

EU-US INSURANCE DIALOGUE PROJECT
BIG DATA AND ARTIFICIAL INTELLIGENCE
October 2021 Summary Report

I. INTRODUCTION/BACKGROUND

The increasing availability of data in today’s digital society combined with increasingly powerful data processing technologies such as artificial intelligence (AI) are very relevant developments for the insurance sector, given that data analytics have always been at the core of its business model. There is a trend to increasingly use data-driven business models throughout all the stages of the insurance value chain. Big data and AI bring opportunities both for insurers and consumers; however, like other innovative technologies and business models, there are also challenges. Against this background, the EU-US Insurance Dialogue Project established the Big Data Working Group (WG) to exchange views and experiences on these strategic developments for the insurance sector.

Over the last few years, the Big Data WG has focused on aspects of the relationship between innovation, technology, and insurance, specifically: (1) the increased use of big data by insurers; and (2) the use of advanced data analytics in the insurance sector. The Big Data WG published a paper in 2018 providing the reader with a better understanding of what data is collected, how it is collected, data portability, data quality and how data is made available and used by both insurers and third parties.¹ Building on this work, the group in 2019 focused on regulatory oversight of insurers’ use of third-party vendors and the ability of insurance supervisors to monitor new vendors operating in the insurance marketplace, disclosures to applicants and policyholders about how rating factors and third-party vendor data are being used, and insurers’ use of artificial intelligence (AI) models that increasingly rely on the use of big data. The group provided a summary of this work in a February 2020 paper.²

This report provides a summary of the Big Data WG exchanges of supervisory experiences and regulatory environments since publication of the February 2020 paper including: (A) further development of AI principles in the US and EU, respectively, including ethical aspects; (B) regulatory review of predictive models, including but not limited to assessing transparency and explainability issues arising from the use of AI (including machine learning algorithms); (C) industry use of big data for fraud detection and claims settlement; and (D) new developments on third-party vendors and consumer disclosure issues since the discussions in 2019.

II. SUMMARY OF DISCUSSED TOPICS

A. The Further Development of AI Principles in the US and EU

The rapid pace of data creation and ever-expanding computing power is accelerating the use of AI within the insurance sector in the U.S. and EU. While this provides new opportunities for

¹ EU-U.S. Insurance Dialogue Project, Big Data Issue Paper (October 31, 2018), https://www.eiopa.europa.eu/sites/default/files/publications/pdfs/big_data_issue_paper.pdf.

² EU-U.S. Insurance Dialogue Project, Big Data Working Group (February 2020 Summary Report), <https://www.eiopa.europa.eu/sites/default/files/publications/eu-us-big-data-wg-feb-2020.pdf>.

businesses across the insurance sector, it also raises new challenges such as consumer privacy and the need to protect against unintended but unfair discrimination that may result from the use of algorithms.

In the U.S., in August 2020, the NAIC unanimously adopted its Principles on Artificial Intelligence to inform and articulate general expectations for “all persons or entities facilitating the business of insurance that play an active role in the AI system life cycle, including third parties such as rating, data providers and advisory organizations.”³ The principles are based on the Organisation for Economic Co-operation and Development’s (OECD) AI principles which have been adopted by 42 countries, including the United States.⁴ In drafting the principles, the NAIC studied the development of AI, its use in the insurance sector, and its impact on consumer protection and privacy, marketplace dynamics, and the state-based insurance regulatory framework. The NAIC’s AI principles outline five key tenets, summarized with the acronym, FACTS:

- **Fair and Ethical:** respect the rule of law and implement trustworthy solutions designed to benefit consumers and implemented in a manner that avoids harmful or unintended consequences including unfair or proxy discrimination against protected classes.⁵
- **Accountable:** be responsible for the creation, implementation and impacts of any AI system.
- **Compliant:** have knowledge and resources in place to comply with all applicable insurance laws and regulations.
- **Transparent:** commit to responsible disclosures regarding AI systems to relevant stakeholders as well as be able to inquire about and review AI driven insurance decisions.
- **Secure/Safe/Robust:** ensure reasonable level of traceability of datasets, processes and decisions made and implementation of a systematic risk management process to detect and correct risks associated with privacy, digital security, and unfair discrimination in each phase of the AI system lifecycle on a continuous basis.

