

TERMS OF REFERENCE

STRATEGIC PARTNERSHIP FOR IMPLEMENTATION OF BRD DIGITAL INNOVATION PROJECTS – DATA SCIENCE/ANALYTICS ORIENTED

I. Background

The Development Bank of Rwanda established Pillars for its Digital Transformation journey. Among the pillars, BRD puts Innovation driven from advanced technologies (Interconnected applications, Data-centric solutions) as its priority. Foundation has been laid to prepare BRD to embark with success in this journey.

To increase the speed, efficiency and scale of the projects driving BRD ambitious vision, BRD will partner with external Companies which will provide the qualified talents to implement Digital Innovation projects defined by BRD.

1.1 Presentation of the Development Bank of Rwanda

The Development Bank of Rwanda (BRD) PLC is Rwanda's only national development finance institution with a mandate to ensure that the private sector plays its role in sectors critical to achieving the National Strategy for Transformation (NST1) and the Sustainable Development Goals (SDGs) by providing affordable, long-term, customized development finance. Turning 55 this year, the Bank has contributed to the country's economic growth and development through financial and non-financial investments in key growth areas. It progressively realigns itself to ensure relevance, enhanced value creation, competitiveness, and the sustainability of its operations. Through its financial and non-financial products and services, the Bank supports small, medium and large enterprises directly or through other financial institutions to reach a wider market base.

BRD has seven key intervention areas including energy, agriculture, exports, housing and infrastructure, education, climate change and digital economy. The Bank's product and service offerings include investment loans, grants, guarantees, trade finance and advisory services.

II. Objective and scope of the services

2.1 Main objective

These terms of reference (ToR) concern the establishment of a framework of partnership with Digital Innovation companies in areas of Software Development (Web, Mobile, etc.) and Data Science oriented solution (Data Cleaning, Visualization, AI/Machine Learning). The partnership will focus on providing talents, project design/plan and project implementation/execution to deliver end to end on projects aligned with BRD ambitious plan in the digital innovation space to boost the overall BRD vision.

The partnership will connect external talents with the internal Inhouse team to strengthen BRD capacity through project collaboration where the partner will own the execution and delivery of the project and hand over the whole solution including the source codes (well documented) to BRD Inhouse team which will maintain & support its usage in production.

The on boarding of partners part of this framework will be done on a rolling basis. This means that BRD will keep an open window to get more partners to increase the opportunity for more and diverse strength in Digital Innovation projects.

2.2 Scope and content of the works

The Engagement Approach with the Partner will be a mix of an Outcome Based and Team Augmentation Approach.

This means BRD and the partner responsibilities are as below:

- BRD will define the overall Scope and level of involvement in projects of the partners vs the Inhouse team.
- There is a joint responsibility of deliverables and overall governance:
 - Implementation strategy
 - Project planning
 - Milestone from start to end of the project
- The focus is on key milestones and deliverables
- Collaboration with Inhouse Digital Innovation team on establishing/defining the standards and KPIs for success
- Partners talents deployed at BRD will work on-site or remotely with the BRD Inhouse team and form a scalable team.
- BRD to manage the talent regarding the ongoing projects:
 - Talent to be part of the agile team
 - BRD to (re)-assign, adjust scope in a daily-weekly basis.

On each Digital Innovation project, the partner mandate will be based on the following work:

Step 1: **Understand the expectations of BRD and frame a project proposal**

- Preliminary analysis of the challenge/solution guided by the interaction with the person in charge of digital Innovation in BRD.
- Define Scope, resources, milestones, timelines

Step 2: **Business Analysis and Project Management**

- Detailed User stories (user requirements)
- Define Milestones acceptance criteria
- Provide a project plan

Step 3: **Preliminary work and Project Kick-off**

- Presentation of a Mockup/Demo
- Review all the pre-requisites considering BRD stakeholder feedback.
- Align the design/architecture with BRD Digital Innovation team.

Step 4: **Milestone implementation: (Plan - Build - test - deploy)**

- Execution of the project following the best standard (world class) approach:
 - a. Agile methodology
 - b. Software Development Life Cycle
 - c. Prepare Test units for each module/Feature
 - d. Ensure scalability of the solution
 - e. Provide code review documentation, System documentation (architecture and design), user documentation.

