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The impact of artificial intelligence on decision-making in light of technological developments: Applied to a sample of commercial banks

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Abstract:

The study aims to analysis the impact of artificial intelligence on the decision-making process in light of the significant technological developments that have had a significant impact, particularly in the banking sector. To achieve this goal, we sought to review a sample of commercial banks, relying on a descriptive-analytical approach to describe the phenomenon under study and analyze its various impacts. Despite the varying degrees of impact, we sought to focus on some experiences that can be benefited from globally and regionally, the extent of AI's impact on the decision-making process.

The study concluded that the use of AI technologies is one of the most important solutions used to assist in decision-making. The study also emphasized the need to adopt AI applications by developing the infrastructure that can significantly assist decision-makers in making appropriate decisions for managing commercial banks and keeping pace with technological developments in this field.

Keywords: artificial intelligence, decision-making, commercial banks
JEL Classification: C50 ; D81 ; G21

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Introduction

In light of recent developments and the challenges facing management today, represented by the rapid and successive changes in the business environment, the multiplicity and diversity of problems, the need for speed in achievement and improved performance, the tremendous increase in the volume of data and information circulating, and technological developments, the need to leverage artificial intelligence has emerged. Artificial intelligence systems and the efficient use of them represent a fundamental challenge, as the successful implementation of these systems must depend on scientific knowledge of how to best use them to support the needs of decision-makers. The world is now completely dependent on technology in all aspects of life. Modern technology has contributed to the rapid development of science and its technological applications, making it different from yesterday's and will make the world of tomorrow completely different from today's. Technological progress and organizational maturity have also contributed to optimal utilization to support administrative work and its functions.

Artificial intelligence is one of the most important topics that help administrative leaders confront the evolving challenges in the work environment, especially in commercial banks. Artificial intelligence is of utmost importance, given the assistance and skill it provides in obtaining the necessary and timely information, which helps decision-makers in financial and banking institutions reach the appropriate decision. Based on this, this study attempts to answer the following problem

Research Question:

What is the impact of using artificial intelligence technologies on the decision-making process in commercial banks?

Study Hypotheses:

To answer the question and achieve its intended objective, the following hypotheses were adopted:

- There is a statistically significant direct relationship between artificial intelligence and decision-making in banks at a 5% significance level.

- There is a statistically significant direct relationship between technological developments and decision-making in banks at a 5% significance level.

Studies Previous:

- Study of Arzi Fathi, The Contribution of Expert Systems to Improving Decision-Making in Algerian Institutions (2017)

This study aimed to examine the application of an expert system to the recruitment process in institutions by analyzing the system's impact on decision-making in terms of ease, accuracy, and time savings.

The tremendous development of technology and the emergence of numerous systems and tools aimed at supporting decision-making have created a need for decision-makers to have a system that meets their information needs. The study focused on the recruitment process in the public sector, with its conditions and criteria. The researcher emphasized that expert systems have become an urgent necessity, facilitating work, reducing costs, and enabling sound decision-making.

The study concluded that Algerian institutions, particularly public institutions, lack these systems due to the lack of qualified human resources and their high cost.

- Study Gloria Phillips-Wren, Intelligent Decision Support Systems;

This study aimed to explore how artificial intelligence (AI) techniques can be used to enhance and improve decision-making support through tools such as fuzzy logic, artificial networks, genetic algorithms, and natural language processing. The study focused on integrating these systems in an attempt to understand the use of AI techniques integrated into information systems aimed at supporting decisions. The benefits of AI systems used in decision-making support processes were studied and summarized. The study demonstrated that AI sciences have significantly contributed to improving the efficiency and quality of decisions and enhancing the efficiency of searches among multiple solution alternatives. This is due to the ability of these systems to support the decision-making process.

- **Commentary on previous studies:**

Looking at previous studies, we find that they are diverse in terms of the choice of research topic (dependent and independent variables). We also note that they are diverse in terms of the year the study was published. Some are recent, dating back to 2020 and 2021, and some are older, dating back to the first decade of the third millennium. Looking at the study's methodology, we note that they all address the impact of applying artificial intelligence on the quality of decision-making. Our study intersects with previous studies in many areas, such as artificial intelligence and the quality of decision-making. However, our study differs from previous studies in that it is applied to commercial banks in Algeria.

