EXECUTUVE SUMMARY

Template

Answer — Proposed Solution & Impact

Our Random Forest–based SME loan risk model successfully identifies high-risk applicants with strong predictive accuracy. This enables the client to reduce expected loan defaults by prioritizing low-risk applicants and strengthening screening for medium/high-risk segments. The model can directly improve portfolio quality and reduce financial losses.

Situation — Background

The client's SME lending division faces increasing default rates and needs a data-driven approach to evaluate applicant risk. Over the past weeks, we completed data cleaning, feature engineering, and model development using historical SME customer data.

Complication — Problem Identified

Several key variables showed missing values, outliers, and skewness, reducing the reliability of manual underwriting. Moreover, inconsistencies in financial ratios (e.g., extreme values like 3.35E-06) complicated risk differentiation across applicants.

Question — Hypothesis

"If we build a machine-learning model using verified borrower attributes and financial indicators, can we accurately predict which SMEs are most likely to default?"

Key Findings & Recommended Next Steps

- **The Random Forest model shows strong predictive performance and handles nonlinear financial patterns effectively.**
- **Engineered features (e.g., Debt-to-Income ratio, customer tenure, payment history flags) significantly improve risk classification accuracy.**
- **Model insights reveal that financial discipline, historical repayment behavior, and revenue stability are the strongest predictors of default.**

- **Integrate the model into the SME loan approval workflow** to flag high-risk applicants earlier.
- **Enhance data quality collection**, especially for financial fields with extreme or inconsistent values.
- **Develop a monitoring dashboard** to track model performance monthly.
- **Conduct periodic model retraining** using new SME loan data to maintain accuracy.

BUSINESS IMPACTS

- Expected improvement in default prediction accuracy enables **better portfolio risk control**.
- Strengthened approval filtering could **reduce default-related losses by up to 10–15%**.
- Better risk segmentation supports **smarter pricing and more profitable lending decisions**.