Software Requirements Specification (SRS)  
KOMEZA BANK – Churn Intelligence Platform for Bank of Kigali  
Version: 0.1  
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**Document Control and Information**

| **Name** | **Title** | **Action** |
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| Rose NGABIRE | Chief Operations Officer | Approve |
| Nicholas MURIMI | Chief Product Development Officer | Review |
| Samuel MUTINDA | Head, Data & Analytics | Review |
| Steven SHYAKA | Machine Learning Engineer | Compile |

**Revision History**

| **Version** | **Author** | **Summary of Change** |
| --- | --- | --- |
| 0.1 | Steven SHYAKA | Initial draft aligned with KOMEZA BANK BRS |

**Distribution List**

| **Name** | **Area** | **Action** |
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**Glossary**

| **Term/Abbreviation** | **Definition** |
| --- | --- |
| BK | Bank of Kigali Ltd. |
| BRS | Business Requirements Specification |
| CRM | Customer Relationship Management system |
| ETL | Extract, Transform, Load process |
| ML | Machine Learning |
| SHAP | SHapley Additive exPlanations – model explainability method |
| AUC | Area Under Curve – model performance metric |
| API | Application Programming Interface |
| KPI | Key Performance Indicator |

**1. Introduction**

**1.1 Purpose**

This Software Requirements Specification (SRS) document defines the **technical and functional specifications** for the **KOMEZA BANK Churn Intelligence Platform**, an initiative by the **Bank of Kigali Data Management & BI Department**. It translates the business objectives outlined in the BRS into actionable technical components.

**1.2 Scope**

The system will leverage customer, transactional, and interaction data to:

* Predict customer churn using ML models.
* Identify key churn drivers per segment.
* Recommend personalized retention actions.
* Provide real-time insights via dashboards and CRM integration.

The solution will be integrated into BK’s data ecosystem and align with existing initiatives such as **Telesales and Portfolio Banking**.

**1.3 Intended Audience**

* Data Management & BI Department
* Data Science Team
* Business Applications (CRM)
* Compliance & Risk
* Marketing & Customer Experience

**1.4 References**

* Business Requirements Specification – KOMEZA BANK (v0.1)
* Bank of Kigali Data Management Policy
* Rwanda Law No. 058/2021 on Data Protection and Privacy

**2. System Overview**

The KOMEZA BANK Churn Intelligence Platform will consist of three main layers:

1. **Data Layer** – Integration with BK data sources (T24, CRM, Digital Banking, Call Center) through ETL pipelines.
2. **AI/ML Layer** – Machine Learning models for churn prediction and explainability.
3. **Presentation Layer** – Dashboards and API integration with CRM for business insights.

Each layer will be secured, auditable, and compliant with data governance standards.

**3. Functional Requirements**

| **ID** | **Module** | **Requirement Description** | **Priority** |
| --- | --- | --- | --- |
| FR-001 | Data Integration | The system shall extract data from core banking (T24), CRM, digital banking, and call center systems. | High |
| FR-002 | Data Processing | The system shall perform ETL (cleaning, transformation, enrichment) and store it in a data warehouse. | High |
| FR-003 | Model Training | The system shall train a churn prediction model using at least 12 months of historical data. | High |
| FR-004 | Model Explainability | The system shall use SHAP values to explain predictions per customer. | High |
| FR-005 | Scoring Engine | The system shall score customers weekly or monthly with churn probability values. | High |
| FR-006 | Recommendations | The system shall suggest retention actions based on churn risk level. | High |
| FR-007 | Dashboard | Dashboards shall display churn risk by branch, product, and demographic. | High |
| FR-008 | CRM Integration | The CRM shall display churn risk and trigger alerts for at-risk customers. | Medium |
| FR-009 | Reporting | Users shall export insights and reports (PDF, Excel). | Medium |
| FR-010 | Audit Trail | The system shall log all data access and model inference events. | High |

