The Emergence of BDAI Regulation – Commonalities and Challenges

EAA e-Conference on
Data Science & Data Ethics

12 May 2022
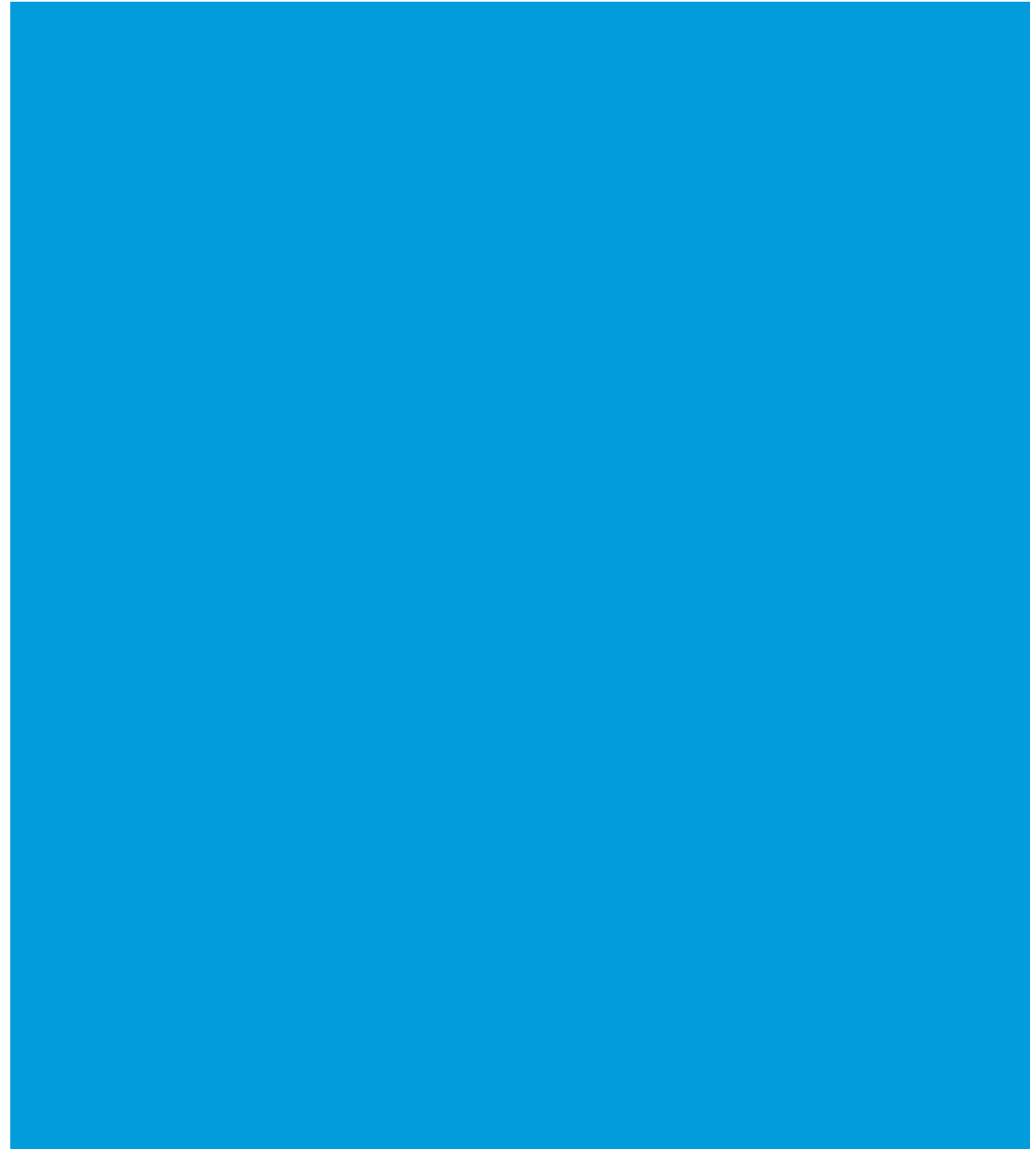
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Agenda

1. ML/AI REGULATION – A GLOBAL TREND

2. STRUCTURES AND OBSERVATIONS

3. IMPLICATIONS FOR ML/AI MANAGEMENT

ML/AI REGULATION – A GLOBAL TREND

OVERARCHING OECD ML/AI PRINCIPLES – ADOPTED IN MAY 2019

Inclusive growth, sustainable development and well-being

… highlights the potential for trustworthy AI to contribute to overall growth and prosperity for all – individuals, society, and planet – and advance global development objectives.

