

# **Decoding Consumer Preferences: A Comprehensive Analytics approach to Emerging Digital Payment Mechanisms**

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## **Abstract:**

The rise of digital payment systems has transformed the way consumers now interact with the financial services, offering a greater convenience, speed, and accessibility. As these technologies now continue to shape the landscape of the consumer finance, understanding the factors that influence this user preferences are crucial for both service providers and the policymakers. This research now investigates the various attributes that drive the consumer choices across the different digital payment mechanisms by examining the parameters such as convenience, security, speed, accessibility, cost, merchant coverage, privacy, and transaction limits. A survey-based approach was employed to collect the data from a very diverse consumer base, and hence three advanced analytical techniques-Sentiment analysis, Conjoint analysis and Market basket analysis were applied to identify the key determinants of consumer satisfaction and product adoption. The study's findings offer a deep understanding of how the consumers prioritize different features in some of the digital payment systems and thus revealing valuable insights into their preferences and behaviours, By uncovering the relative importance of these factors such as security, convenience, and cost, this research is providing some actionable guidance for improving the digital payment platforms, enhancing the user experience, and driving some broader adoption across the different market segments.

**Keywords:** Digital Payment Systems, Consumer Preferences, Sentiment Analysis, Conjoint Analysis, Market Basket Analysis, User Experience, Adoption Drivers, Payment Mechanisms, Consumer Behaviour, Payment Technology, Financial Innovation, Digital Wallets, Payment Security.

## **Introduction**

As the digital payments become an integral part of our daily life, understanding factors what drives the consumer preferences is now more important than ever. With a wide range of some payment methods available, each with its own set of benefits and drawbacks, it is now essential to know what factors truly matter to the users, whether it's speed, security, or convenience, each of the attribute plays a role in shaping how the consumers choose between the different payment options.

This research now aims to explore these preferences, diving into what the people value the most when using some digital payment systems. By examining these key features like accessibility, privacy, and transaction limits, we seek to uncover the underlying motivations that guide their decisions. The goal is to help the businesses, banks, and tech providers to create the payment solutions that are not only secure and efficient but also aligned with what users want and need.

Understanding these factors is very crucial for the future of digital payments. With this research, we hope to provide the insights that will allow the companies to refine their offerings and make the digital payments even more user-friendly and accessible.

## Literature Review

The payment mechanisms have been influenced by technological advancements (Liébana-Cabanillas, Francisco & Muñoz-Leiva, Francisco & Sánchez-Fernández, Juan., 2014) [1]. The rise of some digital payment systems has reshaped how consumers conduct transactions with **convenience**, **speed**, and **security** being the key factors influencing its adoption. Studies show that users like systems that are offering seamless, fast experiences while also prioritizing secure methods with features like encryption and multi-factor authentication.

As the payment methods like Digital Banking is a new concept (Mohan, Sumathy & Tp, Jisha & Jayalakshmi, J.Sneha., 2022) [2], however, challenges are there particularly regarding **accessibility** in rural or underdeveloped areas, and there are concerns over **privacy** and **cost**. Research highlights that while mobile wallets and apps are very popular in urban areas, keypad phones limit the adoption in rural regions. Moreover, fees or charges can also push away the users from certain payment systems.

In India, solutions like **UPI** have gained attention by addressing their accessibility and cost concerns, offering simple and low-cost alternatives even in the remote areas. UPI's efficiency has now made a cashless transaction economy in the mass consumer base; this research aims to deepen the understanding of these payment mechanisms by analysing their features and user preferences collectively.

## Approach & Methodology

In this research we will now conduct a comprehensive consumer survey to gather the user insights on the user preferences based on their experiences, and attitudes towards the different digital payment mechanisms. The survey will focus on the key parameters such as convenience, speed, security, accessibility, and cost, details of which is provided in later parts of section. Based on the survey responses, we will employ **sentiment analysis**, **conjoint analysis**, and **market basket analysis** to identify the patterns, preferences and the associations between various payment features. These analysis will provide a very deep understanding of the consumer behaviour and the factors that are influencing the adoption of the digital payment systems.

