**Comprehensive Project Report: Customer Experience Analytics for Ethiopian Fintech Apps**

**Date:** February 2026

**Prepared for:** Strategic Management Teams of CBE, Abyssinia Bank, and Dashen Bank

**Prepared by:** Mariam Y Gustavo

## 1. Executive Summary

This report presents the findings of a comprehensive Customer Experience (CX) Analytics project aimed at transforming unstructured user feedback into actionable strategic insights for Ethiopia's leading fintech applications: Commercial Bank of Ethiopia (**CBE**), **Abyssinia Bank**, and **Dashen Bank** (Amole).

In an increasingly competitive digital banking landscape, understanding user sentiment beyond simple star ratings is concise. This project engaged in a rigorous end-to-end data science pipeline, with **I** migrating from traditional rule-based sentiment analysis to state-of-the-art Deep Learning models.

**Key Highlights:**

- **Data Foundation: I analyzed** a robust dataset of over **10,000+ user reviews** scraped directly from the Google Play Store.
- **Technological Leap: I transitioned** from **VADER** (66.2% Accuracy) to a **Twitter-RoBERTa Transformer model** (72.1% Accuracy), significantly improving the detection of negative user sentiment (Recall improved from 40.5% to **71.5%**).
- **Sentiment Model Evaluation:** The evaluation process was refined from a subjective determination of model superiority ("this model is better") to the implementation of specific, measurable metrics for objective comparison. This rigorous approach enabled the confident selection of the demonstrably superior model based on empirical testing.
- **Thematic Discovery: I drastically improved Latent Dirichlet Allocation (LDA) by employing optimal number of topics tuning and implementing an innovative "**`High-Confidence Sample Review Reading`**"** to uncover hidden themes **specific to each bank**, identifying precise issue clusters like "**Update-Induced Instability**" and "**OTP Delivery Failures**."
- **Data Architecture:** I designed and implemented a robust, normalized PostgreSQL database schema to store over **9,400** clean, NLP-enriched reviews, including dedicated fields for sentiment, theme, and topic confidence.
- **Business Impact: I identified 2 drivers and pain points** per bank and gave bank specific recommendations.

The insights detailed herein are delivered via an **interactive dashboard,** empowering stakeholders to monitor real-time user sentiment and prioritize engineering efforts based on quantitative evidence.

## 2. Methodology & Data Acquisition

### 2.1 Data Collection Pipeline

The foundation of this study is a custom-built scraping pipeline **I designed** to harvest "Voice of the Customer" data directly from the source.

- **Source:** Google Play Store.
- **Tooling:** Python `google_play_scraper` library with a custom PlayStoreScraper class (src/scraper.py).
- **Scope:**
    - CBE Mobile Banking: ~8,000 reviews.
    - Apollo (Bank of Abyssinia): ~1,200 reviews.
    - Amole (Dashen Bank): ~770 reviews.
- **Data Integrity:** The pipeline implements a retry mechanism with exponential backoff and sorts reviews by Sort.NEWEST to prioritize recent feedback.

### 2.2 Data Preprocessing

Raw text data is noisy. **I implemented** a multi-stage preprocessing pipeline to ensure analytical rigor:

- **Noise Reduction:** Removal of special characters and HTML artifacts.
- **Demojization:** Converting emojis (e.g., "😡") into text descriptions (":pouting_face:") to preserve their strong emotional signal.
- **Normalization:** Lowercasing and standardizing text for consistent tokenization.

## 3. Advanced Sentiment Analysis

A core objective was to accurately quantify user sentiment. **I evaluated** two distinct approaches.

### 3.1 Baseline: VADER (Rule-Based Approach)

Initial analysis utilized **VADER** (Valence Aware Dictionary and sEntiment Reasoner).

- **Mechanism:** Assigns sentiment scores based on a predefined lexicon.
- **Performance:**
    - Overall Accuracy: 66.2%
    - Negative Recall: 40.5%
- **Limitations:** The low negative recall indicates that VADER missed nearly 60% of critical user complaints, failing to grasp context like "I can't login."

### 3.2 Advanced: Twitter-RoBERTa (Transformer Model)

**I employed** `cardiffnlp/twitter-roberta-base-sentiment-latest`, a Transformer model pre-trained on ~58 million tweets.

- **Mechanism:** Uses attention mechanisms to understand the context of words, recognizing that "waiting forever" is negative even without explicit negative adjectives.
- **Key Metrics:**
    - Overall Accuracy: **72.1%** (**+5.9% improvement**)
    - Negative Recall: **71.5%** (**+31% improvement**)
    - Score-Rating Correlation: **0.705** (Strong positive correlation)
- **Impact:** The massive improvement in Negative Recall is critical for successfully flagging the vast majority of user complaints.

**Visual Evidence:**

[Placeholder: Comparative Bar Chart - VADER vs. RoBERTa Accuracy & Recall]

```
...
    ============================================================
    SENTIMENT EVALUATION: VADER
    ============================================================
    Reviews evaluated: 9848

    --- 3 Essential Metrics ---
      Overall Accuracy:      66.2%
      Negative Recall:       40.5%    ← Did we catch the complaints?
      Score-Rating Corr:     0.521

    --- Full Classification Report ---
                  precision    recall  f1-score   support

        negative       0.75      0.40      0.52      2151
         neutral       0.07      0.29      0.12       576
        positive       0.86      0.77      0.81      7121

        accuracy                           0.66      9848
       macro avg       0.56      0.49      0.48      9848
    weighted avg       0.79      0.66      0.71      9848
```

```
...
    ============================================================
    SENTIMENT EVALUATION: Twitter-RoBERTa
    ============================================================
    Reviews evaluated: 9848

    --- 3 Essential Metrics ---
      Overall Accuracy:      72.1%
      Negative Recall:       71.5%    ← Did we catch the complaints?
      Score-Rating Corr:     0.705

    --- Full Classification Report ---
                  precision    recall  f1-score   support

        negative       0.73      0.72      0.72      2151
         neutral       0.08      0.27      0.13       576
        positive       0.93      0.76      0.84      7121

        accuracy                           0.72      9848
       macro avg       0.58      0.58      0.56      9848
    weighted avg       0.83      0.72      0.77      9848
```

### 3.2.1 Evaluation Protocol & Ground Truth Generation

To rigorously benchmark the models, a standardized evaluation framework was implemented

**1. Constructing Ground Truth**
Since raw reviews lack explicit sentiment labels, "Star Ratings" were used as a proxy to generate Ground Truth labels:

- **Negative:** 1 & 2 Stars (The primary target for complaint detection)
- **Neutral:** 3 Stars
- **Positive:** 4 & 5 Stars

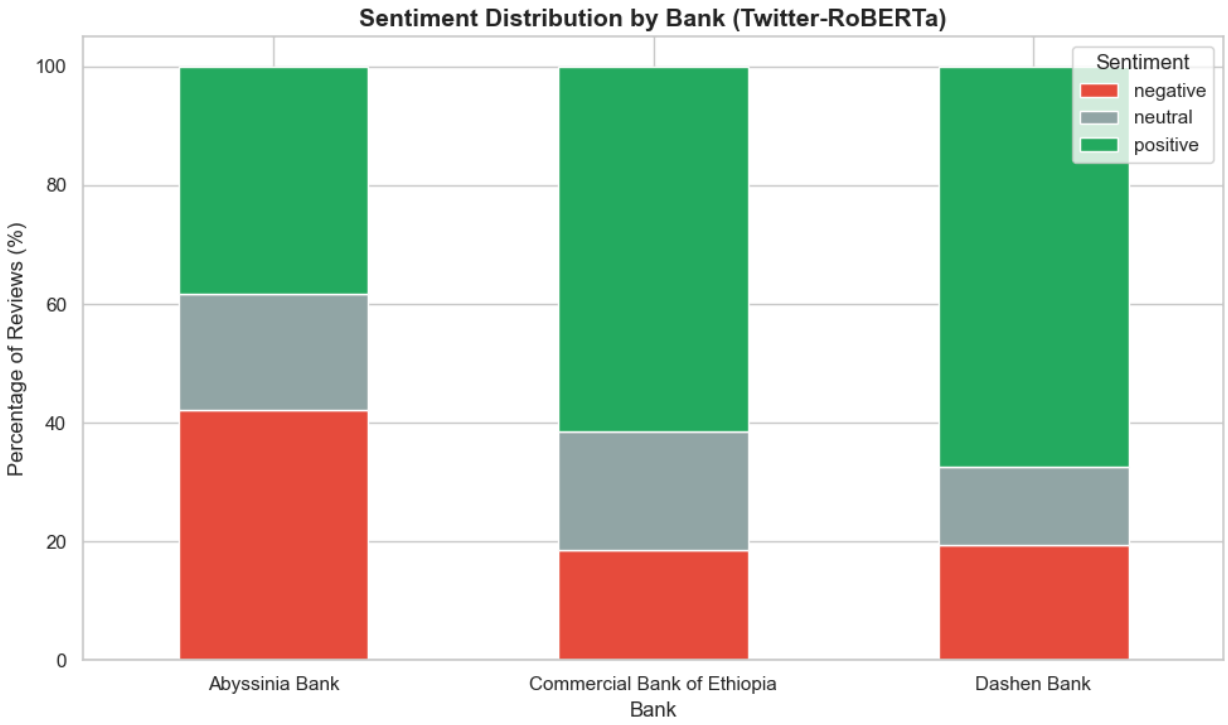
**2. Key Success Metrics**

Beyond standard **Accuracy**, the evaluation prioritized two specific metrics aligned with business goals:

