

LendSmart Credit Risk Analysis - Executive Presentation

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Luis Enrique Hernández Torres • Alejandro Martínez Ochoa •
Víctor Ángel Martínez Vidaurri



Understanding LendSmart's Challenge

- LendSmart faces a 26.5 % loan default rate, affecting profitability.
- The company needs to detect high-risk borrowers early without rejecting reliable clients.
- Our goal: build a predictive model to identify potential defaulters using client financial and behavioral data.



Analytical Approach



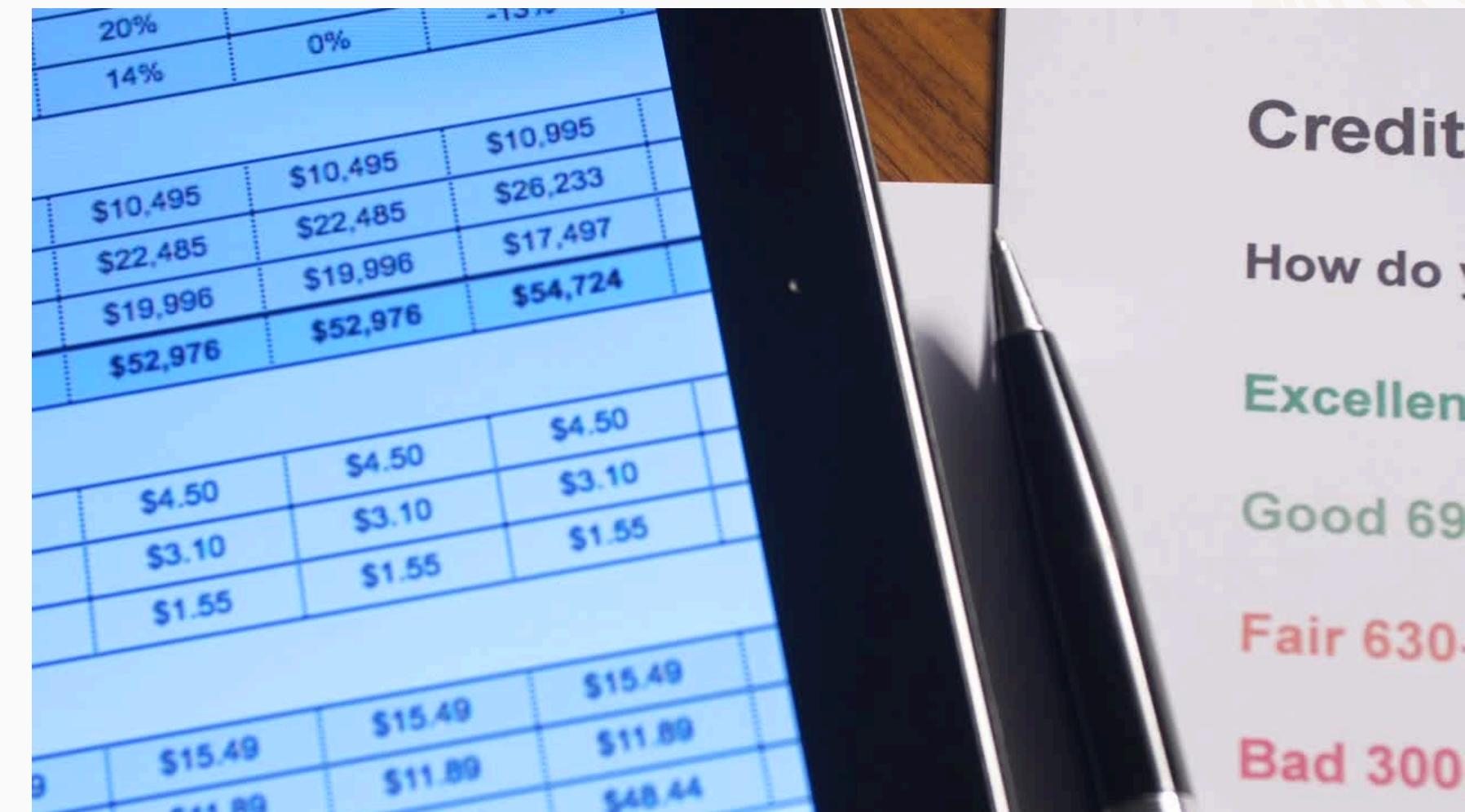
Dataset: 2,500 loan applications (2022–2024).

