

ALGORITHMIC INSURANCE

Fatma-zahra RABEHI ^{*1}, *Leila HADDOM* ²¹ *University of Algiers 01 Said HAMDINE (Algeria), fz.rabehi@univ-alger.dz*² *University of Algiers 01 Said HAMDINE (Algeria), l.hadoum@univ-alger.dz*

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Abstract:

Algeria is one of the countries that seek to modernize its various economic sectors, including the insurance sector, by moving towards a digital economy, by automating its services using artificial intelligence applications, with the aim of improving the quality of service provided, achieving customer satisfaction and gaining their loyalty.

This study aims to identify the impact of the possibility of applying artificial intelligence on the activity of insurance companies and distribution channels in Algeria and to present the most prominent challenges facing these companies to reach the employment of technology in their services, and to reach to high level of financial effectiveness

The study concluded that artificial intelligence seeks to achieve financial inclusion by accelerating the digitization of insurance products and services and simplifying the claims and compensation process.

Keywords: artificial intelligence; insurance digitization; technological insurance; service automation; financial inclusion

1. INTRODUCTION

Digitization techniques have been at the forefront of the world's attention, as they radically affect the economic sectors that have become dependent on the use of technology in business and the adoption of new ways of practicing it in order to achieve speed and adaptability.

Within the framework of strengthening the e-Algeria project, Algeria has become a fertile ground for technology and digitization, especially in light of the coronavirus pandemic and the precautionary measures it has imposed, as the latter revealed the need to

^{*} *Corresponding author*

rely on the communications and information sector intensively inside and outside the country.

In line with the new transformations and developments, and to keep pace with the global technological progress towards digitization, the insurance sector is seeking to move from traditional insurance, which is no longer sufficient to face potential risks, digitize its services and automate its various businesses in order to enhance efficiency, increase speed of execution and market access, reduce costs, and improve the effectiveness of mediation. This new approach will create wealth, attract customers and facilitate distribution, which are important resources for creating a sustainable economy, since the insurance sector represents one of the most important service sectors given its role in the financial system. On the one hand, it aims to protect property from risks, achieve the principle of solidarity among members of society and reach financial inclusion¹, and on the other hand, it is a tool to mobilize national savings and transfer them from those with surplus to those with financial deficits².

As a result of the rapid progress in the use of digitization methods and tools, as a new cognitive perspective that seeks to improve the efficiency and quality of insurance services offered to the insured, and move away from the traditional paper-based system and deal directly with customers, the insurance sector has been enhanced and activated by the technology of artificial intelligence and its implementation in insurance operations.

Artificial Intelligence (AI) is one of the most prominent fields in the world of technology, as it represents the most important components of the fourth industrial revolution. It is defined as a branch of computer science, which makes computers perform tasks similar to those performed by human intelligence, such as the ability to learn, deduce, make decisions, and solve problems. It is the science that builds machines that perform tasks that require a certain amount of human intelligence, by creating a set of programs that mimic the work of neural networks in the human brain and linking them together to perform a specific learning process³. Artificial Intelligence (AI) has become an essential tributary of knowledge, thanks to its ability to process large amounts of data quickly and efficiently, and its ability to make decisions based on intelligent analyses of data and surrounding conditions, thus contributing to improving performance and efficiency and providing smart services to users by providing them with real-time data and solutions⁴.

¹ Financial inclusion is the access of all segments of society to a wide range of high-quality, affordable financial products and services that meet their needs

² Ibrahim Mazioud, Mahieddine Hamdani, Measuring and evaluating the efficiency of Algerian insurance companies using the method of folding data analysis, *Journal of Commercial Sciences*, Algeria, Volume 18, Issue 01, 2019, p. 207

³ Mohamed Saad Ahmed Mohamed, The role of Insurance in facing the Risks arising from Artificial Intelligence and Information Technology, *Egypt Contemporary Magazine*, Egypt, No. 543, 2021, p. 462,

⁴ Mohamed Hussain Thowfeek, Samsudeen Sabraz Nawaz, et al. Drivers of Artificial Intelligence in Banking Service Sectors, *Solid State Technology*, Srilanka, Volume 63, Publication 5, 2020, P 6400.

Artificial Intelligence (AI) is one of the key technologies that are changing the course of many fields, foremost of which is insurance. This technology has shown huge potential in reshaping the insurance sector and how people interact with it and improving many aspects of the business. Although it is relatively new, it has contributed to the development and automation of the functions of insurance companies, particularly at the international level, as it has improved products, facilitated customer engagement and trust, reduced time and effort, enhanced modern communication channels and enhanced service quality.

