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# Measuring the Service Quality of Indian Cryptocurrency Apps Using Text Mining & SERVQUAL Metrics

**Dr Mohd Moinuddin Mudassir** [1]

[1]Associate Professor, Shadan Institute of Computer Studies (MBA Dept.), Hyderabad, India

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**KEYWORDS**

*Cryptocurrency Apps, SERVQUAL, Text Mining, Reviews and Ratings*

**ABSTRACT**

As cryptocurrency adoption grows in India, assessing the service quality of cryptocurrency apps becomes critical. This study integrates text mining of user reviews (N=1,000) from Google Play and Apple App Store with a structured survey of 200 active cryptocurrency app users. Using the SERVQUAL framework—reliability, assurance, tangibles, empathy, and responsiveness—we evaluated user perceptions and satisfaction. Text mining revealed key themes of dissatisfaction including app crashes, slow customer support, and high transaction fees, whereas survey analysis confirmed the importance of responsiveness and assurance in user satisfaction. The study provides actionable insights for app developers and fintech companies to enhance service quality and user experience.

## 1. INTRODUCTION

Financial investment plays a significant role in every individual's life to grow and prosper. Generally, the options for investment to individuals are stocks, fixed deposits, commodity trades, real estate, insurance, bonds, mutual funds, and gold. However, the introduction of block chain technology in the banking and financial sector has given a birth to the new avenue of investment called cryptocurrency. Currently, cryptocurrencies are attracting huge attention, mainly because of enormous ups and downs (growths and falls) in their exchange rates.

There is not trusted intermediary in its exchange process. It means no central bank exists to secure transactions or issue cryptocurrencies. There are various types of cryptocurrencies. The top five types that dominate 80% of the market are Bitcoin, Bitcoin cash, Cardano, Ethereum, and Ripple.

### Cryptocurrency in India

The cryptocurrency in India started its journey from 2010. However, from the last five years, there were huge spike in number of cryptocurrency investors across Indian cities especially tier2 and tier3 areas. As of 2025, the market has over 20 million crypto investors, with total crypto holdings of around 41 thousand crore rupees (approx. $5.37 billion, [2022]). According to some reports, India has the highest number of crypto owners and second in terms of adoption rate. Despite the non-regulatory nature of the asset, more than 60% of Indian states are emerging as Cryptocurrency adopters. In 2022, Indian government has legalized the cryptocurrencies in India and made 30% tax rate on income gains from it.

The surge in cryptocurrency adoption in India has been paralleled by a proliferation of mobile applications facilitating digital asset trading. However, with increased usage, expectations for service quality have also risen. This research aims to evaluate the service quality of these apps through the SERVQUAL model, combining qualitative insights from user-generated content with quantitative survey data.

### Cryptocurrency Platforms in India

Since smartphones have been a primary touch for individuals, companies of cryptocurrenciesexchange offer their services in a mobile app format so that they can reach to every smartphone user (every individual). Some of the popular crypto investment services apps in India are CoinDCX, CoinSwitchKuber, Unocoin, BitBns, ZebPay, BuyUCoin, NAGAX, and Giottus..

## 2. RESEARCH PROBLEM

During T20 World Cup 2021 (October-November), cryptocurrency companies in India like CoinDCX, WazirX, CoinSwitch Kuber, etc. collectively spent around Rs. 50 crores in advertisements to attract the individual investors. And this promotion made a positive effect in the market as the adoption rate of crypto investment among Indians have increased. As the number of crypto investors are increasing in India, the service quality of cryptocurrency exchange mobile apps should meet the expectations of the customers. To know the quality status of such apps, the researcher has done a text mining of about 1000 reviews from play store and app store. It has been found that there are many quality issues that customers/users of such apps are facing and complaining consistently. The relevance of the study emerges from here. This study is an attempt to measure the service quality of crypto exchange apps in India.