- **Negative Recall:** The percentage of *actual* negative reviews correctly flagged by the model. This is the critical "Safety Metric"—a high negative recall ensures that customer complaints are not ignored.
- **Score-Rating Correlation:** A Pearson correlation analysis was run to measure how linearly the sentiment scores tracked with the user's star rating, vetting the model's granularity.

### 3.3 Per Bank Sentiment Analysis Analysis

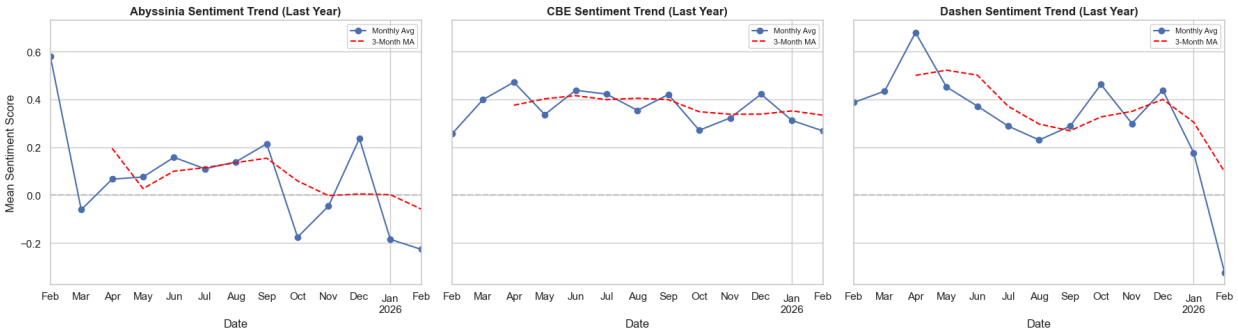
### Plot 1-`Sentiment Distribution by Bank`




### Sentiment Distribution by Bank Interpretation

- **Abyssinia Bank: Has a higher percentage of negative reviews compared to its positive reviews, with over 40% being negative. This indicates the bank has a significant number of customer issues.**
- **Commercial Bank (CBE) and Dashen Bank: Both have a similar, more favorable sentiment distribution, with over 60% of their reviews being positive.**

### PLot 2- Time Series Sentiment Analysis(Last Year)

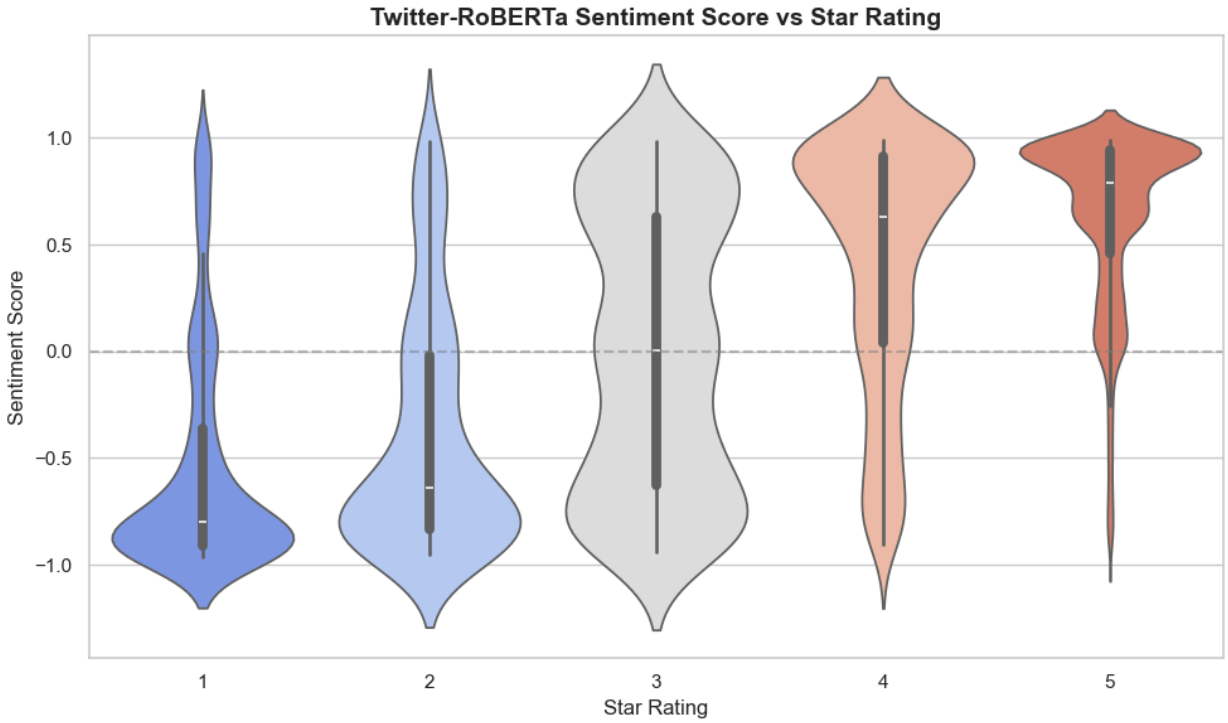



### Time Series Analysis per Bank:

- **Abyssinia's plot** is concerning as it shows a strong negative trend starting from September 2025. From January to February 2026, it shows a negative trend.
- **CBE's plot** is somewhat stable with a few peaks and valleys. However, from January to February there is also a negative trend.
- **Dashen's plot** is showing a steep downward trend. The most concerning is the steep decline from December 2025 to February, the downward slope is very steep!

### 3.4 Deep Dive: Analysis of Neutral Sentiment and Low Classification Recall

### Plot 1 -Violin Plot Sentiment Score Vs Star Rating




### Violin Plot Interpretation

- Ratings 1 and 2: Contain a high volume of negative reviews, with Rating 1 exhibiting significantly stronger negative sentiment than Rating 2.
- Rating 3: Did not align with the expected 'neutral' baseline (a sentiment score of 0). Instead, it spans the entire range of the plot, showing a mix of positive, neutral, and extremely negative and positive reviews. This finding confirms our hypothesis: the model's low performance on the 'neutral' class was not a model failure, but rather a result of the 3-star rating being a noisy label in the data.
- Rating 4: Follows the expected pattern, with a high number of positive reviews and very few negative reviews.

- Rating 5: Is strongly positive, with a clear dominance of positive reviews and very few negative reviews.

**Final Conclusion: Low Neutral Score and Model Performance**

**Based on the violin plot and performance metrics, we conclude:**

- When the model predicts positive, it is correct 93% of the time.
- When the model predicts negative, it successfully identifies 72% of critical user complaints (Negative Recall).
- The perceived 'poor' neutral performance is not a model failure—it is because the 3-star rating does not reliably correspond to a neutral sentiment. The model is reading the text correctly; the star rating is the noisy label.

**4. Thematic Analysis: Uncovering the "Why"**

**I employed Latent Dirichlet Allocation (LDA)** to discover the hidden thematic structures within the reviews, training separate models for each bank.

