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Using artificial intelligence in business: the example of ChatGPT in management

Abstract

Generative artificial intelligence is used to create new content and solutions through its ability to discover relationships in raw data, thus simulating the human thinking process. One particularly popular tool of this type is ChatGPT, which generates text and helps to solve a variety of problems. Consequently, it can also support company management by helping in the performance of various functions. By automating routine tasks, for example, it allows employees to focus on more strategic activities, while the use of data to identify trends supports informed decision-making, which enhances a company's competitiveness and efficiency. The primary objective of the presented paper was to identify the key areas of application of ChatGPT in management. Accordingly, a quantitative and qualitative bibliometric analysis of the literature on this subject from the Web of Science and Scopus databases was undertaken, with a targeted selection of examples for case studies made based on the main research areas identified through bibliometric mapping. The article not only outlines the general trends related to the growth of the literature on ChatGPT in the field of management and quality sciences, but also specifies the main ways in which this tool supports management. It was noted that due to its ability to generate, automate, analyse and optimise, ChatGPT in management practice primarily supports (internal and external) communication, data use and problem solving.

Keywords: ChatGPT, management, generative artificial intelligence, AI, artificial intelligence in management

Introduction

Artificial intelligence can be defined as a multidisciplinary technology that, through the use of data, algorithms and computing power, can efficiently process information, simulating various aspects of human intelligence (Lu, 2024). Due to their ability to process huge data sets, these types of systems are particularly useful in sectors where analysing large volumes of information is essential, and it is these systems that predominantly set the course for the further development of this type of technology (Zhang & Lu, 2021). Moreover, the most recent systems that use deep learning mechanisms not only have the ability to conduct traditional data analysis (Janiesch et al., 2021; Taye, 2023), but are also capable of discovering relationships and objects in raw data, as well as creating new functionalities (Garnelo & Shanahan, 2019; Nasution et al., 2020). To this end, neural network algorithms build predictive models around complex problems involving natural language processing, computer vision, or content generation (Bisong, 2019; Xie et al., 2017).

There are many generative artificial intelligence tools that are used to produce new and creative content, including text, images, video, music, as well as other forms of design (Muller et al., 2022), and ChatGPT is among them. According to the information generated by this system, it is "an advanced artificial intelligence language model developed by OpenAI, specifically belonging to the GPT (Generative Pre-trained Transformer) family, and which perfectly understands and generates human-like text from the input received. Trained on a diverse range of internet text, ChatGPT can engage in conversations, answer questions, generate creative content and assist with a variety of tasks requiring natural language understanding and generation" (ChatGPT, n.d.). Similar information on this system can also be found in scientific publications, with ChatGPT's ability to perform the tasks related to understanding and generating language according

to the user's prompts highlighted in particular (Aslam & Nisar, 2023; Javaid et al., 2023; Wu et al., 2023). It is capable of having conversations (Abdullah et al., 2022; Bansal et al., 2024), helping to solve problems (Bapat et al., 2023; Li, 2023), and producing creative content (Htet et al., 2023; Wang et al., 2023).

For a user to interact with ChatGPT, a text prompt must be written, for example in the form of a question or command. It must be worded as precisely as possible, as this has a significant effect on the system's ability to solve the problem specified in the prompt (Wang et al., 2024). An answer is then generated based on the knowledge acquired by the tool through its previous interactions with web resources based on deep learning mechanisms (Pavlik, 2023, Wu et al., 2023), meaning that the potential of this tool can be evaluated as growing steadily with each new interaction. Due to its functionalities, as well as its efficiency and increasing effectiveness, ChatGPT can be used in various fields of life, including medicine, education and research, as well as management (Alafnan et al., 2023; Ayinde, 2023; Kung et al., 2023; Sedaghat, 2023; Silva & Janes, 2022).

The primary objective of the presented paper was to identify the key application areas of ChatGPT in management. Accordingly, a bibliometric analysis of the literature on this subject from the Web of Science and Scopus databases was undertaken, based on which a targeted selection of examples for case studies was made. The article not only outlines the general trends related to the growth of the literature on ChatGPT in the field of management and quality sciences, but also specifies the main ways in which this tool supports management.

