

Invitation for Expression of Interest for Implementing an Advanced Data Analytics System Comprising Artificial Intelligence and Machine Learning Solutions at the Bank of Mauritius

Response to Clarifications and Queries

No	Queries and Clarifications	Answers
1	What is your current application architecture? What is the existing data landscape? Could the Bank of Mauritius provide more comprehensive information on its current IT infrastructure, including any legacy systems, to better understand the technical environment into which the AI/ML system needs to be integrated? Can you provide an overview of the current systems and workflows with which the new technology stack will need to integrate?	The Bank of Mauritius already has a data warehouse, other RDBMS systems and several internal systems generating data. Further details will be communicated at a later stage.
2	Is Cloud implementation an Option? Are there any specific technical constraints or preferred platforms (such as cloud services or on-premises solutions) that the Bank of Mauritius has for the integration of the new system?	As specified in the EOI document, the applicant should clearly indicate if the solution being proposed is a cloud-based or on-premise deployment. Respondents may propose multiple deployment options. All source data is on premise.
3	Could you please specify how many systems are anticipated to be integrated and the type of data they generate? Is the data structured or unstructured? Is there a data management solution? What technologies are used for data storage, integration and analytics?	The Bank of Mauritius has an XBRL-based data collection system in place and a data warehouse, which stores both structured and unstructured data. The Bank also uses BI reporting tools.
4	What is the expected data volume to be used as an input for data models ? How much data is being processed and collected ?	Data volume will vary depending on the used case models. Information about sizing will be provided at a later stage
5	How is the data being collected (data sources / format. i.e., Excel, XBRL etc.)? Is there is labeled dataset?	The Bank of Mauritius is currently collecting data in terms of XBRL, XML, csv and Excel formats. Datasets are available but not necessarily in the required format.
6	Are there specific data security and privacy standards, compliance standards, regulations, industry/internal standards, security protocols that need to be considered?	The solution should comply with the Data Protection Act 2017 and relevant international standards. Specific details will be shared at a later stage. Applicants may refer to the website of the Bank of Mauritius for more information on the legislative and regulatory framework. Respondents should specify which standards/ protocols their solution will be compliant with.
7	Does the Bank of Mauritius have an existing mechanism for Identity and Access Management ? Which system does the Bank of Mauritius use?	Yes. Additional information will be provided at a later stage.
8	Could you please specify the existing systems or platforms to which interoperability is crucial?	Interoperability is required on the Bank of Mauritius's data warehouse.
9	Is there a need for API exposure to enable seamless communication with other systems?	Yes
10	Are there any restrictions or considerations related to the use of certain technologies?	No
11	What is the expected budget ?	The budget is confidential and cannot be disclosed.
12	What currency should be used to provide the price estimation?	USD
13	Which area of the Data Management does the Bank of Mauritius need AI intelligence (data validity, data consistency, data analytics etc.)	Please refer to Annexure A (sections 2(a) & (b)) of the EOI document.