To further inform the NAIC work on big data/AI, in September 2021, under the authority of nine participating states, a survey was sent to insurers writing Private Passenger Auto (PPA) insurance in those nine states. The survey begins with a threshold question of whether an insurer is using AI/machine learning (ML). The survey then asks how AI/ML is being used in the areas of rating, underwriting, claims, fraud detection, marketing, and loss prevention. For each of these operational areas, the survey seeks information on the level of deployment, the use of third-party vendors, and whether model governance is in place. In addition, the survey includes questions about whether insurers have contracts with third-party vendors that might limit transparency to state insurance regulators and how insurers voluntarily provide transparency to consumers regarding data being used. Finally, the third aspect of the survey relates to data elements being used in AI/ML. This includes seeking information on the use of consumer “scores” that may be used. The survey excludes questions about traditional and more well understood uses of data. The nine states intend

³ NAIC Principles of Artificial Intelligence, NAIC, August 2020, https://content.naic.org/sites/default/files/inline-files/AI%20principles%20as%20Adopted%20by%20the%20TF_0807.pdf.

⁴ OECD, “Artificial Intelligence > OECD Principles on AI,” <https://www.oecd.org/going-digital/ai/principles/>.

⁵ As part of the “fair and ethical” tenet, NAIC members added a principle encouraging industry participants to take proactive steps to avoid proxy discrimination against protected classes when using AI platforms.

to have a final report in December 2021 which will include aggregated responses only, protecting the confidentiality of each reporting company. This report will help inform the NAIC's Big Data/AI (EX) Working Group (WG) in completing its long-term goals of developing guidance and recommendations to update the existing US regulatory framework for the use of big data and AI in the insurance industry, including how to monitor and oversee the industry's compliance with the expectations embedded in the NAIC's AI principles. The WG will likely expand its survey work to other lines of insurance, such as life insurance and homeowners' insurance.

The NAIC is also taking the significant step of creating a new standing committee focused on innovation, AI, and cybersecurity by the end of this year. While the NAIC has addressed AI, big data and cyber through the work of several task forces and working groups over the last several years, given the critical importance of technology related issues and their impact on insurance markets and consumers, this will be the first new letter committee – the “H” Committee – formed by the NAIC in several decades. While the mission and charges of the new H committee have not yet been finalized, it will likely be charged with monitoring developments and coordinating the NAIC's work in the areas of innovation, AI, and cybersecurity that are impacting the insurance sector. The new committee will also determine an appropriate approach to developing regulatory models and guidance, as deemed necessary, to ensure the state-based system continues to keep pace with the rapidly evolving insurance sector.

In May 2021, the Federal Insurance Office (FIO) published a request for information (Auto Insurance RFI) to solicit input regarding FIO's future work relating to monitoring the availability and affordability of PPA insurance).⁶ The Auto Insurance RFI noted key themes, including “market evolution and structural shifts in the conduct of business, including the effects of technology and the use of big data.” The Auto Insurance RFI specifically posed questions on “how big data is being used in the personal auto insurance business” and “What are the benefits and risks to both consumers and insurers in the use of big data, particularly as it relates to auto insurance underwriting and pricing?” FIO's analysis of Auto Insurance RFI responses, and its work on these topics, remains ongoing.

In the EU, in June 2021 the European Commission published a proposal for a Regulation laying down harmonized rules on Artificial Intelligence.⁷ The cross-sectoral legislative proposal follows a risk-based approach. Insurance-related AI use cases are currently not included in the list of high-risk AI applications and therefore not subject to the requirements for such AI use cases foreseen in the legislative proposal. Specifically for the insurance sector, following the publication of its thematic review on the use of Big Data Analytics in motor and health insurance,⁸ in October 2019 EIOPA created a Consultative Stakeholder Group on Digital Ethics in insurance⁹ which has

⁶ Monitoring Availability and Affordability of Auto Insurance; Assessing Potential Evolution of the Auto Insurance Market, 86 Federal Register 28681 (May 27, 2021), <https://www.federalregister.gov/documents/2021/05/27/2021-11167/monitoring-availability-and-affordability-of-auto-insurance-assessing-potential-evolution-of-the>.

⁷ European Commission 2021/0106 (COD) (2021). Proposal for a Regulation on the harmonisation of rules on artificial intelligence (Artificial Intelligence Act), <https://digital-strategy.ec.europa.eu/en/library/proposal-regulation-laying-down-harmonised-rules-artificial-intelligence-artificial-intelligence>.

⁸ Big Data Analytics thematic review in motor and health insurance, EIOPA, May 2019, https://www.eiopa.europa.eu/content/big-data-analytics-motor-and-health-insurance_en.