This study aimed to understand the interactive relationship and mutual influence between the effective use of expert systems and the quality of

decisions made. Considering the expert system as an intelligent and advanced decision support system that helps managers at various levels make decisions to solve problems, especially unstructured problems, through the alternatives these systems provide for solving these problems, based on the experience stored within them. The researchers confirmed that expert systems play a significant role in supporting decision-making in commercial banks. They:

- Provide advice to the system user based on the information it provides, even in uncertain situations.
- These systems can perform tasks performed under hazardous working conditions, avoid human exposure to risks, and perform these tasks efficiently.
- These systems enable sound and more comprehensive decisions than expert decisions by finding solutions, supporting decision-makers, and speeding up problem resolution.
- They rely on artificial intelligence to identify and diagnose problems and access information used to solve them from the available knowledge base.
- They are considered intelligent and advanced decision support systems, playing an effective role in improving the quality of information and, consequently, increasing the efficiency of decisions.

1. Theoretical Framework of the Study:

This section of the study reviews the most important concepts related to artificial intelligence and its characteristics, as well as the most important areas of AI use, focusing on the role of AI in supporting decision-making systems.

1.2 Definition of Artificial Intelligence and Its Characteristics:

Artificial intelligence is considered one of the new applications that help in providing various scientific and theoretical solutions, so that we can learn natural languages, accomplish actual tasks in an integrated manner, or use images and cognitive forms to rationalize physical behavior, in addition to storing accumulated human experiences and knowledge and using them in the decision-making process. Therefore, it can be said that applications in the field of artificial intelligence are renewable and open to development and creativity. It is also characterized by multiple characteristics, the most important of which will be addressed in this part of the theoretical study. (Benmehdi, 2024)

1.2.1 Definition of Artificial Intelligence:

There are many concepts related to artificial intelligence, and we will attempt to address the most important of them:

Artificial Intelligence (AI) is a specialized area within computer science and information science focused on creating hardware and software

systems capable of solving problems and completing tasks that, if performed by humans, would be deemed intelligent. This multidisciplinary field explores both the cognitive aspects of thinking and reasoning, as well as the behavioral aspects of action and problem-solving. Its ultimate goal is to develop machines that exhibit intelligent behavior and can autonomously adapt to diverse contexts and challenges. (Takoua, 2024)

Artificial intelligence (**AI**) is a science and technology that draws on specific fields and disciplines such as computer science, mathematics, biology, psychology, linguistics, and knowledge engineering to develop computer systems that can think, see, hear, walk, speak, and thus act intelligently. (Ishak, 2025)

In other words, the field of AI refers to efforts to develop computer information systems that are parallel to human intelligence and give computers the capabilities of perception, learning, and problem-solving. It relies on knowledge, not data. It is the fruit of the convergence of modern science and technology. These systems aim to design and develop computer systems that mimic human intelligence and are used to solve problems and make decisions. They give machines the ability to perform the intelligent operations that humans perform.

From the above, we note that artificial intelligence encompasses diverse key applications, such as natural language processing, expert systems, neural networks, fuzzy logic, use cases, and intelligent agents. Therefore, it is not possible to study and analyze all areas of artificial intelligence application in management processes and activities. Therefore, we will examine the most important artificial intelligence systems used to support management decisions. The current picture of artificial intelligence includes four main areas: (Djoudi, 2024)

Table number (01): Artificial intelligence (**AI**)

	Artificial intelligence (**AI**)		
Natural interface Application	Robotics Applications	Computer Science Applications	Cognitive Science Applications
-Natural Languages -Discourse Recognition -Multiple Interfaces -Virtual Reality	-Visual Perception -Acuity -Transportation -Mobility	-5thgeneration computer -Balanced Processing -Symbolic Processing -Neural Networks	-Expert systems -Knowledge systems -Learning systems -Fuzzy logic -Intelligent agents

Source: Djoudi, C. (2024). Using Artificial Intelligence Technologies in the Media. International Journal, p62.