Problem Statement

The adoption of artificial intelligence technology by the insurance sector would bring about a radical transformation in how insurance services are provided, benefiting the company and customers alike, but it is today a major challenge that requires providing the appropriate conditions and climate for the adoption of this technology and taking the necessary measures to manage the resulting risks, especially the issue of information security and technical and legal protection, which is a two-sided currency. Despite the countless advantages, it involves many risks that must be managed through the rational use of this technology within the framework of respecting the ethics of this use.

The objectives of the study are as follows:

- To highlight the role and effectiveness of artificial intelligence in the development of insurance services.
- To determine the extent to which the legal system keeps pace with digital transformations, i.e. the existence of a favorable legislative environment that facilitates the adoption of AI technology in the insurance sector.
- To identify the most important challenges facing the insurance sector when using AI.
- To identify the capabilities and requirements needed to implement AI.
- The impact of AI on the quality of insurance products.

We have considered addressing this topic according to a systematic plan through the following two chapters:

CHAPTER I: Artificial Intelligence in the Insurance Relationship

CHAPTER II: Challenges of Artificial Intelligence in the Insurance Sector

2. Artificial Intelligence in the Insurance Relationship

The world today is on the heels of a tremendous development in the field of technology, and scientists are inventing applications based on the concept of information systems. It was therefore necessary for the insurance sector to think about how to automate its processes and functions. AI is already optimizing insurance processes and providing services tailored to the needs of customers, determining the type of insurance to be offered

to each person and the premiums to be collected, as it is involved in all stages of the insurance process from its conclusion to the resolution of disputes related to it.

In order to understand the various aspects of this research, we considered to present it through the following two sections, the first on how to conclude and execute an insurance contract, and the second on fraud detection and dispute resolution arising from the insurance contract in light of the use of AI.

2.1 Artificial Intelligence in The Conclusion and Execution of the Insurance Contract

The insurance sector uses artificial intelligence technology through a set of mechanisms, and to achieve this, there must be a partnership between the insurance sector and the technology sector specialized in insurance programs and systems. In fact, spending on cognitive systems and artificial intelligence has been huge, and insurance companies use multiple analysis tools to assess risks and thus enable them to determine fair and balanced compensation. Data analysis and chatbots ensure the accuracy of risk assessment, contribute to improving services, and help provide insurance solutions tailored to the needs of customers. By integrating these technologies, the company ensures the success of operations and the achievement of goals.

AI helps insurers develop their business models to provide new and innovative services, helps companies understand their customers and provide services that meet their needs. It offers many solutions that contribute to enhancing insurance operations, whether by reducing costs or customer selection, which we describe in the following two sections:

2.1.1 Artificial Intelligence in the Underwriting Stage of the Insurance Contract

Underwriting is defined as the signing of insurance contracts between the insurance company (the insurer) and customers (the insured) after studying the risks to be insured. The insurance company attaches great importance to the probability of risk materializing at this stage, and if the probability of such risks materializing is high, it refuses to insure them, and vice versa. Underwriting is the evaluation of risks and ensuring their acceptance in order to issue appropriate insurance policies. It is an essential process in insurance, as it reviews the risks submitted by customers to obtain insurance coverage, which ensures that the premium is accurately estimated and proportional to the probability of the insured risk materializing and the surrounding circumstances, i.e. determining the appropriate price of the premium according to the insured risk¹.

AI plays an important role at this stage and makes the underwriting process smoother and more efficient, by analyzing the data provided by customers and helping them access

¹ Osama Azmi Salam, Moussa Shaqiri Nouri, Risk Management and Insurance, Dar Al Hamid for Publishing and Distribution, Amman, 2007, p. 157, citing Abdennour Boumkhlouf, Techniques and methods of dynamic financial analysis in assessing underwriting risks in damage insurance companies, Master's thesis, University of Setif, Algeria, 2016, p. 7

insurance services faster. AI algorithms provide the most appropriate and most beneficial insurance coverage options for the company, which decides to accept or reject the offer based on the unreliability of data related to customers, which ensures avoiding the misassessment of risk and estimating the premium more accurately and fairly based on the individual risk assessment of each customer. AI models are also used to analyze data related to age, physical fitness for example and other factors that affect the insured risk, accordingly determine the premium price, and provide insurance services at competitive prices¹.

To achieve these goals, insurance companies use interactive platforms based on chatbots and virtual assistants that provide immediate assistance to customers around the clock, and applications such as ZELROS, to optimize insurance processes and reach the full width of the coverage offered.

A- The role of chatbots in the underwriting process

The insurance industry uses chatbots in the underwriting process. Chatbots allow customers to ask routine questions, book appointments and respond to their queries by providing them with pre-written responses based on pre-programmed decision rules.

With the help of these bots, known as virtual workforces, conversations are conducted with customers and guide them to the appropriate insurance coverage for the insured risk, leading to faster underwriting decisions.