Objective and research method used

The primary objective of the presented paper was to identify the key application areas of ChatGPT in management. In order to meet the objectives of this study, while combining a theoretical approach with business practice, a decision was made to use two research methods: bibliometric analysis and a multiple case study. First, a bibliometric analysis involving quantitative and qualitative research of publications from the Web of Science and Scopus databases that contain the phrase 'ChatGPT' or 'Chat GPT' in their subject (title, keywords and abstract) was undertaken, followed by bibliometric mapping and a multiple case study, with a targeted selection of examples based on the research conducted.

The core tasks of bibliometrics include exploring the content of databases, analysing trends, identifying major research themes, and examining the links between them (Ejdys, 2016; Olczyk, 2016; Theus, 2016). The research first focused on identifying general trends in the literature on ChatGPT, particularly in the field of management and related sciences. In the context of the bibliometric research, the general trends related to the growth of the literature on ChatGPT in the field of management and quality sciences are presented. Bibliometric mapping was then performed using Vos-

Viewer software to reveal the popularity of individual keywords in the analysed articles from the Scopus and Web of Science databases, and the main research sub-areas for the subject of ChatGPT in management and quality sciences were identified. This was followed by an examination of practical examples of the tool's use in management, employing a multiple case study methodology. This is a qualitative method that involves creating a detailed and multi-dimensional description of the investigated phenomenon, and secondary and primary empirical material is used in the analysis of processes and their context (Matejun, 2012; Rashid et al., 2019). The studied examples of the use of artificial intelligence in advertising were selected in a targeted manner, based on their compatibility with the research areas identified in the bibliometric analysis, the innovativeness of the solutions used, and the possibility of their widespread use in business practice.

The final stage of the study was aimed at relating the discussed case studies to the results of the qualitative analysis of the literature exported during bibliometric research, based on which specific areas for the use of artificial intelligence in management were identified. The research was based on the following research questions:

- What are the general trends related to the proliferation of scientific publications on ChatGPT, particularly in the field of management and quality sciences?
- What research sub-areas can be identified in the literature on the use of ChatGPT in management and quality sciences?
- How can ChatGPT support management?

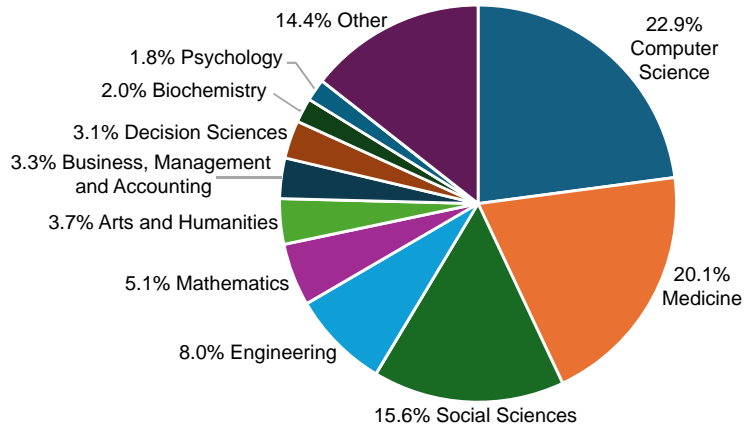
All the data for the research was exported on 20 April 2024, using Web of Science (<https://www.webofscience.com>) and Scopus (<https://www.scopus.com>) resources, and the links between the keywords were visualised with the VosViewer software (<https://www.vosviewer.com>).

ChatGPT in publications in the field of management and quality sciences

A total of 4,336 publications that included the phrase 'ChatGPT' or 'Chat GPT' in the subject were classified in the Web of Science database, while 7,055 such publications were identified in the Scopus database. A provisional thematic analysis indicates that in the Web of Science database, 148 of the indexed items deal with issues similar to this paper (Business; Management; Communication). In the Scopus database, in turn, which quantitatively has more items thematically related to ChatGPT, these mostly deal with the areas of Computer Science, Medicine and Social Sciences (Figure 1). As few as 399 papers relate to the area of Business, Management and Accounting.

For the purposes of this research, a quantitative summary of publications on the subject of 'ChatGPT' that are available in the Web of Science and Scopus databases (Table 1) was compiled. The literature is presented in general (all available publications) and

Figure 1
Themes covered by publications on 'ChatGPT' or 'Chat GPT' in the Scopus database



Source: authors' own work based on Scopus.