14	<p>Please provide details on the existing advanced analytics and data management capabilities as well as any existing initiatives that this program could build on.</p> <p>Does the team already have a good knowledge in Python?</p> <p>Is there any guidance on expectations for training and capacity building, both in terms of form, as well as period.</p> <p>Do you already have a team of Data Scientist?</p>	<p>The existing technical staff would require training and knowledge transfer for the models to be deployed.</p> <p>Respondents are required to cater for a training and knowledge transfer programme for the project.</p> <p>Training should also be provided for creation of models.</p>
15	<p>Are there any limitations of requirements in terms of licensing and associated costs? Could the solution set be developed using SaaS platforms with recurrent costs, or be developed bespoke and stand-alone? Are there any specific licensing requirements or constraints for the software and tools to be used in this project?</p>	<p>Respondents may propose multiple deployment options. Please refer to clarifications provided for question 2. Respondent to provide details of software and tools to be used.</p>
16	<p>Does the Bank of Mauritius have stated objectives for developing an AI/ML stack?</p>	<p>Please refer to paragraph 3 of the EOI.</p>
17	<p>What unit in the Bank of Mauritius is the custodian of this initiative, and will be the custodian of the stack once delivered?</p>	<p>The system to be delivered will be used by several departments at the Bank of Mauritius. The IT Department will provide first level support.</p>
18	<p>What is the project communication language? Which languages need to be supported?</p>	<p>English</p>
19	<p>Do you have a full list of formats expected for processing? Shall we assume that the system needs to be flexible to support adding new data types? Please provide more information on types/examples of structured or unstructured data.</p> <p>Are all data in digital format?</p>	<p>The systems proposed by the respondents should be flexible to accommodate a wide range of data formats. Structured data can be in RDBMS or OLAP databases, or flat files. Unstructured data can be in flat files, excel files, word documents, pdf files, etc and from external sources such as websites (through webscraping).</p> <p>Most of the data is in digital format.</p>
20	<p>Please provide details on the Bank of Mauritius's current data and analytics hard and soft infrastructure (e.g. software, data sources and flows, existing database logical design, analytical models etc.).</p>	<p>The documentation cannot be shared at this stage.</p>
21	<p>Other than the data from financial institutions, what are the other sources of data? For which economic sectors are data collected? What is the list the external data sources (structured and unstructured) which should be supported?</p> <p>Are data scraping / integrating external data sources included in the scope?</p>	<p>Data is collected from Financial Institutions, internal systems, other stakeholders, from the web, etc.</p> <p>Data scraping/ Integration with external data sources is in scope.</p>
22	<p>How many years of data is available with the Bank of Mauritius? Are there unique identifier keys in the data to merge data from various sources? Is there historical data for loading and further use in models? If so, for which objects/datasets?</p>	<p>The time period varies depending on the nature of the data. Not all datasets have unique identifiers. Historical dataset includes data collected through regulatory returns.</p>
23	<p>The support required is mentioned as 5 years in the EOI. Post 5 years, does the Bank of Mauritius intend to run the data analytics system on its own?</p>	<p>Yes</p>
24	<p>Can the services be provided as a combination of onsite and offsite execution?</p>	<p>Yes. Respondents to provide details.</p>
25	<p>Please provide the terms and conditions of the EOI.</p>	<p>All the terms and conditions are in the EOI.</p>
26	<p>Do you envision involving a compliance manager & a business analyst responsible for requirement alignment from your end?</p>	<p>Yes</p>

27	Are you looking for a ready-made solution, a customized solution or a proprietary solution ? Are you interested in the development of the software or usage of existing components?	Different options can be submitted as long as they meet the requirement of the EOI.
28	Please share details or additional information about the “user-friendliness” of the solution. Shall we assume there would be an operator desk for the solution? Should the solution be a web application, mobile application or desktop application? Can you provide details about the requirements for the operator desk?	End users should be able to easily navigate and the technical staff should be able to provide support as required. Respondents may specify different options available.
29	Please share details or additional information regarding indicative use cases. Which of the use cases are executed/implemented in the existing systems? What are the problems/areas for improvement in existing solutions? How many ML models are expected?	Currently, existing systems are not making use of AI/ML models. Respondents may refer to the EOI document for details on desired use cases.
30	Could you provide some details on existing workflows of the Bank of Mauritius that will be extended with advanced analytics? What type of stress testing is in use now?	Respondents may refer to the EOI document (Annexure A - 2(b)) for details on desired use cases. Further details will be shared at a later stage.
31	What issues and problems exist now?	Please refer to EOI document paragraph 3.
32	Who will use the results of each model and for what tasks?	Business users from different departments will use their respective model use cases.
33	In what form should the results of each model preferably be presented?	Respondents may propose templates.
34	How many users are planned to work in the analytical system, including the number of report developers, users working with pre-built reports, administrators? Please confirm the total number of users who will be expected to use the AI and ML features. Please confirm the number of users to be trained on the different models?	Details will be shared at a later stage.
35	Is it necessary to develop regular reports of a specified format, automate their generation and deliver them to users?	Yes.
36	How do you envision the integration of the new system with existing data sources and infrastructure at the Bank of Mauritius?	Respondents should propose the different integration mechanisms supported by their solutions.
37	What are the key performance indicators (KPIs), benchmarks and metrics to be used to evaluate the AI/ML system's performance?	Respondents should provide relevant KPIs / metrics/ benchmarks.
38	What is the expected timeline for the implementation of this project?	Respondents are required to provide the estimated implementation timeline/ plan.
39	What is the expected frequency of data refresh for analytics? Is there a need for real-time analytics?	Data collected by the system should be reflected as soon as possible on the Analytics layer.
40	What is the expected Explainability level for ML models related to Sentiment Analysis/NLP?	Respondents are required to propose on the explainability level.
41	Will the Bank of Mauritius provide expertise or resources to assist in ensuring that the AI/ML solutions comply with the applicable data privacy laws and other relevant laws and standards?	Yes
42	Could you provide more details on the regulatory requirements for the different regulated entities?	Please refer to the Bank of Mauritius 's website for more information on applicable Guidelines.