Chatbots are a vital part of generative AI technology², used to provide customer support, optimize service and collect massive amounts of data in a very short period. Insurers rely on chatbots to respond to customers anywhere and anytime, obtain information about products to be insured, and process underwriting applications in real time³.

These bots are used to understand customer issues faster and provide more efficient answers, and since insurance companies regularly deal with a high volume of business transactions, these bots have become an important part of the insurance company⁴.

B- ZELROS App Model⁵

In addition to chatbots, insurance companies use applications such as the ZELROS App, created since 2016 by experts in data and machine learning. It is a platform for

¹ Abdul Rahman Al-Khatib, Artificial Intelligence and the Revitalisation of the Insurance Sector, <https://alquds.com/ar/posts/137527> accessed on 05-02-2025

² AI is divided into two types: generative and predictive, the former is specifically designed to create new content, and the latter is designed to analyze data.

³ Karim Mamdouh Abbas Helmy, The Impact of Big Data Analytics using Artificial Intelligence Techniques on Improving the Quality of Financial Reports, Scientific Journal of Financial and Commercial Studies and Research, Egypt, Volume 5, Issue 2, Tome 2, 2024,p472

⁴ Khafous Souhila, The Contribution of Artificial Intelligence Applications to the Development of the Insurance Sector, Journal of Management and Development for Research and Studies, Algeria, Volume 13, Issue 01, 2024, p. 69

⁵ <https://www.usine-digitale.fr/article/zelros> accessed on 29-01-2025

underwriting insurance policies and distributing products and services, as well as advising on appropriate insurance coverage, distribution channels, and supporting the insured throughout the insurance period.

It is a digital distribution channel geared to distribute insurance products as well as traditional distribution channels, to meet the growing demands of customers, and to help the insurer get to know its customers and customize the most beneficial offer for them.

The application is powered by machine learning algorithms that mimic the way humans learn, inputting all the data available to different insurance companies, in order to provide timely and correct advice on the right product for each customer.

2.1.2 Artificial Intelligence in the Claims Processing Stage

This stage includes monitoring and deciding on the insured risks, working to minimize costs and provide compensation amounts when claimed. It includes sorting the risks related to the insurer (liquidity risk, market risk and underwriting risk) and those related to the insured (physical and moral losses) and determining which of them are insurable¹.

The claim process starts when the insured risk is materialized, and the insurance company is in charge of processing the claims submitted by the insured and assessing the losses as well as the amount of compensation due in proportion to the size of the loss and the terms of the contract. It is a process that usually takes a long time and requires effort due to the procedures taken by the company upon the occurrence of the accident, as the company has to verify the validity of the information provided, review various documents (medical report, police reports, photos...), and the estimation of compensation requires the expert to travel to the place where the accident occurred to estimate the losses and collect evidence. Therefore, the automation of this process through artificial intelligence contributes to improving efficiency and reducing the time spent in studying the claims (reducing processing time) as well as speed and accuracy in dealing with these claims. This technology will not change the procedure itself, which is still inevitable, but rather the way of working, processing and calculation is different, as AI allows many documents to be scanned in a short time.

The application of AI during this stage effectively contributes to the process of analyzing, adapting and detecting potential fraud when claims are based on incorrect data, such as claiming compensation for an accident that did not happen, exaggerating the accident, claiming compensation based on false medical certificates, or impersonating another person. AI-enabled software can detect this fraud by analyzing the data provided and comparing it with the customer's data to determine whether the claim is legitimate or suspicious.

¹ Ayman Mohamed El-Chanti, Mohamed Salim El-Issa, and others, The Impact of Reinsurance Operations in Reducing the Risks facing the Insurance Company, Journal of Economic Studies, Algeria, Vol. 18, No. 02, 2020, p. 8

There are several AI applications that identify the severity of accidents (e.g. car accidents) and assess the damage, such as WEPROOV.

WEPROOV App Model: Artificial Intelligence (AI) uses the algorithms and data programmed in it to provide solutions to the cases it deals with, thanks to the data related to the previous cases of compensation requests and how they were processed, the AI extracts models and patterns from them, and then uses these models to make decisions and determine the amount of compensation, i.e. predicting the future results of similar cases¹.

This application proposes many services, which are as follows²:

- Preparation of the estimated and financial statement related to the risks to be insured;
- Explanatory videos about the types of insurance branches available with the company;
- Ability to print the insurance contracts concluded and save them securely;
- Geolocation of the insurance agencies of the parent insurance company;
- Declaration of the accident with the possibility of taking pictures and recording sound and sending them through the application;
- The insured can receive messages from the insurance company while it studies the accident file;
- The company can be contacted via the app as part of the assistance insurance in case the car breaks down on the road.

