Journal of Social Sciences *Vol. VI, no. 4 (2023), pp. 32 - 40*
Fascicle *Social Science* *ISSN 2587-3490*
Topic *Economics and Management* *eISSN 2587-3504*

https://doi.org/10.52326/jss.utm.2023.6(4).03
368:004.89

INSURANCE DEVELOPMENTS IN THE LIGHT OF DATA USE

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Received: 10. 26. 2023
Accepted: 12. 04. 2023

Abstract. Insurance companies are increasingly utilizing large sets of data and artificial intelligence for the purpose of evaluating risks and tailoring insurance products within the framework of insurance contracts. This research seeks to examine the effects of employing extensive data in insurance contracts, particularly concerning privacy and risk. It aims to assess the extent to which existing legal regulations can safeguard policyholders from potential mistreatment resulting from the use of such methodologies. The study concludes that despite the safeguards offered by data and consumer protection laws, the unregulated and unconstrained application of data analytics and algorithms in risk evaluation could potentially harm policyholders by infringing on their privacy and leading to discrimination, thereby impinging on their rights.

Keywords: *Artificial intelligence, sensor technology, privacy, risk.*

Rezumat. Companiile de asigurări folosesc din ce în ce mai mult seturi mari de date și inteligență artificială în scopul evaluării riscurilor și al personalizării produselor de asigurare în cadrul contractelor de asigurare. Această cercetare urmărește să examineze efectele utilizării datelor extinse în contractele de asigurare, în special în ceea ce privește confidențialitatea și riscul. Articolul își propune să evalueze măsura în care reglementările legale existente pot proteja asigurații de potențialele maltratări rezultate din utilizarea unor astfel de metodologii. Studiul concluzionează că, în ciuda garanțiilor oferite de legile privind datele și protecția consumatorilor, aplicarea nereglementată și neconstrânsă a analizei datelor și a algoritmilor în evaluarea riscurilor ar putea dăuna asiguraților prin încălcarea vieții private a acestora și conducând la discriminare, afectând astfel drepturile acestora.

Cuvinte cheie: *inteligență artificială, tehnologie de senzori, confidențialitate, risc.*

1. Introduction

The emergence of big data analytics and artificial intelligence [1] led to a significant transformation in the insurance industry, as insurance companies have rushed to digitize their operations and products to assess (previously uninsurable) risks and define and predict them. Access to data and the capacity to generate new risk insights will be key competitive elements in the insurance sector.

The emergence of these innovative technologies is predicted to bring about significant changes within the insurance sector through two distinct ways. Firstly, the growing volume of data, amplified computational capabilities, and advanced sets of data analysis tools will enable insurance firms to intricately and comprehensively assess risks, thus imparting a personalized nature to risk evaluation. Conversely, the utilization of big data and algorithms has the potential to considerably compromise individuals' privacy and may lead to discriminatory outcomes.

Sensing technology in collecting personal data promptly allows insurance companies to customize insurance products and allocate risks**.**

Accordingly, adopting the insurance contract for each insured on his situation requires knowledge of some aspects of his personal and professional life, which enables defining a specific risk for him. Based on that, an appropriate insurance amount can be determined for him. This creates a form of fairness in the contract and changes the legal nature of the traditional insurance contract for its excessive submission.

Undoubtedly, there are significant operational and legal risks for insureds' counterpart to the benefits arising from using big data and smart technologies**.**

In general, this study seeks to identify the impact of using big data on insurance contracts regarding privacy conditions, the risk factor, and whether the current legal framework is adequate to provide the required protection for insureds.

The study's problematic lies in the fact that big data is modern technology, and its use is a relatively new development in the insurance industry. The stakeholders in this industry anticipate that it will significantly impact insurance, both positively and negatively.

Based on the previous, the following main question can be raised:

How can big data bring about transformation in the world of insurance?

The study adopted an analytical and descriptive approach to explore this subject comprehensively, encompassing various aspects. This was achieved by analyzing relevant legal texts and elucidating certain legal concepts primarily related to big data, individualization, privacy, and risk. This was conducted within the framework of two fundamental points.