1.2.2 Characteristics of Artificial Intelligence:

In the field of information systems, programmers, analysts, and system designers assist decision-makers in storing, retrieving, and working with data, providing them with comprehensive, accurate, and timely information. However, in the field of artificial intelligence, this technology focuses on generating and presenting knowledge and facts. Therefore, knowledge engineers attempt to discover rules of thumb that enable computers to perform tasks handled by humans. Furthermore, the rules used in the field of artificial intelligence include numerous interconnected technologies derived from a group of experts. Therefore, we can distinguish between the technical and non-technical characteristics of an artificial intelligence system, as follows:

1.2.2.1 Technical characteristics of artificial intelligence:

- Symbolic Processing: When AI systems are applied to computers, they don't process letters or numbers. Rather, they process symbols, arranging them into structures resembling networks or lists, which show how the symbols communicate with each other.
- Non-computational Processing: Computer programs, when outside the scope of AI, are programmed algorithms. They are a set of procedures that determine how to solve a problem. Therefore, this system is knowledge-based.
- Logic: I systems are used to solve problems by relying on logical deduction, which enables machines to reason and arrive at appropriate solutions.
- Perception: Perception is one of the most prominent characteristics of AI systems. These systems can process various sensory inputs, such as sounds and visual images, and then infer many things about the world. (Benazza, 2024)
- Communication: AI systems are distinguished by their ability to use human language to communicate and understand written and spoken language. They also use natural language processing techniques to understand people's emotions and intentions.

- Learning Ability: AI programs have the ability to learn, something traditional systems have yet to achieve.
- Planning: One of the characteristics of an AI system is its ability to set and achieve goals. This process is called planning, which is implemented through a sequence of actions that influence progress toward the set goals.
- Rapid Decision Making: Many of the largest and most innovative organizations are using AI systems in their decision-making process, given their ability to address multiple factors and process multiple data points simultaneously, in addition to proposing the best decisions using probability. (Benazza, 2024)

1.2.2.2 Other features of artificial intelligence

- Using intelligence to solve problems presented in the absence of complete information.
- The ability to think and perceive.
- The ability to acquire and apply knowledge.
- The ability to learn and understand from previous experiences and expertise.
- The ability to use old experiences and apply them to new situations.
- The ability to use trial and error to explore different issues.
- The ability to deal with ambiguous situations in the absence of information.
- The ability to visualize, create, and understand and perceive visual matters.
- The ability to present information to support management decisions.

2.2 Artificial Intelligence Systems Supporting Administrative Decisions:

Decision-making is a complex process at the level of commercial banks due to the interplay of many factors influencing the decision-making process. Therefore, a sufficient amount of information must be available, and this information must be of a high level of importance, as the quality of the decision depends on the comprehensiveness and accuracy of this information. Through this information, the best alternative can be chosen from among the available alternatives, especially for commercial banks. This is what artificial intelligence technologies and their various applications provide in this direction.

As AI systems take on tasks that require analytical and decision-making skills, the value of experienced workers in these fields has increased, and they enjoy greater advantages. Many AI systems support managerial decisions, particularly those that are automated, meaning they

do not require human intervention. Automated managerial decisions are sometimes called algorithmic management decisions or automated management decisions. The most important of these can be explained as follows: (Adel, 2025)

2.2.1 Expert Systems:

Sometimes called intelligent support systems, expert systems are among the most successful artificial intelligence technologies. They are computer programs designed to model the ability of a human expert to solve problems. The expert system is based on the expert's knowledge, thinking, and perception, or on his or her method of rationalizing and understanding things. It serves as an advisor to the manager in making various decisions by assisting the computer in making unstructured decisions, which are usually made by individuals with specific expertise. These are artificial intelligence programs designed to store knowledge and information about a specific field based on the expertise of experts working to solve problems. They are effective at solving semi-structured and unstructured problems, and they can also address problems that require theoretical knowledge and practical experience. (Graupe.D, 2005)

2.2.1.1 Types of Expert Systems: Expert systems come in several types, including: (Rogerson, 2023)

- Systems that function as an assistant: The system assists the user in business analysis, clarifying activities that require human intervention.
- Systems that function as a colleague: In this case, the system allows the user to discuss the problem and receive answers. The outcome is the result of a joint effort between the user and the system. If the user discovers that the system is taking the wrong path to solve the problem, it provides further information to correct the path. Therefore, the final decision is the result of a joint effort.
- Systems that function as an expert: They provide ready-made advice to the user. The presence of expert systems in management offers many benefits, the most important of which are:

• Documenting human experience and skills.