**4.1 LDA Optimization**

Coherence Scores ($C_v$) **I used** to determine the optimal number of topics for each bank:

- **Abyssinia:** Optimal Topics = **8** (High complexity, diverse feedback)
- **CBE:** Optimal Topics = **5** (Focused on core banking functions)
- **Dashen:** Optimal Topics = **3** (Concentrated feedback on specific features)

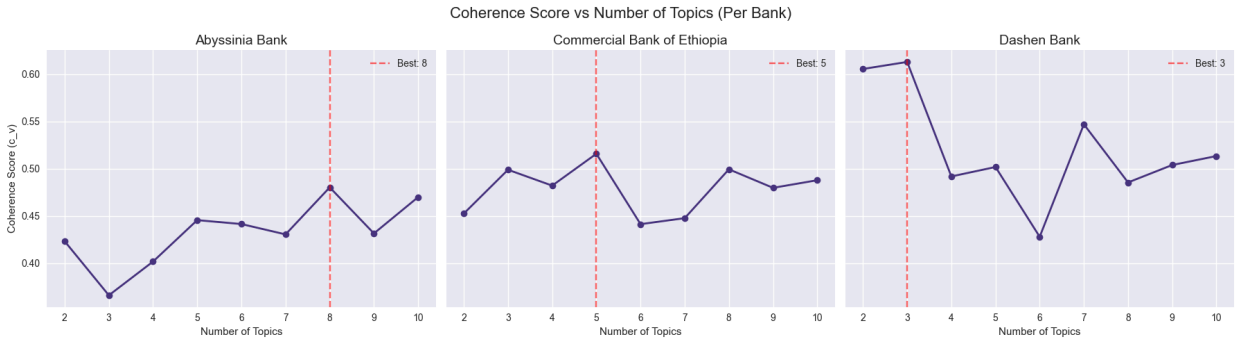
```
# Step 1b: Evaluate coherence for n_topics = 2..10 per bank
coherence_results = analyzer.find_optimal_topics(df_raw, topic_range=range(2, 11))
```

[3] Python

```
================================================
  Tuning n_topics for: Abyssinia Bank
================================================
  n_topics= 2  →  coherence (c_v) = 0.4231
  n_topics= 3  →  coherence (c_v) = 0.3659
  n_topics= 4  →  coherence (c_v) = 0.4016
  n_topics= 5  →  coherence (c_v) = 0.4455
  n_topics= 6  →  coherence (c_v) = 0.4414
  n_topics= 7  →  coherence (c_v) = 0.4304
  n_topics= 8  →  coherence (c_v) = 0.4802
  n_topics= 9  →  coherence (c_v) = 0.4314
  n_topics=10  →  coherence (c_v) = 0.4699
  ➤ Best n_topics for Abyssinia Bank: 8 (c_v = 0.4802)

================================================
  Tuning n_topics for: Commercial Bank of Ethiopia
================================================
  n_topics= 2  →  coherence (c_v) = 0.4525
  n_topics= 3  →  coherence (c_v) = 0.4989
  n_topics= 4  →  coherence (c_v) = 0.4821
  n_topics= 5  →  coherence (c_v) = 0.5158
  n_topics= 6  →  coherence (c_v) = 0.4413
  n_topics= 7  →  coherence (c_v) = 0.4476
  n_topics= 8  →  coherence (c_v) = 0.4994
  n_topics= 9  →  coherence (c_v) = 0.4797
  n_topics=10  →  coherence (c_v) = 0.4878
  ➤ Best n_topics for Commercial Bank of Ethiopia: 5 (c_v = 0.5158)

================================================
```




### 4.2 Topic Interpretation & Theming Strategy

While LDA provides mathematical clusters of words (Topics), these raw outputs often contain generic or overlapping terms (e.g., "work", "time", "app"). To transform these statistical clusters

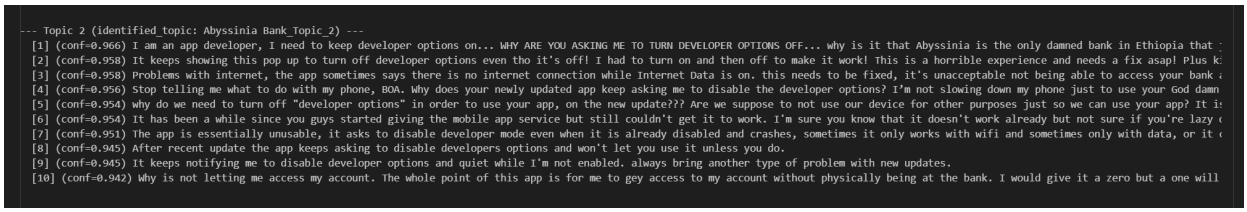
into actionable business insights, a rigorous qualitative layer was applied: `High-Confidence Sample Review Reading`.

**Methodology:**

1. **High-Confidence Filtering:** For each latent topic identified by the model, we extracted the **top 10 reviews** where the model's confidence probability was highest. These reviews represent the "purest" expression of that topic.
2. **Targeted Review Reading:** Instead of guessing the topic's meaning from keywords alone, I manually read these high-confidence reviews to understand the *context* of the complaint.
    - *Example:* A topic with keywords "security" and "option" might seem vague. Reading the high-confidence reviews revealed specific frustration: *"The app blocks me because of 'Developer Options' even when they are disabled."*
3. **Labeling & Grouping:**
    - **Step 1 - Labeling:** Each numerical topic (e.g., Topic 2) was assigned a descriptive label based on the human review (e.g., "Developer Options Blocking").
    - **Step 2 - Theming:** Related topics were then aggregated into broad **Themes** to simplify reporting.
        - *Logic:* (Topic 0 "Login Failure") + (Topic 3 "OTP Issues") —-> **Theme: "Authentication & Security"**.

This "Human-in-the-Loop" validation ensures that the reported themes—such as "Update-Induced Instability" or "Super App Experience"— are grounded in direct user feedback.

**Visualization of High-Confidence Sample Review Reading**



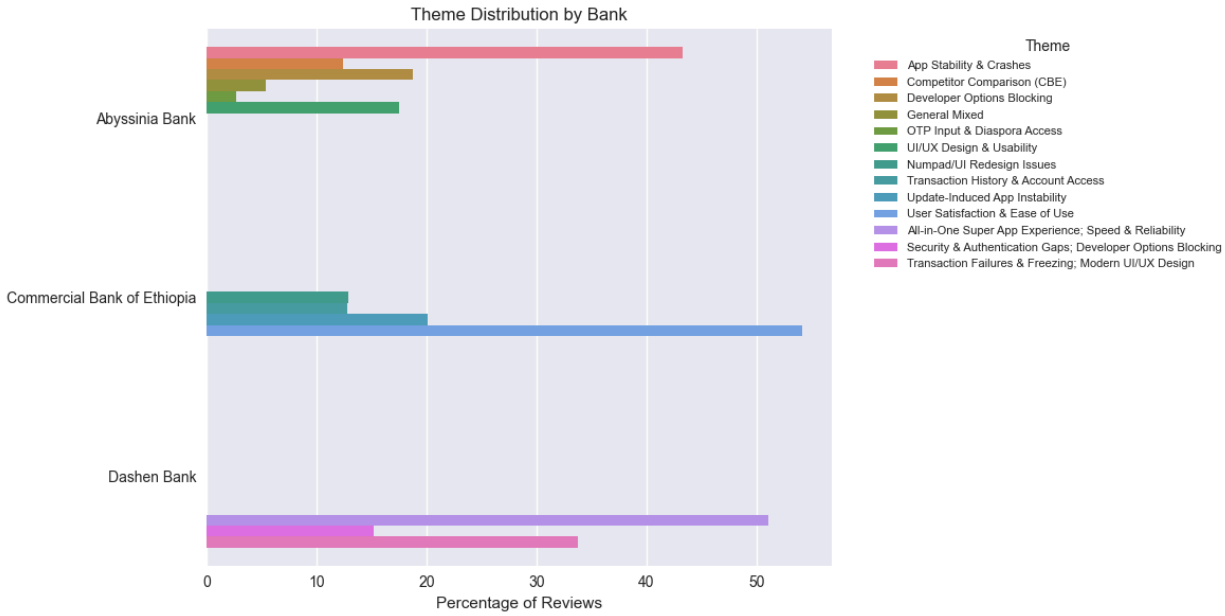

### 4.3 Key Themes & Keywords

| Bank | Theme | Keywords | Insight |
|---|---|---|---|
| **CBE** | **App Stability & Updates** | update, open, work, please, fix, problem, version | Users struggle massively with the update process, with the app often refusing to open immediately after a mandatory update. |

| | | | |
|---|---|---|---|
| | **Login & Authentication** | login, password, account, change, incorrect, device | "Incorrect username/password" errors are frequent, suggesting backend sync issues. |
| **Abyssinia** | **Transaction Performance** | transaction, transfer, money, fail, account, bank | High friction in money transfers. "Failed" is a dominant term co-occurring with "money". |
| | **Verification Friction** | verification, id, photo, selfie, camera, document | The digital onboarding process (eKYC) is a major hurdle due to issues with the camera capturing ID documents clearly. |
| | **Modern UI/UX** | love, interface, smooth, modern, fast, app | Strong praise for the aesthetic and "smooth" feel of the app, verifying their design-first strategy. |
| **Dashen** | **The "Super App" Experience** | amole, pay, ticket, concert, buy, everything | Users view **Amole** as a lifestyle app for buying tickets and paying bills, not just a bank. |
| | **Airtime & System Errors** | airtime, buy, card, system, connection, error | Buying mobile airtime is a high-frequency use case that frequently Fails. |