43	How does data availability and accessibility differ among the various entities regulated by the Bank of Mauritius and how might this impact the development and implementation of AI/ML models?	The reporting requirement vary on the type of Financial Institutions.
44	Can you elaborate on how the AI/ML solutions are expected to integrate with existing regulatory and supervisory processes within the Bank of Mauritius?	The solution are expected to enhance the existing processes.
45	How does the Bank of Mauritius envision the integration of the AI/ML solutions with the proposed Data Management System? Are there specific technical interfaces or APIs that the AI/ML solutions should be compatible with? How will data flow from the DMS to the AI/ML systems? Will there be real-time data access, batch processing, or a combination of both?	The AI/ML solutions should be able to pull information from the Data Management System. Respondents may propose compatible solutions. The solution should provide the flexibility for both batch processing and real-time data feed/ processing depending on the use case. The Bank of Mauritius may consider the implementation and deployment of the projects in parallel.
46	How does the existing data evaluation requirement in the AI/ML tender align with the data processing and validation capabilities of the DMS? Is there any expectation that the AI/ML system will leverage the DMS's data validation and quality monitoring features? Are there specific functionalities within the DMS that the AI/ML system is expected to complement or enhance, particularly regarding data analysis and visualization? How does the Bank of Mauritius envision the integration of data evaluation and analytics functions between the DMS and the AI/ML systems to ensure a unified approach to data handling and analysis? If the AI/ML solutions are expected to interact with the DMS, may we assume that the data formats and technical specifications detailed in the DMS tender will be applicable? Are there particular features or capabilities of the DMS that the AI/ML solutions are expected to leverage, such as data validation, user-defined queries, or alert systems?	Please refer to the scope of work in the EOI. The Bank of Mauritius may consider the implementation and deployment of the projects in parallel.
47	Will the Bank of Mauritius provide access to sanitized or anonymized datasets? Will the responsibility for data anonymization lies with the Bank or with the contractor?	To be communicated at a later stage.
48	Could you provide details regarding the frequency and velocity of data updates for the datasets that will be used in the AI/ML project? Are there any specific requirements or expectations concerning the real-time processing of data within these systems? Is all data received at the same time or are different data submission times possible? Is it possible to change the data after the data have already been received?	Data is collected on Bi-Daily, Daily, Weekly, Fortnightly, Monthly, Quarterly, Half-yearly, Yearly frequencies. Submitted data should be reflected as soon as possible in the final models/reports. Data may be receive at the same/ different times. Submission of amended information is possible.
49	Could you provide details on the extent and quality of documentation available for the various datasets ? Will assistance be provided in the process of evaluating and understanding the data?	Details may be shared at a later stage. Yes. Support will be provided in the process of evaluating and understanding the data.
50	Are there preferred format and storage mechanisms for the predictions generated by the AI/ML models?	Respondents can propose multiple formats and storage mechanisms options.