Table 1
Summary of literature on ChatGPT available in the Web of Science and Scopus databases – general approach and with thematic focus on management and quality sciences

Data*	'ChatGPT' or 'Chat GPT'			
	All publications available		Publications in the field of management and quality sciences	
	Web of Science	Scopus	Web of Science	Scopus
Number of publications	4,336	7,055	148	399
Number of citations	6,372	35,576	648	3,206
Average number of citations	5.26	5.07	4.38	8.04
h-index	58	76	12	25
Year of the earliest publication	2022	2022	2023	2022
Authors with the highest number of publications	Wiwanitkit (104); Kleebayoon (57); Daungsupawong (41)	Wiwanitkit (127); Kleebayoon (66); Daungsupawong (55)	Chowdhury (4); Aguinis (3); Beltran (3); Dwivedi (3); Kanbach (3)	Dwivedi (6); Kim (5); Chowdhury (4); Korzynski (4); Mazurek (4)
Publications with the highest number of citations	Dwivedi et al., 2023 (664); van Dis et al., 2023 (417); Sallam, 2023 (383)	Dwivedi et al., 2023 (664); Sallam, 2023 (573); Kasneci et al., 2023 (572)	Lim et al., 2023 (100); Paul et al., 2023 (58); Peres et al., 2023 (49)	Dwivedi et al., 2023 (664); Lim et al., 2023 (160); Haleem et al., 2022 (145)
Research centres with the highest number of affiliations	University of California System (101); Chandigarh University (74); Harvard University (72)	Chandigarh University (92); Harvard Medical School (70); National University of Singapore (67)	George Washington University (4); Indian Institute of Management IMM System (4); Newcastle University UK (4); Swansea University (4)	Swansea University (7); Kyung Hee University (6); Auckland University of Technology (6); University of Southern California (6)
Journals with the highest number of publications	Cureus: Journal of Medical Science (176); Annals of Biomedical Engineering (72); JMIR Medical Education (51)	Lecture Notes in Computer Science including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics (129); CEUR Workshop Proceedings (125); ACM International Conference Proceeding Series (109)	International Journal of Management Education (8); Profesional de la Información (8); Online Journal of Communication and Media Technologies (7)	Lecture Notes in Business Information Processing (13); Humanities and Social Sciences Communications (12); Technology in Society (11)

Note. *All the data for the research was exported on 20 April 2024.

Source: authors' own work.

in the field of management and quality sciences (Web of Science: Business; Management; Communication; Scopus: Business, Management and Accounting).

It is worth noting that the ChatGPT tool was released for use in 2022, so the earliest publications on the tool are from that year. In practice, we can therefore speak of a dynamic proliferation of scientific literature in this field, while at the same time, its themes are highly fragmented, due to the constant search for new ways to use this technology. We can also expect an increasing interest among ChatGPT researchers, due to its growing popularity in business practice, and similar trends may also be relevant for other related generative artificial intelligence tools (e.g. Character.AI, Midjourney).

ChatGPT in management and quality sciences – research sub-areas

In the following analysis, articles from the Web of Science and Scopus databases in the field of management and related sciences (Web of Science: Business; Management; Communication – 148; Scopus: Business, Management and Accounting – 399) that had the phrase 'ChatGPT' or 'Chat GPT' in their subject were exported. Duplicate papers were then removed, resulting in 483 publications for further analysis. Using the VosViewer software, the co-occurrence of keywords in the studied papers was examined, with a total of 2,202 keywords obtained, from which those repeating at least 10 times were identified. Thus, a visualisation of the links between the 31 most frequent keywords was obtained (Figure 2).

