EXPLAINABLE ARTIFICIAL INTELLIGENCE FOR C-LEVEL EXECUTIVES IN INSURANCE

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As Artificial Intelligence (AI) increasingly transforms industries, ensuring transparency and accountability in AI systems is paramount, especially for C-level executives navigating the insurance sector. This discussion paper explores Explainable AI (XAI), emphasising its critical role in maintaining regulatory compliance and fostering stakeholder trust. By demystifying AI-driven decision-making processes, XAI not only aids in adhering to the EU's AI Act and GDPR but also elevates AI from a 'black box' to a more transparent, trustworthy tool. The paper provides a comprehensive toolbox of XAI methods, such as LIME, ICE, and SHAP, offering practical guidance for integrating XAI into business strategies. Executives will gain insights into leveraging XAI for strategic decision-making, enhancing model management, and demonstrating a commitment to ethical AI practices, thereby positioning their organisations as industry leaders in responsible AI.

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1   INTRODUCTION

Artificial Intelligence (AI) is rapidly transforming industries and people's daily lives. 'AI systems' perform operations characteristic of human intellect such as data analysis, planning, language understanding, object and sound recognition, learning, problem-solving, and decision-making. Embracing AI is crucial for staying competitive and preparing for the future of the insurance industry. However, the adoption of AI, particularly in sensitive areas like pricing or claims management, is often met with caution due to concerns about ethical considerations such as transparency, and accountability. The AI Act provides clarity on legal requirements for AI to be employed in the European Union, and establishes the levels of sanctions, comprehensively covering what is legally binding. Hence, it will become ever more important to make decisions made by AI traceable, understandable, and explainable to retain intellectual oversight and control.

Explainable AI (XAI) refers to AI systems that meet these prerequisites and to the corresponding tools and governance frameworks that support them. This discussion paper aims to provide guidance to executives on the importance of XAI from the regulatory and value-creation perspectives, and to offer practical advice on how to approach XAI implementation.

Actuaries bring a unique blend of technical skills, professionalism, and ethical standards to the implementation and governance of AI systems. Our education syllabus and professional experience in data analysis, risk management and predictive modelling, positions actuaries as valuable contributors to the development and oversight of AI technologies within the insurance sector.

The Actuarial Association of Europe (AAE) has discussed the role of the actuarial profession in Artificial Intelligence in our May 2024 publication titled 'How Actuaries can provide an ethical and professional dimension to AI', emphasising our commitment to uphold ethical and professional standards in AI applications.

2   WHY EXPLAINABLE AI MATTERS FOR EXECUTIVES

Artificial Intelligence holds immense potential value for companies, but it also brings significant challenges regarding operational, ethical, and regulatory risks, as well as increased shareholder expectations. Executives must approach these opportunities with professionalism and caution. This is not merely a theoretical exercise – risks do materialise, as seen in the global rise in lawsuits due to the misuse of AI, which can result in substantial fines (e.g., https://news. bloomberglaw.com/health-law-and-business/ai-lawsuits-against-insurers-signal-wave-of-health-litigation). For instance, in the EU, the General Data Protection Regulation (GDPR) and the AI Act impose rigorous requirements on the professional use of AI and demand responsibility in automated decision-making, enabled by transparency, traceability and accountability. Employing XAI models helps companies comply with these regulations by providing insights into how decisions are made. Thus, for C-level executives, XAI is essential in order to stay compliant with increasing AI regulations.

Moreover, XAI transforms AI systems from opaque 'black boxes' to more transparent systems whose decisions can be better understood and consequently better trusted by all stakeholders and all those responsible, including customers, employees, partners, regulators, and shareholders. For example, XAI can clarify how coverage prices are determined and identify the factors leading specific decisions. By providing these insights, XAI bridges the gap between complex algorithms and user comprehension, giving executives better oversight of AI systems, and enabling employees to professionally apply AI through suitable tools and governance. For the entire company, XAI serves as a catalyst to unlock the value of AI.