51	The list of potential use cases for the AI/ML system appears broad. Please give some examples of models to be built. Could you prioritize these use cases or specify which are of particular interest or importance to the Bank of Mauritius? Are there any specific challenges or pain points within these use cases that the Bank of Mauritius is especially keen to address?	Further details will be shared at a later stage.
52	Does the Bank of Mauritius have specific preferences for certain types of AI models known for their higher levels of interpretability?	Respondents can propose as per their solutions.
53	Is the Bank of Mauritius looking for any specific features or capabilities in the system ?	Respondents may propose the available features/ capabilities.
54	Please provide details regarding preferred practices for the deployment and updating of the ML models? Does the Bank of Mauritius expect distinct phases such as a Proof of Concept, a Minimum Viable Product, followed by full-scale development and deployment?	Respondent to provide details on the proposed framework.
55	Are there specific regulatory reporting or audit requirements for model performance and decision-making processes that need to be incorporated? Can you provide more details on the auditing capabilities required? Are there specific regulatory or internal auditing processes the solution should support?	Additional information will be provided at a later stage. Respondents should provide details on the available features.
56	Are there any restricted remote locations(countries)?	Yes. To be disclosed during implementation phase.
57	Does the Bank of Mauritius currently utilizes an automated credit score system?	No
58	Has any AI solution been implemented?	No
59	In reference to Annexure A: Section 2 (b), What type of sentiment data should be analyzed?	Sentiment data on specific subjects.
60	Any technology Preference ?	No
61	Will the whole project be done by one company or there will be any collaboration with any other company as well?	To be considered at a later stage.
62	Is there a specified document outline structure for submitting the EOI proposal. Kindly share the same if any.	The required details and Annexures should be provided.
63	Please provide details on Existing Systems where ML system to be deployed and integrated with? Are models to be deployed via exposing through APIs? Are Model results to be displayed in front end tool such as existing web applications or power BI dashboard?	Please refer to details provided for question 3 on existing systems and reporting tools. Respondents may propose solutions.
64	Could you please provide details regarding specific functionalities or data which needs to be integrated between the new system and the existing ones.	Respondents to propose the features and functionalities of their proposed solution.
65	Please confirm if the project for the EOI (Data Management System) should be done in parallel with the project for Data Analytics System Comprising Artificial Intelligence and Machine Learning Solutions) or will the Bank of Mauritius for a phase-wise implement separately for each EOI.	The Bank of Mauritius may consider the implementation and deployment of the projects in parallel.
66	How does the Bank of Mauritius prioritize model explainability against performance? Are there specific decisions or processes where explainability is more critical?	To be communicated at a later stage.
67	Are there any preferences or restrictions regarding operating systems and software (e.g., open-source vs. proprietary solutions)?	Respondents to provide their specifications.

68	Can you provide a few examples for the types of unstructured data that the Bank of Mauritius collects? (referred to in Annex 1, Point 1)	Information from annual reports, power point presentations, Information available from the web, etc.
69	Can the model use case “Forecasting and identifying early warning indicators” cover financial statement-based early warning indicators as well?	Respondents may propose as deemed relevant.
70	Can the Applicant focus on a selection of the Model use cases?	Respondents may propose as relevant.
71	Regarding Annex 1 Pont 2 l, “Integration with Existing Systems”, are we correct in assuming that the Applicant should only provide an interface specification for the data to be loaded, but the actual integration/data interface development would be the Bank of Mauritius’s task?	Respondents to provide relevant details.
72	Can the Applicant propose a third-party software solution for the modelling, for which the acquisition of the licenses needed would be the Bank of Mauritius’s task; or would it be mandatory to include this third party offer in Applicant’s offer package?	Please refer to paragraph 8 of the EOI. Details of third party software should be provided.
73	Can the Bank of Mauritius confirm whether the Data Analytics Platform will be facing the internet, or on a private network?	The Data Analytics system will be on the internal network.
74	What are the current existing data quality issues or inconsistencies that need to be addressed?	Please refer section 2(a) in the Annexure A of the EOI.
75	How many environments does the proposal need to cater for (Preprod, Production, Disaster recovery, etc.)?	Respondents may propose as they deem appropriate.
76	With regards to data quality monitoring, what are some quality checks that are currently performed on your data?	Details to be communicated at a later stage. Respondents may provide relevant features of their solutions.
77	What are some examples of searches performed on documents and internal records?	Currently basic search are conducted. Respondents to propose alternative solutions.
78	With regards to the natural language processing tool, do you intend to search documents containing confidential information?	Yes
79	With regards to the natural language processing tool, are you open to using Microsoft Azure AI or ChatGPT cloud service?	Respondents may propose as they deem appropriate. However, all proposals should be compliant with the requirements of the EOI.
80	What are some examples of connected transactions and how do you plan to visualise such transactions (e.g. table, data flow diagram, etc...)?	More details on source data to be provided at a later stage.
81	Where are the source data located? Are they all in Mauritius (on premise) or do you also have some cloud based solutions?	All current data sources are on-premise.
82	Is the required hardware, infrastructure, operating system and software in place and/or will be provided?	Respondents to provide details of the requirements.
83	Can the data be transferred to third party services?	Respondents to provide relevant details on data transfer.
84	What are the Bank of Mauritius's expectations regarding disaster recovery and model rollback mechanisms ? Could you provide details on the types/ frequency of backup for the systems and retention periods. Do you need a high availability solution? What is the minimum downtime, RPO and RTO?	Details to be communicated at a later stage. Respondents may provide relevant features of their solutions.