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Mapping the Impact of AI Agents on Business Performance: A Bibliometric Approach

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Abstract. *The way companies currently interact with their customers is due to the evolution of Artificial Intelligence (AI), especially through Artificial Intelligence Agents. Many organizations have realized that they can defeat their competitors in numerous sectors by using computer technology, mainly AI, to enhance their functions, which minimize cognitive loads for the employees and allow very personalized customer interactions. Despite these advantages, challenges related to ethics, data security, transparency, and user trust remain pressing concerns. To dissect how they develop and are converted into results, the companies initially should know which approaches they should adopt and what the consequences are on business size. While we are diving into the impact of Artificial Intelligence Agents on corporations, an important point should be figured out – the expansion of a strong comprehension of the research field. Likewise, an essential point is represented by the establishment of an overview of the theoretical framework offered by the specialized literature. To map the research landscape and identify trends and gaps in the scientific literature, a bibliometric analysis was conducted on 106 scientific articles published between 2019 and 2024. This study uses co-occurrence analysis and co-citation in VOSviewer to map the intellectual structure of the field and to discover the most considerable research clusters and the research areas needing further exploration. The dimensions inquired are AI-owned customer personalization, automation-gained cost efficiencies, and AI-induced corporate decision making through augmented roles.*

Keywords: AI Agents, Customer Support, Operational Optimization, AI-driven personalization, Automation, Bibliometric Analysis.

Introduction

We are observing a period of time in which artificial intelligence has completely remodeled the working climate. It has managed in an extremely short time to optimize operations by improving customer relationships, reducing costs and generating new revenue opportunities. As highlighted by McKinsey & Company, one of the world's leading strategic management consulting firms, the impact of AI varies across industries and business functions, with substantial benefits observed in marketing, operations, and research and development.

Industries in the high-tech and banking sectors are the ones that benefit the most from productivity gains through automation, personalization and process optimization.

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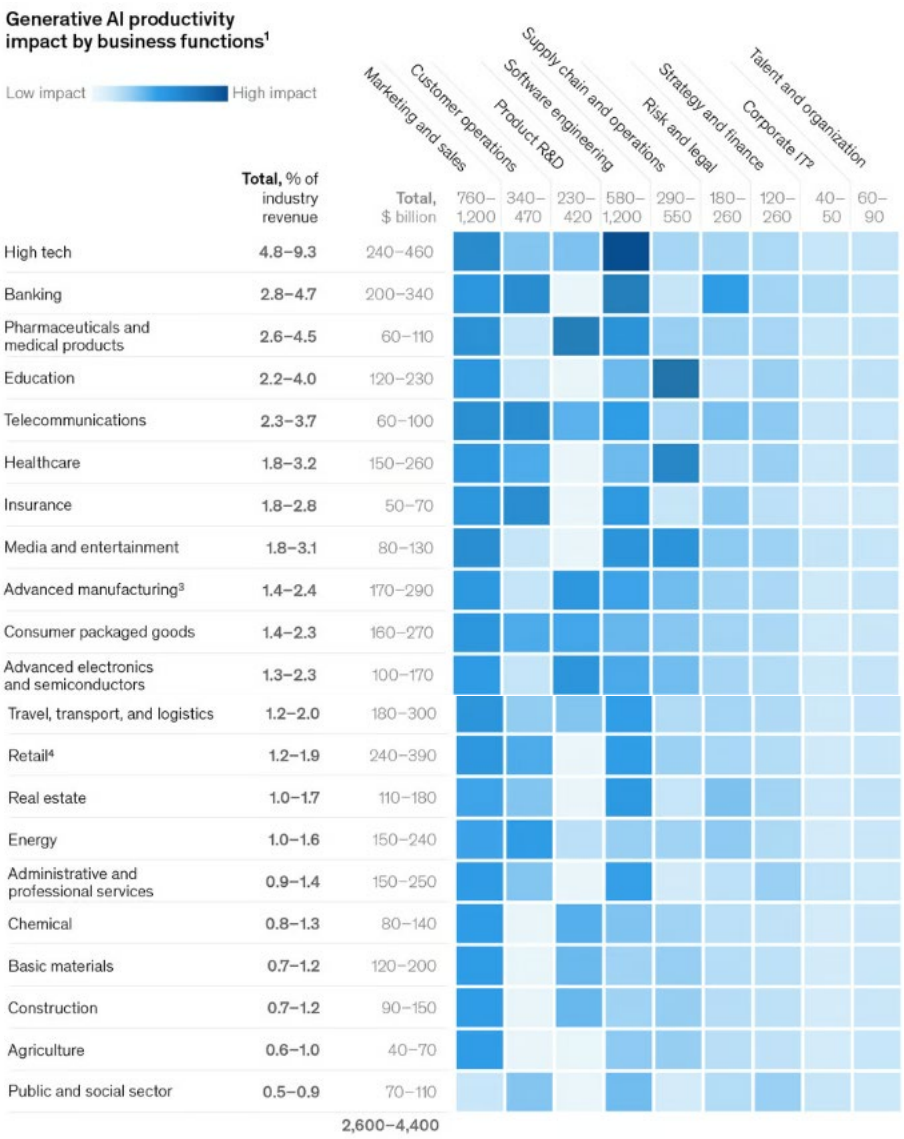

Figure 1. Different impacts of Generative AI on business functions across industries

Source: https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier#industry-impacts.

Tech environment has been transformed and is having as a primary answer the so-called AI agents. Although they started as simple systems, they have now become models capable of analyzing complex situations and making decisions in real time. They play a strategic role within companies and offer a wide range of advantages, such as cost reduction, handling large workloads (without the need to hire or train staff), and even delivering consistent performance—unlike humans, who can tire or lose focus when faced with repetitive tasks.

The majority of companies admitted the contributions delivered by the AI agents, taking into account the latest trends in the market. A selection of those inputs is showing the capacity of recognizing and clarifying the context, memorize from their own occurrence and follow long-lasting objectives. In this context, they have shown interest in integrating agents into daily

activities: from AI assistance for companies to conversational chatbots, supply chain optimization algorithms or predictive analytics systems.

An example of this can be found in the area of customer support. AI agents manage customer interactions by providing personalized responses in real time, 24/7. This technology therefore manages to have an impact not only on companies' revenue efficiency and improve customer satisfaction. If customers are satisfied with the services, then they will return, and therefore the companies' revenues will increase.

Ai agents can bring benefits to organizations but also come with a series of difficulties. In the relationship with customers, they may encounter impediments to the level of understanding required or fail to perceive their emotional nuances. Also, a company that wants to implement such technology must take into account the costs of implementation and maintenance, as well as the resistance of customers to interacting with a virtual entity.

The intent of this article is to ensure a comprehensive image of the actual research field on the performance of AI agents in companies, based on an extensive bibliometric analysis.