⁹ EIOPA Consultative Stakeholder Group on Digital Ethics in insurance, 2019, https://www.eiopa.europa.eu/content/eiopa-establishes-consultative-expert-group-digital-ethics-insurance_en.

developed a set of AI governance principles which aim to help insurance firms implement ethical and trustworthy AI systems in their organizations.¹⁰ The principles and accompanying guidance are summarized below:

- **Proportionality:** The level of governance measures should be adapted to specific AI use cases and based on their potential impact on consumers and/or insurance firms.
- **Fairness and non-discrimination:** Insurance firms should adhere to principles of fairness and non-discrimination when using AI and take into account the outcomes of AI systems balancing the interests of all the stakeholders involved.
- **Transparency and explainability:** Insurance firms should strive to use explainable AI systems, although in certain AI use cases the lack of explainability may be compensated with alternative governance measures insofar as they ensure the accountability of firms.
- **Human oversight:** Adequate levels of human oversight (also known as “human in the loop”) should be in place across the AI system’s lifecycle and insurance firms should assign clear roles and responsibilities amongst their staff and provide them with adequate training.
- **Data management and record keeping:** Insurance firms should pay special attention to removing bias in the training data and keep relevant records of how datasets are processed and the modelling methodologies used.
- **Robustness and performance:** Prediction accuracy of AI systems should be monitored using relevant metrics and they should be deployed in resilient and secure IT infrastructures.

In addition, some EU Member States have recently developed relevant initiatives in this area at a national level. For example in Germany BaFin published a report on supervisory principles for the use of algorithms in decision-making processes by financial institutions.¹¹ Those principles are intended to promote the responsible use of big data and artificial intelligence and facilitate control of the associated risks. Based upon those supervisory principles BaFin and Deutsche Bundesbank have also published a public consultation on the use of machine learning in risk models.¹²

B. Regulatory Review of Predictive Models, Including Explainability Issues Arising from the Use of AI (Including Machine Learning Algorithms)

In the U.S., the NAIC developed a paper entitled “Regulatory Review of Predictive Models” which identifies four best practices for regulatory review of predictive models.¹³ First, regulators should

¹⁰ AI governance principles: towards and ethical and trustworthy AI in the European insurance sector, EIOPA’s Consultative Expert Group on Digital Ethics in insurance, June 2021, <https://www.eiopa.europa.eu/sites/default/files/publications/reports/eiopa-ai-governance-principles-june-2021.pdf>

¹¹ BaFin, supervisory principles for the use of algorithms in decision-making processes by financial institutions, June 2021, <https://www.bafin.de/dok/16185950>

¹² BaFin and Deutsche Bundesbank, Use of machine learning in risk models, July 2021, <https://www.bafin.de/dok/16342436>.

¹³ NAIC White Paper, Regulatory Review of Predictive Models, 2020, https://content.naic.org/sites/default/files/inline-files/9-15%20CASTF%20-%20Predictive%20Model%20White%20Paper%2009-09-2020_1.pdf.

ensure the model complies with state rating laws (i.e., rates shall not be excessive, inadequate, or unfairly discriminatory). Second, regulators should review all aspects of the predictive model including the underlying data, assumptions, adjustments, variables, input and resulting output. Third, regulators should evaluate how the model interacts with and improves the rating plan (e.g., obtain a clear understanding of how model output interacts with non-modeled characteristics/variables used to calculate a risk's premium). Fourth, predictive models should enable competition and innovation. This paper was adopted by the full NAIC membership at the NAIC Spring National Meeting in April 2021.

The question of whether such models, and the big data underlying them, can lead to unfair discrimination is one that insurance supervisors continue to examine, including via the Federal Advisory Committee on Insurance.¹⁴

In the EU, EIOPA's Big Data Analytics thematic review showed that 31% of participating European insurers were using AI across the insurance value chain and another 24% were at a proof-of-concept stage. Against this background, in parallel to the creation of the Consultative Expert Group on Digital Ethics in insurance in 2020 EIOPA launched a workstream on the supervision of AI in insurance. EIOPA developed a discussion note analyzing the different types of AI algorithms, their differences with traditional algorithms and the supervisory risks arising from them, namely as a result of the opacity of certain types of AI algorithms and the importance of being trained with unbiased datasets. Noting that this is an area of active research and taking into account the need to respect the principle of proportionality, EIOPA developed a number of supervisory recommendations in order to promote supervisory convergence in areas such as data quality, model calibration, validation and reproducibility, and model explainability. As stated above, BaFin and Deutsche Bundesbank recently published a consultation paper on the use of Machine Learning of internal models.