The keywords depicted in the cluster map fall into 4 thematic clusters:

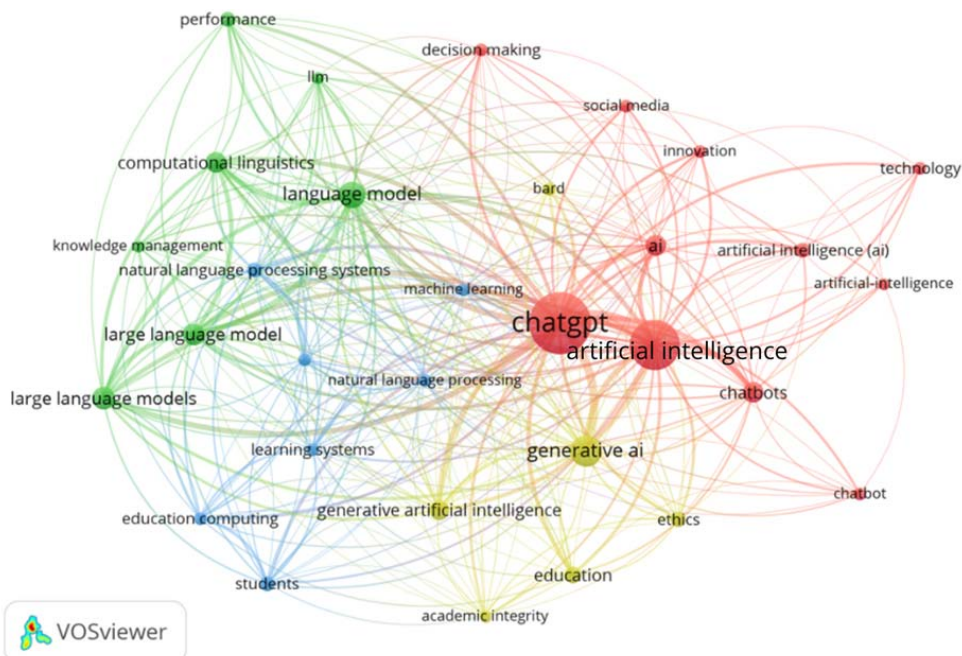
- the red cluster – 11 elements – related to the subject of AI-related tools, as well as customer support in the purchasing process, promotion and purchasing decisions; the most popular keyword in the cluster is 'ChatGPT', which occurred 273 times, followed by the phrase 'artificial intelligence', which was used 180 times,
- the green cluster – 7 elements – focusing on language models, linguistics and system performance, with the phrase 'language model' as the most frequent, used 50 times,
- the blue cluster – 7 elements – mainly related to education and learning – both in the context of computer system learning and youth education, where the most frequent keyword was 'natural language processing systems', which occurred 17 times,
- the yellow cluster – 6 elements – mainly covering subjects related to generative artificial intelligence, its use in education, and ethics, with the most frequent term being 'generative AI', occurring 73 times.

The bibliometric analysis therefore allows for the identification of 4 main thematic sub-areas, which represent exemplary research directions for the issue of the use of ChatGPT in various management areas (Table 2).

It should be noted that the identified research sub-areas are to some extent overlapping, which is due to the multi-dimensional quality of artificial intelligence technology and the diversity of ChatGPT's uses in

Figure 2

Map of links between keywords in articles on ChatGPT in the field of management and related sciences



Source: authors' own work.

Table 2

Main research sub-areas for the subject of ChatGPT in management and quality sciences with sample references

Research sub-area	Sample themes	Most popular keywords	Sample references
Purchasing processes and promotion (the red cluster)	artificial intelligence, decision-making, chatbots, social media	ChatGPT (273); artificial intelligence (180); AI (32); chatbots (31)	Haleem et al., 2022; Taecharungroj, 2023; Hussain et al., 2024; Kirshner, 2024
Language models and knowledge management (the green cluster)	language models, knowledge management, performance	language model (50); large language models (38); computational linguistics (31)	Dwivedi et al., 2023; Leinonen et al., 2023; Bin-Nashwan et al., 2023
Machine learning and collaborative working (the blue cluster)	machine learning, education, natural language processing	natural language processing systems (17); students (16); education computing (13); learning systems (13)	Javaid et al., 2023; Malinka et al., 2023; Nithithanatchinnapat et al., 2024; Xing et al., 2024
Educational and ethical aspects of generative AI (the yellow cluster)	generative AI, ethics, education, academic integrity	generative AI (70); generative artificial intelligence (27); education (21); ethics (17)	Lim et al., 2023; Halaweh, 2023; Adiguzel et al., 2023; Stahl & Eke, 2024

Source: authors' own work.

various management areas. It is also worth noting that a large share of the publications deals with issues related to computer systems and their operation, rather than the effects of their use.