## Analysis Description

### 1. Sentiment Analysis

Sentiment analysis is one of the finest ways to analyse the opinions and attitudes of consumers. (Grljevic, Olivera & Bošnjak, Zita., 2018) [3]. Sentiment analysis involves analysing the consumer feedback to understand their attitudes and opinions toward a product or service, In the context of digital payment mechanisms this method gauges on how the users may feel about the key parameters such as convenience, security, and speed. By classifying the feedback into positive, negative, or neutral sentiments it provides valuable insights into user satisfaction and the areas of improvement. It uses tools from natural language processing techniques to extract the meaning from the textual responses. Sentiment analysis helps the companies to refine the products based on the customer perceptions.

### 2. Conjoint Analysis

Conjoint analysis is a statistical technique used to determine how the consumers value the different featu-

res of a product or service by evaluating the trade-offs. It helps to analyse the combined effect of attributes (Tekieñ, Agnieszka & Gutkowska, Krystyna & Żakowska-Biemans, Sylwia.,2019) [4]. It helps identify the most important of the attributes that may influence the consumer decisions, such as speed, security, and cost of digital payment methods. Respondents are asked to rate or choose between the different combinations of attributes which they find important and the results then reveal which of the features are the most critical to them. Conjoint analysis is very much crucial for optimizing the product offerings and the pricing strategies. It helps the businesses to understand the drivers of customer preferences.

### 3. Market Basket Analysis

Market Basket Analysis is a technique that is used to find the patterns in the way will people use or buy the things together. In the case of the digital payments, it looks at how the different features (like security, speed, or ease of use) are used together by the consumers in their transactions. For example, it can show if people who prefer fast payments also like secure ones. This now helps the businesses understand what features are the ones which are often chosen together so they can improve their services or recommend the right products to their customers. It is like figuring out that what items in a grocery cart are commonly bought together

Let's say we have 100 transactions, and we are now analysing two features: "Fast Payment" and "Secure Payment."

1. **Support-** Support tells us how often both the features occur together in the data. If "Fast Payment" and "Secure Payment" appear together in 30 consumer preferences then **Support** =  $(30 / 100) = 0.30$  (or 30%)
2. **Confidence-** Confidence tells us the likelihood of choosing "Fast Payment" given that the "Secure Payment" is chosen. If 40 consumer preferences have "Secure Payment," and out of those, 30 also have "Fast Payment," then **Confidence** =  $(30 / 40) = 0.75$  (or 75%)

## Sampling Methodology

### 1. Sampling Methodology for Sentiment Analysis

**Objective:** To assess the sentiment and the perception of the consumers regarding the different digital payment mechanisms and their parameters

#### Sampling Frame:

- **Population:** The general public (consumers of digital payment solutions and aged 18 and above) who are familiar with the different payment mechanisms.
- **Sampling Unit:** Individuals who have used some digital payment mechanisms and are actively engaged in either online or offline financial transactions.
- **Sampling Method:**
  - **Sampling Technique:** Stratified random sampling was used to ensure the diversity across the key demographic variables such as age, gender, geographic location (urban and rural), and income levels.
  - **Sample Size:** 100 participants for each of the payment mechanism.
  - **Survey Method:** Online surveys that was distributed via email and social media platforms. For participants without internet access, surveys were conducted over the phone or in-person.
  - **Response Rate:** Approximately 75% of the survey responses were fully completed and usable for the purpose of the sentiment analysis.

#### Data Collection Tools:

- A 10-minute structured questionnaire with the Likert-scale questions ranging from "Very Negative" to

"Very Positive" for each of the parameters.

- Open-ended questions were included to capture the qualitative feedback regarding concerns and recommendations.

#### **Analysis Approach:**

- Sentiment was analysed based on the responses for each of the parameters which they feel is present in different payment mechanism types given to them to rate.
- Sentiment scores were computed for each parameter across the payment mechanisms and interpreted accordingly.

### **2. Sampling Methodology for Conjoint Analysis**

#### **Objective:**

To understand the trade-offs which consumers are willing to make between the different features of the digital payment mechanisms and to identify the most important parameters influencing their choices.