The good news is that practical solutions exist to overcome the problem of explainability. These tools can assist the justification of outcomes and decisions, highlight the importance of features, and provide insights on fairness. While primarily tailored to advanced AI applications that do not allow an easy trace-back of outcomes, these tools should be embedded in an overarching AI and data governance framework that ensures a professional use of data and models overall.

Real-Life Example:

Consider a major insurance company that implemented an AI system to automate its claims processing. Initially, the system operated as a black box, leading to distrust among customers and regulatory scrutiny due to the lack of transparency in how claims decisions were made and whether they are justified. To address these concerns, the company adopted XAI tools, such as SHAP (Shapley Additive Explanations), to provide clear explanations for each claim decision.

By doing so, these tools could show customers which factors influenced the approval or denial of their claims, allowing them to decide whether to challenge the decision or not. This transparency not only improved customer trust and satisfaction but also demonstrated compliance with regulatory requirements, ultimately avoiding potential fines and lawsuits. Additionally, the insights gained from XAI helped the company refine their AI models to make fairer and more accurate decisions, further enhancing operational efficiency and ethical standards.

3   HOW TO APPROACH XAI

Successfully embedding XAI requires more than the deployment of sophisticated tools. It requires a comprehensive data and AI strategy, commitment from key stakeholders, and a team with the appropriate expertise. This section provides practical guidance on how to approach the implementation of XAI in business strategies.

Data and AI strategy

Data and AI strategy: Align internal key stakeholders behind a common vision on AI, emphasising the critical importance of ethical AI, including Explainable AI. Achieving buy-in from key stakeholders is essential, as the ethical deployment of AI is of strategic importance, extending beyond operational considerations.

Access to Sufficient AI Competence

Access to Sufficient AI Competence: Before embarking on the implementation of XAI, it is crucial to ensure that your organization has access to the necessary AI expertise. This could involve building a team with a strong understanding of both AI and XAI principles or collaborating with external experts or consultants who specialize in XAI to provide guidance and support. Ensuring sufficient AI competence will help in accurately assessing your current AI systems, identifying the most appropriate XAI tools, and developing a robust implementation strategy.

Assessment and Planning

Assessment and Planning: Begin by assessing the current AI models and identifying areas where transparency is most critical. Ensure that ongoing and future AI development aims at XAI solutions in any areas where compliance and transparency may be required. Develop a plan that outlines the scope and resources required for implementing XAI.

Tool Selection

Tool Selection: Choose the appropriate XAI tools based on the specific needs and complexities of your AI models as well as the IT environment of your organisation. The selection should consider factors such as the type of model, the level of explanation required, and regulatory demands, not forgetting the need to be able to integrate the XAI to the IT environment and existing AI.

Integration and Testing

Integration and Testing: Integrate the chosen XAI tools into your existing AI systems. Conduct thorough testing to ensure that the explanations provided by the tools are accurate and meaningful. This step is crucial for validating the effectiveness of the XAI implementation.

Training and Education

Governance and Oversight

Training and Education: Train your operational teams on how to use the XAI tools effectively. This includes understanding how to interpret the outputs and how to communicate these insights to internal and, potentially, external stakeholders. Engage with stakeholders, including customers, employees, and regulators, to gather feedback on the explainability of AI systems. This feedback can be invaluable in refining XAI practices and improving transparency.

Governance and Oversight: Establish an AI governance framework that includes policies and procedures for using XAI. This framework should ensure continuous monitoring, evaluation, and improvement of the XAI processes to maintain compliance and ethical standards. It should furthermore take into account the possible reporting requirements called for by the AI Act. Regularly perform audits to ensure that AI models are not only explainable but also fair and unbiased. Use XAI tools to detect any biases that may exist in the model's decision-making process and therefore may allow for mitigating actions, where possible.

4 XAI TOOLS

While executives benefit from understanding the fundamental principles of XAI to stay compliant and unlock value, the practical integration and implementation of XAI are typically carried out by operational teams. The increasing interest at both academic and business level has led to a dynamic expansion of the XAI toolbox.

