

Invitation to Tender (ITT):

Artificial Intelligence (AI) and Machine Learning (ML) in Actuarial Modelling in the UK

Provision of Research Services

Reference	FRC2022-0142 - AI and ML in Actuarial Modelling in the UK
Date	24/06/2022

Assessing the use of artificial intelligence (AI) and machine learning (ML) in actuarial modelling in the UK.

1 Background and context

The Financial Reporting Council (FRC) regulates auditors, accountants and actuaries and sets the UK's Corporate Governance and Stewardship Codes. We seek to promote transparency and integrity in business; our work is aimed at investors and others who rely on company accounts, audit, and high-quality risk management.

The use of Artificial Intelligence (AI) and Machine Learning (ML) is growing in actuarial modelling. The Institute and Faculty of Actuaries (IFoA), the UK's professional association for actuaries, has been encouraging education and training in these techniques among its members and recently launched a data science certification.

2 Project description

2.1 Purpose & Objectives

The objective of this research is to learn more about the role of AI/ML in UK actuarial modelling practices across pensions, life insurance, general insurance, and wider fields (e.g., banking and investment). It will also compare the extent of AI/ML deployment by the actuarial profession with that of other similar professions¹. The overall purpose of the research is to improve our understanding of new risks that AI/ML might bring to the quality of actuarial work. To do this, the research will address the following four areas of enquiry:

1. *Areas of use*: Which actuarial departments are involved in using AI and ML techniques in their work?
2. *Approach*: What approach(es) and technique(s) are used? How are they selected?
3. *Governance*: What is the governance process around the use of AI and ML techniques as compared to the governance process around the more traditional techniques?
4. *Output*: How do the areas of use, approach and governance of AI and ML impact on
 - a. the way outputs are used internally by a company, and
 - b. the uncertainty around the actuarial modelling results using AI/ML, as compared to the uncertainty around results from the more traditional approaches?

2.2 Scope

Examples of the questions to be answered in each of the project's four areas of enquiry are presented in the table below. These are indicative only. *Bidders' proposals should include a more extensive list of questions, explaining the method(s) by which each is expected to be*

¹ Examples could be Public Health epidemiologists, demographers.

answered, the sources that would be used, and in which phase(s) of the project the relevant work would take place.

Area of enquiry	Example questions
Areas of Use	<p>Which departments/teams/functions are involved in using AI/ML techniques in their actuarial work, and at what seniority levels?</p> <p>How are responsibilities allocated between actuaries and non-actuaries?</p> <p>Which aspects of actuarial work (that was carried out previously) are AI/ML techniques being applied to, and to what extent?</p> <p>Is the deployment of AI/ML techniques also opening new avenues of actuarial work which were previously not possible?</p>
Approach	<p>How, and by whom, are decisions made about whether to use AI-ML?</p> <p>How does this decision-making compare to that for other approaches?</p> <p>Which AI/ML techniques are used? How are they selected? Which AI/ML techniques are considered but not used?</p> <p>What additional considerations and areas of judgement are needed in the context of AI/ML techniques that are (were) not needed for other approaches?</p>
Governance	<p>What is the governance process around the use of AI and ML techniques?</p> <p>How does this compare to the governance process around more traditional techniques?</p> <p>How much do the Management or Executive team discuss the level of reliance being placed on AI-ML techniques?</p> <p>Are reports sent to the Risk Committee which assess how AI-ML techniques are being used?</p>
Output	<p>How are the results of AI-ML assisted actuarial modelling validated?</p> <p>How is bias in the data checked?</p> <p>How are the results interpreted?</p> <p>How is uncertainty around the results considered and assessed, as compared to uncertainty around results from other approaches?</p>

	What are the differences, if any, in how actuarial practitioners communicate their results and/or advice to clients when it is based on AI-ML modelling (compared to more traditional techniques)?
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2.3 Suggested approach

It is envisaged that the project will proceed broadly as indicated in the table below. However, we encourage bidders to suggest alternative approaches and innovations if they believe these would improve the project's efficiency or its outcomes.