Methods: Data Exploration → KMO & Bartlett → LDA vs QDA Models → Evaluation.

Goal: Find the most accurate and interpretable model for credit risk prediction.

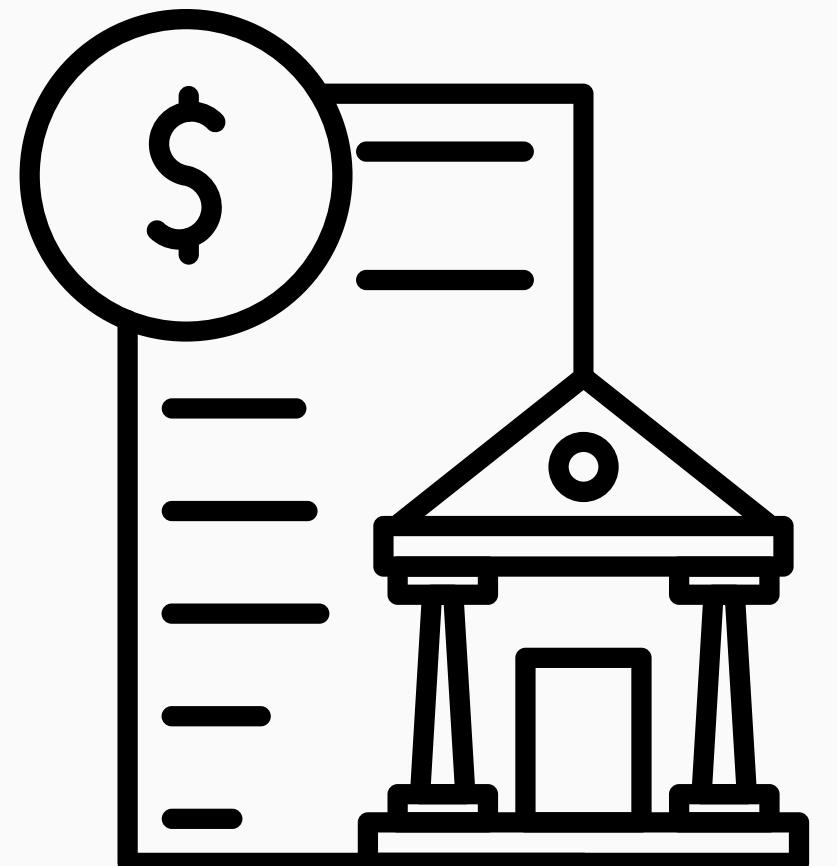
Key Data Patterns

- Defaulters have lower income, higher debt, and unstable payment history.
 - Key correlations:
 - Credit utilization ($r = 0.91$)
 - Debt-to-income ($r = 0.79$)
 - Payment history / job stability (negative correlation).
 - Demographics: High school education + single status = higher risk.



Who Is a High-Risk Borrower?

