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THE USE OF ARTIFICIAL INTELLIGENCE TOOLS IN BUSINESS

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ABSTRACT

Artificial Intelligence (AI) research has emerged as a crucial field of study with the potential to transform industry and society. This paper explores the evolution of AI in the business context through a systematic literature review to understand the impact of this technology on business. The aim is to trace the trajectory of AI, highlighting its main applications, benefits, and challenges. The rationale for the study lies in the need to understand how AI has been integrated into companies and what its implications are for the future of business. A systematic literature review was chosen as the methodology to ensure a comprehensive and critical analysis of existing studies. This qualitative approach involved rigorously defining inclusion and exclusion criteria, with the selection of peer-reviewed articles and high-quality studies. The research identified the main phases of AI evolution, from its earliest implementations to the most recent innovations. The results show that AI has been applied in areas such as process automation, data analytics, and customer service, offering significant advantages such as increased efficiency and personalization. However, challenges also arise, including governance issues and resistance to change. In conclusion, AI is shaping the business environment in profound and diverse ways. While it offers innovative solutions and drives business success, companies must address the challenges associated with its implementation. Adopting a well-defined strategy and addressing the complexities of AI is essential to maximizing its benefits and sustaining future innovation. The study underscores the importance of effective AI integration to drive business growth and transformation.

Keywords: AI. Organizations. Business.

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INTRODUCTION

Artificial intelligence (AI) research has emerged as a rapidly growing field of study with the potential to profoundly transform industry and society in the coming decades (Makridakis, 2017). As such, leaders in the field of AI research will play a crucial role in guiding and defining this transformation. It is therefore essential that academia, the private sector, government agencies, policymakers, and the general public understand which stakeholders have the greatest influence in this area (Färber; Tampakis, 2023).

Artificial Intelligence (AI) has emerged as a transformative force in the business world, catalyzing a revolution in the way companies operate and innovate. This article seeks to present the evolution of AI in the business context, using a systematic literature review to trace the development and application of these technologies over time. The systematic analysis will allow an in-depth understanding of how AI tools have been integrated into business, from their earliest implementations to the most recent innovations.

The objective is to examine the trajectory of AI in business, highlighting the main phases of its evolution and how these changes have shaped the current business environment. The review will address three main aspects: first, the identification of the main applications of AI over time, highlighting how these technologies have been adapted and evolved to meet business needs.

Second, the benefits and challenges that have arisen with the implementation of AI will be assessed, analyzing the advantages gained and the obstacles faced by organizations.

Throughout this systematic review, this article will provide a comprehensive overview of the impact of AI on business, highlighting its evolution and its implications for the future of organizations.

DATA SCIENCE

Data Science is a multidisciplinary field that combines statistics, machine learning, applied mathematics, software engineering, and computer science to transform data into actionable knowledge.

According to (Marchionini, 2017) and (Virkus & Garoufallou, 2019), Data Science (DS) arises from the application of studies in the areas of measurement, representation, interpretation, and management, involving problem-solving in different sectors, such as industry, health, environment, and governments. International Business Machines (IBM) defines DS as an external practice for solving complex problems and identifying actionable

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insights for business, through advanced data analysis, which integrates techniques from mathematics, statistics, programming, AI, and machine learning. This multidisciplinary approach allows Data Science to become an essential tool for innovation and informed decision-making. The increasing availability of data and the improvement of processing and analysis technologies have driven the demand for specialized professionals in the area, who can obtain specific knowledge from large volumes of information. Furthermore, the application of DC in different contexts promotes the digital transformation of organizations, offering new opportunities for process optimization and the development of more effective products and services (IBM, 2024; Marchionini, 2017; Moutinho, et. al., 2024; Virkus & Garoufallou, 2019).

According to Chen et al., 2012), by integrating quantitative and qualitative methods, Data Science not only provides insights into the past but also creates predictive models that can help anticipate future trends and behaviors, directly impacting the development of business strategies. Furthermore, as pointed out by Davenport and Patil (2012), organizations that adopt Data Science in their management are better positioned to innovate and improve operational efficiency, quickly adapting to changes in the market and consumer needs, identifying market opportunities, and improving the personalization of products and services. This is reflected in an increasing reliance on predictive algorithms, such as those used in product recommendations and consumer behavior analysis, which are fundamental to marketing strategies (Davenport & Patil, 2012).