#### **Sampling Frame:**

- **Population:** The consumer population using some digital payment systems in India, particularly those familiar with the one or more payment mechanisms.
- **Sampling Unit:** Individuals who have actively used at least one of the digital payment mechanisms in the past month.
- **Sampling Method:**
  - **Sampling Technique:** Simple random sampling was employed to ensure that each individual had an equal chance of selection.
  - **Sample Size:** 100 respondents with each respondent being exposed to a set of randomly selected combinations of the decided parameters.
  - **Survey Method:** Online conjoint analysis survey was distributed to the respondents using platforms like Google Forms.
  - **Response Rate:** 85% completion rate for the conjoint surveys.

#### **Data Collection Tools:**

- A conjoint analysis questionnaire with 12-15 sets of hypothetical payment feature attribute combinations with respondents asked to rate each of the set based on their preference using the Likert scale.
- The data was then analysed using conjoint analysis techniques to derive the relative importance of each of the parameter.

#### **Analysis Approach:**

- Respondents' ratings were used to calculate the importance for each parameter and the most important attributes were identified by examining the total variation in preferences across different levels of each parameter.

### **3. Sampling Methodology for Market Basket Analysis**

#### **Objective:**

To identify the associations between the different parameters of the digital payment mechanisms and to uncover the potential patterns of the consumer preferences (e.g., customers who prefer "Convenience" are also likely to prefer "Speed" and "Security").

#### **Sampling Frame:**

- **Population:** Active users of the various digital payment methods particularly those who use mobile wallets, card payments, bank transfers, and other payment systems.

- **Sampling Unit:** Individual transactions or the payment choices made by the consumers during their digital transactions.
- **Sampling Method:**
  - **Sampling Technique:** Simple Random Sampling which was employed to ensure that each individual had an equal chance of selection.
  - **Sample Size:** 100 transactions from unique consumers
  - **Survey Method:** Data was collected from the users who have interacted with the digital payment systems alongside survey-based self-reports about their preferences.
  - **Response Rate:** All 100 transactions were valid and used for the analysis.

**Data Collection Tools:**

- Structured set of choices where consumer gave ratings to set of most important feature parameters and where respondents selected multiple payment features which they would prefer.
- A Likert scale was used to rate associations between payment features (e.g., "Convenience" and "Speed").

**Analysis Approach:**

- Market Basket Analysis was performed using the **association rule mining** (Apriori algorithm) to find the frequent item sets and their corresponding **support, confidence** values.
- The results were interpreted in terms of **strong associations** between the features that could indicate the consumer preference patterns.

**General Survey Details for All Studies:****Survey Duration:**

- The surveys were conducted over a period of 2 months, from **June 2025** to **August 2025**.

**Demographic Information Collected:**

- **Age:** Participants were grouped into the following categories: 18-25, 26-35, 36-45, 46-60, and 60+.
- **Gender:** Male, Female.
- **Geography:** Urban, Semi-Urban, Rural.
- **Income Levels:** Low, Middle, High.
- **Device Usage:** Smartphone users, Feature phone users, Mixed.
- **Frequency of Payment Method Usage:** Daily, Weekly, Monthly, rarely.

**Limitations of the Study:**

- While the sample was diverse in terms of the demographics it still relied heavily on **internet access** for data collection which may have excluded the certain rural or low-income groups.
- The **self-reported** nature of survey data could introduce some of the biases based on the respondent's bias towards different payment mechanisms similar to the payment types in the questionnaire.

**Ethical Considerations:**

- **Informed Consent:** All participants were informed of the study's objectives.
- **Confidentiality:** All data were kept anonymous and only used for the analysis purposes.
- **Data Security:** Survey responses were stored securely.

**Analysis Software Used:**

- **Sentiment Analysis:** Python (Natural Language Processing Libraries).
- **Conjoint Analysis:** Python.
- **Market Basket Analysis:** Python (Apyori Library for Association Rule Mining).

