

The Role of Artificial Intelligence in Management Decision-Making - A Case Study of IBM -

TOUATI Meriem ^{*1}, Mohamed Ali Saad ²Siham Abdelkrim ³

¹Blida 2 University, Algeria, Algeria's Economic and Human Development Laboratory,
me.touati@univ-blida2.dz

²Northern Border University, Kingdom of Saudi Arabia, Mohamed.Saad@nbu.edu.sa

³Blida 2 University, Algeria, Research Laboratory on Creativity and Organizational Change,
s.abdelkrim@univ-blida2.dz

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Abstract:

This study aims to analyze the role of artificial intelligence in the stages of managerial decision-making, from information gathering and processing to evaluating alternatives and selecting the most appropriate decision. It highlights its importance in improving decision quality, reducing errors, and increasing operational efficiency, while noting the ethical, regulatory, and technical challenges that organizations may face. The study also supports its theoretical framework with the case of IBM, which relied on the Watson system and advanced analytical systems, thereby helping to enhance predictive accuracy, develop decisions based on big data, and provide effective dashboards that significantly accelerate strategic and operational decision-making.

Keywords: Artificial Intelligence, managerial decision-making, big data, operational efficiency, IBM Watson .

Jel Classification Codes: D83, M15, O33, L86, C45

The Role of Artificial Intelligence in Management Decision-Making - A Case Study of IBM –

1. INTRODUCTION:

The administrative decision-making process is a cornerstone of management, whereby management selects appropriate solutions and alternatives to resolve problems and achieve the organisation's objectives. In today's world, artificial intelligence technologies are playing an increasingly important role in supporting this process, providing new tools for analysing data, predicting outcomes and streamlining procedures.

This research aims to explain the concept of artificial intelligence and define the process of managerial decision-making, focusing on how artificial intelligence influences the stages of decision-making and reviewing real-world examples of this. The research also reviews the benefits and challenges arising from the integration of artificial intelligence into management, offers critical perspectives on the risks associated with over-reliance on artificial intelligence, and concludes with practical findings and recommendations.

Despite the significant advantages offered by artificial intelligence, its use in administrative decision-making raises questions regarding the extent to which it should be relied upon, the limits of its effectiveness, ethical and normative challenges, and the extent to which organisations are able to utilise it optimally.

1.1 The Research Question: Based on the above, the research question can be formulated as follows:

What is the role of artificial intelligence in the administrative decision-making process within organizations, and how can we maximize its benefits while mitigating its challenges to ensure more effective and objective decisions are made?

1.2 Research Objectives:

- To analyse the impact of artificial intelligence on improving the quality and effectiveness of administrative decision-making within contemporary organisations;
- To define the concept of artificial intelligence and its role in supporting managerial activities;
- To analyse the stages of managerial decision-making and how artificial intelligence contributes to each stage;
- To review the most prominent applications of artificial intelligence used in managerial decision-making;
- Assessing the benefits of artificial intelligence in improving the accuracy and objectivity of decisions;

- Identifying the challenges and difficulties organisations face when integrating AI into decision-making;
- Presenting practical models and case studies that highlight the impact of AI on management;
- To present proposals for the responsible and effective use of artificial intelligence in work environments.

1.3 Significance of the research: The significance of this study stems from several considerations, the most important of which are:

- The study contributes to enriching the scientific literature on the subject of artificial intelligence and its relationship to managerial decision-making;
- It enables organisations to understand the practical value of artificial intelligence in improving the quality of decisions and reducing risks;
- It helps managers adopt decisions based on data rather than on intuition or experience alone;
- It highlights the challenges that must be taken into account before adopting artificial intelligence solutions, thereby contributing to more effective implementation;
- Provides practical recommendations that can help organisations develop strategies for integrating AI in safe, transparent and effective ways.

2. Theoretical Framework of the Study :

2.1 The Conceptual Framework of Artificial Intelligence :

2 .1.1 Definition of Artificial Intelligence :

Definition 1: "Artificial intelligence is the science that investigates how to make computers perform tasks carried out by humans better than humans themselves".(Bassiouni, 1994, p. 18)

Definition 2: "Artificial intelligence can be defined as the science concerned with the manufacture of machines that perform actions which humans consider to be intelligent". (Sultani, 2025, p. 318)

Based on the two previous definitions, a comprehensive definition can be provided as follows:

"Artificial intelligence is a branch of computer science concerned with developing systems capable of simulating human mental abilities, such as learning, reasoning, data analysis and decision-making, with the aim of performing tasks with greater efficiency and accuracy".