As explained by (Brynjolfsson & McAfee, 2014), the use of real-time data allows companies to adjust their strategies quickly, creating a continuous cycle of optimization that meets demands more effectively. Data Science also facilitates innovation in various sectors, such as health, education, and logistics, improving the accuracy of diagnoses, improving learning, and optimizing supply chain management (Brynjolfsson & McAfee, 2014).

According to (Wamba et al., 2023), the use of real-time data and integration with artificial intelligence systems have the potential to transform traditional business models, offering managers powerful tools to improve strategic and operational decision-making. By applying machine learning algorithms, for example, companies can predict consumer behaviors, identify failure patterns in production processes, and optimize resource allocation. This results in greater efficiency and agility in responding to market changes, as highlighted by (Choi et al., 2023). In addition, Data Science allows organizations to

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personalize offers and improve customer experience, creating solutions that are more compatible with the specific needs of each audience segment. One of the fundamental pillars of Data Science is machine learning, which, as defined by (Mitchell, 1997), is the study of algorithms that learn and improve automatically with experience. Supervised techniques such as linear regressions and neural networks help identify patterns in labeled data, while unsupervised methods such as clustering can uncover hidden structures in unlabeled data (Hastie; Tibshirani & Friedman, 2009). A practical example of the application of machine learning is natural language processing (NLP), where advanced models such as Bert have advanced improvements in tasks such as machine translation and sentiment analysis (Devlin et al., 2019). These developments have impacted areas such as marketing, customer service, and even education, enabling large-scale automation of tasks.

In parallel with technical advances, ethical issues have become increasingly central to the practice of Data Science. The application of data and algorithms must be conducted responsibly to ensure privacy and transmission.

In addition, Data Science has demonstrated transformative impacts in several economic sectors. In healthcare, for example, machine learning-based models are being used to predict diseases and personalize treatments, as in the case of neural networks applied to medical image analysis (Esteva et al., 2017). In the financial sector, algorithms have optimized advanced processes such as credit risk analysis and fraud detection (Domingos, 2018). Companies that adopt data-driven strategies are not only able to predict market trends, but also improve their supply chains, which provides a significant competitive advantage (Fawcett & Provost, 2013).

FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) has emerged as one of the most influential technologies today, shaping various sectors and profoundly impacting society. Given this, it becomes essential to understand which stakeholders exert influence on AI research, as pointed out by (Farber & Tampakis, 2023).

Artificial Intelligence (AI) is a field of computer science focused on the development of systems capable of simulating human intelligence, seeking to replicate the ability to learn and solve problems logically and rationally (IBM, 2023). AI involves the creation of machines and software that can interpret data, learn from this information, and perform

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tasks based on the acquired knowledge. There are different types of AI, each with specific characteristics and applications (Wang & Cheng, 2023). Among them are: 1. Artificial Narrow Intelligence (ANI): This type of AI is designed to perform a specific task with high performance but without the ability to generalize or understand beyond that limited task. 2. Artificial General Intelligence (AGI): Refers to an AI capable of learning, perceiving, understanding, and operating comprehensively, like a human being. AGI aims to achieve a level of intelligence comparable to that of humans, allowing the execution of a wide variety of tasks. 3. Artificial Superintelligence (ASI): This represents a stage of AI that surpasses human intelligence. ASI is capable of replicating and surpassing the multifaceted intelligence of humans, possessing an expanded memory capacity, analyzing data at high speed, and making complex decisions efficiently (Wang & Cheng, 2023).

AI is already present in several sectors, such as health, industry, finance, customer service, and transportation, among others. It is used to automate tasks, optimize processes, analyze large volumes of data, offer personalized recommendations, and even simulate human behaviors (IBM, 2023).

Evolution of Artificial Intelligence in Business

The evolution of Artificial Intelligence (AI) was marked by the work of Alan Turing in the 1950s, who laid the theoretical foundations of the field with the introduction of the Turing Test. In his article Computing Machinery and Intelligence, Turing proposed that a machine could be considered intelligent if it could fool a human interrogator by simulating responses similar to those of another human. The test, which involves a human, a machine, and an interrogator, does not measure consciousness, but rather the ability of a machine to imitate intelligent behaviors, challenging the idea that intelligence is a function of the human brain (Turing, 1950).

The Turing Test had a profound impact on the understanding of AI, as intelligence could be assessed by observable behavior rather than subjective attributes. This concept remains a cornerstone in discussions about the definition and evaluation of artificial intelligence, reaffirming the relevance of Turing's work in the search for machines capable of replicating human cognition (Turing, 1950).