Phase	Purpose
A	Population: Identify the population of companies/organisations to be surveyed. This will include a representative mix of experienced and less-experienced actuarial practitioners drawn from: <ul style="list-style-type: none"> a) Insurance companies b) Actuarial consultancies c) Other organisations where actuarial modelling is significant More details of the target population are provided in section 2.4 below.
B	Questionnaire and 'deep dive' participant recruitment: Use a questionnaire, potentially tailored to each company to increase relevance and the response rate, asking the research population high-level questions covering all four areas of enquiry. Use questionnaire responses to identify a suitable sample of actuaries willing to participate in the Phase C 'deep-dives' (see below). Bidders should also please suggest other means of recruiting Phase C participants in case of low survey participation.
C	Deep dives: This will phase will focus on a smaller number of actuaries to examine in greater depth the process, approach, and governance of the use of AI and ML in actuarial modelling, and the 'internal' outcomes (areas of enquiry in section 2.1 above).
D	AI/ML in similar professions: Compare the extent of AI/ML deployment by the actuarial profession with that of other similar professions.
E	Write-up of final report

The research contractor will need to assure companies of the confidentiality of any such information they may disclose while participating in the research. The research contractor may also need to design their research with some actuaries such that it can produce meaningful findings without the actuaries disclosing company-specific sensitive information. Getting actuaries to participate in the 'deep dives' will depend on their confidence in such measures.

Please outline in your proposal the steps you would take in this regard to maximise participation.

2.4 Target Participants

We envisage the most important information gathering will take place during the ‘deep dive’ interviews, although, as stated above, we encourage bidders to suggest alternative approaches and innovations. Ideally, the participants in the research will be a representative mix of experienced and less-experienced actuarial practitioners drawn from:

- a) Insurance companies
 - both life and non-life (general) insurers
 - a range of sizes
 - to include the Chief Actuary
- b) Actuarial consultancies
 - including a mix of those specialising in insurance, pensions, and investment
 - a range of sizes
 - to include Scheme Actuaries where consultancies are providing advice to pension schemes
- c) Any other organisation where actuarial modelling is significant

We expect the focus of the research will be on the individuals who are using AI techniques in carrying out their technical actuarial work. These individuals will most likely be working in multi-disciplinary teams some members of which may have an actuarial qualification from a professional body (such as IFoA). It would also be beneficial to include individuals who are not carrying out the technical actuarial work but who are responsible for the governance of AI/ML.

Bidders for this research project should explain in their proposals how they would successfully recruit a sufficient number of participants matching the characteristics above. Proposals should also specify how many participants will be included in (each phase of) the research while remaining within the project budget and timeline.

If ‘deep dives’ are to be used, your proposal should also explain how the deep dives will be structured. For example, will they be held with teams or with individuals, or both? Will there be follow-up sessions, or just one per team/individual?

2.5 Deliverables, milestones, and high-level project timeline

The final report of this research project should set out how widely and how significantly actuarial modelling in the UK employs AI/ML in a detailed analytical narrative that addresses each area of enquiry set out in section 2.1., covering the research questions subsequently agreed (see timeline below). It should also include a comparison of the extent of AI adoption by the actuarial profession against similar professions. We would expect the research, and hence the report, to contribute to a better understanding of the scale of AI/ML modelling

being performed by actuaries in the UK and provide a basis upon which to anticipate the pace of growth in the next few years and the level of risks to the quality of the actuarial work.