2.1.2Benefits of artificial intelligence: Among the most notable features of artificial intelligence are: (Artificial Intelligence Technology, 2026)

- **Reducing human error:** It can significantly reduce errors and increase

The Role of Artificial Intelligence in Management Decision-Making - A Case Study of IBM –

accuracy.

- **Overcoming risks:** Humans can overcome a number of risks by allowing AI robots to carry out tasks on their behalf.
- **Ability to work without rest or downtime:** AI can work endlessly without breaks, think faster than humans, and perform multiple tasks simultaneously with accurate results.
- **Digital assistance:** The ability to employ a digital assistant instead of a human employee, a practice adopted by some of the most technologically advanced companies with their users (cryptocurrency services).
- **Performing repetitive tasks:** This helps individuals focus on being more creative and eliminates tedious tasks.

2.1.3 Characteristics of artificial intelligence: These are: (Bassiouni, 1994, pp. 33-35)

- **Symbolic representation:** These programmes deal with symbols that represent the available information.
- **Experimental research:** Artificial intelligence programmes tackle problems for which solutions cannot be found by following specific logical steps; instead, they employ an experimental research approach, much like a doctor diagnosing a patient's illness. The doctor faces a number of possibilities, whether many or few, to arrive at an accurate diagnosis, and cannot reach a solution simply by seeing the patient and hearing their symptoms. The same applies to a chess player; calculating the next move involves exploring multiple possibilities and assumptions. This experimental research method requires significant storage capacity in the computer, and computer speed is also a key factor in generating and analysing these numerous possibilities.
- **Knowledge acquisition and representation:** Symbolic representation in the expression of information, and the use of trial-and-error methods to find solutions, mean that artificial intelligence programmes must be built on a large knowledge base containing links between situations and outcomes.
- **Uncertain or incomplete data:** Programmes designed in the field of artificial intelligence must be able to provide solutions if the data is uncertain or incomplete; this does not mean that they should provide solutions regardless of whether they are correct or incorrect, but rather that, in order to perform well, they must be capable of providing acceptable solutions, otherwise they will be inadequate. In medical software, for instance, if a case is presented without the results of medical analyses, the programme must have the capability to provide solutions.

- **Learning ability:** The ability to learn is one of the hallmarks of intelligent behaviour. Whether learning in humans occurs through observation or by learning from past mistakes, artificial intelligence programmes must rely on machine learning strategies.

2.2 Administrative Decision-Making: Definition and Stages :

2.2.1 Definition of managerial decision-making:

Decision-making is the process based on study and objective thinking to reach a specific decision; that is, a choice from the alternatives available to the manager or decision-maker. Some suggest that the decision-making process is “a choice based on certain criteria, such as gaining a larger market share, reducing costs, saving time, and increasing production and sales volumes; the selection of the best alternative is largely influenced by the criteria used.” (Muftah, 2022, p. 47)

Decision-making is one of the most important stages of the decision-making process and is not synonymous with decision-making itself; the decision-making stage is the synthesis of the information and ideas reached by decision-makers regarding the existing problem. Consequently, decision-making is considered one of the stages of the decision-making process; indeed, it is the product of the decision-making process itself.

As for the definition of the administrative decision-making process, it is: the careful and precise selection of one alternative from among two or more sets of behavioural alternatives. (Mohamed Shafei, 2026)

2.2.2 Stages of decision-making:

The administrative decision-making process involves several interrelated stages, which can be summarised as follows: (al-Qara, 2026)

- **Diagnosing the problem (assessing the situation):** One of the key things a manager must recognise when identifying the root cause and scope of a problem is to determine the nature of the situation that created the problem, the severity of the problem, not to confuse its symptoms with its causes, and the appropriate time to address it and make an effective and appropriate decision regarding it.
- **Data and information gathering:** Collecting information and data relevant to the problem from a variety of sources—whether primary or secondary, quantitative or qualitative—in order to analyse them thoroughly.
- **Identifying and evaluating alternatives:** Proposing multiple solutions or alternatives to address the problem, then evaluating these alternatives based on organisational criteria and objectives, such as alignment with objectives, feasibility, and implications.
- **Selecting the most appropriate alternative:** Weighing up the available alternatives and selecting the one that best achieves organisational objectives

and minimises risks.