Overview of selected ChatGPT applications in management

The study analysed eight carefully selected examples of the use of artificial intelligence in advertising (Table 3), which were classified according to the research areas identified as a result of mapping the results of the bibliometric analysis. The discussed examples of the use of artificial intelligence in advertising were selected in a targeted manner, based on the following criteria:

- the possibility of widespread use of the applied solutions in business practice,
- innovativeness of the solution examined,
- compatibility of the use of ChatGPT with the research areas identified in the bibliometric analysis.

ChatGPT is a tool that can support the management of a company on various levels. As demonstrated by practical examples, its applications are relevant to each of the management functions, i.e. planning, organising, directing and controlling. Moreover, it is used both inside and outside the company, and ChatGPT-based solutions have multi-dimensional tasks, integrating the activities of multiple departments in the organisation.

Table 3

Overview of the solutions examined

No.	Company name	Description of the solution	How is ChatGPT used
Purchasing processes and promotion			
1.	Carrefour	The brand has implemented OpenAI technology in three areas of management: a chatbot that allows to communicate using natural language with the customer, based on which it can indicate the products in which the consumer may be interested; dedicated product data descriptions using ChatGPT 4.0; supporting internal customer service processes, as well as preparing tenders and price quotes based on the inputs.	<ul style="list-style-type: none"> • communication with customers • product recommendations • creation of customised descriptions • customer service coordination • data analysis
2.	Morele.net	By using ChatGPT, the brand creates personalised shopping recommendations for customers based on their individual preferences, and additionally answers consumers' questions about specific products. At the same time, the company measures the effectiveness of the tool in order to optimise its use.	<ul style="list-style-type: none"> • communication with customers • product recommendations • answering questions • data provision and analysis

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Table 3 – continue

No.	Company name	Description of the solution	How is ChatGPT used
Language models and knowledge management			
3.	Mercedes-Benz	Through the use of an the intelligent manufacturing ecosystem – MO360 – employees and managers can access information generated from the analysis of manufacturing data, which ultimately enables the identification of errors and determining their causes, as well as managing quality and optimising processes along the entire production line.	<ul style="list-style-type: none"> • data analysis • error identification • identifying the causes of errors and opportunities for their elimination • process optimisation
4.	Ernst & Young	EY worked with Microsoft to develop a generative AI-based chatbot to answer payroll questions asked by employees from 159 countries and in 49 languages. Based on Microsoft Cloud and ChatGPT in the Azure OpenAI Service, Chatbot uses a large language model (LLM) that analyses information from payslips, tax laws and employer policies to provide answers to complex payroll questions – with the aim of increasing employee satisfaction and reducing costs for employers.	<ul style="list-style-type: none"> • holding conversations with employees • answering questions • analysing information and putting it in a broader context
Machine learning and collaborative working			
5.	KPMG	In collaboration with Microsoft, KPMG received its own version of ChatGPT – KymChat, which is used to automate administrative processes and support employees in their daily tasks. The tool is trained to perform new tasks based on the data provided by the company, and the solution consolidates collaboration between teams and aids the induction of new employees.	<ul style="list-style-type: none"> • automation of administrative processes • problem solving • education of new employees • promoting cooperation between teams
6.	The Coca-Cola Company	The Coca-Cola brand has signed a long-term strategic partnership with Microsoft to develop innovative cases for the use of generative artificial intelligence in optimising business operations. The collaboration is designed to improve the assistance of employees in improving the customer experience, to streamline operations, develop innovation, gain a competitive advantage, as well as increase productivity and help to identify new growth opportunities.	<ul style="list-style-type: none"> • supporting employees in their communication with other stakeholders • data analysis • process streamlining • problem solving and proposing new solutions
Educational and ethical aspects of generative AI			
7.	Pricewaterhouse Coopers	PwC's use of generative AI (ChatGPT Enterprise) provides its employees with the opportunity to use AI to deliver better results by educating internal customers, leading to increased productivity and helping them to develop new products and services. This allows for the provision of performance gains in tax and consulting services with a wide range of business and sector solutions.	<ul style="list-style-type: none"> • education of employees • suggesting solutions to employees based on data analysis • helping to develop new solutions
8.	Snapchat	Snapchat has made the GPT engine-powered 'My AI' Chatbot available to creators active on the platform. Its main purpose is to educate creators who want to become popular on the platform, to help them produce creative content and to provide answers to questions, which at the same time must be age-appropriate.	<ul style="list-style-type: none"> • analysing user data • educating external customers • creating content and supporting the creative process