- Collaborate with BRD Inhouse team (Digital Innovation) in the implementation's phases
 - a. Sprint plannings and reviews to be done together with Inhouse team from the starting point
 - b. Reviewing codes together to confirm common understanding of the approach
 - c. Adjust & apply changes from Sprint feedback.
 - d. Build Test unit (functionality and stress test) and test cases.

Step 5: Post – Implementation: (Train – Document – Hand-over)

- Develop training materials for the users of the system/tool/software developed
- Provide documentation of all the stages and different audiences involved in the project using appropriate tools.

1. TECHNICAL TOOLS REQUIREMENTS:

The following programming languages and Framework are required for BRD Inhouse Digital Innovation team to adapt, maintain, and change/adjust later:
For Software Development:

a. Architecture design model:

- i. Micro-services
- ii. Service Oriented Architecture

b. Programming Language

- i. JavaScript Language with its popular framework:
 1. React.js
 2. Express.js
 3. Python
 4. Ruby

c. Code Version control Tool:

- i. GitHub
- ii. Git

d. UI/UX design tool

- i. FIGMA
- ii. Wireframe

e. Agile Project Management and Documentation:

- i. JIRA (Atlassian)
- ii. Confluence (Atlassian)
- iii. Pivotal Tracker

f. Data Science Tools & Programming Language:

- i. KNIME

- ii. Azure machine Learning
- iii. Jupyter Notebooks
- iv. Python Programming language:
 - 1. TensorFlow.
 - 2. NumPy.
 - 3. SciPy.
 - 4. Pandas.
 - 5. Matplotlib.
 - 6. Keras.
 - 7. SciKit-Learn.
 - 8. PyTorch.
 - 9. Plotly
 - 10. Seaborn
- v. PowerBI and Tableau for Visualization
- vi. Python Library for natural Language processing:
 - 1. NLTK
 - 2. Spacy
- vii. Python Library for Image processing: Computer Vision

2. PRODUCT DOCUMENTATION:

ii. System/Technical documentation:

1. **Product requirement document:** objectives, roles and responsibilities, Background and strategic fit, assumptions, user stories, acceptance criteria, user interaction & design, questions
2. **Solution architecture design document**
 - a. Overview & Background
 - b. Architecture & Design Principles
 - c. User Story description
 - d. Solution details
 - e. Diagrammatic representation of the solution
3. **Source code document**
 - a. HTML generation framework and other frameworks applied
 - b. Type of data binding
 - c. Design pattern with examples (e.g., model-view-controller)
 - d. Security measures
4. **Other patterns and principles**
5. **Quality assurance documentation**
 - a. Quality management plan
 - b. Test strategy
 - c. Test plan
 - d. Test case specifications
 - e. Test checklists

6. The maintenance and help guide describes known problems with the system and the solutions and represents the dependencies between different parts of the system.

7. API documentation

iii. **User documentation:**

iv.

1. End-user documentation

a. **The quick start Guide** provides an overview of the product functionality and gives basic guidelines on how to use it.

b. **The complete manual** includes exhaustive information and instructions on how to install and operate the product

c. **The troubleshoot guide** gives end-users information on how to find and resolve possible issues that might arise when using the product.

Online end-user documentation may include the following sections:

- FAQs
- Video tutorials
- Embedded assistance
- Support Portals

2. System administrators' documentation

a. **Functional description:** describes the functionalities of the product.

b. **System admin guide** explains different types of behaviors of the system in different environments and with other systems.

b. PROCESS DOCUMENTATION

i. **Plans, estimates, and schedules:** These documents are usually created before the project kicks off and can be altered as the product evolves.

ii. **Reports and metrics.** reflect how time and human resources were used during development. They can be generated on a daily, weekly or monthly basis.

iii. **Brainstorming working papers:** These documents exist to record engineers' ideas and thoughts during project implementation.

iv. **Standards:** should include all coding and UX standards that the team adheres to throughout the project's progression

c. AGILE PRODUCT ROADMAPS

They are used in Agile software development to document vision, strategy, and overall goals of the project. Below are the types of ROADMAPS:

- **Strategic roadmap:** Strategic roadmaps usually state a vision and long-term goals
- **Technology or IT roadmap:** is a low-level document that describes technical requirements and the means of technology implementation

- **Release plan:** is used to set strict time limits for releases. A release plan should focus on the actual deadlines without specifying release details.