Literature review

The beginnings of AI Agents trace back to 1956 when Allen Newell and Herbert A. Simon invented a "thinking machine" called the Logic Theorist. This program was designed to solve logic problems to prove theorems from Principia Mathematica (a foundational work in mathematics) by applying rules. They mark the starting point of artificial intelligence by creating a functional program that mimics human reasoning.

Aras Bozkurt (2024) defines Generative Artificial Intelligence (Gen AI) as a powerful and rapidly evolving technology that refers to a category of AI technologies that learn from existing data and use this content to create new and original material. While the role of Generative AI is oriented toward content creation, AI agents are more focused on direct adaptation to a dynamic environment and making decisions to achieve their goals. On the same note, Kanbach et. al (2023), argues that Gen AI represents a paradigm shift in business model innovation through its impact on how companies create value, develop new products and services, and restructure their monetization strategies.

AI agents are defined by Belloni (2015) as either physical entities (such as robots) or virtual entities (such as software agents) with the primary purpose of acting, perceiving the environment, and communicating with other agents, without human intervention (Dumitru et al, 2024). Nine years later, the definition is further refined by Alan Chan (2024), who describes AI agents as design systems with a high level of autonomy, capable of performing complex tasks and acting in numerous ways to achieve their objectives. However, it should be mentioned that the connection between the two concepts is quite strong, as AI agents (or AI assistants) use generative AI as a central engine to create coherent and relevant responses in real time and to expand their functionalities.

Before AI Agents we had the dummi version of it: the chatbots. They were programmed to do only specific tasks and mainly used in a longer end-to-end automation process (Savastano et al, 2024). So, the comparison in the Table 1 below provides a better image of this transition:

Table 1. Comparison between Chatbot vs. AI Agents features

Feature	Chatbot	AI Agent
Technology	Predefined scrips, decision trees, etc.	Machine Learning, probabilistic models
Use cases	Customer support (internal or external), FAQ, basic or low automation.	Executes tasks, Helping users in decision making, Data analysis, etc.
Learning ability	None (ie., dummi)	Learns from each interaction
Context awareness	None to low	Medium to High
Autonomy	Low; is triggered by users	Medium – can trigger itself
Decision-making	None	Can make recommendation based on data and context
Integration	Low; usually having a GUI chat	Medium to high: APIs, 3rd party software, etc
Personalization	Low	Medium

Source: Author's own research.

Particularly, Table 1 compares Chatbots and AI Agents across various features. Chatbots rely on predefined scripts, have low autonomy, lack learning ability, and provide minimal personalization, whereas AI Agents utilize machine learning, can act autonomously, learn from interactions, and offer higher personalization. Additionally, AI Agents demonstrate greater context awareness, decision-making capabilities, and integration with external systems compared to the more limited functionality of Chatbots.

Unlike traditional methods, which are limited in operating hours, present scalability issues, and are prone to human error, AI agents effectively overcome these limitations.

The configuration of the AI agents incorporates a chain of different elements and process flows that allows in a fast way to handle user demands and bring back appropriate answers. Practically, the user communicates with the AI agent through a prompt, which is processed using a prompt template that structures the instructions sent to the agent. The AI agent collaborates with an LLM (Large Language Model) for advanced linguistic processing, utilizing language models like GPT to analyze and generate responses.

Marko Sarstedt et al. (2024) define LLMs as a type of generative artificial intelligence capable of processing a wide range of inputs and predicting the next word or part of a word (called a symbol) in a sequence. These designs are built to support massive text data sets, being able to utilize self-control learning and provide improved answers once the person feedback is received. This allows them to mimic human-like response behavior. Depending on the user's question, command, or instruction, the agent can access external modules, such as Tools (for specific actions) or Memory, to store and retrieve information. The flows between the modules are bidirectional, ensuring that the agent receives and provides information through a reasoning process. In this architecture, the final step is to deliver the response to the user. An AI agent that therefore has the ability to integrate linguistic processing, memory, and external actions. This way he is able to offer effective solutions based on user requirements.

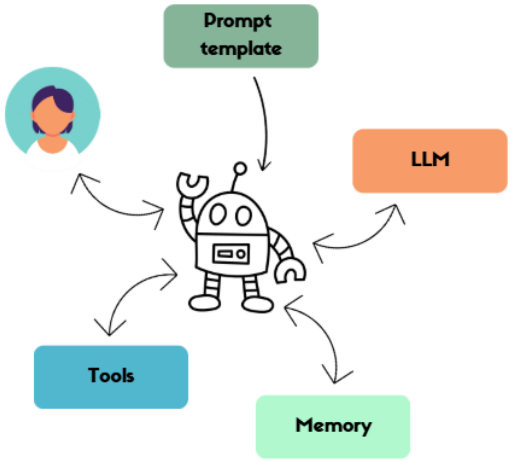

Figure 2. The architecture of an AI agent
Source: https://blog.ori.co/ai-agent-introduction.

Mengmeng Song (2022) and colleagues reviewed several studies (from 2014 to 2021) on consumer perceptions of AI agents. Their paper is based on several aspects: indeed, AI agents have the ability to satisfy customer needs, but they propose a risk in terms of the credibility of interactions with them. An important aspect is that they fail to guarantee the same level of empathy and cannot offer the same closeness as human agents.

In their 2022 article, Bagozzi et al. introduced the concept of the "Feeling Economy". They emphasize that AI must respond to the emotional needs of customers. If AI agents can build deep relationships with customers through empathy and emotion, then the degree of satisfaction and loyalty can increase. This idea is also supported by Nisreen Ameen (2021). He argues that building relationships based on trust can significantly improve the user experience. Users who, thanks to this trust relationship, later return to the brand.

A similar concept, "Feeling AI" is addressed in Huang and Rust's (2023) paper. The direction this technology should take includes recognizing, understanding, and managing customer emotions. They note that AI agents can offer scalability advantages if a genuine emotional connection is created between them and the buyer.

Swaroop Reddy Gayam has been arguing since the 2020s that through advanced natural language processing and machine learning techniques, AI providers can automate customer support, effectively answering their questions and thereby reducing the burden on human consumers. Moreover, this technology can handle multiple customers at the same time, which is something a human agent cannot do. In addition, AI solutions also present a valuable advantage, especially during busy periods: the need to hire, integrate and train additional agents disappears.

The fact that AI is transforming services by automating interactions and improving customer experience is also confirmed by McKinsey. 80% of repetitive tasks can be automated and can have an impact on reducing operational costs. Moreover, AI can also facilitate the recognition of consumer intentions, therefore providing prompt and adapted solutions.