C. Industry Use of Big Data for Fraud Detection and Claims Settlement

The Big Data WG discussed how insurance supervisors in both the US and EU are looking at the insurance industry's use of big data to detect fraud and handle claims.

The NAIC presented information regarding the property and casualty sector's use of data and algorithms to triage the handling of claims for "right touch" claim processing. Through this process, insurers identify which claims might have a low propensity for fraud and can be settled very quickly, claims that might need further review by an experienced claims adjuster, and claims that should be referred to a Special Investigative Unit. The NAIC also described how data might be used in the life insurance sector to identify consumer misrepresentations made when a life insurance policy is purchased. Finally, the NAIC presented information on how the insurance industry is using geospatial data for faster fraud detection, catastrophe response, and claims handling.

EIOPA provided an overview to the Big Data WG of AI use cases in the area of fraud detection and claims settlement used by European insurers. On claims management, other than for fraud

¹⁴ See, e.g., FIO, Annual Report on the Insurance Industry (September 2020), 101, <https://home.treasury.gov/system/files/311/2020-FIO-Annual-Report.pdf>.

detection, most European insurers use AI for automated invoice verification, automated payment processes (for small claims) and to segment claims by type and complexity. Going forward, European insurers expect to increasingly use AI on a number of areas such as chat-box based First Notification of Loss (FNOL) or for automated value estimation using picture and video recognition techniques. As far as fraud detection is concerned, European insurers use AI (including deep learning algorithms) on a number of tools including claims scoring, anomaly detection, social media analytics, social network analytics, and behavioral modeling. By flagging potentially fraudulent claims, investigators can focus on claims that are likely to be fraudulent and reduce the number of false positives and false negatives.

D. Monitoring Developments on Third-Party Vendors and Consumer Disclosures

Building on the discussions of the Big Data WG in 2019, the NAIC described state regulatory standards that require insurers to maintain oversight of third-party vendors, with particular attention given to those situations where a third-party vendor may have direct interaction with an insurance consumer. The NAIC also explained the traditional role of Advisory Organizations which collect data, prepare loss costs and the potential for new data vendors becoming subject to state laws and regulations that specifically apply to Advisory Organizations. With the increasing number of third-party vendors using new data and modeling, the NAIC concluded with a discussion on a regulatory approach to focus on testing the consumer outcomes of models. U.S. insurance regulators continue to discuss how to fulfill their regulatory responsibilities over licensed Advisory Organizations and new, unlicensed entities that may be acting as Advisory Organizations.

EIOPA presented the findings of its Report on (Re)insurance value chain and new business models arising from digitalization.¹⁵ While acknowledging that outsourcing is not new in the insurance sector, the report found a trend towards the increasing complexity of the value chain because of new players entering the market in particular, in the distribution stage of the insurance value chain, where incumbent insurers increasingly cooperate with a greater variety of players in evolving ecosystems such as the mobility, travel, or health sectors. EIOPA's Big Data Analytics thematic review also showed the increasing use of new types of data and new data sources by European motor and health insurers. In this context, the European Commission presented in September 2020 its Digital Finance Strategy,¹⁶ which was accompanied by a legislative proposal on digital operational resilience for the financial sector, the Digital Operational Resilience Act (DORA).¹⁷ Among other things, DORA seeks to harmonize certain key elements of the relationship between financial institutions with third party service providers and also develops an oversight framework for to-be-defined "critical ICT third party service providers".

¹⁵ Report on (Re)insurance value chain and new business models arising from digitalization, EIOPA, 2020, https://www.eiopa.europa.eu/content/discussion-paper-reinsurance-value-chain-and-new-business-models-arising-digitalisation_en.

¹⁶ Digital Finance Strategy, European Commission, 2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0591>.

¹⁷ Legislative proposal on digital operational resilience for the financial sector (DORA), European Commission, 2020, <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12090-Digital-Operational-Resilience-of-Financial-Services-DORFS-Act>.

III. CONCLUSION/NEXT STEPS

The topics of big data and AI are of ongoing relevance to insurance markets from both sides of the Atlantic. Information exchanges relative to these areas and other relevant topics will continue in the new 2021-2022 workstream on Technology and Innovation.