The report should explain the methods and sources used, including the criteria for categorising different extents of, and approaches to, the use of AI and ML in actuarial modelling. The main report should be accessible to a non-technical audience, with supporting technical matters explained in annexes. The FRC may decide to publish the final report, therefore we would expect drafts and the final reports to be written to a publishable standard.²

2.6 High-level project timeline

<i>Date</i>	<i>Deliverable / milestone</i>
w/c 26-09-2022	Kick-off meeting, agree detailed project timeline and methods for each phase
w/c 10-10-2022	Agree target populations/samples
w/c 17-10-2022	Participant recruitment begins
w/c 31-10-2022	Fieldwork begins
w/c 23-01-2023	Interim findings presentation
w/c 20-02-2023	Agree final report structure
w/c 20-03-2023	Draft Final Report to FRC for comment
w/c 24-04-2023	Final Report to the FRC

2.7 Liaison Agreements

The FRC policy team should be updated on project progress and consulted on key decisions in the research design and operationalisation.

- Regular updates throughout the project (by conference call), including recruitment progress.
- The FRC to sign-off topic sets and questions for each area of enquiry.
- Preliminary findings presentation midway through the 'deep-dive' phase.
- Draft report and final report both to be signed-off.

2.8 Cost and financials

The tenderer should provide a fixed fee for the work, exclusive of VAT, inclusive of all expenses. Tenderers should detail their costs in the Tender Response Documents in the

² If published, the FRC would arrange document design (at the FRC's expense) in collaboration with the contractor. The contractor would be cited as the author of the work.

format specified. No other costs should be charged on top of the fixed fee, unless the scope materially changes from what is set out / agreed. Changes to the scope / cost of the project must be mutually agreed.

The FRC does not anticipate tender bids over £50,000 excl. VAT

2.9 Your tender response

The proposal should be no more than 7 pages in total, excluding annexes, and include:

- A succinct summary of the proposal, including an estimated timeline of project milestones.
- Details of the proposed approach. This should include details of your participant recruitment approach and strategy, as well as data sources (e.g. for identifying the target population). It should also include a more extensive list of questions, as set out in section 2.2, explaining the method(s) by which each is expected to be answered, the sources that would be used, and in which phase(s) of the project the relevant work would take place.
- An estimated timeline of project milestones.
- Your team's experience of similar projects and relevant research capability, including its knowledge of actuarial work and AI/ML.
- The arrangements to be put in place for managing this work and quality assuring outputs.
- A budget, including a breakdown of time and costs per activity, in line with the project objectives outlined above.
- CVs for the project team should be included in an annex, along with any additional information about your organisation that you consider relevant.
- Bids should identify any real or perceived conflicts of interest.

2.10 Tender evaluation

Proposals will be assessed against the following principal criteria:

- (20%) Understanding of our requirement (supported by relevant experience, track record and / or transferrable knowledge).
- (35%) The suitability of the approach (including methodology and management).
- (25%) Experience / relevant experience of the proposed personnel.
- (20%) Pricing / cost of your proposal.

3 References

The FRC reserves the right to take up references. You will be required to provide references in the Tender Response Document. References must be relevant to the FRC requirement and in the last five years

4 Use of ITT & publication

Tenderers **must not** undertake any publicity activity regarding the procurement within any section of the media.

5 Questions & Clarifications

Tenderers may raise questions or seek clarification regarding any aspect of this tender at any time prior to the tender clarification deadline.

Tenderers may raise questions or seek clarification within the timeframe by sending questions to procurement@frc.org.uk in the following format.

Nature of query / clarification	Query / Clarification

The FRC will not enter into exclusive discussions regarding the requirements of this ITT with tenderers.

To ensure that all tenderers have equal access to information regarding this tender opportunity, FRC will publish all its responses to questions raised by Tenderers on an anonymous basis.

Responses will be published in a questions and answers document to all Tenderers who have indicated that they wish to participate.

6 Tender process timeline

DATE/TIME	ACTIVITY
24/06/2022	Publication of the Invitation to Tender
11/07/2022 by 10am	Deadline to submit clarification questions
18/07/2022 by 5pm	Deadline for publication of responses to clarification questions The FRC will endeavour to meet this deadline
15/08/2022 by 12pm	Deadline for supplier submission of tender to the FRC.
w/c 12/09/2022	Tender Outcome
w/c 26/09/2022	Contract Start Date
24/04/2023	Contract End Date

7 Conduct

The tenderer must not communicate to any person the tender price, even approximately, before the date of the contract award other than to obtain, in strict confidence, a price for insurance required to submit the tender.