During the 1970s and 1980s, John McCarthy developed symbolic AI, focused on rule-based and logic-based systems to simulate specialized knowledge, such as medical diagnosis and legal advice. In the 1990s, Judea Pearl introduced Bayesian networks and

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probabilistic modeling, expanding AI's ability to deal with uncertainty and make inferences from incomplete data.

In the 2000s, Geoffrey Hinton, Yann LeCun, and Yoshua Bengio advanced the field of deep learning, enabling the recognition of complex patterns in large volumes of data and transforming areas such as computer vision and natural language processing (Hinton; Le Cun; Bengio, 2015). Although deep learning has revolutionized several areas, some challenges persist in older technologies. One example of this is Captcha, a test used to verify whether a website user is a human or a computer (Von Ahn & Blum, 2003). This tool, although widely used, presents challenges and limitations, as pointed out by several studies in the area. Captcha works on the premise that the human ability to interpret visual information, even when distorted or presented in unconventional formats, is superior to that of a computer. By presenting distorted letters, Captcha creates an obstacle that, in theory, only a human would be able to overcome (Cloudflare, n.d.). The justification is that a human being, through their experience with different fonts and writing styles, can recognize patterns and interpret letters, even when they are deformed.

In other words, Captcha, despite its name, works oppositely to the Turing test. While the Turing test seeks to determine whether a computer can be indistinguishable from a human, Captcha aims to differentiate humans from computers. To do this, it presents challenges that exploit the current limitations of artificial intelligence, such as the difficulty of interpreting distorted images or visual noise.

However, with the advancement of artificial intelligence and machine learning, bots are becoming increasingly sophisticated in solving Captchas. Some of these tools use advanced pattern recognition algorithms to identify distorted letters with high accuracy. Faced with this challenge, companies such as Google, with its reCaptcha, have developed new techniques to differentiate humans from bots, seeking more complex and adaptable tests (Cloudflare, n.d).

Recaptcha has evolved significantly, moving from simple visual tests to a more complex analysis of user behavior. The most recent versions are capable of evaluating a wide range of factors, such as click patterns, typing speed, and browsing history, to determine whether an interaction is human or automated. This proactive approach allows many users to be authenticated without the need to solve Captchas, making the online experience more fluid.

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Since the 2010s, Andrew Ng has highlighted the growing application of machine learning in business, improving personalized recommendations, data analysis, and automation, which has brought significant gains in efficiency and decision-making. In 2018, Buolamwini and Gebru published the study “Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification,” which revealed accuracy disparities in facial recognition systems, showing that these systems were less accurate in identifying the race and gender of individuals with darker skin and women. This study highlighted the need to consider intersectional factors when evaluating the performance of AI algorithms (Buolamwini & Gebru, 2018). Gebru and Buolamwini (2018-2021) highlight the importance of ethics in AI, emphasizing the need to mitigate bias, ensure data privacy, and use AI responsibly to avoid discrimination and negative impacts on society. In 2021, Gebru faced controversies and challenges related to her research on AI ethics, which culminated in her departure from Google. Despite this, her research and activism continue to influence the field. Together with Buolamwini, Gebru continues to collaborate on AI startup options to ensure that AI is developed and used responsibly, emphasizing the importance of mitigating biases and negative impacts (Gebru & Buolamwini, 2021).

Gebru and Buolamwini's work is fundamental to ensuring that AI is used ethically and fairly, shaping discussions on how to avoid biases and promote transparency and inclusion in technology. Table 1 presents a summary of the main concepts and contributions that have marked the evolution of Artificial Intelligence (AI) over time.

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Table 1: The Conceptual Milestones in the Evolution of Artificial Intelligence (AI)