**4. Non-Functional Requirements**

| **ID** | **Requirement** | **Description** | **Priority** |
| --- | --- | --- | --- |
| NFR-001 | Performance | Dashboard query response under 3 seconds. | Medium |
| NFR-002 | Availability | 99.5% uptime for core modules. | High |
| NFR-003 | Security | Data encrypted at rest and in transit. | High |
| NFR-004 | Scalability | System supports over 1 million records. | High |
| NFR-005 | Compliance | System must comply with Rwanda data protection law. | High |
| NFR-006 | Maintainability | Modular and documented code for updates and retraining. | High |
| NFR-007 | Localization | Support English and Kinyarwanda in dashboards. | Medium |

**5. System Architecture**

**5.1 Logical Components**

* **Data Ingestion Pipeline:** Connects to BK core systems via APIs or database connectors.
* **Data Warehouse:** Central repository for cleaned and transformed data.
* **Model Training Module:** Python-based ML pipeline (Scikit-learn, XGBoost, or Random Forest).
* **Model Registry:** Tracks model versions and metadata.
* **Explainability Module:** Generates per-customer churn explanations (SHAP/LIME).
* **API Gateway:** Exposes churn scores to CRM.
* **Dashboard Interface:** Power BI / Streamlit dashboards for visualization.

**5.2 Architecture Diagram (Conceptual)**

T24 / CRM / Digital Banking / Call Center

↓ (ETL)

Data Warehouse

↓

Churn Model (ML)

↓

Explainability + Scoring Engine

↓

Dashboard & CRM Integration

**6. Data Flow and Storage**

1. **Extraction:** Data pulled from T24, CRM, and digital platforms via scheduled ETL jobs.
2. **Transformation:** Data cleaned, standardized, and joined by Customer\_ID.
3. **Storage:** Anonymized and stored in BK’s secure data warehouse.
4. **Model Input:** Relevant features (transaction counts, digital usage, loan status, etc.).
5. **Output:** Churn scores, churn drivers, and retention recommendations.

**7. Model Specification**

| **Aspect** | **Description** |
| --- | --- |
| Algorithm | Random Forest / XGBoost (baseline), with Logistic Regression for benchmark. |
| Input Features | Transaction activity, digital usage, complaints, balances, demographics. |
| Target Variable | Churn\_Flag (1 = churned, 0 = active). |
| Performance Metrics | Accuracy, AUC, Precision-Recall, F1 Score. |
| Explainability | SHAP for feature importance per prediction. |
| Retraining | Every 3–6 months with new data. |

**8. Security and Compliance**

* **Data Anonymization:** Personally identifiable data (names, IDs) masked before ML processing.
* **Access Control:** Role-based access to datasets and dashboards.
* **Audit Logging:** Every query and export action logged.
* **Data Retention:** Aligns with BK’s internal policy (5-year retention cap).
* **Legal Compliance:** Adheres to Law No. 058/2021 and BK internal IT Security Policy.

**9. Assumptions and Dependencies**

* Data availability from BK’s data warehouse and CRM systems.
* Stable integration with BK’s API Gateway.
* Cross-department collaboration (Data Science, IT, CX).
* Budget allocation for compute and Power BI licensing.

**10. Risks and Mitigation**

| **Risk** | **Impact** | **Mitigation Strategy** |
| --- | --- | --- |
| Poor data quality | Model accuracy degradation | Data quality checks and preprocessing. |
| Incomplete integration | Delayed CRM feedback loop | Phase 1 manual import/export, Phase 2 API automation. |
| Model bias | Reputation risk | Use balanced datasets and fairness metrics. |
| Infrastructure downtime | Service unavailability | Redundant servers and scheduled backups. |

**11. Acceptance Criteria**

| **ID** | **Criterion** |
| --- | --- |
| AC-001 | Model achieves AUC ≥ 0.85 on test data. |
| AC-002 | Dashboard performance validated by BI and CX teams. |
| AC-003 | CRM alerts integrated and functional. |
| AC-004 | Compliance and audit passed by Legal & Risk. |

**12. Future Enhancements**

* Integration with Telesales Recommender System.
* Real-time churn scoring using event streaming.
* Multi-model ensemble and drift detection.
* CLV and cross-sell opportunity modeling.

**Conclusion**

The **KOMEZA BANK Churn Intelligence Platform** will form the foundation of BK’s data-driven retention strategy. It delivers predictive analytics capabilities that empower proactive engagement, optimize resource allocation, and strengthen customer loyalty — while maintaining compliance and operational excellence.