Human-centred values and fairness

AI systems should be designed in a way that respects the rule of law, human rights, democratic values and diversity, and should include appropriate safeguards to ensure a fair and just society.

Transparency and explainability

… about transparency and responsible disclosure around AI systems to ensure that people understand when they are engaging with them and can challenge outcomes.

Robustness, security and safety

AI systems must function in a robust, secure and safe way throughout their lifetimes, and potential risks should be continually assessed and managed.

Accountability

Organisations and individuals developing, deploying or operating AI systems should be held accountable for their proper functioning in line with OECD's values-based principles for AI.

„The OECD AI Principles promote use of AI that is innovative and trustworthy that respects human rights and democratic values"

Shows common ideas and approaches in looking at ML/AI

Source: Source: OECD.AI (2021), https://oecd.ai.

BASED ON A BROAD DEFINITION OF ML/AI SYSTEMS USED BY OECD

An **AI system** is a machine-based system that is capable of **influencing** the environment by producing an output (predictions, recommendations or decisions) for a **given set of objectives**. It uses machine and/or human-based data and inputs to

(i)   perceive real and/or virtual environments;

(ii) abstract these perceptions into models through analysis in an automated manner (e.g., with machine learning), or manually; and

(iii) use model inference to formulate options for outcomes.

AI systems are designed to operate with varying levels of autonomy.

Source: OECD.AI (2021), https://oecd.ai.

OECD.AI COUNTS MORE THAN 700 POLICY INITIATIVES FROM 60 COUNTRIES, TERRITORIES AND THE EU

Global view
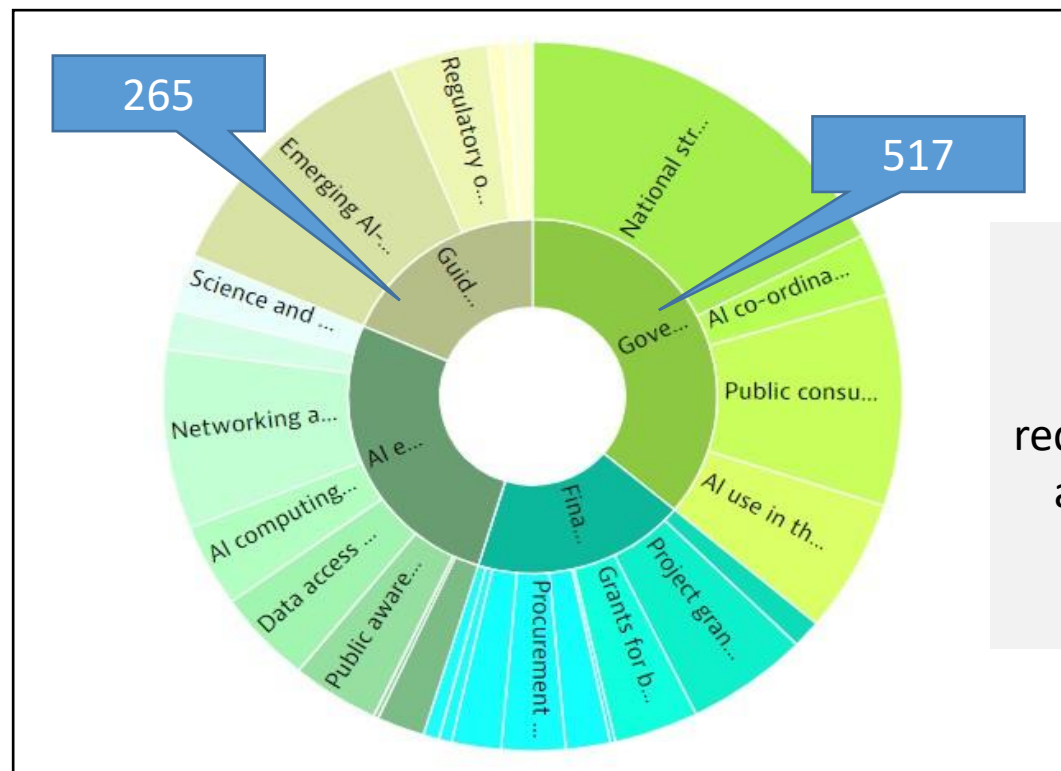
EU view – 59 initiatives
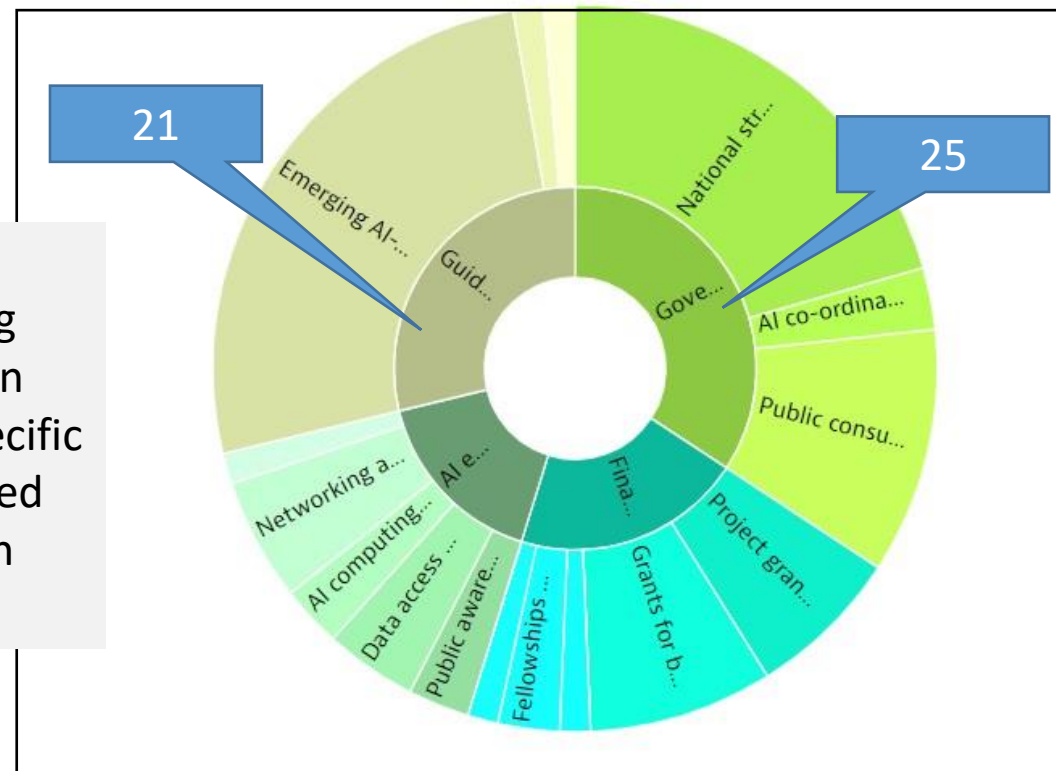
Emerging regulation requires specific and focused attention