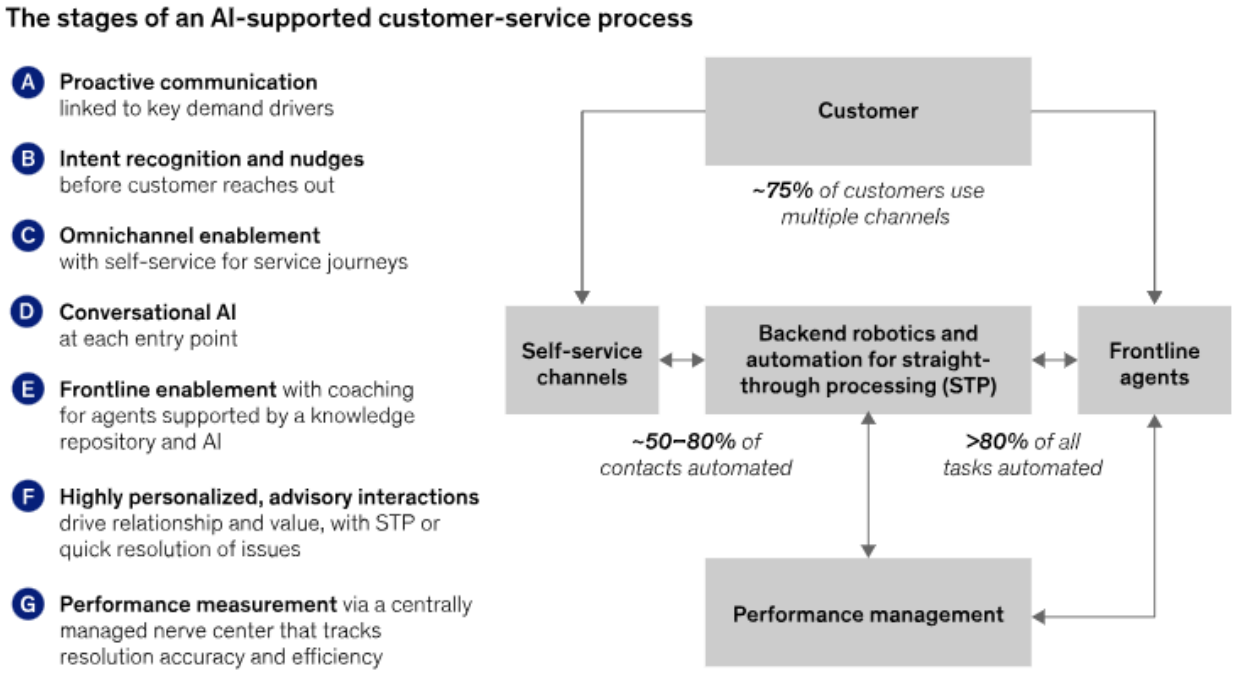

Figure 3. Stages of an AI-supported customer service process

Source: https://www.mckinsey.com/capabilities/operations/our-insights/the-next-frontier-of-customer-engagement-ai-enabled-customer-service.

This topic is also addressed by Debayan Banerjee (2023), who explains that AI agents primarily aim to reduce time spent on repetitive tasks and increase staff productivity. Resource allocation can therefore be more efficient if human agents can focus on more complex tasks. With this hybrid work model, human agents can be supported by AI agents without being replaced, preserving the human component in customer interactions.

Klarna, a Swedish banking company, states that 87% of its employees use the internal assistant KIKI, which helps answer more than 2,000 questions per day in fields such as Legal and Marketing. The company has decided as a strategy to apply a hybrid work model, where human agents handle complex tasks that require deeper analysis, while AI agents manage the rest of the repetitive activities. Furthermore, the company reported a significant reduction in net losses in the second quarter of 2023, thanks to the use of artificial intelligence, with losses decreasing from 854 million Swedish kronor to 10 million. In order to maximize its revenues, Klarna has decided to reduce its workforce from 5,000 to 3,800 employees. For the next period, the company wants to increase the percentage of employee reduction to 47%, so that it will remain with only 2,000 employees.

Another approach is suggested by Mateusz Kot (2022), who is of the opinion that AI agents come up with four kinds of value through AI-guided co-creation: informational, strategic, transactional, and transformational.

Informational value represents the ability of this technology to gather rich data on customer tastes. This knowledge is used to better understand the factual wants of clients and consequently to adjust the packages and services.

Transactional value refers to the uninterrupted ability of AI providers to assist customers. Hence, impacts on the operational costs and individual service delivery from this are optimized.

Strategic value is an important part that helps a firm to be better than its fellow competitors through mass and individualized contacts.

Transformational value is a way to transition to a kind of model that is digital process centered and where AI is the technology that is altered. This positive phase is one of constant change in the life journeys of clients.

AI agents can be categorized into seven types, reflecting the diversity of approaches in artificial intelligence. These range from simple reactive systems to complex decision-making models, each designed to solve problems in different contexts:

Simple Reflex Agents – agents without memory or adaptability, responding directly to environmental stimuli based on predefined rules. An example is a thermostat that regulates room temperature according to a set rule.

Goal-based Agents – agents that analyze possible courses of action and select the optimal solution to achieve a specific objective. A common example is a GPS navigation algorithm that determines the most efficient route to a destination.

Multi-agent Systems – systems composed of multiple agents working together to fulfill user requests. An example is a traffic management system where multiple AI agents communicate to synchronize traffic lights and optimize traffic flow.

Hierarchical Agents –agents structured into multiple levels, distributing tasks among subsystems for efficient planning and execution. A well-known example is a self-driving car, which operates hierarchically: the top level plans the route, the intermediate level makes local driving decisions, and the lower level executes physical actions such as accelerating or braking.

Utility-based Agents – agents that prioritize actions based on a utility function, which measures the benefit of different options. Examples include Siri or Google Assistant, which prioritize tasks like notifications or calls, functioning as personal assistants.

Model-based Reflex Agents – agents that predict and adapt their actions based on environmental changes. An example is a robotic vacuum cleaner that maps rooms to avoid obstacles and plan efficient routes using an internal map.

Learning Agents – agents that learn from experience and feedback, improving their performance over time. A practical example is Netflix's recommendation system, which learns user preferences based on viewing history and suggests personalized content accordingly.

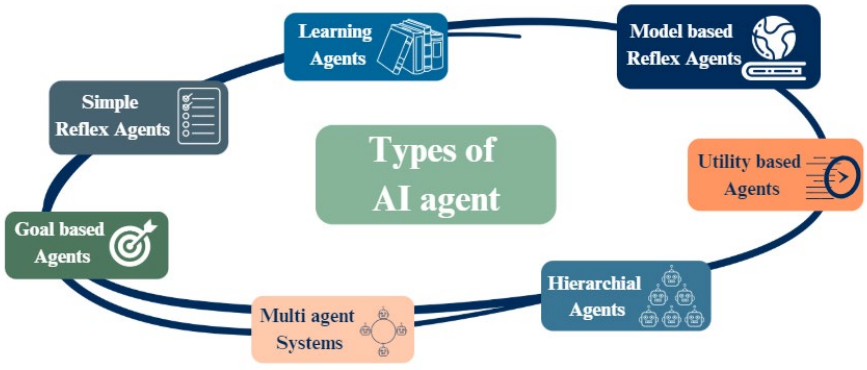

Figure 4. Ai agents types

Source: https://blog.ori.co/ai-agent-introduction.