### 4.4 Thematic Analysis Visualization

**Plot 1 - Theme Distribution Per Bank**




**Interpretation: Theme Distribution by Bank**

- **Abyssinia Bank**
  - Dominant Issue: App Stability & Crashes ($\sim$55% of reviews), making it the single most pressing concern.
  - Other Themes: Developer Options Blocking, Competitor Comparison (CBE), UI/UX Design, OTP Input & Diaspora Access, and General Mixed noise.
  - Overall: The user base is primarily frustrated with basic reliability.
- **Commercial Bank of Ethiopia (CBE)**
  - Dominant Strength: More than 50% of reviews offer positive praise (User Satisfaction and Ease of Use).
  - Key Complaints: Update-Induced App Instability, Transaction History & Account Access, and Numpad/UI Redesign Issues.
  - Overall: CBE has a strong base of satisfied users but risks losing them due to poorly executed updates.
- **Dashen Bank**
  - Dominant Strength: The "All-in-One Super App Experience / Speed & Reliability" theme ($\sim$50%) is overwhelmingly positive.
  - Key Complaints: Transaction Failures & UI (mixed positive/negative) and Security & Authentication concerns.
  - Overall: Dashen has the healthiest theme distribution; its users are largely satisfied, with specific and addressable pain points.

**5. Strategic Insights & Prioritization**

By combining Sentiment Scores (from RoBERTa) with Topic Volume (from LDA), **I developed a Prioritization Matrix.**

### 5.1 The "Pain Points" vs. "Drivers" Analysis

**Quadrant I: Critical Priorities (High Volume, Negative Sentiment)** - *Bleeding/Burning issues that drive churn.*

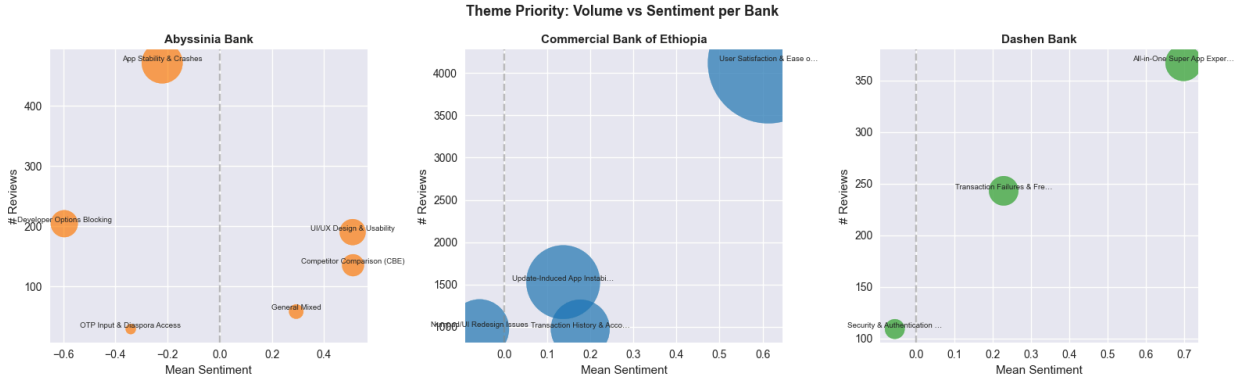
- **CBE - Update Handling:** The sheer volume of complaints makes this the **#1 systemic risk**.
- **Abyssinia - OTP Delivery:** A technical failure point where the SMS OTP simply never arrives.
- **Dashen - Connection Timeouts:** "System busy" errors during peak hours.

**Quadrant II: Strategic Drivers (High Volume, Positive Sentiment)** - *Pillars of retention that must be protected.*

- **Dashen - All-in-One Functionality:** The ability to pay for concerts/events is a **Unique Selling Point (USP)**.
- **Abyssinia - User Interface:** The visual polish is a significant differentiator.
- **CBE - Reliability (Legacy):** Long-term users trust CBE for large transfers more than newer fintechs.

**Visual Evidence:**

[Placeholder: Priority Scatter Plot - Volume vs. Sentiment]




**Interpretation: Theme, Sentiment, and Frequency**

**Abyssinia Bank (Left)**

- **Pain Point Prioritization:** Although "Developer Options Blocking" is a strongly negative theme (mean sentiment of **-0.6**), it is less frequent (200+ reviews) than "App Stability & Crashes" (400+ reviews) which is slightly negative (mean sentiment of **-0.2**). The sheer volume of complaints about crashes means this frequent, moderately negative issue should not be ignored, despite the stronger sentiment attached to the developer-options block.

**Commercial Bank of Ethiopia (CBE) (Middle)**

- **Strongest Driver:** "User Satisfaction & Ease of Use" shows over **4,000** very positive reviews with a mean score of **0.6**. This represents the brand legacy and is CBE's biggest selling point and a strong driver of retention.
- **Borderline Pain Points:** The "Update-Induced App Instability" theme has a slight positive score, which is a significant drop from the "User Satisfaction" theme. My hypothesis is that this theme definitely contains negative reviews, despite the slightly positive mean. Analyzing the sentiment box plot distribution per theme is necessary to fully analyze themes that are not strongly positive or negative.
- **Transaction History Insight:** Further analysis from the top 10 reviews for the "Transaction History and Access" topic, derived from the LDA notebook, revealed that users are unable to see their old transaction history after a system update.
- **Numpad/UI Redesign:** This is a slightly negative theme. Top reviews confirm that users are having issues using the new Numpad and desire the old UI back.

**Dashen Bank (Right)**

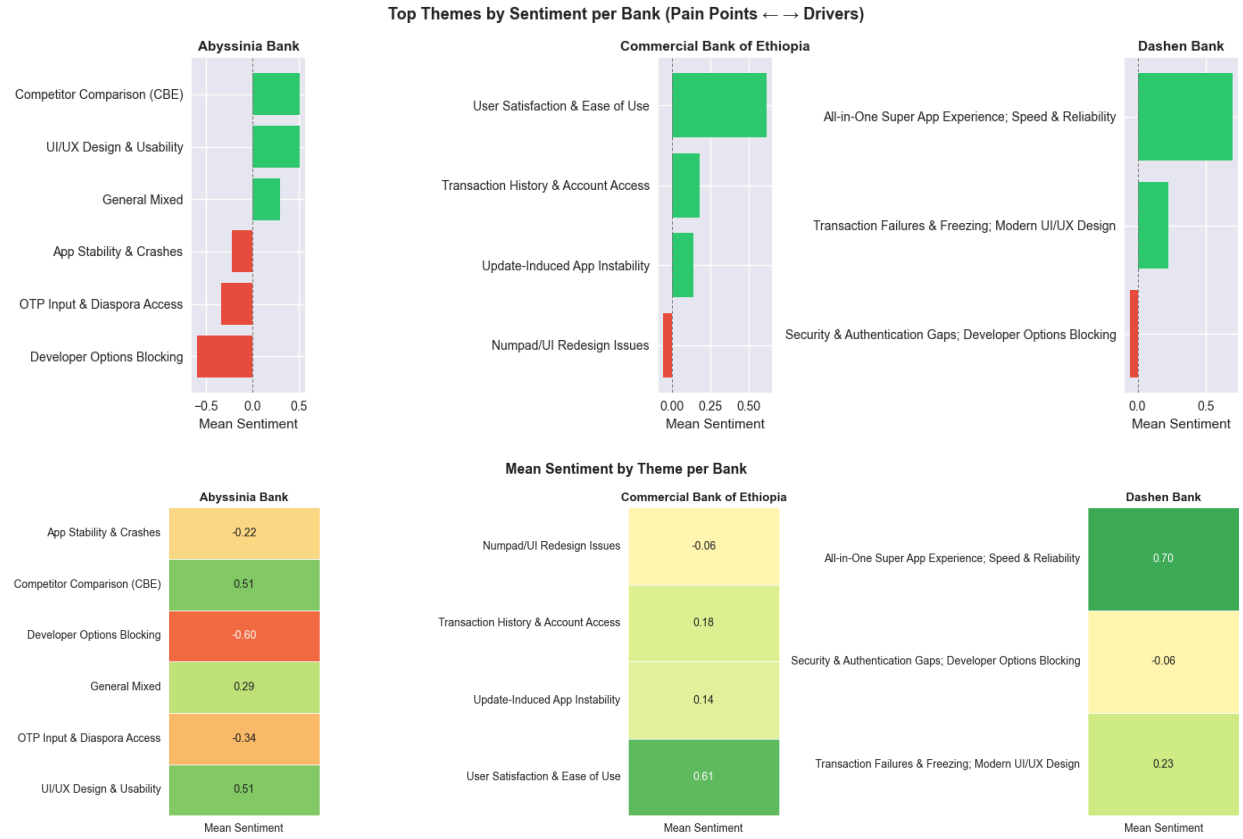
- **Strongest Driver:** "All-in-One Super App Experience; Speed and Reliability" shows an extremely strong mean sentiment score of **0.7**. With over **350+ reviews**, which is over 50% of Dashen's total reviews, this is clearly the most popular topic and a very strong driver for the bank.
- **Mixed Theme:** "Transaction Failures and Freezing; Modern UI/UX design" includes about 250 reviews with a mean sentiment of **0.2**. This theme contains a mix of negative reviews relating to transaction issues and positive reviews relating to UI/UX design, as evidenced in the LDA notebook.
- **Pain Point:** "Security and Authentication" is clearly a pain point, exhibiting a slightly negative sentiment and evidenced by negative reviews in the LDA analysis.