Graphical visualisations employed in XAI methods are crucial as they transform complex data and model explanations into intuitive and accessible formats, enhancing understanding and facilitating better decision making. More detailed information and graphical representation of these tools and methodologies can be found in Section 5 of our paper titled 'What should an Actuary know about Artificial Intelligence?' published in January 2024.

This section aims to provide a brief overview of some of the most renowned XAI tools and methodologies, and discuss how these can be used to enhance the transparency and explainability of AI models.

It should be noted that actuarial standards and methodologies are still in development and hence it is highly recommended to diversify approaches by applying more than one methodology in order to obtain a broader overview for the explainability of results.

KEY XAI TOOLS AND METHODOLOGIES

A. LOCAL INDICATORS

XAI tools can provide answers in two cases. Firstly, they can be helpful in explaining the outcome of an individual case, e.g., the price for a specific customer – these are called local indicators. The three most common XAI tools include the following:

- **ICE (Individual Conditional Expectation)**
  ICE plots show how varying one feature affects individual predictions, aiding in 'what if' analysis. This tool is beneficial for understanding the sensitivity of predictions to changes in individual input variables. More information can be found in Section 5.3 of our January 2024 publication.

- **LIME (Local Interpretable Model-agnostic Explanations)**
  LIME approximates models locally to identify which variables influence specific predictions. This is useful in both regulatory and business contexts. For example, if a regulator requests clarity on how a premium is determined, LIME can generate charts to show the impact of each risk factor on the predicted values. More information can be found in Section 5.5 of our January 2024 publication.

- **SHAP (Shapley Additive Explanations)**
  SHAP values explain each feature's contribution to a prediction, helping to prioritise influential factors. This is particularly useful in regulatory and business contexts where it is necessary to explain specific model predictions. More information can be found in Section 5.6 of our January 2024 paper.

B. GLOBAL INDICATORS

Secondly, XAI tools can explain the broader picture and how variables impact the model as a whole, e.g., to test ethical considerations and potential indirect discrimination – these XAI tools are called global indicators. While there are numerous such tools, one of the most common one is:

- **PD (Partial Dependence)**
  Partial Dependence is an explainability indicator that illustrates the average effect of a specific feature on the predicted outcome of an AI model, by plotting how predictions change when the specific feature changes, while keeping other features constant. Additional information can be found in Section 5.2 of our January 2024 paper which discusses the technical aspects of XAI tools in more detail.

5 REGULATORY FRAMEWORK AND ETHICAL GUIDELINES

In 2019, the AI High-Level Expert Group (HLEG) developed the Ethics Guidelines for Trustworthy AI, setting out seven non-binding principles for ethical AI. These principles include human oversight, technical robustness, privacy, transparency, fairness, societal well-being, and accountability.

Transparency means that AI systems are developed and used in a manner that allows for appropriate traceability and explainability. It involves ensuring that users are aware when they are interacting with an AI system and informing all stakeholders about the system's capabilities and limitations. Additionally, it is crucial to inform individuals about their rights.

In addition to these non-binding rules there is increasing regulation impacting XAI:

1   **GDPR (General Data Protection Regulation)**: GDPR emphasises individuals' rights to understand and contest decisions made by automated systems. Specific articles, such as Recital 71 and Article 15, require transparency and accountability in automated decision-making processes. Compliance with GDPR requires that AI systems provide clear explanations of how decisions are made, ensuring that individuals can understand the rationale behind the outcomes.

2   **AI Act**: The AI Act underscores the necessity for accountability and auditing AI systems for biases and errors. The Act aims to protect individuals from potential discrimination by ensuring that AI systems are transparent, and their decisions are traceable. Compliance with the AI Act will require businesses to implement XAI tools to provide clear, understandable insights into AI decision-making processes. The AI Act also sets out a set of reporting requirements for an AI to be implemented in the EU, which, depending on the scope of the AI, can be considerable.

More information regarding the AI Act can be found in our March 2024 publication titled 'The AI Act sets out the way Artificial Intelligence is to be used in the EU'.