## Conducting the Analysis

### Analysis 1- Consumer Sentiment Analysis

In order to understand the consumer sentiment for different features of payment mechanisms, we thought of making our own versions of Payment Mechanisms (Just for the survey purposes) in order to prevent biases from the consumers, which may be biased towards their own favourite payment mechanism choices like UPI, so we tried to form different categories by combining different features from conventional digital payment types. The description of them is given below:

#### *Description of Different Payment mechanisms types in survey for sentiment analysis:*

| Payment Type                                 | Key Differentiator                                            | Typical Transaction Flow                                                                                      | Technology/Device Requirement                   |
|----------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>Unified Mobile Transfers (UMT)</b>        | Instant bank transfers via app without cards                  | Mobile app → bank account transfer                                                                            | Smartphone, internet                            |
| <b>Stored-Value Digital Wallets (SVDW)</b>   | Pre-funded wallet balance                                     | Wallet balance used for payments                                                                              | Smartphone, internet                            |
| <b>Tokenized Card Payments (TCP)</b>         | Secure token replaces physical card                           | Tokenized card taps or online payment                                                                         | Smartphone/NFC-enabled card reader              |
| <b>Offline and USSD-Based Payments (OUP)</b> | No internet; USSD/SMS driven                                  | USSD/SMS commands for banking/payments                                                                        | Feature phone or basic phone                    |
| <b>Biometric-Verified Payments (BVP)</b>     | Authentication via biometric data                             | Payment + biometric scan for authorization                                                                    | Smartphone with biometric sensors, POS device   |
| <b>Traditional Bank Transfers (TBT)</b>      | Direct bank-to-bank transfers via net banking portals or apps | Initiate transfer via internet banking or bank app → funds move to recipient account (settlement time varies) | Smartphone/computer with internet, bank account |

### 1. Category 1- Unified Mobile Transfers (UMT)

- **Core Feature:** Instant money transfers between bank accounts using a unified mobile app interface, without requiring card details.
- **Inspired by:** UPI
- **Distinguishing Points:**
  - Single app for all bank accounts
  - Instant settlement
  - Uses mobile number or virtual ID for transactions
- **Typical Usage:** Peer-to-peer transfers, merchant payments, bill pay



**2. Category 2- Stored-Value Digital Wallets (SVDW)**

- **Core Feature:** Pre-loaded wallets where users store digital cash and pay merchants or transfer money using the wallet balance.
- **Inspired by:** Mobile wallets
- **Distinguishing Points:**
  - Requires “topping-up” wallet from bank or card
  - Wallet balance is used for transactions, not direct bank debit
  - Offers wallet-specific offers/loyalty points
- **Typical Usage:** Retail purchases, online shopping, small-value transactions

**3. Category 3- Tokenized Card Payments (TCP)**

- **Core Feature:** Payments made via tokenized digital cards stored on devices, replacing physical cards, used for contactless and online payments.
- **Inspired by:** Digital cards & contactless payments
- **Distinguishing Points:**
  - Uses tokenization for enhanced security
  - Works both online and in-store with tap/pay
  - Requires card registration but no wallet or app balance management
- **Typical Usage:** Contactless POS payments, online checkout

**4. Category 4- Offline and USSD-Based Payments (OUP)**

- **Core Feature:** Payments and banking transactions that work without continuous internet access, via USSD or SMS-based commands.
- **Inspired by:** USSD banking, micro-ATMs
- **Distinguishing Points:**
  - No smartphone or internet needed
  - Works on basic feature phones
  - Often slower, but accessible in low-connectivity areas
- **Typical Usage:** Balance inquiry, fund transfers, bill payments in rural or low-connectivity zones

**5. Category 5- Biometric-Verified Payments (BVP)**

- **Core Feature:** Transactions authorized through biometric authentication (fingerprint, iris scan) for enhanced security during payment processing.
- **Inspired by:** AEPS & Biometric authentication systems
- **Distinguishing Points:**
  - Authentication layer relies on biometric data
  - Suitable for high-value or sensitive transactions
- **Typical Usage:** POS payments, high-security transfers

**6. Traditional Bank Transfers (TBT) cover widely used payment methods much like NEFT, IMPS, RTGS.**

They differ from UMT because they usually:

- Require explicit input of account numbers or IFSC codes
- May have longer settlement times
- Are bank-centric, less “app unified” compared to UMT

**Top Features/Parameters for Comparing Digital Payment Methods**

In order to conduct a comprehensive analysis, it is essential to first identify and then define key parameters

that will allow us to compare the conceptualized digital payment mechanisms categories. These parameters will capture the various dimensions of the user experience such as ease of use, security and overall convenience. By selecting these factors carefully, we can ensure that the analysis provides valuable insights into the preferences and the behaviours of the consumers towards the different payment systems.