In the same context, the insurance company has been working on placing a small monitoring device in the insured's car, which allows it to ensure the safety of the driver and know whether he is safe or not, and the insured can carry this smart device with them to know the limits of their life insurance at the lowest prices, and if the device indicates that they live a healthy life, they will receive a discount in the premium. The insurance company has been working on creating a platform capable of tracking the degree of alertness of the insured driver and their behavior when driving, and then identifying the most vulnerable driver in order to adjust their insurance premiums.

2.2 Artificial Intelligence for Fraud Detection and Dispute Resolution

Considering that the insurance contract is classified among contracts of utmost good faith, which must be executed in a lawful and honest manner, and also falls under contracts of adhesion where the legislator intervenes to protect the insured as the weaker party from the potential abuse of power by the insurer as the stronger party, practical practices have nonetheless revealed numerous real-life cases in which insured parties resort to deceit and

¹ <https://www.wedrivit.com/blog/aide/lapplication-pour-letat-des-lieux-des-locations-sans-chauffeur-weproov-go/> accessed on 23-02-2025

² Manel Dellalou, Digitalization of Customer Relations in Insurance (Conceptualization of a Mobile Application SAA APP), dissertation, Institut de Financement du Développement du Maghreb Arabe, Algeria 2020, P 31.

fraud in order to obtain financial compensation for fabricated damages. In such cases, the insurance company becomes the victim of this offense, thereby giving rise to disputes between the two parties¹.

Artificial intelligence intervenes to process claims and predict solutions to potential disputes through smart platforms, which is one of the foundations on which the insurance company relies to achieve innovation and efficiency in work because it contributes to improving the quality of services provided, understanding its customers, providing services that meet their needs and collecting accurate information about them, which results in a more accurate premium amount and a real assessment of risks.

To achieve fraud detection and dispute resolution through AI technology, it is necessary to provide comprehensive and huge data, which is a vital element in companies, implement effective strategies and provide information infrastructure that must be accurate and flexible, and provide innovative solutions to improve the accuracy of estimates. These mechanisms are used in processing requests, identifying customer behavioral patterns and facilitating decision-making, which contributes to reducing charges². It provides techniques to address such behaviors, identify and combat fraudulent activities.

2.2.1 Artificial Intelligence for Detecting Insurance Fraud

Fraud is defined as any act or omission intended to achieve dishonest, illegal or unlawful gain for the fraudulent party, by deliberately misrepresenting, concealing, suppressing or failing to disclose one or all of the material facts.

Insurance fraud is the act of misleading the insurance company about the existence of a non-existent accident in order to obtain a material profit, by making false statements and a false declaration about the accident that did not actually occur and deliberately pretending to damage or that the accident occurred and did not pose a danger requiring compensation, i.e. exaggerating the damage and raising its value, in order to serve the personal interest by illegal means such as submitting false invoices in order to achieve undeserved gains³.

Fraud is one of the obstacles facing the insurance sector due to the moral losses caused by fraudulent claims, such as damaging the reputation of insurance companies, and the financial consequences where the insurer is forced to compensate the losses resulting from this fraud by increasing prices, which leads to an increase in insurance costs.

AI has revolutionized every aspect of the insurance industry, as it is used to detect fraudulent attempts, help find evidence of potential fraudulent claims, and validate claims

¹ Asma Hakkas, Khadija Amraoui, Verification of the Crime of Insurance Fraud, Maalem Journal of Legal and Political Studies, Algeria, Volume 5, Issue 01, 2021, p. 70.

² Hamza Ivan Madi, Laith Ali Yousef Al-Hakim, et al. Artificial Intelligence Applications and their Role in Adopting Digital Insurance Services, Al-Ghari Journal of Economic and Administrative Sciences, Iraq, Volume 20, Special Issue, 2024, p. 1910.

³ Murad Zureiqat, Insurance Company Fraud, Muslim World League, Riyadh, 2008, p. 5

before paying the compensation amount, by detecting potential discrepancies between documents (identity documents, sick certificates...) and analyzing patterns and images if retrieved from Google search engine, in order to detect, combat and mitigate fraudulent activities and unusual claims, and minimize the risk of financial losses, match the details of claims for compensation with the insurance policy and determine the amount due for compensation. Thus, the use of AI technology in the insurance sector increases access to financial services¹. Moreover, it enhances protection against fraud, helps detect issues faster, avoid reputational issues, and possibly even address the issue without human intervention. For example, when an insurance company receives a request for compensation regarding a water leakage incident in the home of one of its customers, the latter provides a photo as evidence of the damage. Here comes the role of artificial intelligence through its programs to examine whether the image is taken from disaster advertisements, and thus provides a detailed report to the insurance expert who has a broad view of the accident compensation. We will address two examples of fraud detection programs, namely:

Example 1: CLAIMS FRAUD DETECTION Program

The insurance company's priority is to identify and stop paying compensation for fraudulent claims that put it at serious financial risk, which benefits the company's bottom line while saving both time and money, using artificial intelligence technology. In fact, this application seeks to detect, predict and combat fraud in a timely manner by relying on the analysis of data and patterns of fraudulent customer behavior, and detect anomalies and suspicious requests in a timely manner. This results in significantly reducing costs and financial losses. This application helps companies to reach fraud detection without the need for additional human resources and expenses².