Although AI agents hold tremendous potential and present a wide range of benefits and opportunities, Samuel Fosso Wamba (2022) also highlights several limitations. AI agents cannot

reach their full potential and may even produce limited and erroneous results if they are not fully integrated into the company's workflows and business processes.

Fatin Aqilah Binti Mohamad Roslan (2023) also discusses challenges, highlighting concerns about data privacy and security. Agents store large volumes of information and even personal information. This can be a security concern if the data is not managed in a transparent manner. Also, if an organization wants its agents to be continuously relevant to customers, then it must assume logistical challenges as well as financial expenses. Scientific research is delving into the impact of AI agents on companies, but focusing more on specific examples and case studies. The connection between theoretical and practical aspects is insufficiently explored. For example, the complex relationship between productivity, customer loyalty and the economic value generated by the implementation of AI agents, especially in the field of customer support, remains insufficiently explored. Therefore, the understanding of the impact of AI agents on organizational performance is limited.

This paper aims to address these topics and answer the following 3 research questions (RQs):

RQ1: What are the main features of artificial intelligence agents which influence the digital transformation process of organizations, according to the latest research?

RQ2: What are the most significant research themes identified in the literature regarding AI agents and operational efficiency?

RQ3: What are the emerging trends and future research directions for the use of AI agents in enhancing organizational performance?

To answer these three questions, 106 scientific articles published in relevant management and business journals indexed in the Scopus database were evaluated. For the analysis of these articles, VOSviewer—a software developed for bibliometric analysis, was used to explore the relationships between articles, authors, and scientific concepts. Through co-occurrence and co-citation analysis, we identified the main research themes, relevant contributors, and directions for future research.

Methodology

Prajukta Tripathy et al. (2024) mentioned about bibliometric analysis that is a very important quantitative method used for identifying structure of the existing knowledge as well as for detecting trends in the specific research domain. In this study, we actually utilized a bibliometric analysis methodology that had been suggested by Fahimnia et al. (2015) for the collection and analysis of data in the research field. This method is a five-step process which addresses the following issues including the ones for the specification of a database, the contaminants of the mass fraction of pure materials, the number of unique particles, the mass fraction of the individual elements, and other uncertainties of the given chemical substances. By using the PRISMA chart (Fig. 2), we could successfully and methodically find and scene relevant sources.

Specifying the database

The first thing we did was analyze a chunk of the specialized literature on the AI of customers through bots and the volume of revenue it increases. To know the terms closest to AI agents, we worked with 7 experts who helped us draw up a list of keywords. The search string used is: ("AI agent" OR "chatbot" OR "virtual assistant" OR "intelligent agent") AND ("business performance" OR "organizational performance" OR "efficiency" OR "productivity") AND ("customer support" OR "customer interaction" OR "customer service" OR "customer experience"). The found publications contain relevant combinations of the terms "AI agent", "chatbot" or "virtual assistant" with "business performance" or "organizational performance" and also address "efficiency" or "performance". Scopus is the database that was used. Altina Silva

Oliveira et al. (2018) discuss the benefits of Scopus in bibliometric analyses as it provides extensive thematic coverage and helps in publication trend analyses, but it also has certain limitations, like narrowness in research. Other databases like Web of Science or Science Direct, might give additional information that is complementary to Scopus. The searches conducted in this database started with the selection of the all fields category and defining the temporal range from 2019 to 2024. 2,700 initial results were generated after applying the filters.

Filtering results

The second stage of the analysis involved filtering the results obtained by specific categories from the Scopus database. The categories chosen were: "Computer Science," "Business, Management and Accounting," and "Economics, Econometrics and Finance". The application of this filter resulted in the generation of 2,217 articles. To narrow down the results, the next step involved defining the time frame: 2019–2024. The reason why this time period was chosen is justified by the fact that the field is evolving rapidly and recent articles are more relevant to this field. This period corresponds to a moment when artificial intelligence began to make significant progress in the development and implementation of AI agents. This is supported by Varsha P. S. et al. (2021), who state that AI agents have become more sophisticated in recent years due to advancements in natural language processing (NLP) and neural networks. With the COVID-19 pandemic of 2019, companies were forced to accelerate their digital transition and therefore implement solutions based on artificial intelligence. This way they were able to remain competitive in the market. We applied an additional filtering step in the Scopus database, limiting the selection to the document type "Review" and then to articles published exclusively in English.

The filtering process resulted in 106 articles, which were further refined to be analyzed subsequently.

Refining the results

Following the initiation of the download of 106 articles from Scopus in CSV, we did a sorting of the articles through their names and DOI. Automated systems and manual checks were done for quality assurance. No redundant articles were found thus making the dataset, relevant for further analytic exercise. Consequently, 106 original articles were assembled for the bibliometric study.

Data description

As we can see from Figure 5, it describes an accelerated growth in researchers' interest in the impact of AI. It can be seen that starting in 2021, there is an exponential growth from 8 publications to 21 in 2023 and 60 in 2024. The widespread recognition of the usefulness of AI agents in the business environment is also confirmed by this evolution of publications.

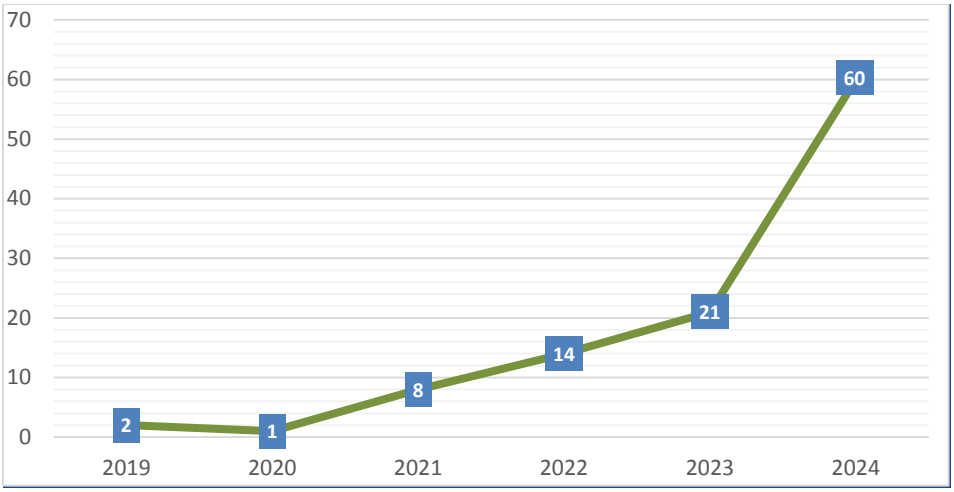

Figure 5. The evolution of publications concerning on the impact of AI Agents on customer support efficiency (years 2019-2024)

Source: Authors' own research.