Year	Author(s)	Concept	Description
1950-1960	Alan Turing	Turing Test	Foundations of AI. Evaluates whether a machine can simulate human intelligence. Introduction of theoretical foundations of AI.
1970-1980	John McCarthy	Symbolic AI	Rule-based and logic-driven systems to simulate specialized knowledge.
1990	Judea Pearl	Bayesian Networks and Probabilistic Modeling	Handling uncertainties and making inferences from incomplete data.
2000	Geoffrey Hinton, Yann LeCun, Yoshua Bengio	Deep Learning	Recognition of complex patterns in large datasets.
2010	Andrew Ng	Machine Learning in Business	Improvements in personalized recommendations and business automation.
2015	Geoffrey Hinton, Yann LeCun, Yoshua Bengio	Deep Learning	Recognition of complex patterns in large datasets.
2018	Joy Buolamwini, Timnit Gebru	Accuracy Disparities in Facial Recognition	Exposes unequal accuracy in facial recognition, highlighting the importance of intersectional factors.
2018-2021	Timnit Gebru, Joy Buolamwini	AI Ethics and Responsible AI	Focus on bias mitigation and responsible AI usage.
2020	Kai-Fu Lee	Digital Transformation and AI Automation	Revolution in business models and innovation through AI.
2021	Timnit Gebru, Joy Buolamwini	Continuation of Research on AI Ethics	Ongoing initiatives for responsible AI usage and bias mitigation.

Source: The Authors (2024)

Artificial Intelligence in Business Management

Artificial Intelligence (AI) is increasingly integrated into business management, playing a strategic role by enabling companies to process large volumes of data, identify patterns, and make predictions that aid in informed decision-making. Recent studies show that, through AI tools such as predictive analytics, organizations can not only predict consumer demands and behaviors but also optimize operations and create new competitive advantages (Perifanis & Kitsios, 2023).

In addition, AI facilitates the automation of manual processes, which increases operational efficiency and allows for greater synergy between humans and machines. However, the implementation of this technology still faces significant challenges in terms of governance and resource organization, which requires a strategic approach to maximize its potential (Teoh & Goh, 2024).

In addition, the work of (Donthu et al., 2023) explores the integration of AI with other emerging technologies, such as blockchain, and discusses how this combination can revolutionize areas such as finance and operations. The authors emphasize that the success of AI in business depends not only on the technology itself but also on the ability of

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companies to adapt their organizational cultures and structures to incorporate these innovations effectively.

Studies (Vickovic & Sitnik, 2023) show how AI can be used in marketing strategies to personalize the customer experience and optimize advertising campaigns, highlighting the impact of AI in improving customer satisfaction and loyalty.

Other studies also highlight the importance of AI in areas such as finance, where technology is being used for risk analysis, service personalization, and automation of financial transactions (Bahoo; Cucculelli & Qamar, 2023). The exponential growth of AI in this sector demonstrates how indispensable technology has become for business innovation and competitiveness.

These advances show that AI is not just a technical tool, but an essential component of modern business strategy, capable of transforming the way companies operate and interact with the market (Bahoo et. al., 2024).

Key authors from 1950 to 2024 who have influenced the field of Artificial Intelligence (AI) in business management are presented in Table 2.

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Table 2 – Major Contributions in the Field of AI in Business Management

Period	Authors	Contributions to AI and Business Management
1950-1970	Herbert A. Simon; Allen Newell	Pioneers in decision theory and problem-solving, fundamental for AI use in business decision-making.
	Norbert Wiener	The Father of cybernetics, contributed to the concept of automation and system control, later applied in AI.
	John McCarthy	Coined the term "AI" and developed LISP, influencing programming and business automation.
	James G. March; Richard Cyert	Studies on organizational behavior and decision-making in companies, linked to AI development.
1980-2000	Marvin Minsky	Founder of the AI field, with theories impacting business automation.
	Michael Dertouzos	Predicted AI's impact on automation and business management.
	Tom Davenport	Discussed how technology and AI could revolutionize business process management.
	James F. Moore	Created the concept of the "business ecosystem," linking it to AI use in managing complex business flows.
2000-2024	Andrew Ng	Popularized machine learning in business through MOOCs, promoting AI in business processes.
	Kai-Fu Lee	2020 analysis on how AI is shaping the future of the economy and work.
	Perifanis and Kitsios	Explored AI's strategic impact on value creation in the digital transformation context.
	Teoh and Goh	Discussed the importance of governance and challenges in implementing AI in business management.
	Donthu et al.	Explored AI integration with emerging technologies like blockchain and its impact on finance and operations.
	Vickovic and Sitnik	Demonstrated how AI can be used in marketing strategies to personalize customer experience and optimize campaigns.
	Bahoo; Cucculelli; Qamar (2023)	Highlighted AI's importance in finance, for risk analysis, service personalization, and transaction automation.
	Bahoo et al. (2024)	Emphasized AI as essential to modern business strategy, transforming operations and market relations.