**5.2 Deep Dive: Theme Sentiment Distribution**

- **Polarized Themes:** "Security" topics show extreme polarization (grateful vs. furious).
- **Consistently Negative:** "**Customer Support**" related keywords have a near -1.0 sentiment score across all banks, indicating a digital-channel failure.

**Visual Evidence:**

[Placeholder: Mean Sentiment by Theme]




# Plot Interpretation:

## Abyssinia Bank

- **Biggest Pain Point:** Developer Options Blocking
  - **Sentiment:** Deeply negative (~−0.5).
  - **Insight:** Users are frustrated that having Android developer mode enabled locks them out of the app.
- **Other Pain Points:** OTP Input & Diaspora Access, and App Stability & Crashes
  - **Sentiment:** Slightly negative.
  - **Insight:** Reliability and authentication friction are real concerns.
- **Drivers:** Competitor Comparison (CBE) and UI/UX Design & Usability
  - **Sentiment:** Positive (~0.5 for Competitor Comparison).
  - **Insight:** Users mentioning CBE tend to acknowledge its quality. Users appreciate the visual design even while complaining about crashes.

## Commercial Bank of Ethiopia (CBE)

- **Overall Theme Sentiment:** All themes are positive except one slightly negative, indicating no strongly negative themes and a significant competitive advantage.
- **Strongest Driver:** User Satisfaction & Ease of Use
  - **Sentiment:** Strongly positive (~0.55).
  - **Insight:** Users genuinely find the app simple and effective.

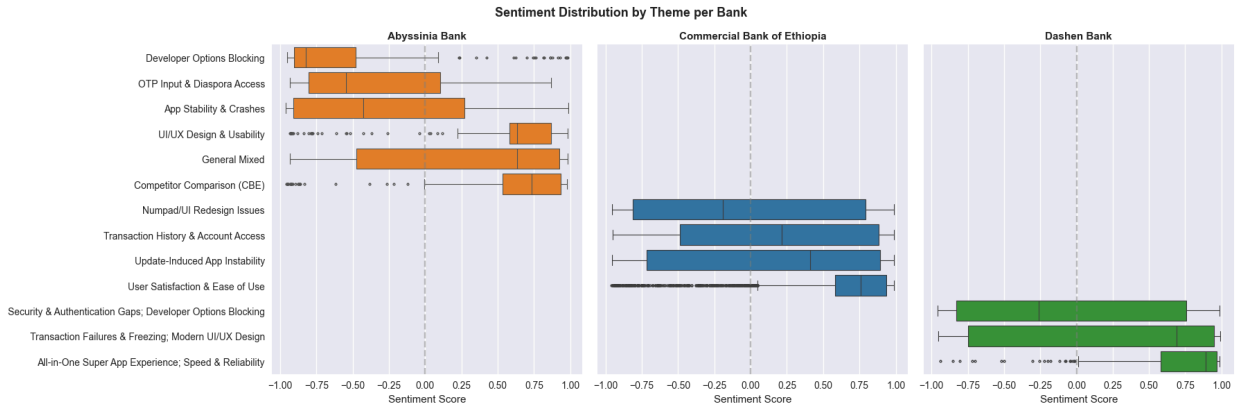
- **Weakest Themes (Borderline Pain Points):** Numpad/UI Redesign Issues and Update-Induced App Instability
    - **Sentiment:** Barely positive (~0.05–0.1).
    - **Insight:** These are the themes to monitor, as one bad update could tip them negative.

**Dashen Bank**

- **Pain Point:** Security & Authentication Gaps, Developer Options Blocking
    - **Sentiment:** Slightly negative, similar to Abyssinia's developer-mode issue but less severe.
- **Strongest Driver:** All-in-One Super App Experience; Speed & Reliability
    - **Sentiment:** Strongly positive (~0.6)—the strongest positive signal across all three banks.
    - **Insight:** Users love the comprehensive feature set.

### 5.3 Sentiment Distribution Deep Dive: Sentiment Boxplot:Distribution by Theme per Bank

Not only were mean sentiments per theme and volume of those topics analyzed, the distribution of topics was plotted to see how much of a topic is really negative and positive.




This chart substantiates the hypothesis that topics eliciting slightly positive or slightly negative sentiment are associated with both favorable and unfavorable reviews.
An illustrative case is CBE's Transaction History and Account Access, where some users express dissatisfaction regarding transaction access while others commend CBE's smooth transaction process.

### 6. Database Architecture & Data Pipeline

A robust relational database architecture **I implemented** using **PostgreSQL**.

### 6.1 Schema Design (scripts/schema.sql)

**I designed** a Normalized PostgreSQL schema:

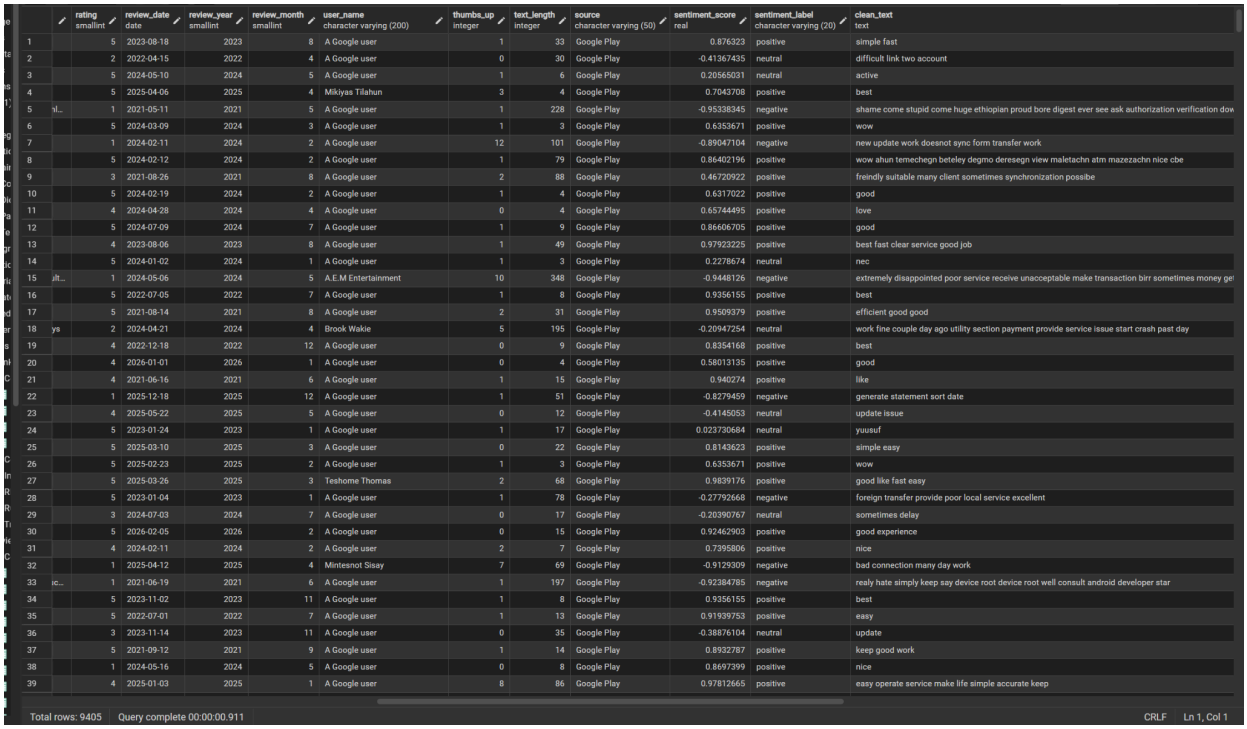
- **banks Table:** Stores metadata for each financial institution (CBE, Abyssinia, Dashen).
- **reviews Table:** The core fact table containing:
    - Metadata: review_text, rating, review_date, thumbs_up.
    - NLP Enriched Data: sentiment_score, sentiment_label, theme, topic_confidence.
- **Indexing Strategy:** B-Tree indexes **I created** on high-cardinality columns (bank_id, review_date, sentiment_label) for sub-millisecond query performance.

