Independent Technical Expert/s - evaluate proposed AI platform to predict classroom conditions in Tanzania

Frontier Technologies Hub

We expect candidates to provide a full budget broken down by individual costs, with an expected timeframe for completing the work. Budgets cannot exceed £25,000.

Deadline for applications:

14/02/2024

Want to contribute to the UK Civil Service's most innovative programme?

The Frontier Technologies Hub works with the UK Foreign Commonwealth and Development Office (FCDO) at the intersection of tech, innovation, and international development. We work across three main areas:

⚡ Livestreaming explores the use of frontier technologies by working with partners all over the world to test and scale tech with the potential for positive social impact.

⚡ Futures connects FCDO people with one another and the world of tech, equipping them to apply frontier technologies in their programmes.

⚡ Hub Research gathers & shares what we learn and dives deeper into areas where tech has the greatest potential for doing good.

The Frontier Technologies Hub is managed by three partners: Results for Development (R4D), DT Global (formerly IMC Worldwide), and Brink. It's funded by UK Aid from the UK Government. To find out more about the programme and its goals, visit our [website](#)

What's the opportunity

Classrooms in Sub-Saharan Africa can often be

uncomfortable places to be, let alone to teach and learn in. Sweltering temperatures have proven negative physiological impacts. A meta-analysis estimated that learning improvement can be increased by 20% with a temperature reduction of 10℃.

A study showed classroom temperatures in Tanzania already regularly exceed 40℃ Poorly lit, or overly sun exposed, classrooms make it much more difficult to read, and introduces health risks (Ibhadode et al., 2019). Lack or excess of light excludes children with poor eyesight, introducing a layer of inequity. During the rainy season it becomes nearly impossible to teach given the sound of rain on corrugated iron.

Overall, these classroom conditions, all infrastructural in nature, are fundamentally part of the learner experience. Furthermore, the reliability of water supplies fluctuate impacting schooling. Natural disasters can derail the whole process of schooling. All of these challenges are expected to increase in the coming years due to climate change.

The FCDO is currently funding work to measure classroom experience in Tanzania and has a separate study looking at what interventions, such as retrofitting, would be relevant for different conditions, and to prioritise these measures based on maximising impact to children.

To support this work, the FCDO would like to predict classroom experience in classrooms across Tanzania. Classroom experience is strongly related to factors such as sound and temperature, as well as access to light, levels of pollution, and disaster risk.

To predict these classroom conditions, an AI could be used to intelligently predict certain conditions. To create model/s, training data needs to be collected. The World Bank is collecting this data in 50 schools. However, we expect we will need more data to build/train an AI model.

An early indication of how big a sample is needed for the different measures is deemed important because not all schools can be surveyed.

The opportunity is to work to understand
- What the potential for AI models could be to determine certain conditions, like temperature, light and sound, and
- Understand for each metric how much data might need to be collected to

produce an AI model with greater than 95% accuracy,

With this information, the team will use the answer to drive the next phase of data collection plans, and focus efforts on which measures show the greatest promise with regards to developing an AI model/s. This could help create a national model that maximises impact of investments made, and improve child education in Tanzania.

The scope of work

The FT Hub is looking to contract an individual/team to work closely with the FCDO team and World Bank leads from Global Facility for Disaster Reduction and Recovery (GFDRR) to respond to the question:

How many classrooms in Tanzania do we need to collect data in order to develop an AI model that can predict conditions in classrooms across Tanzania to a 95%+ accuracy?

Using in the model: satellite imagery (giving school positioning), satellite temperature, Tanzania Meteorological Authority data, country weather zones, school locations.

Covering and evaluating which of the classroom conditions needs or shows promise for machine learning, and what training data is needed?

- Light
- Sound
- Temperature
- Pollution

The work will be focused on producing a summary paper outlining:
- Direct answer to the question above.
- Summary of any key considerations, including an evaluation of the relative merits of using an AI tool for each classroom condition
- A rough costing model for the work to develop the AI model (once data is collected).
- A summary of the different types of AI models that could be used and a recommendation on the most effective model for each measure
- A review of any similar models created in Tanzania or elsewhere around the world – including contact details for those who completed previous work.

The paper should exclude review of approaches to collect data – as this will be explored by our partners.

The subsequent model will then be used to target interventions under the FCDO's Shule Bora programme, which includes a component trialling climate smart retrofit infrastructure investments.

Key qualifications

We'll be accepting applications from individuals and teams. We're interested in applicants with a range of different experiences, so please do apply even if you do not meet all the criteria outlined below.

Technical knowledge of:

- Different factors influencing optimal training set size
- State of the art predictive modelling techniques, and an understanding of how they could be applied in context
- Cost drivers for developing AI models

Practical experience with:

- Building training sets which incorporate the data types referred to above
- Building predictive models with a comparable use-case

Contextual knowledge:

- Challenges with infrastructure in LICs

Application Instructions

Please submit the following materials to FTLenquiries@dt-global.com (with name in the subject line):

- Current CV/s tailored to meet the requirements of the position
- A short covering letter outlining details and suitability of proposed roles, as well as how you would approach the scope of work (no more than 400 words)
- A proposed timeline referencing the scope of work and team availability.
- A budget outlining all costs

Please include how you plan to work with FCDO and the FT Hub. We are interested in collaborating with a team with the right background and expertise, but we're keen to learn about the approach you would propose.

Proposed Timeline

- Application deadline - 14 September 2024 @ 11:59pm UK time
- Assessment of written applications – 15-16th February
- 45-minute interview with FT team and FCDO (20-minute presentation by candidates, followed by Q&A) – w/c 19th February
- Kick off / work commencing - latest 28th February.

Evaluation Criteria

Criterion	Maximum Total points
Technical expertise: Strength of applicant/s technical expertise, as broken down in the key qualification section of this document.	55
Practical experience: Experience building training sets which incorporate similar data types.	25
Contextual experience: Experience working with infrastructure in LICs.	10

Strength of commercial proposal: We will prefer proposals which offer an ambitious and realistic proposal relative to the scope of work.	10

Enquiries

Please contact FTLenquiries@DT-Global.com for further enquiries regarding this Terms of Reference or for further information on the Frontier Technologies Programme.