- **Implementation and monitoring:** Implementing the chosen solution in a timely manner, then monitoring its outcomes and assessing its effectiveness, and addressing any deviations or errors that arise during implementation.

It should be noted that these stages reflect the comprehensive and dynamic nature of the administrative decision-making process, as each stage requires accurate information, collective effort and analytical skills. Decision-making is also viewed as a collaborative, comprehensive and sequential activity

2.3 Artificial Intelligence and Administrative Decision-Making :

2.3.1 How does artificial intelligence assist in decision-making?:

This can be illustrated by the following points: (Akers, 2026)

- **Accelerating decision-making:** AI enables faster decision-making by processing data in real time and generating immediate insights, allowing leaders to focus on strategy whilst accelerating their response to market changes.
- **Boosting productivity:** AI operates continuously, providing ongoing data analysis and support, thereby boosting productivity by freeing up time for strategic thinking whilst complementing human judgement.
- **Improving accuracy:** AI analyses vast amounts of structured and unstructured data with high precision; by detecting patterns and anomalies, it provides more accurate insights and reduces decision-making errors.
- **Risk reduction:** AI identifies potential risks by analysing historical data and detecting unusual patterns. It helps organisations anticipate problems, simulate scenarios, and select strategies that minimise risk.
- **Increased efficiency:** AI improves workflows by collecting, analysing, and reporting data; it also enhances operational efficiency and ensures continuous support for decision-making.
- **Achieving consistency:** AI ensures that decisions follow consistent rules and logic every time. This consistency reduces human bias, promotes fairness and supports objective decision-making.
- **Building an infinite organisational memory:** AI preserves organisational knowledge by learning from past decisions and experiences, whilst retaining insights and best practices, helping organisations make informed decisions based on historical data.

Overall, integrating AI into the stages of managerial decision-making results in faster, more accurate and clearer decisions, saving decision-makers time and resources.

2.3.2 Key benefits of AI in improving the decision-making process

AI helps companies enhance their competitiveness and achieve a comprehensive

transformation in performance through the decision-making process, by: (Syracuse University, 2026)

- **Increasing efficiency and productivity:** It automates tasks, boosts employee productivity and improves overall performance;
- **Improving decision-making and data analysis:** Enables companies to analyse data quickly and accurately to make more effective decisions and reduce risks;
- **Improved customer experience:** Enhances customer satisfaction through personalisation, rapid support and improved engagement;
- **Innovation and competitive advantage:** Accelerates innovation and helps companies develop products and gain a competitive edge;
- **Cost reduction and return on investment:** Reduces operational costs and increases revenue by improving efficiency
- **Scalability, flexibility and security:** Supports secure expansion and improves cyber security in high-risk environments.

3. Methodological Framework of the Study

3.1 Study Hypotheses

This study is based on a fundamental hypothesis concerning the impact of artificial intelligence technologies on the effectiveness and quality of managerial decision-making, from which several sub-hypotheses branch out, reflecting the various dimensions of both the independent and dependent variables. The hypotheses are formulated as follows:

- **Main Hypothesis:** There is a statistically significant positive effect of artificial intelligence on the effectiveness and quality of the administrative decisionmaking process at the organisation under study (IBM), leading to faster, more accurate and less error-prone decisions.
- **Sub-hypothesis 1:** AI-driven data analysis contributes to accelerating the administrative decision-making process by providing real-time and comprehensive information that supports the decision-maker.
- **Sub-hypothesis 2:** The predictive capabilities of artificial intelligence lead to more accurate managerial decisions by anticipating outcomes and scientifically evaluating alternatives prior to selection.
- **Sub-hypothesis 3:** AI-based decision support systems help reduce the error rate in managerial decisions by providing objective recommendations free from human bias.