Dataset analyses

According to Raminta Pranckutė (2021), bibliometric analysis primarily explores the configuration and dynamics of a research field.

The following actions were completed after the information was imported into VOSviewer: we first chose the option "Create a map based on bibliographic data" that helped to define the co-authorship, keyword co-occurrence, and then we chose the "Read data from bibliographic database files" and uploaded the CSV file extracted from Scopus to enable the processing.

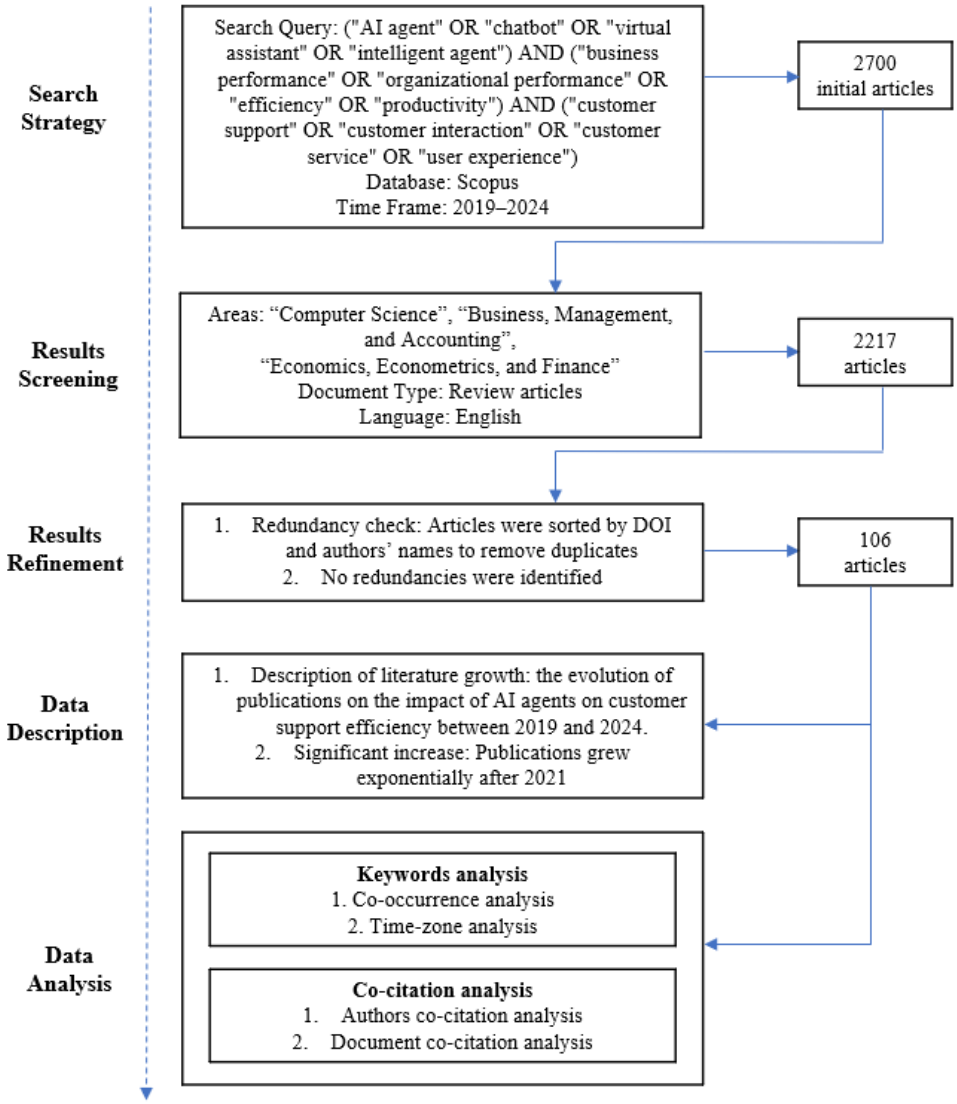

Figure 6. Research protocol scheme and phases

Source: Authors' own research.

Co-occurrence of keywords analysis

Aishwarya Ramesh et al. (2022) point out that co-occurrence analysis is a bibliometric visualization technique. It focuses on exploring thematic connections between terms and highlights strong correlations as well as potential gaps in research.

1. Keywords co-occurrence analysis

As we can see, Figure 7 describes the co-occurrence network of keywords in the field of AI. The size of the nodes is proportional to the frequency of keyword occurrences, while the links between them represent the number of co-occurrences in the analyzed documents. The "Co-occurrence" analysis type was selected, with "Author keywords" as the unit of analysis and the "Full counting" method. A minimum threshold of 2 occurrences was set for keyword inclusion, and out of 481 keywords, 53 were selected.

The keyword "artificial intelligence" is predictably the central node in the network, connected to multiple subdomains and having the highest frequencies. The close connection

between the terms “artificial intelligence”, “chatbot” and “generative AI” highlights the fact that these 3 domains can influence both organizational efficiency and customer relations. Subdomains such as “healthcare”, “tourism” highlight the expansion of AI application in different sectors. The need to address the ethical challenges that AI generates is also highlighted, through the “privacy” subdomain. The research interest in the area of operational efficiency and revenue growth is confirmed by the identification of the subdomain "Chatbot". As we can see in the map below, the red cluster highlights the well-structured theoretical approach in analyzing the efficiency of AI agents. The central area of specialized research, in continuous growth and with numerous research directions, is represented by Artificial Intelligence.