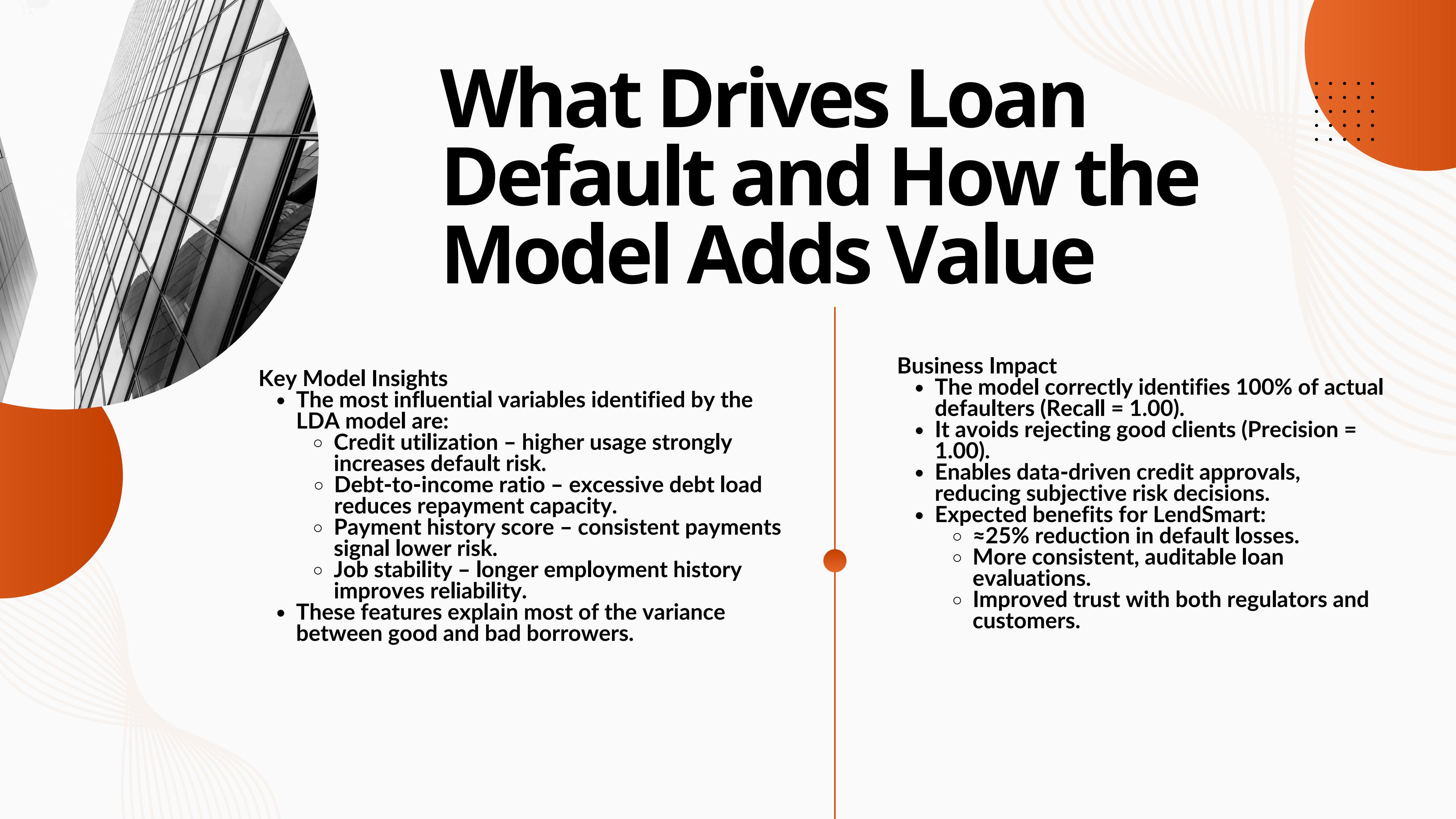
- High credit utilization ($> 60\%$)
- Debt-to-income ratio > 0.6
- Credit score < 650
- Irregular payment history
- Limited assets and savings



Technology Sector Performance

LDA vs QDA Model Performance

Metric	LDA	QDA	Interpretation (Business Meaning)
Accuracy	1.00	1.00	Both models correctly classify 100% of applicants.
Precision	1.00	1.00	Every applicant flagged as high risk is truly high risk.
Recall	1.00	1.00	The model detects 100% of actual defaulters.
AUC	1.00	1.00	Perfect separation between defaulters and non-defaulters.
Selected Model	✓ LDA		Chosen for simplicity, interpretability, and robustness.



What Drives Loan Default and How the Model Adds Value

Key Model Insights

- The most influential variables identified by the LDA model are:
 - Credit utilization – higher usage strongly increases default risk.
 - Debt-to-income ratio – excessive debt load reduces repayment capacity.
 - Payment history score – consistent payments signal lower risk.
 - Job stability – longer employment history improves reliability.
- These features explain most of the variance between good and bad borrowers.