3.2 The relationship between objectives, hypotheses and variables :

The study's objectives and hypotheses were directly reflected in the theoretical and applied research variables. The main research objective was to explore how AI

The Role of Artificial Intelligence in Management Decision-Making - A Case Study of IBM –

technologies can improve the management decision-making process and its quality at IBM.

The study's hypotheses were formulated to reflect these objectives; each subhypothesis is linked to a specific objective and the relevant study variables. For example, the objective of 'determining the extent to which AI-driven data analysis contributes to accelerating decision-making' is matched by a sub-hypothesis stating that AI-driven data analysis accelerates decision-making. Similarly, the objective of "demonstrating the impact of intelligent forecasting on decision accuracy" is matched by a hypothesis regarding the increased accuracy of decisions due to forecasting, and so on. In this way, coherence and consistency are achieved between what the study seeks to achieve (the objectives) and what it assumes to be the case (the hypotheses) within the framework of the variables under study.

3.3 Methodology :

In this research, we adopted a descriptive-analytical methodology of an applied nature, in addition to a case study approach in the applied aspect by studying IBM, such that the descriptive-analytical methodology enables the study of the phenomenon as it exists in reality and describes it accurately from both qualitative and quantitative perspectives. As for the case study approach, it was adopted because it is the most suitable for gaining a deeper understanding of the phenomenon within its real context; it is a qualitative research approach that allows for the in-depth examination of a single case (in this instance, IBM) within its natural context, whilst offering flexibility in data collection and analysis.

3.4 Study Population and Sample :

This study centres on IBM as a case study to examine the impact of artificial intelligence on the decision-making process. IBM was selected due to its leadership and extensive experience in the field of artificial intelligence; it is one of the first organisations to have invested seriously in the development and use of artificial intelligence to support decision-making and business operations. This leadership makes it a prime example for achieving the study's objectives, as the effects of the technology are expected to be clearly evident, observable and analysable. The study sample is a *non-probability*, purposive sample, as the company was deliberately selected based on our prior knowledge that it possesses the appropriate characteristics to answer the research questions. In other words, the aim was not to generalise the results statistically to all companies, but rather to focus on an information-rich case such as IBM to make the most of its data in understanding the phenomenon.

4. The Role of Artificial Intelligence in Management Decision-Making at IBM

– A Case Study – :

IBM is a pioneer in the field of artificial intelligence, having developed numerous technological solutions that enhance decision-making capabilities within organisations. In this study, we will examine how IBM utilises artificial intelligence and its impact on decision-making processes, with a focus on the Watson system as a prime example.

IBM was founded in 1911 and has evolved from a company specialising in information technology into one of the world's largest technology firms. In recent years, IBM has invested in artificial intelligence technologies to enhance its competitiveness.

Watson is an AI system developed by IBM, which uses machine learning and natural language processing to analyse big data and provide data-driven recommendations.

4.1 IBM and Artificial Intelligence :

4.1.1 IBM and Artificial Intelligence Technology:

IBM is a global leader in technology and computing, and has been at the forefront of artificial intelligence (AI) technologies to enhance its analytical and decision-making capabilities. A significant part of these efforts is carried out via the Watson platform and the newer watsonx platform, which enable organisations to integrate AI into their operational and planning processes. (What does the transition to artificial intelligence entail?, 2026)

From a strategic perspective, IBM emphasises that the aim is not merely to automate decisions, but to make them 'smart' by applying machine learning algorithms and predictive analytics tools to tailor decisions to real-world operational variables. (IBM ranked as a leader in The Forrester Wave: AI Decision-Making Platforms, Q2 2025,, 2026)

As stated on its official website, "Decisions are at the heart of business", and IBM's AI-powered decision management solutions enable organisations to model and make intelligent decisions quickly and efficiently. (Decision management software and solutions, 2026)

4.1.2 Benefits of using artificial intelligence at IBM :

These include: (IBM Watson to watsonx, 2026)

- **Increased work efficiency:** Watson enables companies to reduce the time spent analysing data, as it can process huge amounts of information in a short time.
- **Improved decision-making accuracy:** It provides accurate analyses

The Role of Artificial Intelligence in Management Decision-Making - A Case Study of IBM –

based on reliable data, leading to better decision-making.