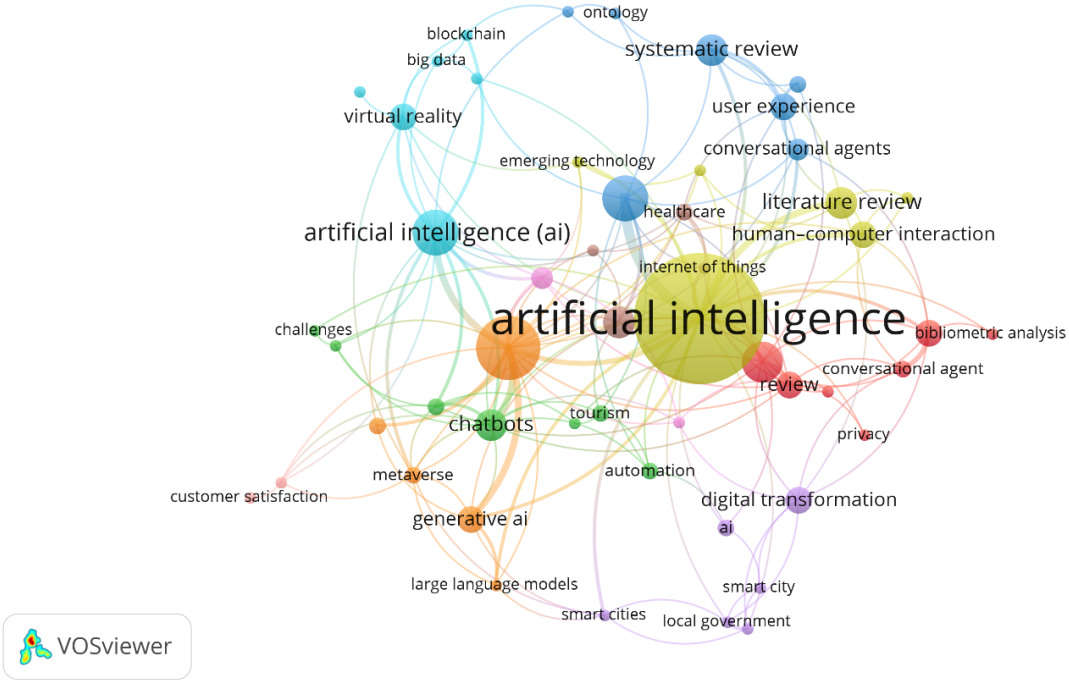

Fig 7. Keywords co-occurrence networks

Source: Map generated with VOSviewer.

2. Time zone -analysis

The temporal map of terms provides an overview of the evolution of research in the field of AI agents between 2019 and 2024 and was created using the overlay visualization feature in the VOSviewer software.

As shown in Figure 8, the node colors vary from blue (2019-2020) to yellow (2023-2024), indicating the moments when topics began to gain increasing interest in the research area.

Analyzing the central terms, "artificial intelligence" and "chatbots" were found to be related to the literature which showed the high degree of the terms' relevance in the specialized literature in the past years (2023-2024). As noted the terms "chatbot" as well as "generative AI" relate closely to the terms "customer satisfaction" and "automation". These words show that the application of these technologies correlates with the improvement of organizational efficiency and customer interaction. The terms "healthcare" and "tourism" along with "artificial intelligence" are discovered as usual in this report as well. Some terms like "digital transformation", "smart cities", "privacy", and "user experience" tend to emerge as a result of the incertitude surrounding AI's effects on society and the economy.

While the initial phase of research (2019-2021) explored academic contributions, the period 2022-2024 focuses on the applicability of artificial intelligence with an emphasis on improving business operations. The fact that there is a transition in research that starts from fundamental concepts and moves towards specific applications is confirmed by this.

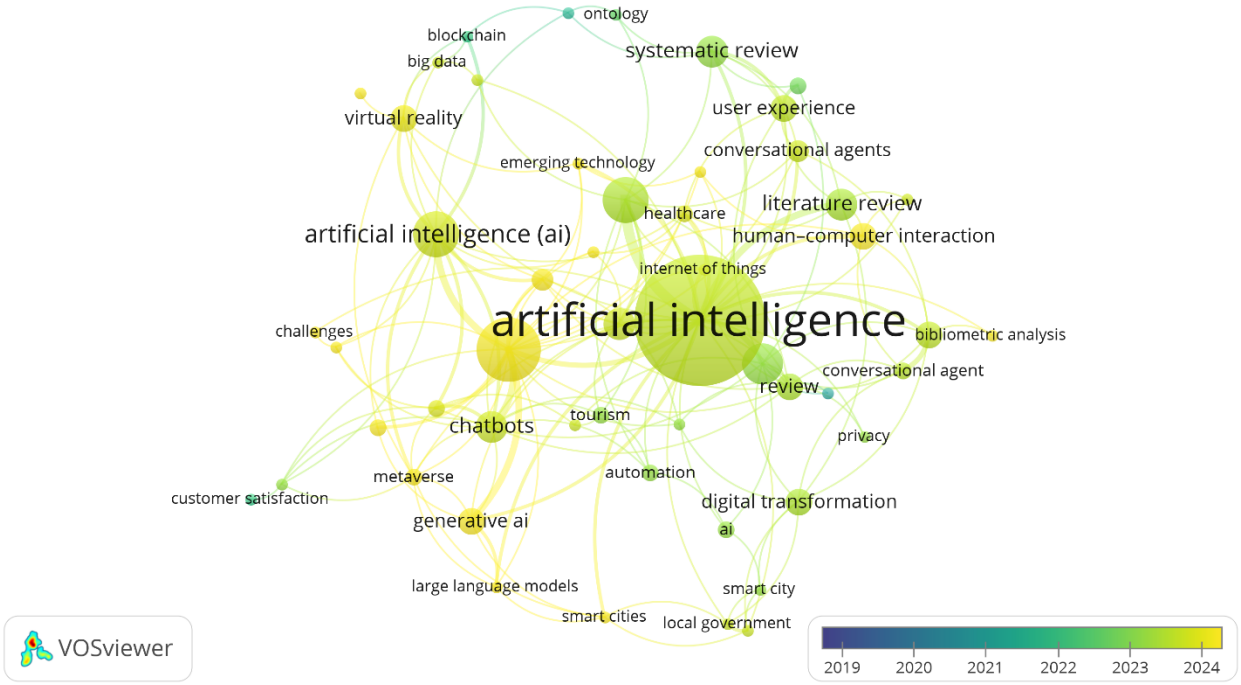

Figure 8. Time zone -analysis

Source: Map generated with VOSviewer.

Co-citation analysis

İsmail Gökay Kirtil (2021) emphasizes that co-citation analysis aims to identify groups of works that frequently appear together in reference lists and share a common theme. In practice, this type of analysis seeks to uncover relationships between documents by identifying recurring connections. If two works share numerous common citations, it suggests a similar accumulation of knowledge.

1. Authors co-citation analysis

In İsmail Gökay Kirtil's (2021) research, it is mentioned that Authors co-citation analysis is a method used to analyze the relationships between authors who are cited together in scientific works. This type of analysis helps identify groups of authors who share common themes or methodological approaches.