## 3. LITERATURE REVIEW

| **Service Quality Dimension(s)** | **Key aspects with reference to Crypto** | **Observed Impact** | **Reference** |
|---|---|---|---|
| Usability and Information Quality | Relevance, clarity, user- friendly interface, ease of understanding of crypto- specific information, visual attractiveness, and secure login, low user misconceptions and cognitive complexity. | Customer experience, Task Completion Rate (TCR), Loyalty, Time on Task (ToT), Error Rate (Frequency of user errors) | Dobshynska & Alona (2024); Nikzat & Hosseinzade, (2025); Voskobojnikov et al. (2021) |
| Adoption & Engagement | Complexity, and level of understanding are barriers to mass adoption. High cost of crypto exchange and volatility impacting user behavior. | Active User Rate, Retention Rate, Conversion Rate, Percentage of users taking desired action (sign-up, purchase, etc.), and Referral Rate | Al Reshaid, R., Al-Smadi, R., & Al-Qudah, A. A. (2025); Kumari, V., Bala, P. K., & Chakraborty, S. (2023) |
| Efficiency (EFC) | Transactions speed, app flow and user-friendliness, ease of finding payment methods, and information flow. | Customer experience and loyalty. | (Al Reshaid et al., 2025); (Desmal et al., 2019; Zhang & Adipat, 2005); (Nikzat & Hosseinzade, 2025) |
| Reliability (REL) | Transaction accuracy and consistency; prompt error correction; clear instructions for unprocessed transactions, transaction irreversibility; dependable service provision; protection against risks like data misuse. | Partially influences customer experience and loyalty | (Nikzat & Hosseinzade, 2025); (Voskobojnikov et al., 2021); (Dobshynska, 2024) |

| | | | |
|---|---|---|---|
| Security and Privacy | Protection from financial loss, hacks, and fraud; safeguarding transactional and personal information; robust security features; honesty in data sharing. | Customer experience and loyalty. | (Nikzat & Hosseinzade, 2025); (Chohan, 2018; Johnson, 2024); (Al Reshaid et al., 2025). |
| Assurance | Providing accurate information about transaction completion; precise record- keeping. fostering comfort in sharing sensitive payment details; | No significant impact on customer experience and loyalty. | (Nikzat & Hosseinzade, 2025) |
| Responsiveness | Swift and speedy handling of returns and problems and complaints, quick response from customer support | Do not explicitly find in the studied crypto app studies, but these are significant in e-service. | (Ighomereho et al., 2022) |
| Security Perception & Trust | Fear of losing funds due to attacks/errors; lack of clarity on transaction costs; non-uniform regulatory landscape affecting users' confidence, exchanges and wallet security. | Perceived risks (financial, physical, psychological, social risks); Trust scales (technology, overall ecosystem) | (Dobshynska, 2024; Voskobojnikov et al., 2021) (Al Reshaid et al., 2025) (Chohan, 2018; Johnson, 2024) |

## 4. OBJECTIVES

To identify the dimensions of service quality most relevant to Indian users of cryptocurrency apps.

To extract and analyze key themes from user reviews via text mining.

To validate findings through a structured SERVQUAL-based survey.

## 5. METHODOLOGY

The study used the following two methods:

Text mining of 1,000 app reviews from the Play Store and App Store for apps such as WazirX, Binance, CoinDCX, and ZebPay. Tools like Python, NLTK (Natural language tool kit), VADER (Valence aware dictionary and sentiment reasoner), and Gensim were used for pre-processing, tokenization, sentiment analysis, and topic modeling.

A SERVQUAL survey of 200 users using a 22-item questionnaire on a 5-point Likert scale. Data analysis included reliability analysis, descriptive statistics, exploratory factor, and regression using SPSS.

## 6. DATA PRESENTATION AND ANALYSIS

This section presents and interprets results from two data sources

Text mining**:** 1000 reviews from Google Play Store and Apple App Store.

A quantitative survey of 200 Indian cryptocurrency app users based on the SERVQUAL model.

Text Mining Analysis (N = 1000 Reviews) Data Cleaning and Preprocessing

Tools used: **Python**, **NLTK**, **VADER**, **Gensim**, **Scikit-learn**

Adopted steps:

Removal of emojis, stop words, and special characters

Lemmatization and tokenization

Removal of duplicates and conversion to lowercase

Resulting corpus: 8200 unique tokens across 1000 reviews

Word Frequency Analysis

**The most frequently mentioned terms reflect user experience themes.**

| Term | Frequency | Associated SERVQUAL Dimension |
|---|---|---|
| **"support"** | 268 | Responsiveness |
| **"crash"** | 221 | Reliability |
| **"secure"** | 198 | Assurance |
| **"fees"** | 183 | Assurance / Transparency |
| **"interface"** | 170 | Tangibles |
| **"delay"** | 153 | Responsiveness / Reliability |

**Visual 1: Word Cloud**

A word cloud was generated to visually highlight frequently appearing keywords. Larger fonts represented higher word frequencies.

Sentiment Analysis (VADER)

**Positive reviews**: 412 (41.2%)

**Neutral reviews**: 274 (27.4%)

**Negative reviews**: 314 (31.4%)

Visual 2: Pie Chart of Sentiment Distribution

The overall sentiment score was **slightly positive (compound score = 0.12)**, indicating mixed experiences, with concerns around support and app reliability.