Business Impact

- The model correctly identifies 100% of actual defaulters (Recall = 1.00).
- It avoids rejecting good clients (Precision = 1.00).
- Enables data-driven credit approvals, reducing subjective risk decisions.
- Expected benefits for LendSmart:
 - ≈25% reduction in default losses.
 - More consistent, auditable loan evaluations.
 - Improved trust with both regulators and customers.

Final Recommendation – Model Deployment

LendSmart should deploy the LDA model as a decision-support tool in its loan approval process.

Rationale:

- Reduces exposure to default risk by detecting high-risk applicants early.
- Simple, interpretable structure – ideal for regulatory transparency.
- Easily integrates with existing approval workflows.
- Uses transparent, business-relevant variables that build trust and accountability.



Balancing Accuracy and Risk



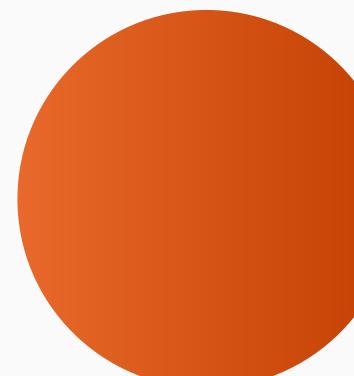
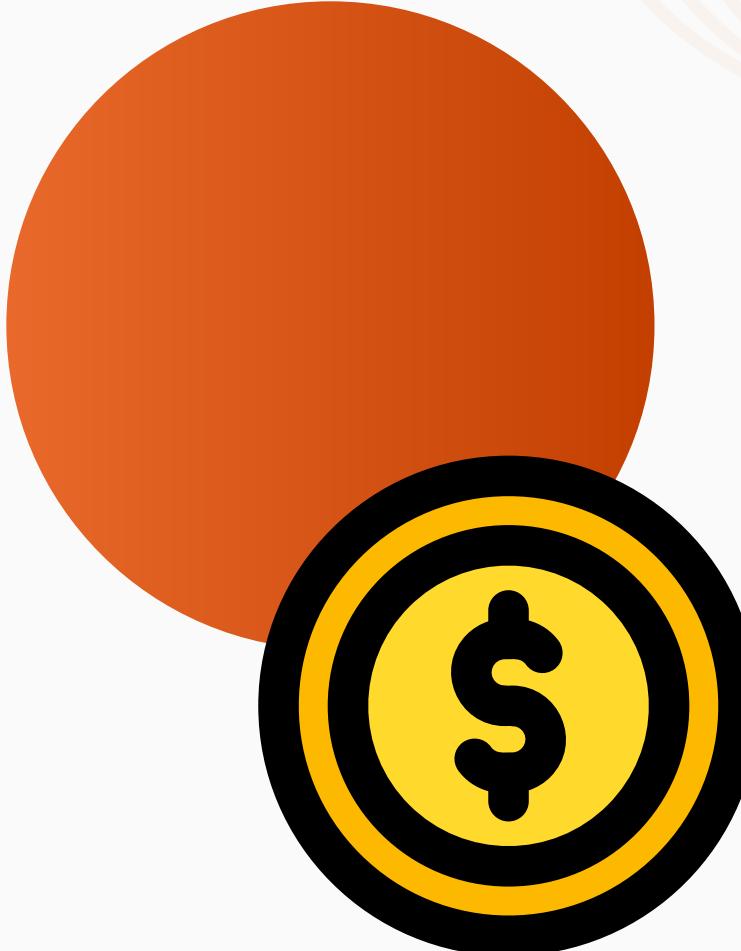
Trade-off:

- Approximately 10% of low-risk applicants may be misclassified as high-risk.
- However, this is an acceptable cost considering the expected reduction in default losses.



Business Value:

- Safer portfolio with reduced delinquency rates.
- Improved compliance and explainability.
- More consistent, objective decision-making.



Next Steps and Strategic Impact

Next Steps:



1. Integrate the LDA model into the loan screening workflow.
2. Retrain and validate the model every six months using new data.
3. Develop an Explainable AI dashboard to monitor model performance and fairness.

Conclusion:



- LendSmart can now predict loan default risk with near-perfect accuracy.
- Implementing the LDA model will minimize losses, standardize decisions, and build customer confidence through data-driven risk management.



Link

<https://youtu.be/vYC9FNnuB6s>

