PROJECT REPORT: ANALYSIS OF LOAN IMPACT FOR KIVA

Executive Summary

This project aimed to analyse Kiva's loan data to define and evaluate the Loan Impact Score (LIS), a metric designed to assess the potential impact of each loan on poverty alleviation. The analysis focused on understanding the distribution of the LIS and its correlation with key variables such as loan amount, Multidimensional Poverty Index (MPI), sector, repayment rates, and borrower gender. This report outlines the project approach, key milestones achieved, findings, and strategic recommendations for Kiva.

Project Approach

1. **Data Collection and Preparation**
   - **Data sources**: kiva_loans.csv, kiva_mpi_region_locations.csv, loan_theme_ids.csv, loan_themes_by_region.csv.
   - **Data preprocessing:** Cleaning, normalization of key variables, and merging datasets for a comprehensive view.

2. Definition of Key Performance Indicators (KPIs)

KPI	Definition	Rationale	Pros	Cons
Loan Impact Score (LIS)	LIS is a composite score for each loan, integrating factors such as loan amount, repayment rate, and the poverty level of the region (using MPI - Multidimensional Poverty Index).	The LIS offers a nuanced understanding of the potential impact of individual loans on poverty alleviation. Higher scores indicate loans that are likely more beneficial to borrowers in terms of addressing poverty.	**Holistic Assessment:** Combines financial aspects with socio-economic factors to assess the loan's impact. **Targeted Interventions:** Enables Kiva to identify and prioritize loans that could have the greatest impact.	**Complexity:** The calculation and interpretation of this score are complex. **Dynamic Revisions:** The score may require regular updates to align with evolving goals and data.
Loan Distribution Efficiency	The ratio of actual loan distribution to the total demand in a region, calculated periodically.	This KPI evaluates how effectively Kiva meets the financial needs across different regions, reflecting the alignment of loan distribution with regional demand.	**Resource Allocation Effectiveness:** Directly measures how well Kiva's resources are distributed in relation to the need. **Strategic Planning:** Assists in strategic planning and identifying regions requiring more attention.	**Demand Estimation:** Accurately estimating total loan demand in various regions can be challenging. **External Influences:** Factors such as economic shifts or policy changes can affect demand estimation.

Borrower Success Rate	The percentage of borrowers who successfully repay their loans and potentially take subsequent loans	A high success rate signifies the financial health of borrowers and the efficacy of Kiva's support systems, directly reflecting the organization's impact on financial inclusion.	**Impact on Financial Health:** Indicates the direct impact of loans on borrowers' financial stability. **Measure of Support Effectiveness:** Serves as an indicator of the effectiveness of Kiva's financial and educational support.	**External Factors:** Success rates can be influenced by external conditions like local economic health, beyond Kiva's control. **Varied Interpretations:** The reasons behind high or low success rates can vary, requiring deeper analysis for accurate interpretation.

These KPIs collectively offer a comprehensive view of Kiva's performance, spanning from individual loan impact to broader operational efficiency and borrower success. They are instrumental in guiding strategic decisions and evaluating the effectiveness of Kiva's initiatives in poverty alleviation.

3. Exploratory Data Analysis (EDA) on Loan Impact Score

- **Definition of Loan Impact Score (LIS)**
  - **Objective**: Develop a composite score to assess the potential impact of loans.
  - **Methodology**: LIS was calculated using factors like loan amount, MPI, term in months, and lender count. The variables were normalized and weighted according to assumed importance.
- **Distribution Analysis**: Examined the distribution of LIS.
- **Correlation Analysis**: Investigated correlations between LIS and variables such as loan amount, MPI, and sector.
- **Sector and Gender Analysis**: Analysed the distribution of loans across sectors and the gender distribution of borrowers.

Project Milestones

1. **Data Integration and Preprocessing**: Successfully merged and cleaned the datasets, preparing them for analysis.
2. **Development of LIS**: Defined and calculated the Loan Impact Score, incorporating key variables relevant to Kiva's goals.
3. **Comprehensive EDA**: Conducted an in-depth exploratory analysis, revealing critical insights into the distribution and impact factors of loans.
4. **Insight Generation**: Identified patterns and correlations that have significant implications for Kiva's strategic decision-making.

Key Findings

1. **Variable Impact Scores**: The LIS distribution revealed a mix of high and moderate-to-low impact loans.
2. **Loan Amount and Poverty Correlation**: Larger loans tend to be associated with regions of higher poverty levels (MPI).
3. **Sector Variability**: Different sectors show varying levels of potential impact.

4. **Gender Dynamics in Lending**: Distinct patterns in loan impact were observed based on the gender of borrowers.
5. **Repayment Flexibility**: No strong correlation was found between repayment rates and loan amount or MPI, suggesting flexibility in repayment strategies.

Recommendations

1. **Refine LIS Calculation**: Adjust weights and include more nuanced factors in the LIS formula.
2. **Sector-Specific Strategies**: Prioritize sectors that show higher impact and tailor programs accordingly.
3. **Gender-Specific Programs**: Develop lending strategies focused on women and mixed-gender groups to leverage their higher impact potential.
4. **Target High MPI Regions**: Focus on high-poverty areas for greater impact, balanced with risk management.
5. **Flexible Repayment Scheduling**: Continue offering flexible repayment options suited to borrower circumstances.
6. **Ongoing Data Analysis**: Regularly update models with new data and adjust strategies based on evolving insights.

Conclusion

The analysis provides Kiva with data-driven insights to optimize its loan impact and further its mission. The recommendations, if implemented, can enhance the effectiveness of Kiva's lending programs and contribute significantly to poverty alleviation efforts.

Appendix

Python Code Repository

The Python workbook and datasets used in this project are available in the project folder. The code workbook includes all data processing, analysis, and visualization scripts, providing a detailed view of the methodologies used.

Link to Code: https://colab.research.google.com/drive/1JCnbgkET2McKzT8lu6oRghJoxQIKqpHk