• Ensuring objectivity, reliability, and accuracy in administrative decision-making.

• Ensuring rationality, impartiality, and freedom from emotions, feelings, and psychological tendencies when making important decisions.

• Providing support and assistance to managers and decision-makers (unstructured and semi-structured decisions).

• The flexibility of time and space afforded by an expert system, as it can be used at any time and in any place.

• The expert system does not require a suitable physical, social, or psychological environment to operate efficiently and effectively.

2.2.1.2 Uses of Expert Systems: Expert systems are used in various fields, including: (Graupe.D, 2005)

• Banking and Finance: Expert systems in foreign exchange trading evaluate historical trends, new events, and buying and selling factors.

• Administrative Fields: Expert systems assist managers in solving unstructured problems by providing alternative solutions based on a stored experience base.

There are a number of systems, each with a specific feature. Some are related to identifying tax problems and proposing solutions, others are specific to debt analysis to assist in collection, examining credit granting, and reviewing accounting systems. All of these systems have the ability to help evaluate aspects related to internal control.

2.2.1.3 Advantages of expert systems:

- Increased quality, as expert systems can reduce risk and failure rates.
- Capturing and disseminating rare expertise in specific needs and operating in hazardous environments.
- Access to knowledge and help desks.
- Reliability, meaning expert systems do not tire, get bored, or get sick.
- Increased ability to work with incomplete and uncertain information.
- Improved decision-making and problem-solving capabilities, while reducing decision-making time.

2.2.2 Artificial Neural Networks:

Neural networks are intelligent computing systems associated with the field of machine learning. In recent years, they have become an important means of learning. Unlike expert systems, they cannot provide an explanation for the solution found. Their primary goal is to mimic the mind in making decisions and drawing conclusions in the presence of complex, confusing, or partial information. Neural networks can be described as model-free systems, systems that learn from experience, and dynamic systems with feedback.

2.2.2.1 Definition of a neural network:

It is an information processing system with specific performance characteristics similar to biological neural networks. It has been developed in a mathematical form based on the way human thinking is conducted and how nerves process information. It is a thinking model based on the human

brain, which consists of a group of nerve cells or basic information processing units called neurons. Neural networks are systems that represent intelligence with a group of elements similar to the brain's neurons.

2.2.2.2 Benefits of Using Artificial Neural Networks:

Other AI systems process information efficiently, but the primary advantage of using neural networks is that...

- Neural networks can detect and extract meaning from highly complex and inaccurate data, which is difficult for other systems to do. They are therefore intelligent, trained neural networks that can reason like an expert in a given information category.

- Despite their limited capabilities, neural networks seek to apply some of the useful mechanisms of biological neural systems to problem solving.

3.2.2 Genetic Algorithms:

Also called adaptive computing, genetic algorithms are used to find the optimal solution to a specific problem by examining and testing a very large number of possible solutions to the problem being decided. They have become more widely known as a form of artificial intelligence and are often used in techniques aimed at finding solutions to research and optimal problems. The techniques used to solve problems in genetic algorithms are theoretically based on the concept of living systems that use their capabilities to adapt to the environment through the process of evolution. Just as living systems evolve and respond to environmental challenges, so too does a computer program operate according to genetic algorithm systems. A genetic algorithm program operates according to an algorithm in which possible solutions or alternatives to a decision compete with each other.

3.2.2.1 Uses of Genetic Algorithm Systems: The following techniques are used in genetic algorithm systems: (Adel, 2025)

• Selection and survival of the fittest: giving the highest weight or preference to the best results.

• Intersection: combining the best parts of different results to achieve the best result.

• Convergence: attempting to randomly combine different inputs and evaluate the results.

Genetic algorithm techniques are used in the fields of finance and banking, investment applications, and to solve logistics problems and control the movement of materials. They are applied in various types of modern technology due to their superior ability to test complex problems without making any assumptions about the correct solution. Genetic algorithms are

currently used with neural networks and fuzzy logic systems to solve marketing and scheduling problems.