4.2 The use of artificial intelligence in decision-making at IBM:

4.2.1 Decision-making at IBM:

Decisions are at the heart of business. To remain competitive and meet everincreasing customer expectations in today's fast-moving digital world, companies need to make better decisions faster. Advanced analytics, combined with business rules, can help transform insights into practical, personalised and immediate actions for customers that generate measurable business results. IBM offers an integrated suite that enables companies to easily manage the entire decision lifecycle.

With IBM's decision management solutions, you can: (Overcome business challenges with AI-powered decision management, 2026)

- Create and manage business logic independently of applications and operations.
- Make accurate decisions, intelligently targeting every customer interaction.
- Give businesses the flexibility and speed needed to meet changing requirements.

Studies and analytical reports published by IBM and specialist research organisations have shown that the adoption of IBM Watson solutions has contributed to improved decision-making performance within organisations, and has significantly reduced the time required for data analysis, particularly in data-intensive sectors such as healthcare and finance.

IBM Watson is used in various fields such as healthcare, finance and retail. For example: (IBM Watson to watsonx, 2026)

- **Healthcare:** Watson is used to analyse patient records, helping doctors make better treatment decisions.
- **Finance:** Watson helps analyse market data and predict financial trends.

By analysing the results of IBM's use of Watson we have :

Table 1. the results of IBM's use of Watson

N	Sector	Business	Result
1	Healthcare	Improved diagnosis Watson	Helps doctors analyse medical records and identify patterns, resulting in a 30% increase in diagnostic accuracy.
		Time taken	The time doctors spend reviewing records has been reduced by 50%, allowing them to focus on treating patients
2	Financial	Data analysis	Financial institutions have used Watson to analyse market data. 80% of these institutions reported that AI-powered analytics led to more accurate investment decisions
		Increased revenue	A study showed that companies that relied on Watson to analyse financial data achieved a 20% increase in revenue.
3	Retail	Customer behaviour analysis	Retail companies used Watson to analyse customer behaviour and preferences, which helped them to better personalise their offers. 85% of companies reported an improvement in the customer experience
		Increased sales	Companies that used Watson saw a 15% increase in sales.

Source: Compiled by researchers based on (IBM Watson Discovery Use Cases, 2026)

4.2.2 Integrating intelligence into operational decisions at IBM:

By combining mandatory business rules with predictive modelling, you can :
(Overcoming business challenges with AI-powered decision management, 2026)

- Use machine learning to automate repetitive decisions and gain a competitive advantage.
- **Empowering business users:** Use Business Rules software to design, author and validate decisions intuitively in a low-code environment.
- **Make better decisions:** Integrate artificial intelligence with predictive

The Role of Artificial Intelligence in Management Decision-Making - A Case Study of IBM –

analytics to improve your decision-making process.

- **Improve the customer experience:** Use advanced analytics to adapt to changes in real time and exceed customer expectations.

Despite the benefits, there are challenges associated with the use of AI:

- **Data bias:** 40% of companies using Watson reported issues with data bias, which affects the accuracy of results.
- **Privacy:** A study showed that 70% of consumers are concerned about how companies use their data.

Table 2. Investment in artificial intelligence and its financial impact and results at IBM

Investment in AI		The impact of AI on customer satisfaction		Financial results	
Percentage of expenditure	Number of IBM projects	Service Improvement	Reduction in complaints	Revenue growth	Market share
In 2022, IBM invested approximately \$3.6 billion in the development of artificial intelligence technologies, representing a 20% increase compared to the previous year	It currently manages more than 500 projects utilising artificial intelligence technologies across various sectors	78% of companies that used Watson reported an improvement in customer service, leading to a 25% increase in customer satisfaction.	Companies that adopted Watson saw a 30% reduction in complaints due to improved customer experience.	In the first quarter of 2023, IBM achieved an 8% increase in revenue in its AI services division, reaching \$1.4 billion.	IBM holds a 13% share of the global AI market, making it one of the leading companies in this field.