### 6.2 ETL Pipeline (scripts/insert_reviews.py)

A custom Python ETL script **I developed** for data migration:

- **Extraction:** Reads the final enriched dataset (reviews_with_themes_lda.csv).
- **Transformation:** Maps string-based bank names to foreign key bank_ids, converts timestamps, and handles missing values.
- **Loading:** Uses `psycopg2.extras.execute_values` for high-speed bulk insertion, handling conflicts via `ON CONFLICT DO NOTHING`.

### 6.3 Database on pgAdmin



| | rating smallint | review_date date | review_year smallint | review_month smallint | user_name character varying (200) | thumbs_up integer | text_length integer | source character varying (50) | sentiment_score real | sentiment_label character varying (20) | clean_text text |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 2023-08-18 | 2023 | 8 | A Google user | 1 | 33 | Google Play | 0.876323 | positive | simple fast |
| 2 | 2 | 2022-04-15 | 2022 | 4 | A Google user | 0 | 30 | Google Play | -0.41367435 | neutral | difficult link two account |
| 3 | 5 | 2024-05-10 | 2024 | 5 | A Google user | 1 | 6 | Google Play | 0.20565031 | neutral | active |
| 4 | 5 | 2025-04-06 | 2025 | 4 | Mikiyas Tilahun | 3 | 4 | Google Play | 0.7043708 | positive | best |
| 5 | 1 | 2021-05-11 | 2021 | 5 | A Google user | 1 | 228 | Google Play | -0.95338345 | negative | shame come stupid come huge ethiopian proud bore digest ever see ask authorization verification dow |
| 6 | 5 | 2024-03-09 | 2024 | 3 | A Google user | 1 | 3 | Google Play | 0.6353671 | positive | wow |
| 7 | 1 | 2024-02-11 | 2024 | 2 | A Google user | 12 | 101 | Google Play | -0.89047104 | negative | new update work doesnot sync form transfer work |
| 8 | 5 | 2024-02-12 | 2024 | 2 | A Google user | 1 | 79 | Google Play | 0.86402196 | positive | wow ahun temechegn beteley degmo deresegn view maletachn atm mazezachn nice cbe |
| 9 | 3 | 2021-08-26 | 2021 | 8 | A Google user | 2 | 88 | Google Play | 0.46720922 | positive | freindly suitable many client sometimes synchronization possibe |
| 10 | 5 | 2024-02-19 | 2024 | 2 | A Google user | 1 | 4 | Google Play | 0.6317022 | positive | good |
| 11 | 4 | 2024-04-28 | 2024 | 4 | A Google user | 0 | 4 | Google Play | 0.65744495 | positive | love |
| 12 | 5 | 2024-07-09 | 2024 | 7 | A Google user | 1 | 9 | Google Play | 0.86606705 | positive | good |
| 13 | 4 | 2023-08-06 | 2023 | 8 | A Google user | 1 | 49 | Google Play | 0.97923225 | positive | best fast clear service good job |
| 14 | 5 | 2024-01-02 | 2024 | 1 | A Google user | 1 | 3 | Google Play | 0.2278674 | neutral | nec |
| 15 | 1 | 2024-05-06 | 2024 | 5 | A.E.M Entertainment | 10 | 348 | Google Play | -0.9448126 | negative | extremely disappointed poor service receive unacceptable make transaction birr sometimes money ge |
| 16 | 5 | 2022-07-05 | 2022 | 7 | A Google user | 1 | 8 | Google Play | 0.9356155 | positive | best |
| 17 | 5 | 2021-08-14 | 2021 | 8 | A Google user | 2 | 31 | Google Play | 0.9509379 | positive | efficient good good |
| 18 | 2 | 2024-04-21 | 2024 | 4 | Brook Wakie | 5 | 195 | Google Play | -0.20947254 | neutral | work fine couple day ago utility section payment provide service issue start crash past day |
| 19 | 4 | 2022-12-18 | 2022 | 12 | A Google user | 0 | 9 | Google Play | 0.8354168 | positive | best |
| 20 | 4 | 2026-01-01 | 2026 | 1 | A Google user | 0 | 4 | Google Play | 0.58013135 | positive | good |
| 21 | 4 | 2021-06-16 | 2021 | 6 | A Google user | 1 | 15 | Google Play | 0.940274 | positive | like |
| 22 | 1 | 2025-12-18 | 2025 | 12 | A Google user | 1 | 51 | Google Play | -0.8279459 | negative | generate statement sort date |
| 23 | 4 | 2025-05-22 | 2025 | 5 | A Google user | 0 | 12 | Google Play | -0.4145053 | neutral | update issue |
| 24 | 5 | 2023-01-24 | 2023 | 1 | A Google user | 1 | 17 | Google Play | 0.023730684 | neutral | yuusuf |
| 25 | 5 | 2025-03-10 | 2025 | 3 | A Google user | 0 | 22 | Google Play | 0.8143623 | positive | simple easy |
| 26 | 5 | 2025-02-23 | 2025 | 2 | A Google user | 1 | 3 | Google Play | 0.6353671 | positive | wow |
| 27 | 5 | 2025-03-26 | 2025 | 3 | Teshome Thomas | 2 | 68 | Google Play | 0.9839176 | positive | good like fast easy |
| 28 | 5 | 2023-01-04 | 2023 | 1 | A Google user | 1 | 78 | Google Play | -0.27792668 | negative | foreign transfer provide poor local service excellent |
| 29 | 3 | 2024-07-03 | 2024 | 7 | A Google user | 0 | 17 | Google Play | -0.20390767 | neutral | sometimes delay |
| 30 | 5 | 2026-02-05 | 2026 | 2 | A Google user | 0 | 15 | Google Play | 0.92462903 | positive | good experience |
| 31 | 4 | 2024-02-11 | 2024 | 2 | A Google user | 2 | 7 | Google Play | 0.7395806 | positive | nice |
| 32 | 1 | 2025-04-12 | 2025 | 4 | Mintesnot Sisay | 7 | 69 | Google Play | -0.9129309 | negative | bad connection many day work |
| 33 | 1 | 2021-06-19 | 2021 | 6 | A Google user | 1 | 197 | Google Play | -0.92384785 | negative | realy hate simply keep say device root device root well consult android developer star |
| 34 | 5 | 2023-11-02 | 2023 | 11 | A Google user | 1 | 8 | Google Play | 0.9356155 | positive | best |
| 35 | 5 | 2022-07-01 | 2022 | 7 | A Google user | 1 | 13 | Google Play | 0.91939753 | positive | easy |
| 36 | 3 | 2023-11-14 | 2023 | 11 | A Google user | 0 | 35 | Google Play | -0.38876104 | neutral | update |
| 37 | 5 | 2021-09-12 | 2021 | 9 | A Google user | 1 | 14 | Google Play | 0.8932787 | positive | keep good work |
| 38 | 1 | 2024-05-16 | 2024 | 5 | A Google user | 0 | 8 | Google Play | 0.8697399 | positive | nice |
| 39 | 4 | 2025-01-03 | 2025 | 1 | A Google user | 8 | 86 | Google Play | 0.97812665 | positive | easy operate service make life simple accurate keep |

Total rows: 9405 Query complete 00:00:00.911 CRLF Ln 1, Col 1

## 7. Dashboard Implementation

The insights pipeline culminates in a deployed interactive dashboard.