2. Research Method

This type of research is a legal research method that bases its analysis on applicable laws and regulations that are relevant to the research topic. Based on its type, the legal materials in this study consist of primary legal materials, legal materials secondary, legal doctrines, concepts, theories and expert opinions related to civil law and Social Security contained in written form (books, texts, legal journals and papers or views of legal experts published in the mass media) as well as direct interviews to deepen analysis), and tertiary legal materials. Data collection techniques were carried out through literature and internet searching. Data analysis was carried out using qualitative methods which were presented systematically by analyzing descriptive analysis.

3.Results and Discussion

3.1 Big Data and Policyholder Privacy

Big data constitutes information assets characterized by voluminous size, velocity, and diversity, necessitating innovative and efficient forms of processing distinct from ordinary data processing. This empowers users to enhance insights, make decisions, and engage in automated operations.

3.1.1. Big Data, Informational Privacy, and Globalization

Big data is described as information resources characterized by their large volume, rapid generation speed, and diverse range, necessitating efficient and creative processing methods to facilitate improved comprehension and decision-making. It has five dimensions: volume, velocity, variety, veracity, and value [2]. These can be categorized into three types [3]:

1. Structured data refers to organized data presented in tables or databases, ready for processing.
2. Unstructured data: This constitutes the most significant portion of data, encompassing textual writings, video images, messages, and online clicks individuals generate daily.
3. Semi-structured data: This is a form of structured data, but not arranged in tables or databases [4].

Today's world is surrounded by an abundance of data, which has given rise to a new market in the technology sector known as "Big Data." The volume of data, particularly the data generated automatically, presents significant challenges in handling this data. The importance of utilizing big data in the insurance field as part of business intelligence systems is evident. Big data is processed to develop products, create new products, reduce costs, avoid errors, enhance competitiveness, promote innovation and renewal processes, and strengthen business intelligence.

On the other hand, one of the biggest challenges and risks associated with big data is ensuring personal data privacy. The latter has become a valuable currency traded on platforms such as Facebook, Twitter, Yahoo, Google, and others. These companies profit by exploiting customers' personal data, including browsing habits, for advertising purposes. Advanced consumers seeking car insurance are likely unaware of the information being retained about them and how it is used [5] to assess risks [6] **.**

Privacy is the most delicate issue in this context as a fundamental human right [7]. Consequently, societies, particularly democratic ones, strive to protect privacy, viewing it as an independent and inherent right. They do not merely rely on laws to safeguard it but also endeavor to instill it in minds by cultivating noble values that play a significant and effective role in preventing intruders from encroaching upon others' privacy and revealing their secrets. This right has garnered significant attention from global entities, institutions, constitutions, and legal frameworks. At the international level, this concern is reflected in various global agreements, such as the Universal Declaration of Human Rights enacted by the United Nations General Assembly on 10th December 1948, with specific emphasis on Article 12" [8].

There is a type of information referred to as personal data related to individual and belongs to his entity as a person, such as a name, address, phone number, and other similar information. It is information that takes the form of data inherently linked to every natural person, whether identifiable or definable [9].

In our present time, this type of information has gained significant importance in contemporary information philosophy, significantly since the digital world concept can only progress and align with human interests with the use of information. Hence, the concept of information privacy, also known as data privacy, has emerged [10].

The concept of privacy has been addressed as a right to prevent the government's misuse of data processed electronically or digitally or to restrict its use in accordance with the law only [11].

In this context, a new term has emerged, which is 'data globalization.' What is protected in Switzerland may not be protected in the United States. This raises several questions in an environment where data transfers can be easily justified through laws such as the US Cloud Act ('The Cloud Act allows relevant parties to enforce US law by compelling technology companies that are based in the United States, through a court order, to furnish the required data stored on servers, irrespective of whether it is stored within the United States or abroad. Similarly, the improper utilization of data by non-professionals, leading to unjustifiable price discrimination against customers, is inherently unsound from a technical perspective.