Source: authors' own work based on: *Carrefour integrates OpenAI technologies and launches a generative AI-powered shopping experience*, Carrefour, 2023 (<https://www.carrefour.com/en/news/2023/carrefour-integrates-openai-technologies-and-launches-generative-ai-powered-shopping>); *Juž tu jestem*, Morele.net, n.d. (Retrieved 2024, May 18, from <https://www.morele.net/aktualnosci/juz-tu-jestem/22052/>); *Mercedes-Benz tests ChatGPT in intelligent vehicle production*, Mercedes-Benz, 2023 (<https://group.mercedes-benz.com/innovation/digitalisation/industry-4-0/chatgpt-in-vehicle-production.html>); *The last frontier of disruption: With its new AI chatbot, EY teams seek to take the pain out of payroll questions*, D. Bach, 2023 (<https://news.microsoft.com/source/features/digital-transformation/the-last-frontier-of-disruption-with-its-new-ai-chatbot-ey-teams-seek-to-take-the-pain-out-of-payroll-questions/>); *KPMG KymChat – changing the game with Trusted AI*, KPMG, n.d. (Retrieved 2024, May 18, from <https://kpmg.com/au/en/home/topics/artificial-intelligence-ai/kymchat-trustworthy-ai.html>); *The Coca-Cola Company and Microsoft announce five-year strategic partnership to accelerate cloud and generative AI initiatives*, Coca-Cola, 2024 (<https://www.coca-colacompany.com/media-center/the-coca-cola-company-and-microsoft-announce-five-year-strategic-partnership-to-accelerate-cloud-and-generative-ai-initiatives>); *PwC is accelerating adoption of AI with ChatGPT Enterprise in US and UK and with clients*, PwC., 2024, May 29 (<https://www.pwc.com/us/en/about-us/newsroom/press-releases/pwc-us-uk-accelerating-ai-chatgpt-enterprise-adoption.html>); *My AI*, Snapchat, n.d. (Retrieved 2024, May 18, from <https://help.snapchat.com/hc/pl/sections/13532188353428-My-AI>).

Discussion

The tasks assigned to ChatGPT often concern skills such as communication, creativity, and collaboration (Giordano et al., 2024), and such systems can therefore interact with the user in real life, assist in decision-making and analyse the data acquired (Shahin et al., 2024). However, to produce satisfactory, valuable AI-generated content, it is essential to optimise prompts and to properly model the dialogue with ChatGPT (Christou et al., 2024; Klievtsova et al., 2023), because the system is not only capable of natural language processing and intelligent text generation, but also of interactive conversation (Taecharunroj, 2023; Yunfei et al., 2024). In business practice, it is used in a variety of applications that are related to:

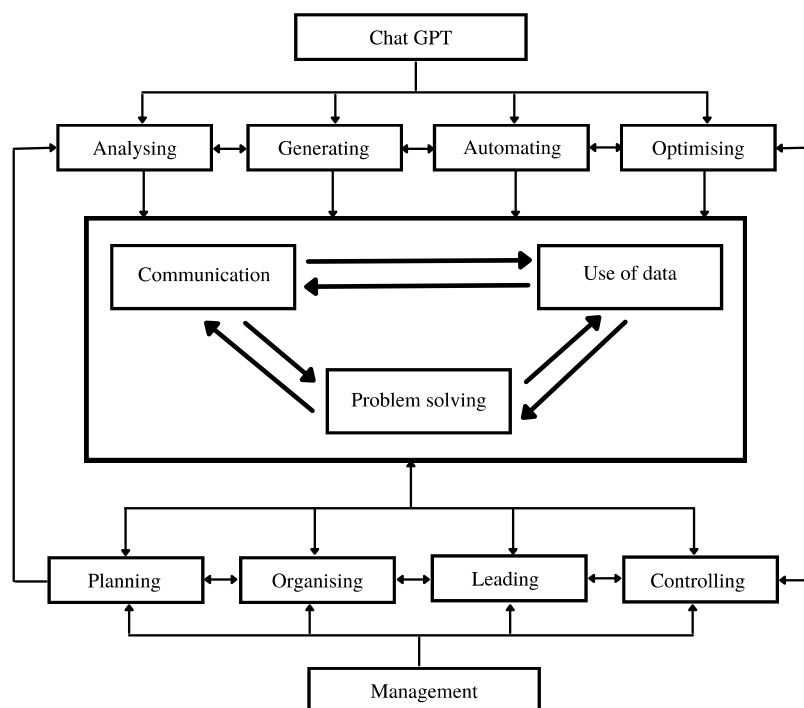
- generating – the ability to engage in dialogue and produce varied content that is new and creative, though created from secondary data (Demir & Dalgıç, 2024; Haleem et al., 2022), which can be drawn from web resources but also provided directly by organisations,
- automating – the ability to mechanise processes, especially repetitive ones, whether inside or outside the company (Banafa, 2024; Raj, 2023),
- analysing – identifying trends and correlations in text or numerical data, capturing possible anomalies and creating reports based on the available information (Budhwar et al., 2023, Dwivedi et al., 2023),