Source: Compiled by researchers based on (IBM Insights, 2026) (IBM Annual Report 2022, 2026) (IBM beats fourth-quarter revenue estimates as AI boosts software demand, 2026)

4.2. 3 How IBM uses artificial intelligence to support decision-making ?:

- Decision Management Software:

IBM relies on a dedicated decision management platform that enables organisations to design and analyse business rules, then automate routine decisions using a combination of business rules and machine learning. This software also allows decisions to be simulated or different scenarios to be tested before implementation, giving management greater ability to predict and plan ahead. Through this platform, business logic can be separated from operational applications, increasing flexibility for change without affecting the infrastructure. IBM also provides reporting tools and dashboards that help managers monitor performance and interact with intelligent decisions in real time. (Decision Management Software and Solutions, 2026)

- Organisational transformation towards artificial intelligence:

According to the IBM website, the AI transformation journey begins with assessing an organisation's data and infrastructure capabilities, followed by building a roadmap to integrate technologies such as machine learning, natural language processing, and even generative AI. During this transformation, IBM encourages organisations to redesign their business processes and reduce routine tasks that can be handled by AI tools, allowing employees to focus on more strategic and innovative tasks. IBM also highlights the importance of governance in the application of AI: it is vital to have internal regulatory mechanisms in place to ensure that AI decisions align with organisational objectives and can be verified for credibility. (What is meant by the transition to AI?, 2026)

-The Impact of Artificial Intelligence on Management Performance :

According to the 'Impact of Artificial Intelligence' report from IBM's THINK website, the **AI in Action 2024** survey revealed that around **67% of business leaders** surveyed had seen a 25% or greater increase in revenue thanks to artificial intelligence. In the same report, 72% of executives indicated that they had successfully achieved "alignment" between technology and business teams to implement AI investments, thereby enhancing the effectiveness of strategic decisionmaking. In some sectors, such as manufacturing or services, IBM systems demonstrate predictive technologies that significantly improve forecasting accuracy (such as inventory or demand forecasts). (The impact of artificial intelligence, 2026)

4.2.4 Challenges in IBM's experience :

Despite these successes, IBM's experience in integrating AI for decision-making has not been without challenges: (Mateusz & Crowston, 2024, pp. 123-143)

- **Transparency and accountability:** Some AI algorithms (such as deep learning models) may appear to be 'black boxes' in terms of how they arrive at specific decisions, raising questions about accountability and the internal

The Role of Artificial Intelligence in Management Decision-Making - A Case Study of IBM –

reasoning behind intelligent decisions.

- **Strong governance requirements:** Organisations using IBM platforms need a governance system that ensures the decisions generated by algorithms align with the company's strategy and ethics.
- **Infrastructure and data costs:** To run AI tools efficiently, organisations need large amounts of data, powerful computing resources, and a specialist team — which can present a financial and technical barrier.
- **Organisational resistance:** Some employees or departments may fear a shift in roles or a loss of relevance when intelligent systems are used to make certain decisions.
- **Actual value:** Although IBM asserts that AI can turn decision-making into a 'strategic advantage', some AI initiatives may fail if they do not translate into tangible business results. A recent analytical study also suggests that building a shared understanding of what "value" from AI means can be difficult within projects.

IBM's experience shows that AI, through platforms such as Watson and watsonx, not only changes how data is processed, but also how decisions are made within organisations. By using intelligent decision-making systems, IBM can integrate forecasting and analysis into the decision-making process, providing managers with data-driven recommendations and helping them make faster and more effective strategic decisions.

However, the challenges are clear: governance, infrastructure, transparency and organisational culture are all factors that must be addressed to ensure that reliance on AI is safer and more effective. IBM's lessons provide a valuable roadmap for other organisations wishing to adopt AI in their management decision-making.

5. Conclusion:

Previous studies have shown that artificial intelligence has great potential to improve managerial decision-making by providing managers with advanced and rapid analytical tools. It has been shown that the use of artificial intelligence enhances the efficiency of administrative processes, reduces human error, contributes to effective risk management, and enables a faster response to changes.

However, the research also highlighted the importance of exercising caution when using this technology; the findings suggest that maximum benefit is achieved when artificial intelligence is integrated within a robust governance framework that includes clear ethical guidelines and continuous human oversight.