III. MINIMUM KEY STAFF WITH SKILLS AND QUALIFICATIONS REQUIREMENTS

3.1 partner firms' profile

A firm should have an extensive proven record and experience in implementing successful systems/software owning the entire software development cycle including high standard in strategies, process, development, and tools in banking or similar sectors.

The firm should provide the following key staff and expertise for a given project:

1. Senior Data Scientist/Machine Learning Engineer:

- Minimum of 5 years of experience in designing and developing AI and machine learning applications for our growing client base
- strong programming skills especially with Python Library (minimum of 7 years)
- Minimum of 5 years of experience using Data Science tools for test and deploying ML models in production
- Knowledge in Data Governance & very Familiar with Data Governance strategies & tools
- Ability to write robust code in Python, Java and/or R in the below areas:
 - AI and Machine Learning
 - Computer Vision
 - Natural Language Processing
 - Data Science
 - Deep Learning
- Strong in Knowledge transfer: Training, Workshop, remote guidance.

Qualifications:

- Advanced Machine Learning Certification
- Master's degree (Preferably) or bachelor's degree in computer science with Machine Learning/Data Science specialization
- Reference of developed AI/Machine Learning System: Production and Experiment (Working Model with a real-world dataset)

2. Scrum Master

- Experience leading project with agile methodology (5 years minimum).
- Minimum of 3 years of Experience with using agile tools especially JIRA
- Strong in documenting fast and capturing all details
- Shown ability to drive a project end to end acting as a liaison person between Business stakeholders and developers

Qualification:

- i. Certified Scrum Master / or Project Manager with Agile approach
- ii. Proof of experience running projects with Agile methodology
- iii. Certification of an Agile Project Management Tool. (JIRA preferably)

3. Data Engineer

Strong Knowledge and experience (minimum of 3 years) in

- Apache Hadoop and Apache Spark
- Coding in Python
- SQL (ETL and SQL manipulation and scripting).
- NoSQL
- Data APIs
- Data Warehouse solutions
- Azure platforms for analytics, Data Warehouse
- Dashboard Tools: PowerBI, Tableau
- Write clean and maintainable code.

Qualifications:

1. Certification on Data Visualization (Power BI or Tableau)
2. Certifications of Mastery in Python
3. Bachelor's degree in IT or Computer Engineering.
4. Certification in Database Development and ETL

4. Quality Assurance Engineer / Code tester

- **Strong Experience with**
 - i. Reviewing quality specifications and technical design documents to provide timely and meaningful feedback
 - ii. Creating detailed, comprehensive, and well-structured test plans and test cases
 - iii. Estimating, prioritizing, planning, and coordinating quality testing activities

5. Business Analyst and Documentation master:

- **Strong Experience with**
 - i. Collecting Product requirement
 - ii. Interacting with stakeholders to align and close the product requirement
 - iii. Own the product documentation (Product and Process as defined in deliverables): from start to end
 - iv. Maintain communication and update all stakeholders on the project status and timelines.

IV. SHORTLISTING CRITERIA:

1. Compliance with the administrative criteria
2. Understand and complied with minimum technical tools requirement to be used set in this ToRs
3. Proposed key staff with experience of using technical tools set and with similar experience of project done
4. Financial rates proposed for each key staff. However, the technical evaluation will prevail over

the financial evaluation.

BRD will keep an open window to get more partners to increase the opportunity for more and diverse strength in future Digital Innovation projects.

V. DETAILS ON THE PARTNERSHIP AGREEMENT

The partnership will consist of:

- Providing and availing resources for the entire duration of the project
- The project will be defined by BRD as part of its Digital Innovation Roadmap. It shall be Data Science Oriented
- The project might involve building:
 - A new Solution
 - Revamp an existing solution
 - Component to an existing solution: new module, feature, etc.
 - Enhancement of an existing solution: documentation, code review, etc.
- The scope and size of the human resource to be provided by the partner to build the solution in collaboration with BRD Inhouse team will be defined by BRD depending on the scope of the project.
- The invoicing will be based on the project (scope, resource provided, timeline, etc)
- Any time there is a need to develop a system, BRD shall invite all shortlisted firms to present the technical proposal and financial proposal using the negotiated rates. The successful bidder in terms of technical evaluation will be invited to negotiate the cost as well as signing the specific contract.

Prepared by:
Michel MBONYINKEBE

Manager, Digital Innovation

Approved by:
Ngabe Rutagarama

Head of IT & Digital Innovation