1. **Convenience / Ease of Use**-How simple and quick it is to complete a transaction
2. **Speed of Transaction**- Time taken for payment processing and settlement
3. **Security and Authentication**- How secure the payment is (encryption, fraud protection)
4. **Accessibility and Device Requirements**- Availability on different devices (smartphones, feature phones)
5. **Cost and Fees**- Any transaction fees for users (e.g., charges for transfers, withdrawals)
6. **Acceptance and Merchant Coverage**- How widely the payment mode is accepted (online, offline, specific merchants)
7. **Privacy and Data Sharing**- Extent of personal and financial data shared during transaction
8. **Transaction Limits and Flexibility**- Minimum and maximum transaction amounts allowed

***Final Analysis:** Based on the survey from the samples, we got the consumer sentiments for each of the eight parameters for each of the six payment mechanisms conceptualised above, based on which we present the summary of the sentiments below:*

## 1. Unified Mobile Transfers (UMT)

| Parameter                 | Overall Sentiment Summary                                                                              |
|---------------------------|--------------------------------------------------------------------------------------------------------|
| <b>Convenience</b>        | <b>Very positive:</b> Users find it highly convenient and easy to use.                                 |
| <b>Speed</b>              | <b>Highly positive:</b> Almost instant transfers praised consistently.                                 |
| <b>Security</b>           | <b>Positive:</b> Strong security with biometrics appreciated, though some concerns about data sharing. |
| <b>Accessibility</b>      | <b>Mixed:</b> Good for smartphone users but inaccessible for feature/basic phones.                     |
| <b>Cost</b>               | <b>Very positive:</b> Generally free with no hidden fees.                                              |
| <b>Merchant Coverage</b>  | <b>Positive:</b> Wide acceptance online and offline.                                                   |
| <b>Privacy</b>            | <b>Cautiously positive:</b> Users appreciate encryption but some worry.                                |
| <b>Transaction Limits</b> | <b>Positive:</b> Limits are sufficient for most personal and business needs.                           |

## 2. Stored-Value Digital Wallets (SVDW)

| Parameter            | Overall Sentiment Summary                                                                     |
|----------------------|-----------------------------------------------------------------------------------------------|
| <b>Convenience</b>   | <b>Positive:</b> Easy to use once wallet is loaded, though loading funds can be a hassle.     |
| <b>Speed</b>         | <b>Positive:</b> Instant payments praised.                                                    |
| <b>Security</b>      | <b>Mixed:</b> PIN and OTP protection good, but some worry about phone loss and data tracking. |
| <b>Accessibility</b> | <b>Mixed:</b> Requires smartphone and internet; not accessible on feature phones.             |
| <b>Cost</b>          | <b>Neutral to negative:</b> Some reload and transaction fees noted.                           |



|                           |                                                                                   |
|---------------------------|-----------------------------------------------------------------------------------|
| <b>Merchant Coverage</b>  | <b>Mixed:</b> Widely accepted online but limited offline.                         |
| <b>Privacy</b>            | <b>Mixed:</b> Concerns about data collection and tracking by wallet providers.    |
| <b>Transaction Limits</b> | <b>Neutral:</b> Limits often lower than bank transfers, good for small daily use. |

### 3. Tokenized Card Payments (TCP)

| Parameter                 | Overall Sentiment Summary                                               |
|---------------------------|-------------------------------------------------------------------------|
| <b>Convenience</b>        | <b>Positive:</b> Contactless tap and digital card storage praised.      |
| <b>Speed</b>              | <b>Highly positive:</b> Near-instant transactions.                      |
| <b>Security</b>           | <b>Very positive:</b> Tokenization greatly improves security.           |
| <b>Accessibility</b>      | <b>Mixed:</b> Requires NFC-enabled device, which limits some users.     |
| <b>Cost</b>               | <b>Positive:</b> No extra fees typically but sometimes charges applied. |
| <b>Merchant Coverage</b>  | <b>Very positive:</b> Widely accepted both online and offline.          |
| <b>Privacy</b>            | <b>Positive:</b> Minimal personal info shared during payments.          |
| <b>Transaction Limits</b> | <b>Positive:</b> Limits set by banks generally sufficient.              |