Example 2: SHIFT TECHNOLOGY Program

This application facilitates the work of insurance company employees. It receives customer claims for compensation when the insured risk is fulfilled. It improves claims management, financial crime detection and anti-fraud by relying on data flow towards machine learning algorithms, focusing on the most suspicious claims, analyzing them and finding the right solution for them.

It blocks any claim that deviates from the so-called normal claim and identifies suspicious customer behavior³

¹ SAIDI Sabira, FELLAG Nacira, The Adoption of Artificial Intelligence in Insurance Companies as a Mechanism to Promote Financial Inclusion –Algerian Journal of Management Economics, Algeria, Vol. 15, issue 01, 2021, P. 276.

² <https://www.cigniti.com/blog/fraud-detection-insurance-claim-process-artificial-intelligence> accessed on 18-04-2025/

³ https://www.ifegypt.org/NewsDetails.aspx?Page_ID=1244&PageDetailID=1475 accessed on 18-04-2025

2.2.2 Artificial Intelligence in Predicting Insurance Dispute Resolution

Since AI is trained to mimic human behavior, it can be used in legal practice, research and complex cases to resolve insurance disputes, by summarizing large sets of pleadings, generative AI can create a strategy for cross-examination based on witness testimony and expert report, and this would lead to preparation for arbitration hearings.

The integration of AI into arbitration relies heavily on the quality of the input data to ensure the accuracy and reliability of the output it generates, ensuring the validity of the evidence presented in arbitration hearings. This technology significantly reduces the time and cost involved in arbitration, and makes the process more efficient.

One of the most important characteristics of AI technology is its great analytical ability that helps to read various important data and information to give a visualisation of the probability of a risk materializing. Based on the availability of data on which it is trained and then fed into the AI algorithms, the possibility of predicting insurance disputes before they occur can be identified. However, if the training data is biased or erroneous, this would lead to inaccurate results and possibly exacerbate the dispute, thus the scarcity and unreliability of data and information is one of the challenges of AI technology¹

3. Challenges of artificial intelligence in the insurance sector

The insurance sector uses advanced analytical tools to estimate risks and choose the appropriate solutions for each case, and optimizes them through the application of artificial intelligence technology, which helps in better understanding insurance processes and thus improving the process of making decisions based on reliable information. However, its benefits are subject to taking into account the emerging data collected from various sources, as well as the ethics of using artificial intelligence, which we will address through this chapter.

3.1 The impact of emerging data on the insurance relationship

Recent years have witnessed a flurry of work related to algorithmic decision-making systems, the most significant of which is the emerging data that violates the privacy and confidentiality of individuals, damages their reputation, and affects the relationship between the insurer and the insured when concluding the contract and determining the premium and the amount of compensation, which raises major concerns that threaten the privacy and respect of this data. The information collected by AI, which may not in itself be sensitive, is not what concerns us in this section, but the conclusions drawn from it, which may raise concerns and require protection.

The use of digital technologies is often the source of counter-intuitive and unpredictable conclusions that pose risks to privacy, identity and self-determination.

¹ <https://www.alhurra.com/tech/2023/09/22/> accessed on 22-02-2025

3.1.1 Definition of Emerging Data

Emerging data has revolutionized many industries, including insurance, thanks to its ability to change and reshape them to suit different sectors, as it relies on the production of huge amounts of personal data, often collected without the knowledge and informed consent of individuals¹.

Defining emerging data entails first defining personal data. Law 18- 07 defines personal data as any information, regardless of its basis, relating to an identified or identifiable person directly or indirectly, especially by reference to an identification number or one or several elements of his physical, physiological, genetic, biometric, psychological, economic, cultural or social identity². Personal data is characterized by the fact that it is inherent to the human personality and is close to its owner, who has the right to use it as it is related to him, such as name, date of birth, nationality, gender, race, religion, language, telephone number, job, and other data that directly expresses its owner. As for the emerging data, they are the data derived and inferred from the personal data provided by the user when navigating via Internet, which arise after the processing of personal data by the data controller, and can therefore be considered as new personal data, as they are those data that were not provided directly by the data subjects themselves, but were inferred based on pre-existing data, which were reached through inference processes, for example ‘country of residence’ as inferred from the personal data ‘postal code’³.