BEYOND COMPLIANCE: CORPORATE RESPONSIBILITY

Adopting XAI is not just about regulatory compliance; It reflects a commitment to corporate responsibility. By prioritising transparency and accountability, companies can foster trust and reinforce their reputation in ethical AI practices. Such a commitment demonstrates to customers, regulators, and shareholders that the company is dedicated to the responsible use of AI.

STRATEGIC IMPORTANCE FOR EXECUTIVES

For C-level executives, integrating XAI into their company's AI strategy is essential. It ensures that the organisation not only meets regulatory requirements but also builds a foundation of trust and ethical practice. Executives should focus on embedding XAI within their AI governance frameworks, ensuring that the use of AI technologies aligns with the company's values and regulatory obligations.

By understanding and adhering to these regulatory and ethical guidelines, executives can drive strategic decision-making, maintain compliance, and build stakeholder trust, positioning their organisation as a reliable partner or even leader in the responsible use of AI.

6 CONCLUSION

Successfully integrating Explainable AI (XAI) is crucial for harnessing the full potential of AI technologies while ensuring transparency, accountability, and regulatory compliance. By embedding XAI into your broader AI and data strategy, building a robust governance framework, and applying XAI strategically, organizations can make AI systems more understandable and trustworthy, thereby fostering a culture of trust and ethical use of AI.

Below we summarise the key steps for the effective implementation of XAI:

1 Embed XAI in Your Broader AI and Data Strategy to Foster a Culture of Trust and Ethical Use of AI
For C-level executives, XAI should be a strategic priority within the company's AI and data strategy. Embracing XAI is essential not only for harnessing the full potential of AI technologies but also for ensuring transparency, accountability, and compliance with regulatory standards. By integrating XAI, organisations can make AI systems more understandable and trustworthy, which is crucial for building and maintaining stakeholder trust.

2 Build a Robust AI Governance Framework
Establishing a robust governance framework for XAI is vital. This framework should include clear policies and procedures for the use of XAI tools, regular audits to ensure compliance with ethical and regulatory standards, and ongoing training for staff to keep them updated on the latest XAI methodologies. A robust governance framework will help maintain the integrity and reliability of AI systems across the organisation.
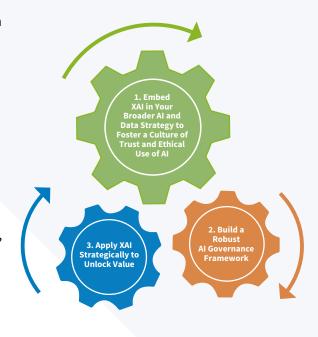
3 Apply XAI Strategically to Unlock Value
Identify critical areas within the organisation where AI decision-making is crucial and where explainability can provide significant value. This could include pricing, claims management, customer service, and fraud detection.
Leverage XAI to enhance strategic decision-making by providing deeper insights into how AI models reach their conclusions. This transparency allows for more informed decisions, helps identify and mitigate biases, and ensures that AI-driven strategies align with the company's values and objectives. Furthermore, XAI can provide actionable insights that drive innovation and improve operational efficiency.

THE ACTUARIAL ASSOCIATION OF EUROPE

The Actuarial Association of Europe (AAE), founded in 1978 under the name of Groupe Consultatif Actuariel Européen, is the Brussels-based umbrella organisation, which brings together the 38 professional associations of actuaries in 37 countries of the EU, together with the countries of the European Economic Area and Switzerland and some EU candidate countries.

The AAE has established and keeps up-to-date a core syllabus of education requirements, a code of conduct and discipline scheme requirements, for all its full member associations. It is also developing model actuarial standards of practice for its members to use and it oversees a mutual recognition agreement, which facilitates actuaries being able to exercise their profession in any of the countries concerned.

The AAE also serves the public interest by providing advice and opinions, independent of industry interests, to the various institutions of the European Union – the Commission, The Council of Ministers, the European Parliament, ECB, EIOPA and their various committees – on actuarial issues in European legislation and regulation.