Furthermore, accessing insured's data can lead to their segmentation into groups and categories, which may result in depriving them of insurance and excluding some consumers with relatively higher risks or imposing higher prices on them compared to other insureds.

While numerous benefits and advantages are associated with using big data in insurance, there are also several problems and challenges. This necessitates additional efforts to mitigate these issues. This can be achieved by advocating for the principle of trustworthiness, while simultaneously endeavoring to safeguard privacy through the implementation of data protection legislation.

3.1.2. Legal Framework for Privacy Protection

It should be noted that excessive privacy protection can negatively impact some insureds, as allowing the company access to their private data helps personalize and customize the insurance contract in a detailed manner that benefits the insured. Within the framework of an auto insurance contract, personal data can differentiate between a driver with drug-related tendencies or neurological disorders and another driver without such characteristics. Remote communication devices, often connected to vehicles, gather information about driving behavior, including geographical location, speed, acceleration, braking intensity, vibrations, collision events, and relay them to car insurance companies. Some home insurance companies offer their customers the opportunity to use remote home communication devices, which are often connected to smoke detectors, carbon monoxide detectors, smart locks, doors, windows, and are instantly transmitted to insurance companies or clients in case of violations.Similarly, some life insurance and health insurance companies provide wearable devices to their customers that collect and transmit real-time data about blood pressure, blood sugar, and heart rate to insurance companies, including dietary habits, weight, sleep, and exercise [12]. The former is more likely to be prone to accidents than the latter. Therefore, imposing the same conditions and contracts on both individuals would be unjust.

While leveraging big data in the insurance sector can yield considerable advantages for policyholders as mentioned earlier, it also has the potential to result in unfair discrimination, according to some viewpoints.

The imperative need to uphold consumer privacy has underscored the requirement for the highest standard of honesty and fairness.

Extending the obligation of transparency to encompass insurance companies utilizing big data entails the provision of comprehensive explanations regarding all risk-related information and the establishment of a legal foundation for its utilization. Furthermore, these companies should identify specific risk factors that directly influence individual insurance premiums. Moreover, individuals should be granted the right to rectify any inaccuracies in their data.

This suggests that insurance companies have an implicit obligation to reveal to policyholders the information they have gathered through the analysis of big data during risk assessments. In principle, during the initial stages before a contract is formed, the insurance company is obligated to disclose the information collected from various origins concerning the risks or attributes of the insured party.

Based on the inadequacy of the principle of good faith in alleviating insureds' privacy concerns, the logical next step is to consider whether data protection legislation provides an appropriate level of protection in data collection and use by insurance companies for risk assessment purposes**.**

It should be noted that most legislations do not prohibit insurance companies from obtaining personal data, but they may require explicit consent from their clients. Additionally, there is a requirement to specify the intended purpose of the collected information and data, which is a necessary assurance. However, this assurance may be relatively limited, as its consent might not be fully informed, considering that individuals might not fully comprehend the extent of their personal data that insurers can acquire, how this data can be used as part of processing, and the duration for which these companies retain such private information. Whether their consent is informed is subject to challenge under various laws, including (the European Directive [13] and several national legislations [14]).

3.2. The Impact of Big Data on the Risk Element in Insurance Contracts

Researching and analyzing big data allows for real-time insurance awareness, serving as a basis for providing individual insurance products to customers. However, before studying the impact of big data on risk, it is necessary to identify the fundamental principles of the risk concept in insurance contracts.

3.2.1. Risk as a Source of the Insurance Contract

An insurance agreement is categorized as an aleatory contract, signifying that it pertains to a subject matter or entity that did not exist at the time of contract formation. The involved parties cannot definitively ascertain the precise outcome or each party's gain from the transaction, as it hinges on the occurrence of insured risks. Hence, within the framework of civil law, insurance provisions are classified as aleatory contracts, as articulated in Article 57 of the Civil Code. This feature is also evident in Article 43 of Order 95-07. If the insured entity is destroyed or is no longer exposed to risk, the element of uncertainty ceases to apply, rendering it unsuitable for insurance.