It is worth noting in this regard that the source of the emerging data analyzed by AI systems is diverse and different, including: Internet of Things (IoT), blockchain, big data, social media, and smartphones⁴, as well as Cookies, cloud computing, facial recognition, and electronic surveillance⁵.

Insurance companies can use emerging data to define customer profiles and create commercial insights such as advertising to facilitate the information search process, reduce decision-making time, improve services⁶ and maintain their competitiveness by relying on artificial intelligence algorithms, such as using data circulated within social media to determine insurance premiums, predict underwriter life expectancy and develop a strategy to mitigate the severity of insured catastrophes⁷.

¹ Vincent Gautrais, The Challenge of Protecting Privacy Faced with the Need for Information Flow, Conference organized by the International Scientific Cooperation Program, France 2003, p. 8.

² Article 03 of Law 18-07 of 10 June 2018 on the Protection of Natural Persons with regard to Personal Data Processing, Official Gazette No. 34 of 10 June 2018 Amending and supplementing, Official Gazette No. 48 of 24 July 2025.

³ Pierre Luc-Deziel, The Limits of the Right to Privacy in the Era of Artificial Intelligence, Canada, Volume 30, No. 3, 2018, p. 834.

⁴ <https://www.fncc.cm/images/Technologiesemergent.pdf> accessed on 10-06-2025

⁵ Abdellah Chibani and Widad Ben Salem, The Right of Information Privacy in the Light of Artificial Intelligence, Journal of Legal and Economic Studies, Algeria, Volume 06, Issue 02, 2023, p. 469

⁶ Technologie Emergentes : <https://www.fncc.cm/images/Technologiesemergent.pdf> accessed on 07-06-2025

⁷ Data-driven insurance: A path to strategic advantage <https://www.cgi.com/sites/default/files/2023-07/fr-cgi-data-driven-paper.pdf> accessed on 09-06-2025

Emerging data aims to create new gains for the company and improve its capabilities, by taking advantage of new data, exploiting it and turning it into useful insights, as the greater the volume of data, the greater the benefits and profits, and the emergence of new features of the economic market that depend on the personal data of users, and the race to obtain the largest amount of individual data in any form¹.

3.1.2 The Impact of Emerging Data on the Right to Privacy²

Protecting individuals from emerging data is one of the most complex issues, requiring comprehensive and integrated measures to be taken by individuals, organizations and governments to ensure the protection of privacy and security in light of the rapid development of this technology³. Emerging data is not just additional information about the user, but a precious commodity for many companies that rely on it to achieve their profits and increase their production. Therefore, it would be unreasonable to keep it without legal protection, as this affects the right to privacy and identity, which requires the recognition of the rights of data owners over the conclusions and results⁴. However, the latter is fraught with many risks, the most important of which are:

- **Creating a good digital identity**⁵

The processing of personal data is used to extract patterns and models of “emerging data” without the full control of the individual. A person does not have the right to control how his information is used and prevent decisions being made about them without their knowledge or consent. They may not know that their data is being used to predict their behavior or categorize them into certain groups such as “high-risk customer” or “potential consumer of a certain product”. AI generates new information about individuals such as financial ability, health status, personal preferences, and creates a digital identity based on its output.

These conclusions may not be 100 per cent correct, and may not actually correspond to the personality of the user attributed to them, or they may be real and disclosed against the will of the owner⁶, as they are personal information that would have remained confidential but for these conclusions, so they constitute a threat and a violation of privacy. Thus, drawing unexpected conclusions without the user realizing, poses risks to privacy, identity, data protection, reputation and information self-determination⁷.

¹ Abdellah Chibani and Widad Ben Salem, op. cit., p. 472

² Personal data protection refers to the protection of data subjects

³ Amr RagabElsayedElsadek, The Impact of Artificial Intelligence on Values and Human Rights - The Right to Personal Data Protection, Banha Journal of Human Sciences, Egypt, Issue 02, Tome 04, 2023, p. 900.

⁴ Samir Saad Rashad Sultan, Strengthening the Legal Protection of Sensitive Personal Data in the Field of Evidence, Journal of Legal and Economic Research, Egypt, No. 88, 2024, p. 1134

⁵ Tal Z. Zarsky, Understanding Discrimination in the Scored Society, 89 Wash. L. Rev., 2014, p. 1375.

⁶ Rose Landry, Privacy in the Age of Big Data, University of Montreal, 2022, ‘A first problem lies in the accuracy of algorithmic predictions,’ p. 42.

⁷ Sandra Wachter & Brent Mittelstadt, a right to reasonable inferences: re-thinking data protection law in the age of big data and AI Columbia business law review, vol 2019, p 510.