3.2.2.2 Characteristics of Genetic Algorithm Systems:

Genetic algorithms are applied to a wide range of decision-making problems. They are considered an excellent solution to some optimization problems that cannot be solved using traditional methods due to the following characteristics:

- Randomness is a key factor in genetic algorithms.
- Genetic algorithms search for a community of solutions, unlike quantum methods, which search for a single solution. This makes them play an important role and provides an opportunity for comprehensiveness.
- They can be applied to any problem, and there are no prerequisites or conditions for their use.
- Genetic algorithms handle all quantitative variables.

4.2.2 Logic Systems:

Also called fuzzy or fluid logic, fuzzy logic is a rule-based technology that represents speculative situations that require the construction of rules using approximate values. These systems are used by organizations to capture implicit knowledge, especially when faced with ambiguous and unspecified circumstances. Fuzzy logic emerged to replace traditional computational logic, which is based on diagnosing phenomena as absolutely true or absolutely false. These systems rely on rules rather than models, and are used in building artificial intelligence systems and technologies, including expert systems, to deliver the necessary technologies. (Jeng, 2007)

4.2.2.1 Logic Uses:

Fuzzy logic techniques and systems are used with other integrated systems that operate using artificial intelligence techniques, such as fuzzy logic expert systems and fuzzy logic neural networks, in key business areas, particularly in financial and banking applications such as forecasting expected returns on securities, risk management, cash flow planning, and investment portfolio management. Fuzzy logic is used in search engines, database management systems, software development, and other important applications.

Computerized fuzzy logic systems used in various business applications are dynamic systems, as sample data is generated and programmed throughout development. They perform the function of estimation without a mathematical model that explains how the outputs depend on the inputs. In other words, the closest description of the nature of

fuzzy logic is that it operates in the opposite direction of statistical estimations or estimates.

4.2.2.2 Areas of application of artificial intelligence technologies:

The areas of application of expert systems, data mining, fuzzy logic, neural networks, and genetic algorithms can be summarized as shown in the following table: (ghaleb, 2006)

Table number (02): Areas of application of expert systems techniques: data mining, fuzzy logic, neural networks, genetic algorithms

Technology	Areas of use
Expert Systems	Diagnosis, troubleshooting, decision-making systems.
Data Mining	Analysis, predictions, classification, rule discovery.
Fuzzy Logic	Route discovery, Robert's motion.
Neural Networks	Recognition, simulation, modeling.
Genetic Algorithms	Finding optimal solutions.
Inference Based on Real-World Cases	Intelligent expert systems, evaluation, finding new solutions.

Source: Arwa Yahya, Decision Support Systems, previous reference, p.218.

1.3.2 Artificial Neural Networks:

As a computing technology specifically designed to simulate the way the human brain performs a specific processing task, they have the ability to penetrate thousands of data records stored in data mining systems to deduce hidden relationships within this data. They thus assist decision-makers in linking the characteristics of the problem itself and assist them in identifying available opportunities due to their ability to offer alternatives. Currently, neural networks are used in various fields of business, finance, industry, services, and trade. However, they are widely used to support financial and banking decisions, analyze and manage investment portfolios, predict stock and bond prices, and predict customer exchange rates. They are also used in operations management, to solve logistical problems, and to support control decisions.

2.3.2 Genetic Algorithms:

These are another type of artificial intelligence system that assists decision-making by penetrating decision support systems to efficiently arrive at the best and most optimal solution. They are widely used in the search for the best solutions and alternatives among possible solutions and alternatives for a decision, with the best solution remaining. These systems

leverage their intuitive knowledge of the real system, address problems, and exploit opportunities. Genetic algorithms are applied in various types of modern technology and in the fields of banking and finance.

3.3.2 Logic Systems:

These are dynamic systems capable of mimicking human perception through incomplete, fuzzy data. These systems are relied upon within decision support systems to assist decision-makers in supporting unstructured and semi-structured decision patterns, thus arriving at the best and most optimal solution with high efficiency. They are particularly used in financial and banking applications to predict expected returns from securities, manage risks, plan cash flow, manage investment portfolios, etc.

4.3.2 The Role of Expert Systems:

Expert systems have created consistency, stability, and interoperability in decision-making. They were specifically designed to solve manufacturing problems and help improve decision-making skills. Expert systems are used in thousands of organizations, serving a variety of tasks by providing senior management with high-quality, accurate, and rapid information when making decisions.