The tenderer must not try to obtain any information about any other person's tender or proposed tender before the date of the contract award.

The tenderer must not make any arrangements with any other person about whether or not they should tender, or about their tender price.

The tenderer must not offer any incentive to any member of FRC's staff for doing or refraining from doing any act in relation to the tender.

If the tenderer engages in any of the activities set out in this section or if the FRC considers the tenderer's behaviour is in any way unethical, the FRC reserves the right to disqualify the tenderer from the procurement.

The tenderer represents and warrants that a conflicts of interest check has been carried out, and that check revealed no conflicts of interest.

Where a conflict of interest exists or arises or may exist or arise during the procurement process or following contract award the tenderer must inform the FRC and submit proposals to avoid such conflicts.

Tenderers must obtain for themselves at their own responsibility and expense all information necessary for the preparation of tenders. The FRC is not liable for any costs incurred by the tenderer as a result of the tendering procedure. Any work undertaken by the tenderer prior to the award of contract is a matter solely for the tenderer's own commercial judgement.

8 Due Diligence

While reasonable care has been taken in preparing the information in this ITT and any supporting documents, the information within the documents does not purport to be exhaustive nor has it been independently verified.

Neither the FRC, nor its representatives, employees, agents or advisers:

- makes any representation or warranty, express or implied, as to the accuracy, reasonableness or completeness of the ITT and supporting documents; or
- accepts any responsibility for the adequacy, accuracy or completeness of the information contained in the ITT and supporting documents nor shall any of them be liable for any loss or damage, other than in respect of fraudulent misrepresentation, arising as a result of reliance on such information or any subsequent communication.

It is the tenderer's sole responsibility to undertake such investigations and take such advice, including professional advice, as it considers appropriate in order to make decisions regarding the content of its tenders and in order to verify any information provided to it during the procurement process and to query any ambiguity, whether actual or potential.

It is a requirement that the successful supplier (i) comply with all applicable laws and regulations including, without limitation, the Bribery Act 2010, the Equality Act 2010 and the Modern Slavery Act 2015; and (ii) in addition to any contractual requirement(s), inform the FRC immediately upon becoming aware of any event (including actual or threatened court proceedings) which may impact upon the reputation of the FRC, whether or not connected with the Supplies and/or Services.

9 Submitting a Tender

Tenderers must submit their tender response within the deadline to procurement@frc.org.uk.

Where a Tender Response Template is provided, potential providers must align their tender response with that format.

A Tender must remain valid and capable of acceptance by the Authority for a period of 90 days following the Tender Submission Deadline. A Tender with a shorter validity period may be rejected.

10 Evaluation

The FRC will award the contract on the basis of the tender which best meets the evaluation criteria aligned to the requirements.

11 Acceptance of Tender & Notification of Award

The FRC reserves the right to amend, add to or withdraw all or any part of this ITT at any time during the procurement.

The FRC shall not be under any obligation to accept the lowest price tender or any tender and reserves the right to accept such portion or portions as it may decide, unless the tenderer includes a formal statement to the contrary in the tender. The FRC also reserves the right to award more than one contract to fulfil the requirement.

The tenderer will be notified of the outcome of the tender submission at the earliest possible time.

Where the procurement process is subject to EU public procurement directives, a minimum standstill period of 10 calendar days will apply between communicating the award decision electronically to tenderers and awarding the contract.

Nothing in the documentation provided by the FRC to the tenderer during this procurement or any communication between the tenderer and the FRC or the FRC's representatives,

employees, agents or advisers shall be taken as constituting an offer to contract or a contract. No tender will be deemed to have been formally accepted until the successful tenderer has received a formal contract award letter from the FRC.

12 Additional Information

Please use the attached Tender Response Document for your reply.

The Terms and Conditions that will apply to this proposed Agreement are attached. **Suppliers should accept the T&C's with no material changes.**