To perform an author's co-citation analysis in VOSviewer, a series of steps were followed. First, Co-citation analysis was selected as the analysis method, and the chosen unit of analysis was Cited authors. This approach focuses on the relationships between authors who are cited together in works. The counting method used was Full counting, which considers each co-citation between two authors, regardless of the total number of citations. Next, a minimum threshold of 15 citations was set to include only the most relevant authors. As a result of this selection, a total of 112 authors were included out of a total of 30313 authors. Finally, all 112 authors who met the threshold were selected, enabling a comprehensive analysis of influential authors. Following these steps, VOSviewer generated the co-citation network map, where the size of the nodes represents the total

number of citations, and the connections between nodes reflect the frequency with which two authors were cited together. According to the author co-citation network map, Bilal M. and Oyedele L.O. are the most influential researchers. They occupy the central positions because they have the highest number of citations but also connections to other authors.

Bilal M. (2022) addresses in his research the idea that artificial intelligence is the solution to solving problems in the construction field. Among the potential problems in this field that can be solved with the help of AI, they identify: delays, high costs, low safety and even reduced productivity. The benefits of conversational AI in the AEC (Architecture, Engineering and Construction) industry are addressed in the study by Oyedele L.O. (2022), the second influential author identified. Like Bilal M., he argues that AI has potential that needs to be explored in process automation. AI agents can improve human-computer interactions, but can also increase efficiency in information management, on-site assistance, and construction safety.

The added value brought by the authors in the literature review, underlines that the old-time industries such as automotive industry could take advantage of the artificial intelligence solutions, thus, by upgrading the internal policies and elevating the functional competencies.

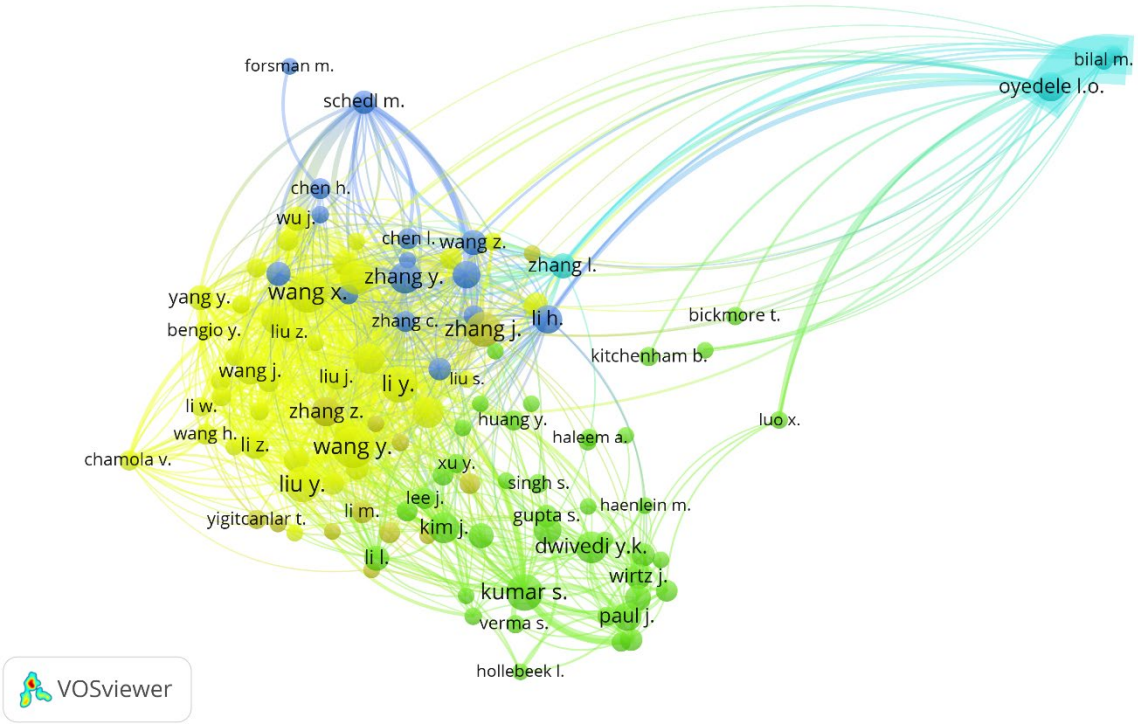

Figure 9. Authors co-citation analysis

Source: Map generated with VOSviewer.

2. Document co-citation analysis

By means of this analysis, the links between references that are often mentioned together in the literature have been determined. To create the co-citation map, the Co-citation analysis type was selected, and Cited references was chosen as the unit of analysis. We selected Full counting and to include only references with significant impact, a minimum threshold of 3 citations was applied, out of a total of 13382 cited references. Thus, only 30 references met the chosen criteria. The visualization settings include the node size, which is proportional to the number of co-citations, and the connecting lines, which indicate the relationships between references. The map in Figure 4

highlights the co-citation network of authors generated for the AI agent's domain. Each node in the network represents a co-cited author.

Studies on the impact of AI on business and organizational processes are associated with authors such as Davenport T., Guha A. and Grewal D. Davenport T.'s study (2020) emphasizes that Artificial Intelligence should complement human capabilities and in no way replace them. Thus, if people were to integrate artificial intelligence into their activities, then there would be a significant impact on marketing strategies but also on customer behavior.

The notion of the Feeling Economy is highlighted by the author Huang M.H. (2019), who is giving a useful viewpoint on how AI is changing the modifying the way of working and split the daily tasks among people and robots.

Due to the economic shift we are part of, the author maintains the idea that artificial intelligence is taking more and more tasks at both analytical and automated level. Additionally, an interesting aspect brought by the same author is that blue collars which acquire emotional know-how will possess a benefit in the modern economic setting.