- improving efficiency – optimising processes and making them more efficient by streamlining them and recommending possible solutions to emerging problems (Figueiredo, 2024; Skórնóg & Kmiecik, 2023).

It can be expected that these tools will ultimately contribute to increasing the competitiveness of market organisations, enhancing managerial competencies, and better aligning offerings and promotional activities with buyers’ needs and expectations (Balamudi, 2019; Pathak & Sharma, 2022). The analysis of the literature and the case studies shows that ChatGPT can support various management functions by offering advanced support in planning, organising, controlling and leading (Figure 2). With its ability to generate, automate, analyse and improve efficiency, it is deployed to support (internal and external) communication, use data to identify patterns and extract insights, and solve problems, supporting decision-making processes at different levels of the organisational structure.

One should, however, be aware that although the ability to streamline processes using ChatGPT brings many advantages, the tool also creates new challenges. On the one hand, these are problems at the strategic level, related, among others, to ethical issues, misinformation and social manipulation (Wach et al., 2023), as well as the need to devise appropriate market analysis techniques or reconsider one’s strategies (Chiarello et al., 2024). On the other hand, some challenges also arise at the operational level,

Figure 3
Relevance of ChatGPT’s capabilities to the various management functions



Source: authors' own work.

such as the abstraction bias in ChatGPT, barriers to the adoption of this type of content by the public, or even generation of false information (Haleem et al., 2022; Kirshner, 2024). Therefore, at this point in time, ChatGPT cannot be seen as a replacement for employees in the company's management-related departments, but rather as a prospective tool to support their work. Automation of some of the tasks would in fact allow human employees to focus on performing more strategic and complex duties (Raj et al., 2023).

Summary

ChatGPT is a prospective tool in many business areas. From a management perspective, it is relevant to all management functions, which is possible due to its capabilities, such as generating, automating, analysing and optimising. In the context of the above discussion, these can primarily be deployed to:

- Communicating – improving internal and external communication by better information flow, automating answers to frequently asked questions, induction of new employees, organising meetings, and reminding of important deadlines. Thus, ChatGPT contributes to reducing the time required to get an answer, increases work efficiency, educates the team, and improves customer service.
- Using the data – analysing large data sets to generate reports, analyse trends, or make predictions. As a result, patterns or causes can be identified, particularly for recurring problems or tasks. Therefore, data analysis by ChatGPT promotes the identification of new business opportunities, process optimisation and increased operational efficiency.
- Solving problems – providing quick and effective solutions to a variety of problems based on available knowledge. The software's ability to process natural language allows it to respond efficiently to complex queries, or to interpret data effectively, which substantially enhances an organisation's ability to respond quickly to problems. As a result, it enables managers to react quickly to changes in the business environment and adapt their operational strategies.

It is worth noting that the indicated areas of ChatGPT use are overlapping, which is related to their interdependence. Consequently, systems that integrate them can further support companies in achieving their strategic and operational goals.

The above considerations should be regarded as material for further research to deepen the results obtained. In the course of the analyses, it was noted that even though there is a growing understanding of the importance of ChatGPT for business, this subject is still not developed in the context of individual management functions. Several research gaps can be identified, primarily related to specific recommendations for the use of this tool in various areas of company management.

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