Topic Modeling (LDA)

Topic modeling using **Latent Dirichlet Allocation (LDA)** uncovered four major themes.

| Topic No. | Keywords | Interpretation |
|---|---|---|
| 1 | support, help, response, delay | Poor customer support (Responsiveness) |
| 2 | crash, freeze, bug, slow | Technical issues (Reliability) |
| 3 | safe, secure, verify, KYC | Security & verification (Assurance) |
| 4 | clean, design, layout, easy | User interface (Tangibles) |

**Visual 3: Topic Distribution Bar Chart**

**Top Keywords**: support, crash, secure, fees, interface

Sentiment Distribution:

Positive: 41.2%

Neutral: 27.4%

Negative: 31.4%

**Topic Modeling (LDA)** revealed 4 themes:

Customer support delays

Technical glitches and crashes

Trust and verification (KYC)

Clean UI/UX

SERVQUAL Survey Analysis (N = 200) Demographics

| Variable | Category | Frequency |
|---|---|---|
| **Gender** | Male | 138 |
| | Female | 62 |
| **Age** | 18–25 | 102 |
| | 26–35 | 72 |
| | 36+ | 26 |
| **App Most Used** | WazirX | 68 |
| | CoinDCX | 54 |
| | Binance India | 44 |
| | ZebPay / Others | 34 |

**SERVQUAL Survey (N = 200)**

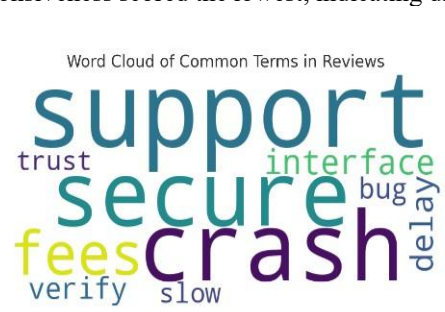
| Dimension | Mean Score | SD | Reliability (Cronbach's Alpha) |
|---|---|---|---|
| **Reliability** | 3.56 | 0.74 | 0.81 |
| **Assurance** | 3.77 | 0.67 | 0.85 |
| **Tangibles** | 4.02 | 0.61 | 0.79 |
| **Empathy** | 3.42 | 0.88 | 0.76 |
| **Responsiveness** | 3.18 | 0.93 | 0.83 |

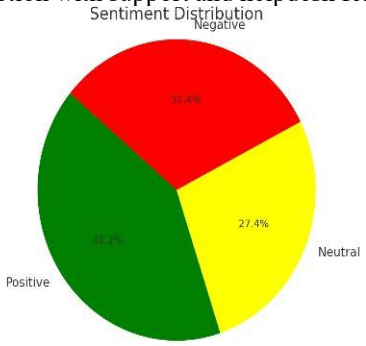
**Visual 4: SERVQUAL Dimension Bar Chart**

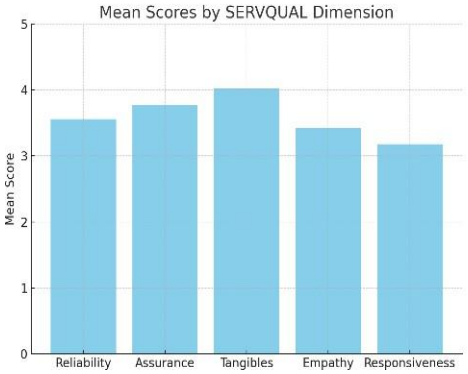
Interpretation:

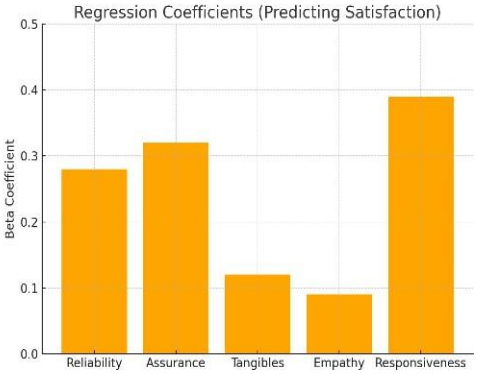
Tangibles received the highest average score, suggesting users appreciate app design and interface.

Responsiveness scored the lowest, indicating dissatisfaction with support and helpdesk features.