According to Article 1964 of the Civil Code, an aleatory contract refers to a mutual agreement where the consequences, including gains and losses, for all parties or some of them, are contingent upon an uncertain event.

It is a type of contract where one of the parties involved cannot ascertain the exact amount to be given or received at the time of contract formation. Furthermore, even if one party can determine the amount given, they cannot ascertain the amount they will receive.

Since the texts of 1804 were unclear, the Court of Cassation intervened to declare that the contract is aleatory when the benefit the parties will receive is not perceptible at the time of contract formation [15].

According to Pothier: "In an insurance contract, neither party seeks a loss for the benefit of the other" [16].

Both parties are considered to have no vested interest in the event of the insured risk. As per the customary regulations, the contract subject should either exist presently or have

the potential for existence in the future, and it should be transferable or have the capacity for transfer and validity. When this is applied to an insurance contract, the risk should be feasible and probable, outlined within the contract as an insurable risk, with the specific stipulation in insurance contracts that it remains independent of the will of either party.

A - The necessity of risk assignment

The contracting parties shall agree on the risk or risks the insurance covers. The risk is assigned by specifying its nature, such as fire, theft, or lightning. Similarly, the object shall be assigned if we are discussing insurance for damages, such as houses, commercial premises, goods, or vehicles. In the case of personal insurance, the individual shall be specified, such as life insurance.

The risk may need to be assigned by establishing its cause if such a cause is specified. For example, fire insurance may cover the explosion of gas pipes, or life insurance may cover death due to natural causes. The risk can also be assigned in general terms, with the parties excluding certain cases. These specific cases must be precisely and clearly defined in such situations to avoid ambiguity. For example, the insurance may exclude coverage for fire caused by civil unrest in the case of war-related insurance. The insurer is not obliged to cover fire resulting from popular disturbances, for example.

B- The risk may be possible (risk probability)

The risk shall have the characteristic of probability. This probability can be viewed from two perspectives: the risk may be possible to occur in the future, meaning it may or may not happen at all, or it may be a particular risk that will occur; however, the date of occurrence is unknown and unspecified, making it possible to happen at any time. An example of such a risk is death. In all cases, the risk shall be potentially occurring, not impossible. If it is impossible, the contract becomes void due to the impossibility of the subject matter, meaning that the risk has materialized before the contract's conclusion, rendering its execution impossible [17].

3.2. 2.Big Data and Risk Sensing

The question arises is whether using big data and predictive analytics can impact the perceived risk probability in insurance contracts and mitigate the occurrence of risks, leading to removing the element of risk from insurance contracts?

Undoubtedly, predictive systems are one of the most important services of artificial intelligence. This service can understand the external environment, such as the timing of the day, social relationships, upcoming appointments, weather conditions, traffic, and many other factors. Predictive systems use various forms of diverse data, including social, local, and big data. They process all this data and provide valuable results and insights in forecasting. One of the types of predictive marketing is big data predictive marketing**.**

Big data is considered a fundamental pillar of predictive marketing. It collects the maximum possible amount of customer data and processes it to understand customer behavior, predict future actions, and analyze their current and past behaviors. The greater the quantity of customer data, the easier it becomes to analyze their behaviors by identifying differences between past and present behaviors, thus facilitating the identification of their desires and future tendencies [18].

Big data can significantly change how parties perceive insurance and the preferred conditions for contracting and risk coverage. Through massive amounts of data, significant

social benefits arise, leading to risk reduction and increasing the possibility of insuring against previously uninsurable risks.

Furthermore, new methods can be envisioned to encourage reaching optimal behavior through big data, allowing insurance to play a more significant role in providing complete protection against risks as well as predicting and preventing risks.

More specifically, big data can impact the principle of probability, mainly due to the reliability of predictive data analysis. By collecting more accurate data than ever, the risks and their financial outcomes can be precisely determined in terms of time and location.