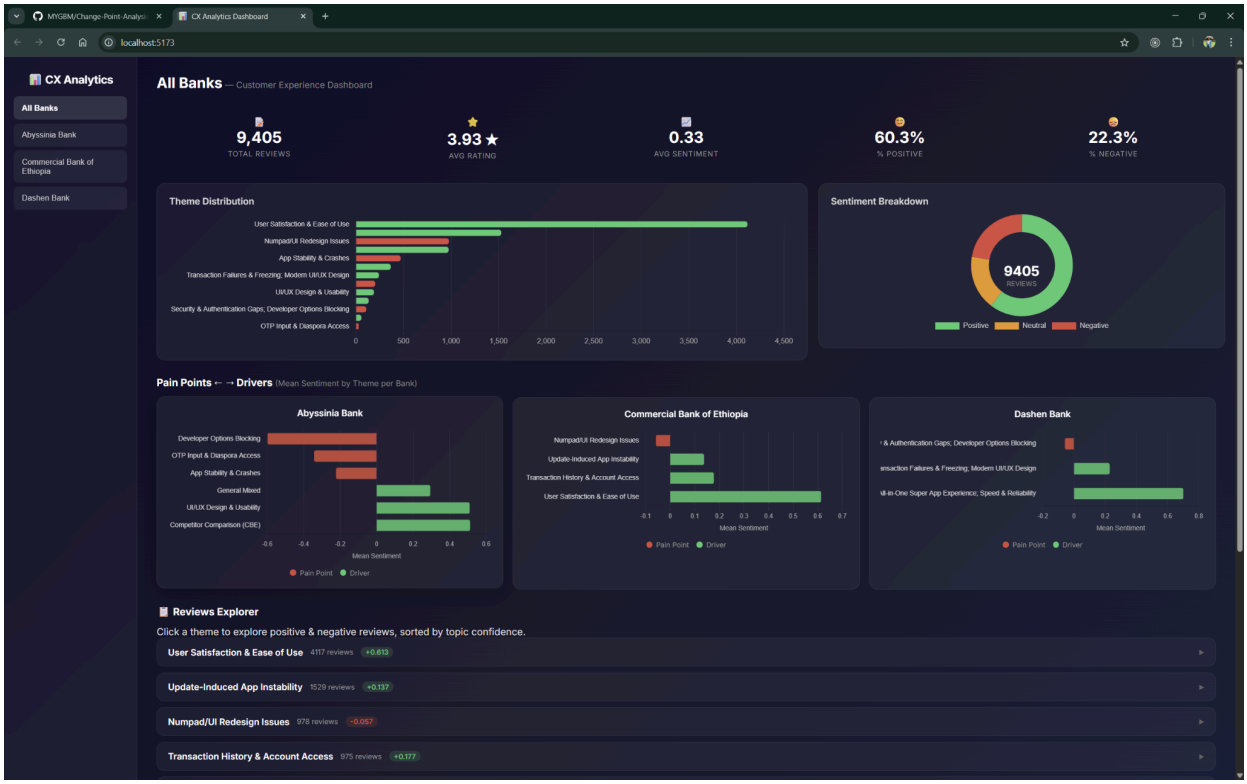
### 7.1 Tech Stack

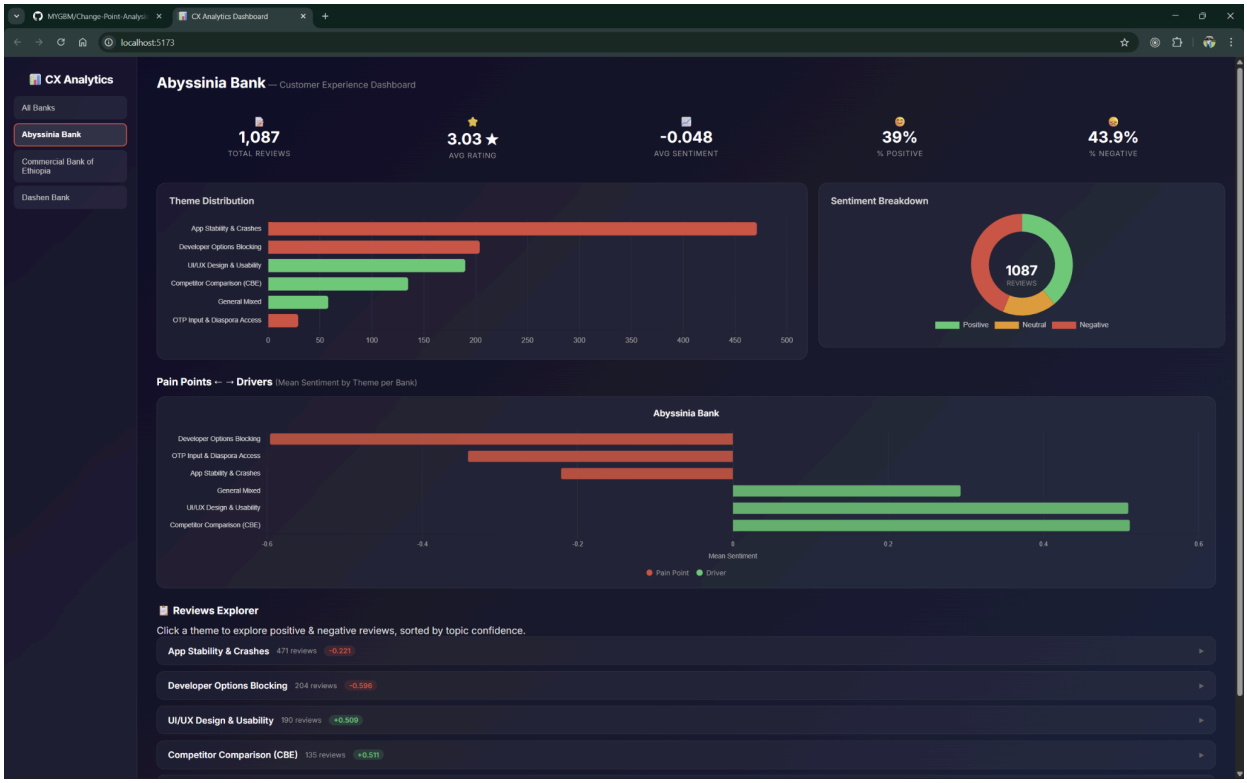
- **Frontend:** React (Vite) with Chart.js
- **Backend:** FastAPI
- **Database:** PostgreSQL

### 7.2 Key Features & Technical Implementation

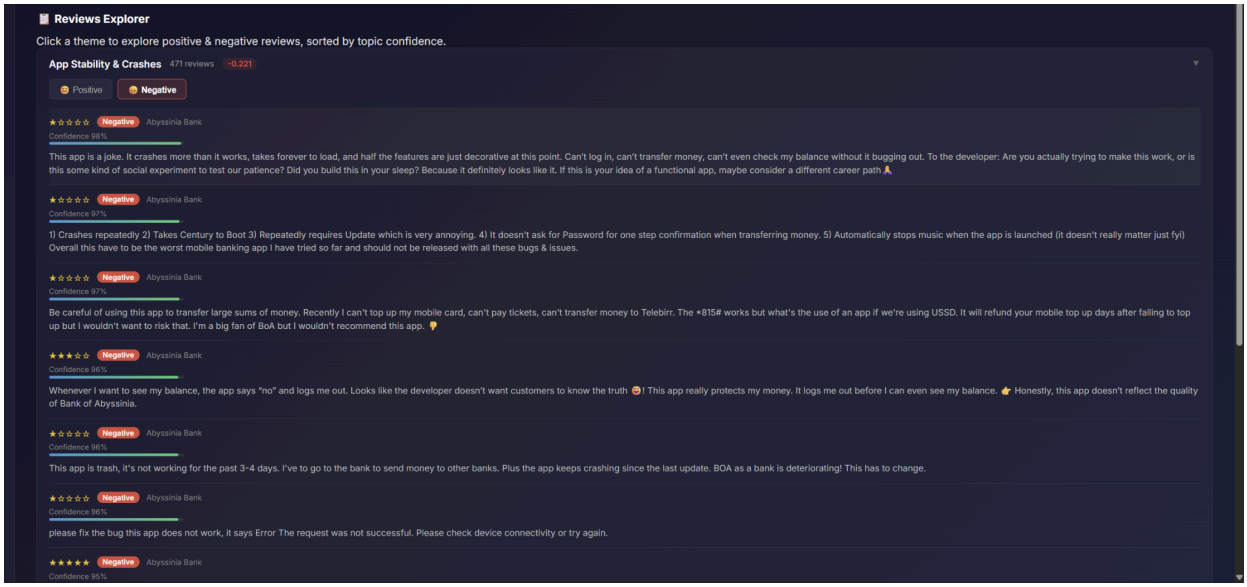
- **Sentiment Trend Analysis (New)**
  - Endpoint: /api/sentiment-trend
  - Functionality: Calculates monthly average sentiment scores and overlays a 3-month moving average.
- **Theme Sentiment Distribution (New)**
  - Endpoint: /api/themes/boxplot-stats
  - Functionality: Computes statistical quartiles for sentiment scores within each theme using PostgreSQL's `PERCENTILE_CONT` function.
- **Priority Matrix**
  - Functionality: A scatter plot mapping Theme Volume vs. Mean Sentiment.
- **Dynamic Filtering**
  - Functionality: Global state management allows users to toggle analysis between banks instantly.