Source: OECD.AI (2021), powered by EC/OECD (2021), database of national AI policies, accessed on 13/04/2022, https://oecd.ai.

STRUCTURES AND OBSERVATIONS

02

- ➤ Artificial Intelligence Governance Framework (Singapore)
- ➤ Artificial Intelligence Act (EU Commission)
- ➤ Artificial Intelligence Governance Principles (EIOPA's Consultative Expert Group)

SNAPSHOT OF SINGAPORE'S MODEL ARTIFICIAL INTELLIGENCE GOVERNANCE FRAMEWORK

Voluntary framework
- Balance between required quality-assurance and protection and innovation

Principles
- AI-based decisions should be explainable, transparent and fair
- AI-solutions should be human-centric

Practical Guidance on key areas
- Internal governance structures and measures
- Determining the level of human involvement in AI-augmented decision making
- Operations management
- Stakeholder interaction and communication

Source: Model Artificial Intelligence Governance Framework, Second Edition, January 2021

EUROPEAN ARTIFICIAL INTELLIGENCE ACT – PART OF EU'S COORDINATED PLAN FOR AI

Source: EU Commission, COM(2021) 205 final, ANNEX
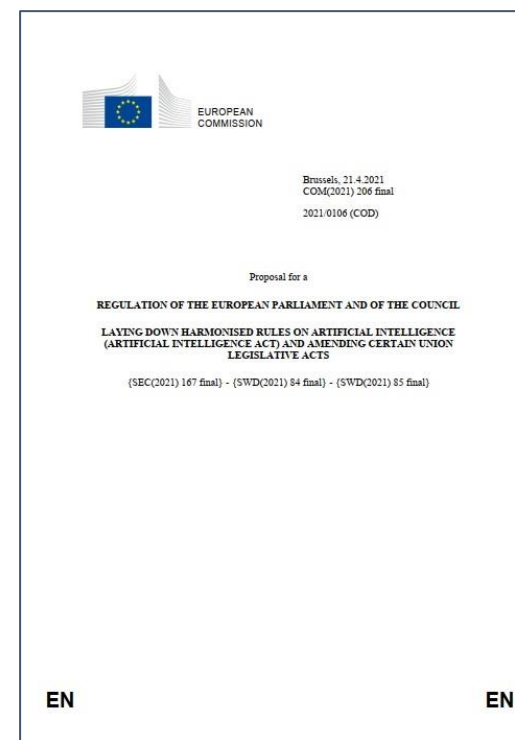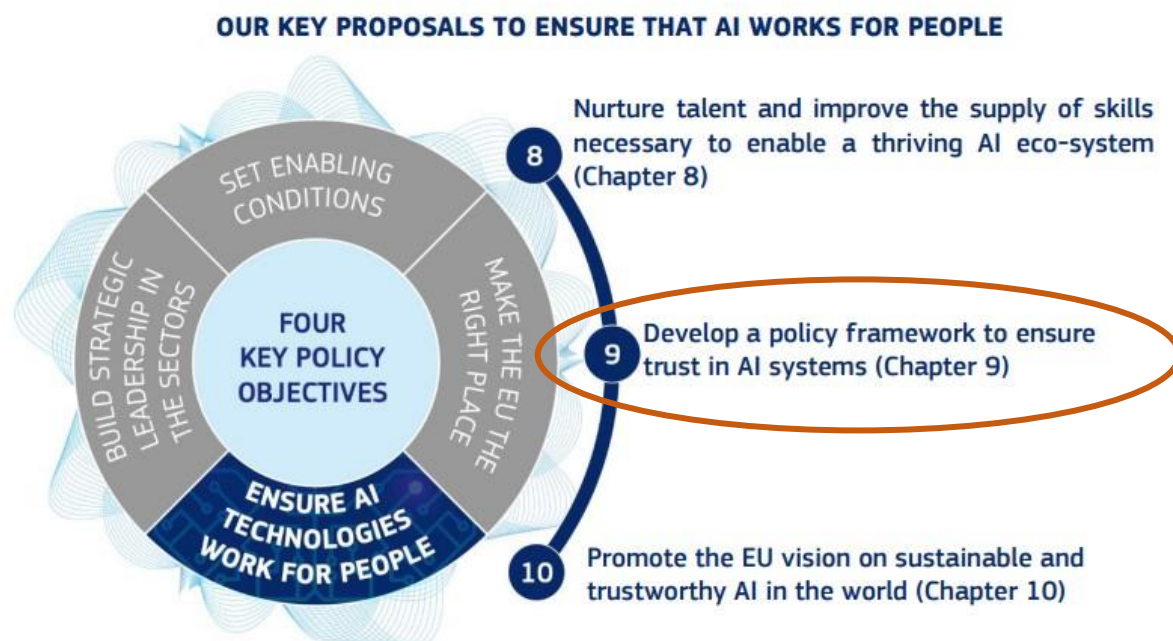
EUROPEAN ARTIFICIAL INTELLIGENCE ACT – KEY OBSERVATIONS ON INSURANCE

Prohibition of unacceptable AI practices:

- manipulate persons through subliminal techniques or exploit the fragility of vulnerable individuals, and could potentially harm the manipulated individual or third person;

- serve for general purposes of social scoring, if carried out by public authorities; or

- are used for running real time remote biometric identification systems in publicly accessible spaces for law enforcement purposes.

Regulation of high-risk AI systems - High-risk AI systems are:

- are part of a product falling under the EU product safety regulation, such as toys or medical devices; or

- belong to a list of stand-alone high-risk AI systems laid down by the proposal, such as AI systems assessing the **creditworthiness of individuals** or used in the context of recruitment.

- providers of such applications must maintain sound risk management systems. They must feed the AI system with training, validation and testing data that meets specific quality requirements and is handled through appropriate data governance and management practices.

Users must comply with the instructions and report to the provider/distributor any serious incident or malfunctioning, which could lead to a breach of fundamental rights.

AI systems are also increasingly used in insurance for premium setting, underwriting and claims assessment which, if not duly designed, developed and used, can lead to serious consequences for people's life, including financial exclusion and discrimination.

According to the Presidency compromise text (as of 29 Nov 2021) now also referring to insurance:

Annex III - High-risk AI systems pursuant to Article 6(23) are the AI systems listed in any of the following areas:

5. […] (d) AI systems intended to be used for insurance premium setting, underwritings and claims assessments.