– **Data disclosure not authorized**¹

Emerging data raises many risks that threaten the safety of users, constitute a real breach of privacy and constitutes a violation of the right to control private information. This undermines the fundamental right to control personal information—data that the user either did not wish to share with others or intended to keep hidden, on the one hand, and on the other hand, this sensitive information may be used and exploited without the permission of its owner. Whatever the original source of the initial, the data subject has not given explicit consent to have their data analyzed in detail, and sensitive information about them that they did not authorize has been deduced and may be used to make decisions that affect them financially or socially.

Example: A person may register in a health app system and provide a lot of information: Age, weight, height, number of hours of sleep, number of daily walking steps, high consumption of fat and sugar. The system analyses this basic personal information using machine-learning techniques that allow it to generate emerging information (new patterns and conclusions) without asking the person, thus concluding that the person is at risk of developing diabetes and that their lifestyle suggests early cardiac risk. Thus, a new piece of information is created about the person that follows them without their knowledge.

These conclusions were not directly provided by the individual, but rather derived by artificial intelligence through processing and analyzing the initial information. The company may sell these results to a health insurance company, which may adjust premiums based on these ‘perceived risks’ without the person's knowledge.

– **Creating a record that stays with the user despite changing circumstances**²

The modern trends contribute to the creation of data and records related to the identity and reputation of individuals, which is another risk generated by emerging data, especially when these records are shared with third parties. The user is categorized as a customer at financial risk, which leads to the bank's reluctance to grant them loans, or their deteriorating health condition is predicted, which leads insurance companies to raise premiums. These decisions are unfair to the user, affecting their future opportunities, despite the fact that they have entered into new life experiences that contributed to improving their financial situation and moving out of the “unreliable customer” circle to the “reliable customer” circle, but such records take away the right of the individual to allow them to start anew without having a previous record.

¹ Mechid Slima, Haddoum Leila, From raw data to emerging data...Which privacy protection?, International Forum on Artificial Intelligence and the Future of the Right to Privacy, Faculty of Law and Political Science, Abdelhamid Ibn Badis University Mostaganem, 25 June 2025, Algeria 2025, pp. 5-6

² Mechid Slima, Haddoum Leila, op. cit., pp.9-10.

3.2 Artificial Intelligence Ethics

Artificial intelligence is a type of rapidly evolving technological technologies, used in scientific and practical life, and has wide and deep effects on all fields. However these technologies may involve many risks and repercussions for those dealing with them, in which humans become victims of their knowledge, in the event that AI systems are trained on data integrated in algorithms that contain bias or discrimination, which inevitably leads to results contrary to fundamental rights and freedoms, especially with regard to the right to privacy and security, transparency, integrity, accountability... etc.

Ethics is a fundamental pillar in all societies and varies according to different individuals, situations, customs and the nature of society. It is closely related to artificial intelligence, which is originally designed by humans, as they train it on the data they provide to it. Therefore, there is a great possibility that artificial intelligence is biased towards what the individual has programmed it with; it may be exploited in illegal and unethical matters. Since its use raises ethical issues, it is necessary to seek to adopt ethical and legal rules governing AI by establishing and adhering to policies, standards, controls, monitoring, since AI is specifically designed to perform actions that benefit humanity, thus necessitating the establishment of a regulatory and ethical mechanism to govern and regulate the work of AI and establish a system of values governing the interaction between humans and machines.

3.2.1 Artificial Intelligence Guidelines¹

The AI Guidelines include a set of basic measures and procedures to be followed by developers of smart technologies, and based on them to protect the privacy of personal data, which are summarized below:

- Assess the potential negative effects of AI applications on human rights and fundamental freedoms related to data and avoid bias and discrimination.
- Evaluate the quality and quantity of personal data used and minimize unnecessary data.
- Establish independent expert committees in various fields and collaborate with organizations that contribute to the design of ethically and socially oriented smart systems;
- Rely on algorithms that promote stakeholder accountability during the lifetime of smart applications to ensure compliance with the Personal Data Protection Law.
- Inform individuals of the processes applied to them and ensure their right to object when their personal data is used.

¹Abdellah Chibani and Widad Ben Salem, op. cit. pp. 476-477.

3.2.2 Artificial Intelligence Principles of Use

This section will address the principles of ethical use of artificial intelligence that must be formulated into laws to ensure the preservation of individuals' rights, as follows¹:

- **Integrity and fairness**

This principle seeks to design the data received by AI in a way that respects the law, human rights and human values, to train it in a correct, accurate, comprehensive, generalizable way to achieve the desired goals, to seek to achieve justice and fairness, especially when designed in a way that respects the law and human rights and takes measures to reduce bias (unfairly favoring a person or group) and discrimination, in addition to ensuring fair and equal distribution of benefits and opportunities, and the absence of unjustified or morally objectionable variables.