Thanks to connected devices, associated applications, big data analytics, and soon genetic science, it is conceivable that the insured will have highly accurate and timely objective information about his health status and future developments [19]. Therefore, if permitted by the insured, the insurer may, through data and algorithms, assess the precise health risks that the insured faces and accordingly determine the insurance premium, considering his full knowledge of when the insured is likely to fall ill [20].

4.Conclusions

While big data significantly aids insurance companies in customizing the risk assessment procedure and adapting their insurance offerings to the public, the improper utilization of data analysis and algorithms for risk evaluation can pose multiple challenges for consumers. Given that existing regulations, particularly data protection laws, are unable to furnish the necessary level of protection for consumers, concerns have arisen regarding the adequate preservation of consumer privacy.

Among the findings, algorithms can indirectly lead to discrimination against specific consumers. These software applications are programmed to identify correlations between input data and target variables, regardless of the nature of these correlations. Additionally, there exists the potential for inaccuracies in data collection or analysis, which could yield unforeseen repercussions for certain policyholders.

- The findings suggest that precise risk evaluation could pose insurance difficulties for specific demographics, particularly individuals affected by hereditary, chronic, or health-related conditions.
- Algorithms have the capacity to enable insurance providers to create profiles for each individual and conduct more comprehensive risk assessments. This more refined understanding of risk allows insurers to place individuals into risk categories that align more closely with their specific characteristics, rather than relying solely on conventional generalized linear models for risk evaluation. Thus, a more detailed delineation of distinct risks is attained through diverse factors, including age, gender, health, occupation, social activities, shopping preferences, and even engagement on social media.
- Consequently, due to this personalized risk evaluation, policyholders will no longer be charged the same insurance premium as those who possess similar relevant traits.
- The unrestrained and unregulated application of these analyses might violate consumer privacy and potentially lead to discriminatory outcomes for those seeking insurance. This could potentially render certain individuals unable to secure insurance or faced with exorbitantly high insurance rates due to factors outside their control, such as their genetic predispositions.
- Nevertheless, even though this new avenue of development presents promising prospects for insurance companies, it is crucial to find the appropriate equilibrium in

regulating it, as excessive regulation might impede the realization of its complete potential. Hence, it is imperative to refine legislation to safeguard data, thereby enabling the equitable and transparent utilization of this technology in risk assessment procedures. It is anticipated that the insurance sector will acknowledge this requirement.

After this study, the following recommendations can be made:

- Closing legal loopholes that could jeopardize individuals' privacy by imposing a time limit on the extent to which insurance companies can go in collecting and using individuals' personal information.
- Beware of the risk of data theft or breaches resulting from a cyber-attack if insurance companies entrust the responsibility of conducting analyses to smaller "insurtech" providers, as the security systems of these firms might be more vulnerable to external infiltration. Consequently, it is vital to define specific mandates concerning how insurance companies must safeguard personal data.
- All types of insurance companies intensify their use of artificial intelligence applications and integration into the digital economy to encourage financial inclusion and advance the insurance sector.
- Establishing a strong infrastructure for services by establishing legal legislation that ensures control over technological limitations and making them able to withstand economic turmoil and crises, and electronic hacks and attacks that affect the computer programs of insurance companies.
- Training researchers and providing support to research centers specialized in the fields of technology in general and artificial intelligence in particular, and optimal investment of accumulated scientific and applied knowledge and experience, updating them and using them in making decisions related to insurance activities.
- Facilitating the geographical spread of insurance companies, especially major international companies, because they provide more flexibility and streamlined movement of funds, as these complexes often have very advanced research centers and are often allocated financial funds that exceed the budgets of many countries, and this allows for the diversification and innovation of many services. Insurance that suits all groups in society.

Conflicts of Interest: The author declares no conflict of interest.

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Citation: Nadjia, M. Insurance developments in the light of data use. *Journal of Social Sciences* 2023, 6 (4), pp. 32-40. https://doi.org/10.52326/ jss.utm.2023.6(4).03.

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