EUROPEAN ARTIFICIAL INTELLIGENCE ACT – DEFINITION OF ML/AI AND MOST RELEVANT ARTICLES

'Artificial Intelligence System' (AI system) means a system that

(i) receives machine and/or human-based data and inputs,

(ii) infers how to achieve a given set of human-defined objectives using learning, reasoning or modelling implemented with the techniques and approaches listed in Annex I, and

(iii) generates outputs in the form of content (generative AI systems), predictions, recommendations or decisions, which influence the environments it interacts with;
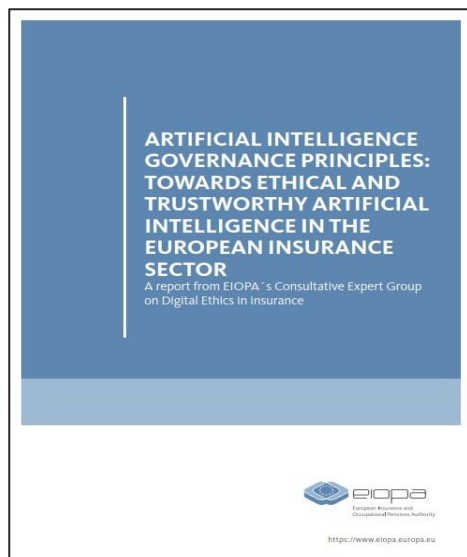
ARTIFICIAL INTELLIGENCE TECHNIQUES AND APPROACHES (Annex I)

(a) Machine learning approaches, including supervised, unsupervised and reinforcement learning, using a wide variety of methods including deep learning;

(b) Logic- and knowledge-based approaches, including knowledge representation, inductive (logic) programming, knowledge bases, inference and deductive engines, (symbolic) reasoning and expert systems;

(c) Statistical approaches, Bayesian estimation, search and optimization methods.

Source: EU Commission, COM(2021) 205 final, ANNEX

- Article 9: Risk Management System
- Article 10: Data and Data Governance
- Article 11: Technical Documentation
- Article 12: Record Keeping
- Article 13: Transparency and provision of information to users
- Article 14: Human oversight
- Article 15: Accuracy, robustness and cybersecurity
- Articles 16-29: Obligations of providers of high-risk AI systems

EMERGING ML/AI REGULATION SPECIFICALLY FOR INSURERS AND BANKS – EU AND GERMANY

ARTIFICIAL INTELLIGENCE GOVERNANCE PRINCIPLES: TOWARDS ETHICAL AND TRUSTWORTHY ARTIFICIAL INTELLIGENCE IN THE EUROPEAN INSURANCE SECTOR
A report from EIOPA´s Consultative Expert Group on Digital Ethics in insurance

https://www.eiopa.europa.eu

- Proportionality and risk
- Fairness and non-discrimination
- Transparency and explainability
- Human oversight
- Data governance, record keeping
- Robustness and performance

DEUTSCHE BUNDESBANK EUROSYSTEM · BaFin Bundesanstalt für Finanzdienstleistungsaufsicht

Maschinelles Lernen in Risikomodellen – Charakteristika und aufsichtliche Schwerpunkte
Konsultationspapier

Maschinelles Lernen in Risikomodellen –
Charakteristika und aufsichtliche Schwerpunkte
Stand: Juli 2021

- End-to-end, risk based approach
- General governance principles
- Principles for development
- Principles for application

RESULTS OF THE EIOPA EXPERTS GROUP

- ▶ Definition and explanation of principles, incl. background and relation to existing regulation (e.g.Solvency II)
- ▶ Benefits and potential challenges of use cases in insurance
- ▶ Application to high-risk use cases, and specification to key areas of insurance value chain (e.g. pricing, underwriting, claims, fraud)
- ▶ Impact Assessment Frameworks for policy holders and companies

Proportionality and Risk

- ▶ Impact assessment per ML/AI use case in three steps
- ▶ Measure the potential impact on policy holders and insurance company – based on a defined impact assessment framework
- ▶ Determine the proportionate combination of measures to address potential risks / impact

Fairness and Non-Discrimination

- ▶ Is there a balance of interests of all stakeholders?
- ▶ CSR considerations: financial inclusion, avoid reinforcing existing inequalities
- ▶ Keep records on concrete measures of fairness
  - ▶ Procedural dimension
  - ▶ Substantive dimension

Transparency and Explainability

- ▶ Which explainable AI is used, esp. in high-impact use cases?
- ▶ Are approaches of explanation adapted to specific use cases and stakeholders?
- ▶ Is explainability coupled with other measures?
- ▶ Are customers aware of the data used, and that they interact with AI?