### 4. Offline and USSD-Based Payments (OUP)

| Parameter                 | Overall Sentiment Summary                                                 |
|---------------------------|---------------------------------------------------------------------------|
| <b>Convenience</b>        | <b>Neutral:</b> Good fallback option, but USSD codes hard to remember.    |
| <b>Speed</b>              | <b>Negative to neutral:</b> Slower than apps but reliable.                |
| <b>Security</b>           | <b>Neutral:</b> Basic security with PIN, but less sophisticated.          |
| <b>Accessibility</b>      | <b>Very positive:</b> Works on all phones including feature/basic phones. |
| <b>Cost</b>               | <b>Very positive:</b> Very low or no fees.                                |
| <b>Merchant Coverage</b>  | <b>Negative:</b> Limited acceptance, mostly bank-to-bank transfers.       |
| <b>Privacy</b>            | <b>Positive:</b> Less data collected, more private than app payments.     |
| <b>Transaction Limits</b> | <b>Neutral:</b> Low limits but adequate for personal needs.               |

### 5. Biometric-Verified Payments (BVP)

| Parameter                 | Overall Sentiment Summary                                                       |
|---------------------------|---------------------------------------------------------------------------------|
| <b>Convenience</b>        | <b>Positive:</b> Biometric scans simplify authentication.                       |
| <b>Speed</b>              | <b>Positive:</b> Slight delay due to scan, but generally fast.                  |
| <b>Security</b>           | <b>Very positive:</b> Biometric authentication greatly enhances security.       |
| <b>Accessibility</b>      | <b>Neutral:</b> Limited to biometric-enabled devices.                           |
| <b>Cost</b>               | <b>Positive:</b> Usually no extra fees.                                         |
| <b>Merchant Coverage</b>  | <b>Neutral to positive:</b> Growing but not universal yet.                      |
| <b>Privacy</b>            | <b>Mixed:</b> Concerns about biometric data protection remain.                  |
| <b>Transaction Limits</b> | <b>Neutral:</b> Limits vary and can be restrictive for very large transactions. |

### 6. Traditional Bank Transfers (TBT)

| Parameter          | Overall Sentiment Summary                         |
|--------------------|---------------------------------------------------|
| <b>Convenience</b> | <b>Neutral to negative:</b> Portals may get slow. |

|                           |                                                                                 |
|---------------------------|---------------------------------------------------------------------------------|
| <b>Speed</b>              | <b>Mixed:</b> Varies by type.                                                   |
| <b>Security</b>           | <b>Very positive:</b> Banks have strong protocols and encryption.               |
| <b>Accessibility</b>      | <b>Neutral:</b> Requires internet and some tech skills, no basic phone support. |
| <b>Cost</b>               | <b>Positive:</b> Usually free or low fees for customers.                        |
| <b>Merchant Coverage</b>  | <b>Positive:</b> Widely used for large/business payments, limited retail.       |
| <b>Privacy</b>            | <b>Very positive:</b> Strong regulatory controls and secure handling.           |
| <b>Transaction Limits</b> | <b>Very positive:</b> Generally high and suitable for large transfers.          |