Source: The Authors (2024)

Table 2 provides an overview of the main contributions in the field of Artificial Intelligence (AI) applied to business management from 1950 to 2024.

In the period from 1950 to 1970, pioneering figures such as Herbert A. Simon and Allen Newell stand out, whose theories on decision-making and problem-solving laid the foundations for the use of AI in business decision-making.

Norbert Wiener, known as the father of cybernetics, made significant advances in the concept of automation and control of systems, influencing AI. John McCarthy, who introduced the term "Artificial Intelligence" and developed the LISP programming language, had a crucial impact on automation and programming. In addition, James G. March and Richard Cyert contributed studies on organizational behavior and decision-making in companies, connecting their discoveries to the development of AI. From 1980 to 2000, the consolidation of AI in business management was driven by Marvin Minsky, one of the founders of the AI field, whose theories had an impact on business automation. Michael

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Dertouzos predicted the transformation that AI would bring to automation and management. Tom Davenport discussed how AI could revolutionize business process management, while James F. Moore introduced the concept of a “business ecosystem,” which refers to the use of AI to manage complex workflows in companies.

From 2000 onwards, the era of digital transformation brought new perspectives. Andrew Ng played an important role in popularizing machine learning in business through MOOCs, facilitating the application of AI in business processes. Kai-Fu Lee analyzed the impact of AI on global competitiveness, with an emphasis on the US and Chinese economies. Perifanis and Kitsios explored the strategic importance of AI in creating business value in the context of digital transformation. Finally, Teoh and Goh discussed the challenges and importance of governance in implementing AI in business management processes, reflecting on the complexities of integrating AI into modern practices. In 2020, Kai-Fu Lee explored how digital transformation and automation through AI are revolutionizing traditional business models and driving innovation in various sectors, highlighting the economic and social impact of this technology. The table thus demonstrates the contributions to AI and its application in business management over the decades, highlighting how each author and their innovations have helped shape the field. 2.1.3 Artificial Intelligence Tools in Business Management Artificial Intelligence (AI) tools are fundamental in modern business management, as highlighted by renowned experts and authors in the field. (Ng, 2016), co-founder of Google Brain and professor of Computer Science at Stanford University, emphasizes that AI can transform efficiency and innovation in business operations. It demonstrates how process automation through AI frees employees from repetitive tasks, allowing them to focus on more strategic activities.

(Lee, 2018), author of "AI Superpowers" and former president of Google China, explores how AI is revolutionizing the global economy and increasing the competitiveness of companies. He argues that the personalization provided by AI not only improves the customer experience but also fosters innovation in various sectors.

(Gartner, 2023), a global research and advisory consultancy that provides an in-depth look at AI trends and their practical applications in business. Their reports highlight how the integration of AI can optimize processes and assist in strategic decision-making, providing valuable insights for management.

Articles in the Harvard Business Review, especially those by (Wilson & Daughert, 2018) discuss how AI can be applied to automation, advanced data analysis, and

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personalization. They emphasize that these technologies offer innovative solutions that drive efficiency and innovation in business operations.

Table 1 - AI Tools for Business Decision-Making

Category	Tools
Data Analysis	Power BI, Tableau, Google Analytics
Predictive Analytics	IBM Watson, H2O.ai
Virtual Assistants and Chatbots	Salesforce Einstein, Zendesk Answer Bot
Process Automation	UiPath, Automation Anywhere
Sentiment Analysis and Competitive Intelligence	Brandwatch, Crimson Hexagon
Marketing Optimization	HubSpot, Marketo
Personalization via Machine Learning	Amazon SageMaker, Google Cloud AI Platform
Recruitment and Talent Management	HireVue, Pymetrics
Risk Analysis and Compliance	Palantir, Ayasdi
Inventory and Supply Chain Management	Llamasoft, ClearMetal

Source: The Authors (2024)

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Norbert Wiener, known as the father of cybernetics, made significant advances in the concept of automation and control of systems, influencing AI. John McCarthy, who introduced the term "Artificial Intelligence" and developed the LISP programming language, had a crucial impact on automation and programming. In addition, James G. March and Richard Cyert contributed studies on organizational behavior and decision-making in companies, connecting their discoveries to the development of AI. From 1980 to 2000, the consolidation of AI in business management was driven by Marvin Minsky, one of the founders of the AI field, whose theories had an impact on business automation. Michael Dertouzos predicted the transformation that AI would bring to automation and management. Tom Davenport discussed how AI could revolutionize business process management, while James F. Moore introduced the concept of a “business ecosystem,” which refers to the use of AI to manage complex workflows in companies.