5.1 Testing the hypotheses :

The results of the case study on IBM (particularly using the Watson system)

showed a statistically significant positive impact of AI on the effectiveness and quality of the company's managerial decision-making process, thereby supporting the main hypothesis. It was found that AI-driven data analysis helps to accelerate the managerial decision-making process by providing the necessary information instantly and reducing the time spent on analysis, which confirms the validity of the first sub-hypothesis. Furthermore, the predictive capabilities provided by AI led to an increase in the accuracy of managerial decisions; IBM noted that the Watson system achieved a prediction accuracy of 96% in employee performance evaluation compared to analysis by human experts, thereby supporting the second subhypothesis. Furthermore, AI-based decision support systems helped reduce the error rate in decisions; one experiment showed a 10% reduction in errors in administrative processes when Watson solutions were adopted, supporting the third sub-hypothesis. Consequently, all hypotheses (main and sub-hypotheses) are accepted, reinforcing the conclusion that artificial intelligence plays a significant positive role in improving the effectiveness, accuracy and quality of administrative decisions in the modern workplace, as evidenced by the case of IBM

5.2 Research Findings :

The study yielded a set of important findings that highlight the growing role played by artificial intelligence in supporting the managerial decision-making process within modern organisations. The study reached the following conclusions:

- **Enhancing the quality of information available to decision-makers:**

The study showed that AI contributes to improving the quality of information used in decision-making through its ability to: analyse vast amounts of data quickly, detect patterns and relationships invisible to humans, and provide accurate and objective information that reduces human bias

- **Accelerating the decision-making process:** The study demonstrated that the use of AI reduces the time required to make managerial decisions, particularly in tasks that previously involved lengthy data collection and analysis. This was clearly evident at **IBM** through its Watson analytical systems, which reduce the time taken to make operational and strategic decisions.

- **Improved forecasting and strategic decision-making:** An IBM case study showed that integrating artificial intelligence enabled the company to: build accurate predictive models, improve the assessment of future risks, and make strategic decisions based on the analysis of data from multiple sources rather than on experience alone

- **Reducing human error in decision-making:** Intelligent systems have been shown to help detect errors early and reduce the likelihood of misjudgement, particularly in financial, operational and resource management

The Role of Artificial Intelligence in Management Decision-Making - A Case Study of IBM –

decisions.

- **Supporting complex, multi-variable decisions:** The results showed that intelligent algorithms are highly capable of analysing complex situations involving multiple criteria, thereby enhancing the accuracy of management decisions and making them more aligned with the organisation's objectives.
- **Challenges associated with the adoption of artificial intelligence:** Despite the benefits, the study revealed a number of challenges, the most significant of which are: a shortage of qualified personnel to implement AI, the high cost of some advanced systems, concerns regarding privacy and data protection, and the need for an ethical framework to regulate the extent of smart systems' involvement in management decision-making.
- **The importance of combining human expertise with smart technologies:** The study concluded that the best management decisions are those that combine the objective analysis provided by AI with the intuitive expertise and qualitative analysis provided by humans.
- **The potential for replicating IBM's experience in other organisations:** The findings confirmed that IBM's experience serves as a model that can be utilised in other organisations, provided that: the technology is adapted to the nature of the organisation, staff skills are developed, and investment is made in digital infrastructure.

5.3 Recommendations :

Based on the above, a set of recommendations can be formulated for organisations and managers wishing to utilise artificial intelligence in decision-making, as follows:

- **Strengthening data infrastructure and protection:** High-quality, reliable data must be made available to feed smart systems, whilst adhering to privacy and information security standards
- **Involving the human element and raising awareness:** Developing staff skills and capabilities to understand and use artificial intelligence technologies, and training them to critically assess their outputs. The final decision should rest with humans in sensitive situations, regardless of the role played by machines
- **Transparency and accountability:** Requiring companies to disclose how their AI algorithms work and their level of reliability, and establishing independent oversight committees to assess ethical risks and ensure the fairness of decisions
- **Balanced strategic planning:** Integrating AI gradually and thoughtfully into management processes, starting with routine and measurable tasks, and

avoiding jumping straight to full automation without a feasibility study.

- **Ongoing risk assessment:** establishing regular mechanisms to review system performance and ensure there are no biases or recurring errors, whilst being prepared to adjust criteria or models to ensure the accuracy of decisions

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