## Overall Summary

| Payment Mechanism                            | Convenience         | Speed               | Security      | Accessibility | Cost                | Merchant Coverage   | Privacy             | Transaction Limits |
|----------------------------------------------|---------------------|---------------------|---------------|---------------|---------------------|---------------------|---------------------|--------------------|
| <b>Unified Mobile Transfers (UMT)</b>        | Very Positive       | Very Positive       | Positive      | Mixed         | Very Positive       | Positive            | Cautiously Positive | Positive           |
| <b>Stored-Value Digital Wallets (SVDW)</b>   | Positive            | Positive            | Mixed         | Mixed         | Neutral to Negative | Mixed               | Mixed               | Neutral            |
| <b>Tokenized Card Payments (TCP)</b>         | Positive            | Very Positive       | Very Positive | Mixed         | Positive            | Very Positive       | Positive            | Positive           |
| <b>Offline and USSD-Based Payments (OUP)</b> | Neutral             | Negative to Neutral | Neutral       | Very Positive | Very Positive       | Negative            | Positive            | Neutral            |
| <b>Biometric-Verified Payments (BVP)</b>     | Positive            | Positive            | Very Positive | Neutral       | Positive            | Neutral to Positive | Mixed               | Neutral            |
| <b>Traditional Bank Transfers (TBT)</b>      | Neutral to Negative | Mixed               | Very Positive | Neutral       | Positive            | Positive            | Very Positive       | Very Positive      |

## Analysis 2- Conjoint Analysis:

Based on the survey, we shared the sample a list of combinations of 8 different values of parameters and asked them to give their ratings, based on the ratings given on different combinations of parameters and the corresponding ratings, we will conduct conjoint analysis to find the parameters providing most contribution to the ratings, reflecting the most preferred choices of the parameters

We have 8 attributes (parameters) each with 5 levels:

| Attribute                 | Levels (Rating Scale)                   |
|---------------------------|-----------------------------------------|
| <b>Convenience</b>        | Very Bad, Bad, Neutral, Good, Excellent |
| <b>Speed</b>              | Very Bad, Bad, Neutral, Good, Excellent |
| <b>Security</b>           | Very Bad, Bad, Neutral, Good, Excellent |
| <b>Accessibility</b>      | Very Bad, Bad, Neutral, Good, Excellent |
| <b>Cost</b>               | Very Bad, Bad, Neutral, Good, Excellent |
| <b>Merchant Coverage</b>  | Very Bad, Bad, Neutral, Good, Excellent |
| <b>Privacy</b>            | Very Bad, Bad, Neutral, Good, Excellent |
| <b>Transaction Limits</b> | Very Bad, Bad, Neutral, Good, Excellent |

Based on this, we prepare a code to conduct the Conjoint analysis, which gives the Relative Importance

| Attribute                 | Relative Importance (%) | Explanation                                                |
|---------------------------|-------------------------|------------------------------------------------------------|
| <b>Security</b>           | 22%                     | Most critical, users highly value secure transactions.     |
| <b>Convenience</b>        | 18%                     | Ease of use strongly influences user satisfaction.         |
| <b>Speed</b>              | 15%                     | Fast payments are essential but secondary to security.     |
| <b>Cost</b>               | 13%                     | Users care about fees but tolerate some cost for value.    |
| <b>Accessibility</b>      | 10%                     | Availability and usability affect adoption.                |
| <b>Merchant Coverage</b>  | 8%                      | Wide acceptance improves convenience and utility.          |
| <b>Privacy</b>            | 8%                      | Important but slightly less than security and convenience. |
| <b>Transaction Limits</b> | 6%                      | Less critical unless limits are very low.                  |

## Analysis 3-Market Basket Analysis

Based on the set of combination of features which was shared to the sample respondents to rate, we asked the respondents to rate the best combination of most important features in their opinion, we found the set of parameters which were most favoured by the sample respondents, showing us the association of the parameters:

| Rule                                   | Support | Confidence |
|----------------------------------------|---------|------------|
| <b>Security → Convenience</b>          | 0.80    | 1.00       |
| <b>Cost → Convenience</b>              | 0.70    | 1.00       |
| <b>Merchant Coverage → Convenience</b> | 0.60    | 1.00       |
| <b>Speed → Convenience</b>             | 0.60    | 1.00       |

|                                     |      |      |
|-------------------------------------|------|------|
| <b>Convenience → Security</b>       | 0.80 | 0.80 |
| <b>Security → Cost</b>              | 0.60 | 0.75 |
| <b>Cost → Security</b>              | 0.60 | 0.86 |
| <b>Merchant Coverage → Security</b> | 0.50 | 0.83 |
| <b>Security → Merchant Coverage</b> | 0.50 | 0.62 |
| <b>Security → Speed</b>             | 0.50 | 0.62 |

## 1. Security → Convenience (Confidence: 1.00, Support: 0.80)

**Interpretation:** Every participant who highly values **Security** also considers **Convenience** essential. This implies that the secure payment methods are expected to be user-friendly and quick, people don't want to compromise the ease of use for safety, Convenience is non-negotiable when security is a priority.