From 2000 onwards, the era of digital transformation brought new perspectives. Andrew Ng played an important role in popularizing machine learning in business through MOOCs, facilitating the application of AI in business processes. Kai-Fu Lee analyzed the impact of AI on global competitiveness, with an emphasis on the US and Chinese economies. Perifanis and Kitsios explored the strategic importance of AI in creating

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Artificial Intelligence Tools in Business Management Artificial Intelligence (AI)

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(Lee, 2018), author of "AI Superpowers" and former president of Google China, explores how AI is revolutionizing the global economy and increasing the competitiveness of companies. He argues that the personalization provided by AI not only improves the customer experience but also fosters innovation in various sectors.

(Gartner, 2023), a global research and advisory consultancy that provides an in-depth look at AI trends and their practical applications in business. Their reports highlight how the integration of AI can optimize processes and assist in strategic decision-making, providing valuable insights for management.

Articles in the Harvard Business Review, especially those by (Wilson & Daughert, 2018) discuss how AI can be applied to automation, advanced data analysis, and personalization. They emphasize that these technologies offer innovative solutions that drive efficiency and innovation in business operations.

METHODOLOGICAL PROCEDURES

This study is a systematic literature review, a qualitative and structured methodological approach that aims to compile, analyze, and synthesize existing research on the use of Artificial Intelligence (AI) tools in business. The methodological procedures followed included the rigorous definition of inclusion and exclusion criteria.

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This research method is extremely valuable for answering specific questions and obtaining a comprehensive view of the literature in a given field of study. Using a well-defined methodology, the systematic review allows to minimize bias and ensure the robustness of the results (Gohr; Lopes; Oliveira, 2013; Bahoo; Cucculelli & Qamar, 2023). By following a structured approach, this methodology provides a critical and organized analysis of the available evidence, contributing to a more accurate and reliable understanding of the topic in question.

The inclusion criteria encompassed studies that address the impact of AI in different areas of business, such as data analysis, process automation, customer service and marketing. Only peer-reviewed articles, academic books, and high-quality research reports were considered. On the other hand, the exclusion criteria excluded articles that did not directly address the use of AI, as well as studies with unclear methodologies or that did not present relevant results on the impact of AI on business.

The search and selection strategy for studies involved the Web of Science database for selecting articles. Search terms included combinations of keywords such as "Artificial Intelligence in Business", "AI and Business Automation", "AI Tools", "Data Analysis with AI" and "Chatbots and Customer Service".

The selection of studies was carried out in two stages: screening of titles and abstracts to ensure initial relevance, followed by a full reading of the selected articles to verify their suitability to the established criteria. In data extraction, for each selected study, data on the research objectives, methods used, main findings, and implications for business were extracted. This data was systematized in a spreadsheet to facilitate analysis.

The analysis and synthesis of the results involved thematic analysis of the studies, and identifying patterns, trends, and gaps in existing research. The results were then synthesized to provide an integrated view of how AI tools are being used in companies, their benefits and challenges, and examples of good practices.

The quality of the studies was assessed using the Bibliometric Analysis Software, Bibliometrix, which allowed the analysis of citation and co-citation networks to identify influential articles and trends in research on AI in business.

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DATA ANALYSIS

To enrich the analysis of the trajectory of Artificial Intelligence (AI) in business, it is important to integrate studies and contributions from prominent authors in the field. The journey of AI in business can be divided into several phases, each marking significant advances that have shaped the current corporate environment.

The integration of the contributions of renowned authors and their research offers a comprehensive view of the trajectory, benefits, and challenges of Artificial Intelligence (AI) in business. This provides a deeper, more contextualized understanding of the impact of this technology on today's business environment, as illustrated in Table 2. These detailed perspectives help clarify how AI has evolved and how its applications have shaped and continue to transform the business landscape.