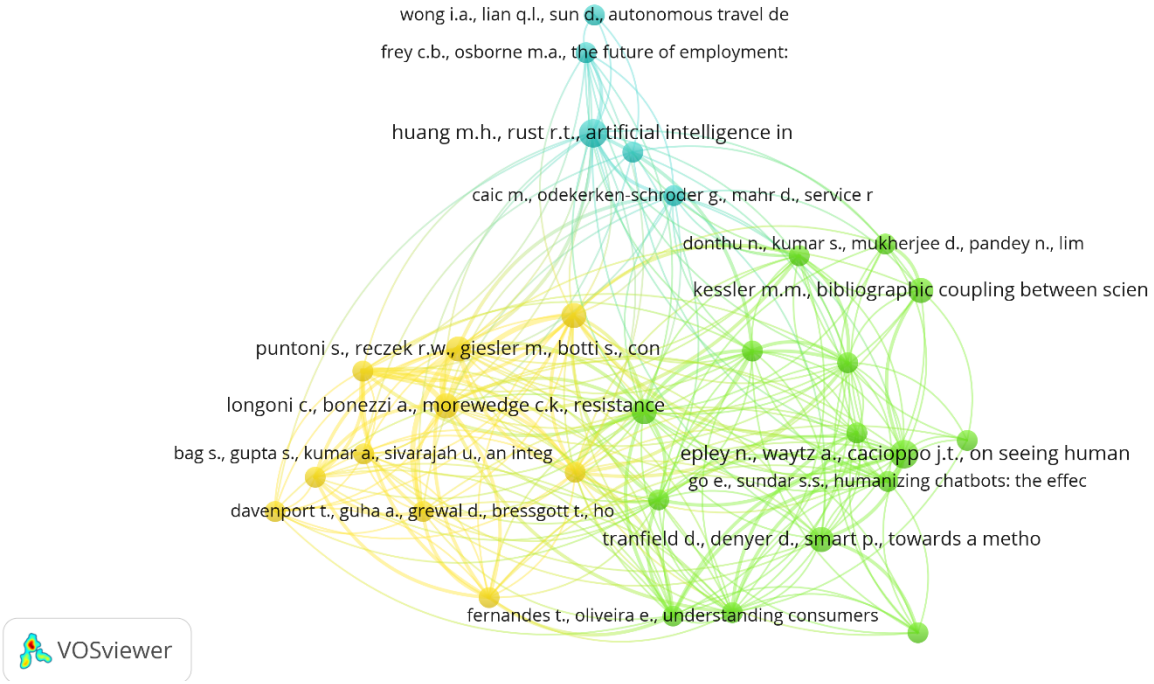

Figure 10. Document co-citation analysis

Source: Map generated with VOSviewer.

Discussions

106 articles were used for this bibliometric analysis, which emphasizes on which are the most discussed topics, the most influential authors or even on identifying the gaps in research. Reducing costs, offering personalized customer interactions, and automating processes are the main subjects of these articles. "Feeling Ai" - a concept studied by several researchers, such as Huang and Rust, has been revealed by Co-citation clusters. It has been proven by researchers that better services (such as financial services or retail) are provided by multiple organizations by using AI. By offering quality services, but still optimizing prices at the same time, the companies managed to increase their optimal satisfaction and also the loyalty index.

Although it has been proven that AI brings lots of benefits to the companies, it is important to also mention that there are numerous challenges that must be taken into account. Among these challenges we can mention data security and confidentiality.

There are still multiple non-technological fields, such as agriculture, education or even textile industry, that remain non-technological and present therefore a great potential for future researches. Notably, the integration of AI agents into business operations has profound implications, fundamentally altering how organizations manage tasks, interact with customers, and optimize efficiency. AI agents, which range from virtual assistants to autonomous decision-making systems, are increasingly leveraged into the business digital transformation process to automate repetitive processes, enhance customer engagement, and generate predictive insights that inform strategic decision-making (Anagnoste et al., 2021; Huang and Rust, 2023).

These agents not only provide cost-effective alternatives to human labor but also improve scalability by handling vast workloads with high precision and consistency, thereby reducing operational inefficiencies (Kot, 2022). A critical advantage of AI agents lies in their ability to enhance customer experience by personalizing interactions and providing rapid and effective support. Companies such as Klarna have demonstrated significant financial benefits from AI integration, reporting reduced operational costs and improved efficiency in customer service (Banerjee, 2023). AI agents facilitate hyper-personalization through real-time data analysis and predictive analytics, which enable businesses to tailor their offerings to consumer preferences, thus fostering customer satisfaction and brand loyalty (Bagozzi et al., 2022).

However, the effectiveness of AI-driven engagement is contingent upon the agents' ability to interpret user sentiment and deliver context-aware responses, this challenge representing an area of active research (Song et al., 2022). From an organizational perspective, AI agents contribute to operational efficiency by streamlining workflows, reducing error rates, and accelerating decision-making. In supply chain management, AI-driven optimization algorithms enhance inventory control, demand forecasting, and logistics coordination, significantly reducing waste and improving profitability (Sarstedt et al., 2024). Similarly, concerning financial services, AI-powered risk assessment models and fraud detection systems can determine more accurate and proactive decision-making, safeguarding assets while improving regulatory compliance (Fosso Wamba, 2022). Despite their advantages, AI agents present challenges related to data privacy, security, energy usage and user trust. Organizations must address ethical concerns associated with data collection and algorithmic decision-making, ensuring transparency and fairness in AI applications (Roslan, 2023).

Additionally, the resistance to AI-driven interactions remains a barrier in industries where human empathy and judgment play a crucial role, such as healthcare and legal services (Ameen, 2021). Therefore, businesses adopting AI agents must implement robust governance frameworks and hybrid models that balance automation with human oversight to maintain trust and accountability (Davenport, 2020). In the medium run, AI agents are expected to evolve further, incorporating more advanced capabilities such as emotion recognition, contextual reasoning, and adaptive learning. The transition from rule-based systems to autonomous, cognitive AI agents will redefine competitive dynamics, requiring firms to invest in AI literacy and ethical AI practices to ensure sustainable implementation, in line with the evolution of regulations in this area. While AI agents significantly enhance efficiency and innovation, their long-term impact will depend on how effectively businesses integrate them into broader digital transformation strategies (Huang, 2019).

Conclusion

As a primary objective of the paper, the focus was to present an overall picture of the actual research made on the subject, followed by a bibliometric study using Vosviewer tool. In addressing RQ1, it was found that current research on the impact of AI agents is primarily focused on streamlining operations, reducing costs, and improving customer experience. To answer RQ2, which explores the central themes regarding AI agents identified in the scientific literature, the main research directions were synthesized. Reducing operational costs, automating repetitive tasks, and personalizing services are among these. In the context of RQ3, several future directions and trends in scientific research have been identified. Among these, we can list "Feeling AI", the importance of recognizing emotions in interactions but also aspects such as cybersecurity, data privacy, ethical issues and the role of regulation emerge as key aspects of responsible development.

Therefore, the multidisciplinary nature of AI research and its effects on business performance is confirmed by the answers identified for the 3 research questions.

Limitations

A limitation of this study is that it was restricted to Scopus database only. An interesting and valuable direction to enhance the analysis may be provided by the employment of additional databases, e.g. Web of Science. Lastly, the database was restricted to English-language articles only, so potentially relevant articles published in another language were not included in this review. Another limitation of the article was that the filtering of articles only considered the categories "Computer Science", "Business, Management and Accounting" and "Economics, Econometrics and Finance". This approach limits the insights available to those arising in the fields mentioned above, and misses relevant insights from other disciplines.

Future research directions

As a next step in our research area, we would like to delve in leading a phenomenological investigation using a survey which will be distributed among diverse companies. The aim of the article will be to understand the perception of professionals or specialists in relation to AI agents, the impact they had and how often they will consider working in the future with AI customized solutions. Consequently, we will be able to provide extensive perceptions into how people cooperate and share their unique experiences with AI technologies. As a general note, we are interested to see how much importance will give our respondents in the relation with AI for the following components: confidence, emotions and commitment.

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