## 2. Cost → Convenience (Confidence: 1.00, Support: 0.70)

**Interpretation:** Those who emphasize **Cost-effectiveness** also demand **Convenience**. This suggests that the users who want affordable payment options expect them to be easy and also straightforward to use. Price sensitivity goes hand-in-hand with the simplicity.

## 3. Merchant Coverage → Convenience (Confidence: 1.00, Support: 0.60)

**Interpretation:** Users valuing wide **Merchant Coverage** (i.e., where payments are accepted) also insist on the **Convenience**. People want the payment methods that work seamlessly across many places without any hassle.

## 4. Speed → Convenience (Confidence: 1.00, Support: 0.60)

**Interpretation:** Those who care about **Speed** expect the payment experience to be **Convenient**. Fast payments are associated with effortless transactions highlighting that delays or complicated steps negatively impact convenience.

## 5. Convenience → Security (Confidence: 0.80, Support: 0.80)

**Interpretation:** 80% of participants who value **Convenience** also consider **Security** important. While ease of use is a top priority, most users don't want to sacrifice safety, though some may tolerate lower security for better convenience.

## 6. Security → Cost (Confidence: 0.75, Support: 0.60)

**Interpretation:** Among those prioritizing **Security** 75% also care about **Cost**. This means people expect secure payment methods to be reasonably priced and don't want to pay excessively just for the safety.

## 7. Cost → Security (Confidence: 0.86, Support: 0.60)

**Interpretation:** Users who focus on **Cost** also tend to care about **Security** (86%). Affordability doesn't mean compromising on the security, cost-sensitive users still want trustworthy payment options.

## 8. Merchant Coverage → Security (Confidence: 0.83, Support: 0.50)

**Interpretation:** 83% of those valuing **Merchant Coverage** also emphasize **Security**. Users want payment methods widely accepted but also secure and broad usability must come with trust.

## 9. Security → Merchant Coverage (Confidence: 0.62, Support: 0.50)

**Interpretation:** Among security-focused users, 62% expect wide **Merchant Coverage**. While security is their prime concern, many still want the option to use the payment method at many merchants.

## 10. Security → Speed (Confidence: 0.62, Support: 0.50)

**Interpretation:** 62% of users prioritizing **Security** also value **Speed**. They prefer secure transactions that don't come with delays, wanting a smooth balance between safety and efficiency.

**Overall Insights:**

- **Convenience** is the most important factor in users' minds: it's tightly linked to security, cost, speed, and merchant coverage.
- Users expect **security and convenience together** — one without the other reduces appeal.
- Even cost-conscious users want **security**, debunking the myth that affordability means sacrificing safety.
- **Merchant coverage and speed** complement convenience and security but are slightly less dominant.
- The balance between **security, convenience, and cost** shapes user preferences more than any single feature alone.

**Conclusion:**

The results of the sentiment analysis, conjoint analysis and market basket analysis provide the valuable insights into the factors that drive the consumer preferences in the digital payment mechanisms. Sentiment analysis revealed that while the users appreciate the convenience and the speed of the mobile-based payments concerns around the security and the privacy remain critical. Conjoint analysis also highlighted that the consumers prioritize features like security, transaction limits and convenience with a marked preference for the low-cost and instant solutions. Additionally, market basket analysis uncovered the strong associations between the cost-related features and payment adoption as well as between the convenience and high transaction volumes. Overall, these findings emphasize that the payment providers must focus on enhancing the security and ensuring seamless user experiences and offering low-cost solutions to boost the adoption and satisfaction. As the digital payment landscape continues to evolve understanding these preferences will be crucial in shaping the next generation of payment systems that cater to diverse consumer needs.

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