Exploratory Factor Analysis (EFA)

Method: Principal Component Analysis with Varimax Rotation

KMO = 0.86; Bartlett's Test of Sphericity = $p < 0.001$

Five factors extracted with Eigenvalues > 1, explaining **76.3%** of total variance

Each SERVQUAL dimension loaded cleanly onto a single factor (loadings > 0.6)

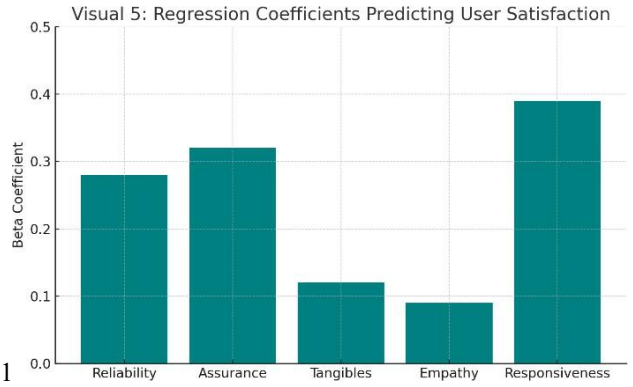
Regression Analysis (Predicting Satisfaction)

Dependent Variable: Overall Satisfaction Independent Variables: 5 SERVQUAL dimensions

| Predictor | Beta Coefficient | t-value | p-value |
|---|---|---|---|
| **Reliability** | 0.28 | 4.63 | <0.01 |
| **Assurance** | 0.32 | 5.17 | <0.01 |
| **Tangibles** | 0.12 | 1.92 | 0.06 |
| **Empathy** | 0.09 | 1.44 | 0.15 |
| **Responsiveness** | 0.39 | 6.22 | <0.01 |

Model Summary:

$R^2 = 0.67$




$F(5, 194) = 79.5, p < 0.001$

Regression Model Summary

**Dependent Variable**: Overall Satisfaction

**Model Fit**: $R^2 = 0.67$, $F = 79.5$, $p < 0.001$

Significant Predictors:

Responsiveness ($\beta = 0.39$, $p < 0.01$)

Assurance ($\beta = 0.32$, $p < 0.01$)

Reliability ($\beta = 0.28$, $p < 0.01$)

Non-Significant Predictors:

Tangibles ($\beta = 0.12$, $p = 0.06$)

Empathy ($\beta = 0.09$, $p = 0.15$)

Interpretation:

Responsiveness, assurance, and reliability are significant predictors of user satisfaction. Tangibles and empathy are appreciated but less impactful on satisfaction when other factors are accounted for.

**Summary**

| **Key Insight** | **Text Mining Evidence** | **Survey Evidence** |
|---|---|---|
| Slow customer service is a major pain point | Topic 1: "delay, help, support" | Responsiveness mean = 3.18 (lowest), β = 0.39 |
| Security and KYC create trust or distrust | Topic 3: "secure, verify, KYC" | Assurance mean = 3.77, β = 0.32 |
| UI and design matter but are not deal-breakers | Topic 4: "layout, easy, interface" | Tangibles mean = 4.02, β = 0.12 (ns) |
| App crashes frustrate users | Topic 2: "crash, freeze, bug" | Reliability mean = 3.56, β = 0.28 |

## 7. DISCUSSION

The study reveals three critical insights:

**Just aesthetic design won't be sufficient:** While users appreciate a clean UI, it doesn't compensate for technical issues or poor support. Tangibles alone cannot drive loyalty.

**Make-or-break the responsiveness:** Users demand immediate responses to support tickets and technical failures. Poor helpdesk integration and long verification delays are key causes of churn.

**Security and trust matter a lot:** In a trust-deficient space like crypto, assurance factors like secure protocols, strong KYC, etc. strongly predict satisfaction.

This reflects a shift in fintech service expectations, aligning more with banking-grade service norms rather than tech startup tolerance.

## 8. CONCLUSION

The integration of text mining and SERVQUAL survey provides a 360° view of user sentiment. Responsiveness, reliability, and assurance are vital drivers of satisfaction, and improvements here can significantly increase retention, trust, and app reputation. Tangibles and empathy, while valued, play a secondary role.

## 9. RECOMMENDATIONS

Enhance real-time system monitoring to reduce crashes and bugs.

Provide transparent and fast KYC verification systems.

Train teams to improve empathy, especially addressing complaints.

## 10. THEORETICAL AND PRACTICAL CONTRIBUTIONS

This research extends the SERVQUAL model into the cryptocurrency domain in a developing economy context. It also illustrates the power of hybrid methods—blending text analytics with statistical models—to extract real user insights. The findings are relevant for:

Fintech developers

Policymakers concerned with digital trust

Marketing and customer experience teams.

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