Human Oversight

- ▶ Is the complete life cycle of AI subject to adequate human oversight?
- ▶ Clear roles and responsibilities, aligned with specific use cases, esp. high-impact use cases?
- ▶ Are these embedded into the ICS?
- ▶ How is the impact of AI on the work of employees assessed? Is there adequate training?

Data Governance and Record Keeping

- ▶ Are data protection laws obeyed (e.g. GDPR) throughout the AI lifecycle?
- ▶ Is data accurate, complete appropriate?
- ▶ Same standards for internal and external data?
- ▶ Safe and secured data environment?
- ▶ Records of data management to ensure traceability and auditability?

Robustness and Performance

- ▶ How is robustness ensured?
- ▶ Intended use and potential harm assessed?
- ▶ Ongoing performance metrics?
- ▶ Sound data management?
- ▶ Stability, calibration and validation to ensure reproducibility, resilience and security …?

Source: Artificial Intelligence Governance Principles: Towards Ethical and Trustworthy Artificial Intelligence in the European Insurance Sector, EIOPA, Frankfurt, 2021

EXAMPLE USE CASE

Fairness and Non-Discrimination

Respect principle of human autonomy
avoid price optimization practices like those aiming to maximize consumers "willingness to pay" or "willingness to accept"

Use Case: Pricing & Underwriting

Insurance firms should be able to explain to regulators and auditors that the principles behind the tariff model are sound, and consumers should be informed of the main rating factors that influence the premium in order to reinforce trust, enable them to adapt their behavior, and adopt informed decisions.

Prepare to prove and explain that the principles behind an AI system are sound
Create tariff ratebook for GLM models to allow performance analyses

Provide stakeholders with information about the use, the nature, and design of an AI system

Information to be provided	Consumer	Auditor and supervisor	Board
Is automated decision making or AI used?	x	x	-
What datasets are used?	x	x	-
Why certain criteria are chosen for underwriting and pricing i.e. causal link	x	x	-
Counterfactual explanation - most influencial rating factors	x	x	-
Reasons for using AI and consistency with corporate strategies / objectives*	-	x	x
Description of how the model is integrated in the current IT system*	-	x	-
Staff involved in the design and implementation and core function groups*	-	x	x
Data collection, preparation and post-processing methodologies*	-	x	-
Technical choices / arbitration and limitations / risks of the AI model chosen*	-	x	-
Code and data used to train and test the model*	-	x	-
Model performance, including KPIs*	-	x	x
Model security measures*	-	x	-
Ethics and trustowrthy assessment*	-	x	x
Documentation on compliance with regulation	-	x	x
Certification by an independent body, disclosure of audit	-	x	x
System logic explained to a non-expert	-	x	x
Implemented third-party technologies and risks	-	x	x

Transparency and Explainability

Source: Artificial Intelligence Governance Principles: Towards Ethical and Trustworthy Artificial Intelligence in the European Insurance Sector, EIOPA, Frankfurt, 2021

IMPLICATIONS FOR ML/AI MANAGEMENT

03

WHAT MEASURES SHOULD BE TAKEN IN ORDER TO ENSURE ML/AI QUALITY AND ADDRESS THE COMING REGULATORY INITIATIVES?

1 Establish a **strategic** view on all ML/AI initiatives, including business cases and a rigorous risk/return assessment

2 Extend **risk management**, internal controls and compliance management for ML/AI, including staff enablement

3 Design your ML/AI **governance framework** in close alignment with your use cases

4 Establish **Data Ops** and **ML Ops** – End-to-end performance monitoring and management of ML/AI use cases

5 ML/AI will not be separate to existing compliance efforts – **embed** it into your SII activities (ORSA)

6 Clean your **data issues** – Data Strategy and new Data Governance are key

Individual Action Plan

► A stable view of the regulatory guidelines is necessary to prepare for the coming regulations.

► An complete inventory of the ML/AI applications is useful.

► An analysis of possible gaps shows the need for action based on the inventory of ML/AI applications.

► A concrete risk assessment is already possible through risk modeling

► The impact on the ICS and current risk management processes is derived from the risk assessment.

► An early warning system can be implemented by setting up guidelines for assessing data criticality (data privacy, …).

► By introducing regular validations and performance management of ML/AI algorithms, it can be mathematically and technologically ensured that algorithms perform efficiently.

Thank you very much for your attention

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