- **Human Values and Justice**

This principle focuses on establishing and adhering to development mechanisms that are compatible with laws, human values and justice when using AI.

- **Transparency and Interpretability**

This principle is the main ethical pillar associated with AI, as it is a way to improve this technology and enhance the trust of its users, by adopting transparency at every stage of AI, providing information about the data and algorithms it uses and its purpose, establishing systems that allow tracking and diagnosing the decisions made and communicating them to the concerned person. Furthermore, AI systems should be able to explain how they reach their decisions and outputs in a simple and understandable way, by providing communication channels that allow people to seek clarification on how this difficult technology works, such as the type of data used for training and how decisions are made, the potential benefits and risks and how to avoid them. This principle can be used as a criterion when selecting algorithms or models.

- **Reliability, security and safety**

This principle considers the security and safety of AI technology and its outputs, and the risks related to it, namely: Attempting to steal sensitive data and access the internal details of this technology, as well as manipulating the inputs and training data and changing them to be useless. Here the importance of this principle appears based on developing a risk management methodology by ensuring data integrity and quality, protecting the validity of its results and decisions, and defining procedures for reporting or investigating when any of these risks occur.

¹ Smart Dubai, AI Ethics Principles and Guidelines, Dubai
<https://sdaia.gov.sa/ar/MediaCenter/KnowledgeCenter/ResearchLibrary/SDAIAPublications07.pdf> Accessed on 07/02/2025

– **Accountability and responsibility**

This principle focuses on ensuring the integrity and fairness of AI systems and clarifying the responsibilities and powers of all work teams, including designers and developers, in terms of interpreting the decisions and results of the AI system that fall within its responsibility. The importance of this principle lies in the need for individuals to clarify the limits of responsibility and accountability when developing and using AI systems and to establish responsible mechanisms to consider claims, investigate the causes of the resulting harm and compensate users affected by its wrong decisions and results¹.

– **Inclusive growth, sustainable development and prosperity**

The importance of this principle lies in the need to develop and utilize AI systems in an innovative way that benefits the individual, society and the environment and contributes to growth and prosperity to support a sustainable future.

4- Conclusion

Investing in modern technologies leads to the development of business strategies, enhancing their competitiveness, staying in the market and upgrading organizations. It is a key factor in the success and development of companies, as rapid technological developments are a never-ending process that has moved from the economy of assets to the economy of information and numbers in order to improve, modernize and digitize the level of service.

Artificial intelligence requires investment in technology and human resources. Technology continues to evolve, so does the need to apply AI to improve services and reduce costs, which paves the way for a more efficient future in the insurance sector, as it allows improving service and providing solutions that meet the needs of customers while taking into account the protection of personal data of customers and adopting professional ethics.

Artificial intelligence has transformed the way services are provided from the traditional paper-based method to the electronic method, using information technology and the Internet in a way that contributes to increasing the level of customer satisfaction with the quality of those services. Thanks to artificial intelligence, the insurance sector has been reshaped and opened new horizons for innovation in addition to its positive impact on company performance. It has revolutionized the insurance sector by providing innovative options for risk analysis and service delivery, paving the way towards more effective solutions, relying on artificial intelligence is critical as an essential tool that promotes innovation and facilitates access to solutions.

This study concluded the following results:

¹ Saudi Authority for Data and Artificial Intelligence, Ethics of Artificial Intelligence, second edition, 2024, pp. 12-33 <https://sdaia.gov.sa/ar/SDAIA/about/Documents/ai-principles.pdf> Accessed on 27/01/2025

- Despite the many benefits of artificial intelligence, the adoption of this technology is accompanied by a set of challenges that insurers face when applying it. AI requires time, teamwork, skills and talents in this field with a management that recognizes its importance, to achieve the insurers' goals of innovation and creativity in insurance products;
- The transition from traditional processes to automated systems is costly for insurers as it requires significant investments in technological infrastructure as well as staff training;
- The future of the insurance industry will increasingly rely on new technologies, requiring organizations to think strategically about how to effectively implement these transformations.

Recommendations

- The use of artificial intelligence in the insurance sector must be accompanied by legislative, regulatory and human readiness that support the implementation of this technology, and thus the need for the law to keep pace with developments in society and the need to amend policies and regulatory frameworks in order to benefit from the benefits of artificial intelligence;
- Provide a digital infrastructure and ensure its management and balance between service quality and costs;
- A strategic plan is needed when adopting the application of AI in different aspects of insurance operations, thus forming an advanced AI-powered digital insurance sector;
- Companies should consider how to optimize working methods including continuous training and support to adapt to the needs of the market.

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