Table 2 – Contribution, Advancement, and Impact of AI in Business Management

Period	Contributions and Advancements	Impact on the Corporate Environment
1950-1970	- Development of AI foundations by Simon, Newell, and McCarthy. - Introduction of cybernetics by Wiener.	- Establishment of fundamental concepts for business automation. - Creation of essential programming tools.
1980-2000	- Advances in AI theories by Minsky. - Discussion on AI-driven business transformation by Davenport and Moore.	- Beginning of complex process automation. - Improved efficiency and reduced operational costs.
2000-2024	- Advances in machine learning and big data. - Integration with emerging technologies like blockchain. - Studies by Ng, Lee, and Donthu.	- Optimization of predictive analytics and personalization. - Creation of new competitive advantages. - Challenges in governance and organizational adaptation.
Present and Future	- Continued evolution of AI and technological innovation.	- Ongoing transformation in business management. - Need for adaptation to innovations and emerging challenges.

Source: The Authors (2024)

Early (1950-1970): AI's journey in business began with theorists such as Herbert A. Simon and Allen Newell developed crucial concepts in decision-making and problem-solving. Norbert Wiener introduced cybernetics, the basis for automation, while John McCarthy coined the term "AI" and the LISP language, early tools for business automation.

Evolution and Consolidation (1980-2000): During this period, AI began to become more integrated into business processes. Marvin Minsky and others advanced AI theories, and Tom Davenport and James F. Moore introduced the concept of a "business ecosystem." Automation of complex processes increased efficiency and reduced costs.

Digital Transformation and Advanced AI (2000-2024): With the emergence of machine learning and big data, predictive analytics and service personalization came to the fore. Andrew Ng and Kai-Fu Lee have shown how AI has transformed global

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competitiveness, while integration with emerging technologies such as blockchain has brought new opportunities and challenges. Challenges such as governance and organizational adaptation remain critical.

Ben C. Stahl and David Eke's work, Ethical Implications of Artificial Intelligence in Business: A Comprehensive Review in 2024, contributes significantly to understanding the ethical challenges that arise with the adoption of Artificial Intelligence (AI) in business.

Current and Future Impact: AI has optimized processes, improved decisions, and created competitive advantages. To fully take advantage of its opportunities, companies must adapt and implement effective governance. The future of AI promises more innovations and challenges, requiring agility and adaptability in the constantly evolving corporate environment (Lee, 2018, 2021; Deep; Adkins, 2024).

The implementation of Artificial Intelligence (AI) in business has promoted significant and impactful changes. Among its main applications are process automation, which improves efficiency by reducing repetitive tasks; predictive analytics, which facilitates trend forecasting and inventory optimization; and personalization of products and services, which enhances the customer experience. In addition, AI plays a crucial role in financial risk management and in optimizing operations such as logistics and supply chains (Lee, 2018, 2021; Deep & Adkins, 2024).

AI-influenced automated decisions have the potential to profoundly impact business management and operations. It is essential to maintain human control over critical decisions to avoid negative impacts and ensure that AI is used responsibly (Stahl & Eke, 2024).

The benefits of AI are clear: it increases operational efficiency, enables data-driven decisions, improves customer experience, and reduces costs through automation and optimization. However, the adoption of AI also presents significant challenges. Effective governance is required to ensure compliance and security, and there may be resistance to change from employees concerned about automation. Furthermore, technical difficulties and high initial costs represent obstacles that must be overcome (Lee, 2018, 2021; Sanghvi & Bashir, 2023; Deep & Adkins, 2024 & Stahl & Eke, 2024).

FINAL CONSIDERATIONS

The analysis of the trajectory of Artificial Intelligence (AI) in business reveals a dynamic and transformative panorama, which underscores the importance of this

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technology in corporate evolution. The review highlighted how AI applications have been progressively adapted to meet growing business demands, evidencing a profound impact on the corporate environment.

First, the adaptation and evolution of AI technologies over time were examined, highlighting their various applications, from process automation and data analysis to personalization and optimization of operations. These advances demonstrate how AI has been fundamental in meeting the new needs and challenges of organizations.

Second, the analysis of the benefits and challenges of AI implementation revealed a balanced panorama. While AI offers significant benefits such as increased efficiency, better decision-making, and enhanced personalization, it also presents challenges, including governance issues, resistance to change, and technical complexities. These challenges need to be carefully managed for companies to maximize the benefits of the technology.

In conclusion, the use of AI is transforming businesses in profound and varied ways. From automation and data analytics to customer service and marketing, AI offers innovative solutions that have the potential to drive business success. However, to fully leverage these opportunities, it is essential that companies take a strategic approach, address the associated challenges, and integrate AI effectively into their operations.

In this way, AI is not not only promotes transformation in the corporate environment but also provides a solid foundation for future growth and innovation.

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