The role of expert systems in the decision-making process can be explained through the stages of this process: (ghaleb, 2006)

- **Intelligence Stage**: Expert systems play an effective role in this stage, assisting the decision-maker in the process of classifying the problem by identifying and classifying it and demonstrating its severity through the knowledge base, which is one of the most prominent components of the system.
- **Design Stage:** Expert systems in this stage can present alternative solutions for complex problems. They also have the ability to predict the outcomes of alternatives.
- **Selection Stage:** The role of expert systems in this case is to develop and evaluate alternative solutions and propose the appropriate solution. They provide advice and counsel, but are not a substitute for the decision-maker.
- **Implementation Phase:** Expert systems are used in the interpretation processes accompanying the decision being made to facilitate its implementation.

Expert systems play an effective role in supporting decision support systems, as they can be relied to process symbolic data through analysis, logical comparison, knowledge acquisition, and deduction. They explain the reasons and principles upon which the analysis is based, define the problem based on the analysis of the input information, present various solutions and

alternatives, and evaluate each alternative. Furthermore, expert systems have played a significant role in formulating decision-making models in the absence of sufficient information. They are one of the most powerful branches of artificial intelligence, used in problems for which there is no clear algorithm for solving them, and they help transfer the expertise of specialists in dealing with problems to support systems. (asma, 2014)

3. Applied Study: Analyzing the Effects of Artificial Intelligence on Decision-Making in Commercial Banks

Decision-making is a technical and scientific method used to develop strategies, draw plans, and set goals. Therefore, the necessary competence is required. This competence involves using artificial intelligence technologies to generate high-quality information, upon which sound decisions are based. This is what some commercial banks rely on. (Jago, 2021)

Accordingly, we will devote this part of the study to some experiences at the level of commercial banks that use artificial intelligence applications in the decision-making process, highlighting this impact, while exploring this impact at the level of commercial banks.

1.3 Requirements for Implementing Artificial Intelligence in Commercial Banks:

According to Accenture, there are a set of measures that must be taken to leverage AI and make appropriate decisions. The most important of these are the following: (Jago, 2021)

- Ensure a well-defined strategy for data usage and applications, in addition to analyzing how data is used, with an agreed understanding of the role AI tools can play in helping build value for employee and customer data.
- Explore the possibility of developing an AI center of excellence, which could provide a centralized capacity that can be implemented within banks. This could include external resources that can provide flexibility and speed of implementation.
- Create a scalable testing and learning environment that can explore AI and banking processes, increasing the speed of innovation. 2.3 Using Artificial Intelligence for Banking Decision-Making

1.2.3 Using Expert Systems to Improve Commercial Bank Decisions:

The expert model, known as COMPAS (1988), was gradually implemented in bank branches and adopted in 1994, covering 88% of the bank's activities. This expert system is equipped with a database derived

from the expertise of loan analysts. It also uses accounting information provided by bank loan applicants to make decisions.

Using expert systems to support improved banking decisions involves designing an expert system whose mission is to assess the status of lenders and then decide whether to grant a loan. The design of an expert system for this purpose typically goes through several stages, which can be explained below:

• Defining the base facts, which represent the sum of data about lenders, represented by quantitative and qualitative variables extracted from borrower files.

• Building a database by defining the probability ranges for the quantitative and qualitative variables and expressing them linguistically, relying on the domain expert's knowledge and the expertise of the data engineer.

• Designing an inference engine that represents the source of inference in the fuzzy expert system by expressing quantitative and qualitative variables in the form of membership functions.

• Testing the expert system by providing it with real data from previous lenders to determine its ability to predict the future status of lenders and assess the associated risks.

2.2.3 Using Artificial Neural Networks for Decision-Making in Banks:

They are widely used in commercial banks to study the degree of risk in the loan granting process, solving the problem of evaluating loan applications. They have also been extensively adapted to predict defaults due to the technology's ability to classify borrowers.

Perhaps the most important features of the network, which has made it a favorite among practitioners, are the following: (Pratiwi, 2023)

- The network's ability to learn, generalize, and reproduce logically, making it a suitable system for estimating loan risk from historical data and extracting the relationship between the variables that best explain and express borrowers' creditworthiness, thus accurately estimating the potential risk.

