, J., Hernandez, D.K., Mital, M.E., Roxas, R.E. (2023). Artificial Intelligence Applications in Quality Management Systems of Philippine Higher Education Institutions. *Lecture Notes in Networks and Systems*, 579, 159-172.

Tricco, A.C., Lillie, E., Zarin, W., O'Brien, K.K., Colquhoun, H., Levac, D., Moher, D., Peters, M.D.J., Horsley, T., Weeks, L., Hempel, S., Akl, E.A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M.G., Garritty, C., … Straus, S.E. (2018). PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Annals of Internal Medicine*, 169(7), 467-473.

Vinichenko, M.V., Melnichuk, A.V., Karácsony, P. (2020). Technologies of Improving the University Efficiency by Using Artificial Intelligence: Motivational Aspect. *Entrepreneurship and Sustainability Issues*, 7(4), 2696-2714.

Vorontsova, A., Tarasenko, S., Duranowski, W., Durasiewicz, A., Soss, J., Bilovol, A. (2025). A Bibliometric Analysis of the Economic Effects of Using Artificial Intelligence and ChatGPT Tools in Higher Education Institutions. *Problems and Perspectives in Management*, 23(1), 101-114.

Xia, Q., Weng, X., Ouyang, F., Lin, T.J., Chiu, T.K.F. (2024). A Scoping Review on how Generative Artificial Intelligence Transforms Assessment in Higher Education. *International Journal of Educational Technology in Higher Education*, 21(1), 40.

Yongtao, Z. (2019). Research on the Application of Artificial Intelligence Technology in Scientific Research Management in Colleges and Universities. 12th International Conference on Intelligent Computation Technology and Automation (ICICTA). Xiangtan, China, 438-441.

Zawacki-Richter, O., Marín, V.I., Bond, M., Gouverneur, F. (2019). Systematic Review of Research on Artificial Intelligence Applications in Higher Education – Where are the Educators? *International Journal of Educational Technology in Higher Education*, 16, 39.

Zhang, K., Aslan, A.B. (2021). AI Technologies for Education: Recent Research & Future Directions. *Computers and Education: Artificial Intelligence*, 2, 100025.

## TECHNOLOGIE SZTUCZNEJ INTELIGENCJI W ZARZĄDZANIU INSTYTUCJAMI SZKOLNICTWA WYŻSZEGO: PRZEGLĄD ZAKRESU LITERATURY

Streszczenie

Rozwój technologii sztucznej inteligencji (SI) niesie ze sobą bezprecedensowe wyzwania, ale i liczne możliwości dla instytucji szkolnictwa wyższego (ISW). Aby nadążyć za dynamicznymi zmianami, konieczne jest systematyczne badanie potencjału zastosowania SI w różnych obszarach zarządzania uczelniami. Celem niniejszego badania jest identyfikacja poziomów oraz subdyscyplin zarządzania, w których technologie SI znajdują zastosowanie w szkołach wyższych. W celu realizacji tego założenia przyjęto metodę przeglądu zakresu literatury. Analizie poddano publikacje dostępne w bazach danych Web of Science i Scopus obejmujące lata 1992-2025. Do ostatecznego przeglądu zakwalifikowano 11 artykułów. Wyniki badania pokazują, że uczelnie stosują różnorodne technologie SI – takie jak uczenie maszynowe, systemy eksperckie czy chatboty – przede wszystkim na operacyjnym poziomie zarządzania, w subdyscyplinach takich jak zarządzanie jakością, zarządzanie wiedzą oraz wspomaganie decyzji kierowniczych. Na funkcjonalnym poziomie zarządzania najczęściej wykorzystywane są w subdyscyplinach zarządzania zasobami ludzkimi, zarządzania finansami i rachunkowości menedżerskiej. Wyniki wskazują, że technologie SI są stosowane w mniej niż połowie zidentyfikowanych subdyscyplin zarządzania. Świadczy to o ograniczonym i nierównomiernym wdrażaniu tych rozwiązań, a wiele potencjalnych obszarów nadal pozostaje niedostatecznie zbadanych. Co istotne, strategiczny poziom zarządzania nie pojawia się w żadnym z analizowanych dokumentów. Może to sugerować, że wdrożenia SI są często incydentalne i nieskoordynowane, zamiast stanowić element spójnej strategii instytucjonalnej. Aby w pełni wykorzystać transformacyjny potencjał sztucznej inteligencji, uczelnie wyższe powinny przyjąć holistyczne podejście obejmujące wszystkie poziomy zarządzania – strategiczny, operacyjny i funkcjonalny.

**Słowa kluczowe:** zarządzanie, uczelnia, sztuczna inteligencja, AI, instytucja szkolnictwa wyższego, przegląd zakresu literatury, technologie AI