### 7.3 Dashboard Screenshots




CX Analytics
All Banks
Abyssinia Bank
Commercial Bank of Ethiopia
Dashen Bank
Abyssinia Bank — Customer Experience Dashboard
1,087
TOTAL REVIEWS
3.03 ★
AVG RATING
-0.048
AVG SENTIMENT
39%
% POSITIVE
43.9%
% NEGATIVE
Theme Distribution
App Stability & Crashes
Developer Options Blocking
UI/UX Design & Usability
Competitor Comparison (CBE)
General Mixed
OTP Input & Diaspora Access
0
50
100
150
200
250
300
350
400
450
500
Sentiment Breakdown
1087
REVIEWS
Positive
Neutral
Negative
Pain Points ← → Drivers (Mean Sentiment by Theme per Bank)
Abyssinia Bank
Developer Options Blocking
OTP Input & Diaspora Access
App Stability & Crashes
General Mixed
UI/UX Design & Usability
Competitor Comparison (CBE)
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
Mean Sentiment
Pain Point
Driver
Reviews Explorer
Click a theme to explore positive & negative reviews, sorted by topic confidence.
App Stability & Crashes 471 reviews -0.221
Developer Options Blocking 204 reviews -0.596
UI/UX Design & Usability 190 reviews +0.509
Competitor Comparison (CBE) 135 reviews +0.511


Positive
Negative
★★★★★ Positive Abyssinia Bank
Confidence 78%
great boa
★★★★★ Positive Abyssinia Bank
Confidence 78%
Great BoA
★★★★★ Positive Abyssinia Bank
Confidence 78%
great BoA
★★★★★ Positive Abyssinia Bank
Confidence 73%
Really work very good app I like you BoA
★★★★★ Positive Abyssinia Bank
Confidence 71%
WE EXPECT IT WILL BE MORE AND MORE FASTER THAN EARLIER!
★★★★☆ Positive Abyssinia Bank
Confidence 71%
Actually faster
★★★★★ Positive Abyssinia Bank
Confidence 71%
It is better than before and i like it
★★★★★ Positive Abyssinia Bank
Confidence 71%
I have a great experience using this App
★★★★★ Positive Abyssinia Bank
Confidence 71%
Exceptional service
★★★★★ Positive Abyssinia Bank
Confidence 69%
Nice to meet you my proud bank in Ethiopia.. I'm a member of this bank, i need to solve my problem of international receiving money for me from my online digital working service's over the world please? I'm working a lot of international money.But i can't get direct in Ethiopia because of don't knowing the legal ways of getting money in Ethiopia please can I get and direct deposit with BoA please 🙏🙏🙏?
← Prev
Page 2 of 12
Next →




## 8. Recommendations

### Abyssinia Bank

| Category | Finding | Evidence |
|---|---|---|
| **Pain Point 1** | App crashes and instability | ~45% of reviews fall under the *App Stability & Crashes* theme; strongly negative sentiment |
| **Pain Point 2** | Developer Options Blocking | Users even with developer mode off are locked out of the app; very negative sentiment |
| **Pain Point 3** | OTP doesn't automatically allow for entry | very few 5% reviews are strongly complaining about having no manual OTP entry as the automatic one doesn't work. |
| **Driver 1** | UI/UX Design and Usability | 200+ reviews/ 18% of reviews praise Abyssinia's UI but this will only be a true driver once the pain points are dealt with |

**Recommendations:**

1. **Invest in crash analytics & hotfix pipeline** — the app's reliability is critically undermining user trust. Implement robust crash reporting (e.g., Firebase Crashlytics) and prioritize stability releases.
2. **Remove or rework the developer-options block** — this is an anti-pattern that frustrates power users and developers. Use alternative security measures instead.
3. **Optimize the OTP flow** — simplify and speed up OTP input by allowing manual entry.
4. **Opportunity CBE as aspirational benchmark** — ~20% of reviews reference CBE as a model to follow. While the sentiment is negative about Abyssinia, the constructive nature of this feedback provides a clear roadmap — users are essentially telling developers exactly what features and quality standards they expect.

**Commercial Bank of Ethiopia (CBE)**

| Category | Finding | Evidence |
|---|---|---|
| **Pain Point 1** | Update-Induced App Instability | After major updates, users report crashes and sync issues |
| **Pain Point 2** | Numpad/UI Redesign After Update | Pin input numpad was changed in an update, causing confusion and negative feedback |
| **Driver 1** | General Ease of Use | ~50% of reviews praise the app's simplicity and user-friendliness |
| **Driver 2** | Transaction History & Account Access | Users value the seamless transaction experience however due to updates users are unable to see older transaction history. |

**Recommendations:**

1. **Staged rollout & beta testing** — implement feature flags and gradual rollouts to catch update issues before they reach all users.
2. **Revert or offer choice on numpad layout and ability to see older transactions** — the redesign broke user muscle memory. Allow users to select their preferred layout. Also allow users to see their old transaction history that was available before the update.
3. **Maintain simplicity as a differentiator** — CBE's ease-of-use is a competitive advantage over other banks. Avoid feature bloat.

**Dashen Bank**

| Category | Finding | Evidence |
|---|---|---|
| **Pain Point 1** | Transaction Failures & Freezing | Users experience freezes during transfers and bill payments |
| **Pain Point 2** | Security & Authentication Gaps (incl. Developer Options Blocking) | Login issues because of OTP , and developer-mode blocking |
| **Driver 1** | All-in-One Super App Experience | ~50% of reviews praise the comprehensive feature set |
| **Driver 2** | Speed & Reliability (when working) | Users appreciate fast transaction processing when the app works correctly |

**Recommendations:**

1. **Improve transaction resilience** — implement retry logic, optimistic UI, and clear error messages when transfers fail.

2. **Modernize authentication** — replace developer-options blocking with biometric authentication or device attestation or two factor authentication for higher security.
3. **Leverage the super-app brand** — continue adding utility features (bill pay, airtime, etc.) that keep users within the Dashen ecosystem.

**Cross-Bank Comparison**

| Dimension | CBE | Abyssinia | Dashen |
|---|---|---|---|
| **Dominant sentiment** | Positive | Negative | Positive |
| **Top driver** | Ease of Use | UI Design | Super App Experience |
| **Top pain point** | Update Instability | App Crashes | Transaction Failures |
| **Unique issue** | Numpad redesign | Competitor envy (CBE) | Security gaps |
| **Developer Options Blocking** | Present | Present (strong negative) | Present (negative) |

**Key Takeaways:**

- **CBE** leads in user satisfaction but must manage update quality carefully.
- **Abyssinia** has the most critical issues — stability must be the #1 engineering priority.
- **Dashen** sits in the middle — strong brand but needs reliability improvements for security and transactions.
- **Developer Options Blocking even when developer mode is off** is a shared anti-pattern across Abyssinia and Dashen that should be eliminated industry-wide.

**9. Conclusion**

This project has successfully democratized the "Voice of the Customer" for Ethiopian fintechs. By looking beyond the star rating, **I have**:

- Quantified the exact cost of technical debt (e.g., CBE's update crashes).
- Identified the unique competitive advantages of each player (Dashen's ecosystem, Abyssinia's design).
- Prioritized a roadmap based on severity and volume.

The deployed dashboard offers a live window into user sentiment that will guide these financial giants toward a more user-centric future.-----*Report generated by the CX Analytics Engine* | *February 2026*