- The digital nature of the neural network makes it easier to use compared to symbolic processing techniques, meaning it can integrate all variables occurring within the environment or even within the lenders themselves. - The ability to process a huge amount of submitted data, enabling it to process a larger number of loan applications and retain the largest amount of data on lenders.

3.3 Opportunities and Challenges of Using Artificial Intelligence for Decision-Making in Commercial Banks

1.3.3 Opportunities Achieved by Artificial Intelligence in Commercial Banks:

The most important opportunities offered by artificial intelligence for commercial banks are as follows: (Jago, 2021)

• Bringing about radical changes in the field of banking services, making them easier, faster, less expensive, and more secure, such as chatbot applications, which are programs that simulate natural conversation between people.

• Reducing banks' operating costs by reducing the number of employees. Banks can reduce operating costs by approximately 50% by reducing the number of administrative and operational office staff who provide daily services to customers by relying on low-cost and relatively high-efficiency technology.

• Achieving a competitive advantage by providing high-quality, distinctive services at a low cost by providing the bank with a machine learning application to protect banks from hacking and piracy. This represents a high level of efficiency for the bank in managing its funds and protecting the bank's reputation. Using machine learning and deep learning, it can detect fraud and hacking of banking systems and combat money laundering.

• Managing credit risk by relying on expert systems. These software collects and analyzes data and provides financial analysts with advice and answers to help them make banking decisions. Natural language generation technology can also be leveraged to intelligently interact with customers.

2.3.3 Disadvantages of Artificial Intelligence in Commercial Banks:

The adoption of artificial intelligence in banks has some associated drawbacks, which can be highlighted as follows: (Sadok, 2022)

- The complete automation of banking operations contributes to weakening oversight.
- The lack of decision-making capacity under special circumstances.
- Further security protocols are required to develop a secure automated environment.
- Artificial intelligence will replace employees in the value chain, i.e., perform tasks currently performed by employees, and perform these tasks faster and more accurately.

3.3.3 Challenges Facing Commercial Banks When Using Artificial Intelligence in Decision-Making

The most important challenges facing commercial banks when using artificial intelligence in decision-making are: (Pratiwi, 2023)

- Security challenges: This entails maintaining the confidentiality, integrity, and security of information, especially with the emergence of e-banking and

virtual banks that rely on the internet. Therefore, websites and personal data must be protected.

- Technical challenges: These relate to the technical staff in banks, as they must possess a level of knowledge and understanding of smart computers, software, and modern technologies.
- Infrastructure challenges: This entails developing software hardware and creating websites, platforms, and application programs, which imposes a significant additional cost on commercial banks.

Conclusion

The study reached the following conclusions:

- Artificial intelligence systems have a clear impact on improving the process of industrial management and decision-making. This positive impact is evidenced by the ease of exchanging and transferring information using available modern technologies; the ease of obtaining, collecting, and storing data; the ease of analyzing and processing this data to arrive at conclusions; the ease of leveraging knowledge and expertise in remote locations in real-time; and the ease of consultation in industry and decision-making using available technologies.
- Artificial intelligence enables decision-makers to identify areas where an organization is performing better or worse, providing management with accurate information to operate efficiently and in a timely manner.
- Increasing awareness of the concept of artificial intelligence among banks, in preparation for linking artificial intelligence to the field of banking transactions, as it helps decision-makers and customers improve the decision-making process in financial matters.
- One of the most significant outcomes of AI in organizations is a reduction in uncertainty about information, an increase in confidence in the role it can play, and a significant improvement in decision-making processes.
- Technology associated with artificial intelligence can improve the quality of decision support systems and has the potential to add interpretive and educational capabilities that complement the components of decision support systems. These technologies are considered an effective and excellent method for supporting financial decisions, as these methods can provide guaranteed prices, predict future prices, and predict stock performance.

- Artificial intelligence aims to support decision-making. It uses technologies, processes, and applications to analyze internal and structured data. It is a broad category of applications and techniques for collecting, sorting, analyzing, and providing access to data to help institutional users make better decisions.
- Commercial banks in Algeria are still far from using advanced artificial intelligence technologies commonly used in global commercial banks, such as artificial intelligence systems and techniques in the field of using neural networks, fuzzy logic, and genetic algorithms to support financial decisions. The lack of use of these advanced technologies is due to a lack of clarity about their importance among management and a lack of technical knowledge and expertise.

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