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Project Report

Assessment of Debit and Credit Card Usage in the Indian
Banking Industry: A Comprehensive Dashboard for
HDFC Bank

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Abstract

Within the dynamic landscape of the Indian banking industry, marked by continual growth and transformation, HDFC Bank, positioned among the top banks in the nation, is committed to upholding its leadership role through strategic decision-making and data-driven initiatives. Recognizing the challenges posed by a fiercely competitive market, the bank has identified the necessity for a robust card usage dashboard. This comprehensive tool is designed to track vital performance indicators, allowing HDFC Bank to assess its position relative to the broader banking sector. The dashboard serves as a benchmarking tool, facilitating an in-depth analysis of customer behaviour and contributing to enhanced customer satisfaction. The project spans from the initial stages of web scraping with Selenium to meticulous data preparation in Excel, culminating in the creation of an interactive and insightful dashboard using Power BI. This subsequent report delivers a thorough examination of the dashboard, revealing key insights and actionable recommendations. These insights will empower HDFC Bank to navigate a course toward sustained success and excellence within India's dynamic banking sector.

Data Collection and Preparation

Data Collection:

To kickstart the project, we employed web scraping techniques with Selenium to gather essential data from the Reserve Bank of India (RBI) website. Selenium, a potent automation tool, facilitated interaction with web pages and systematic data extraction. The RBI website proved to be a valuable source, offering comprehensive insights into various banking and financial metrics, including debit and credit card usage across different banks. The web scraping process unfolded through distinct steps:

1. Accessing RBI Website:

- Directing the web scraping effort to the specific page dedicated to debit and credit card usage data (<https://www.rbi.org.in/Scripts/ATMView.aspx>).

2. Automation with Selenium:

- Leveraging Selenium to automate the web browser, enabling seamless navigation to the targeted page and systematic extraction of the desired data.

3. **Python Scripting:**

- Employing the Python programming language, our web scraping script meticulously collected data for each month within the timeframe spanning April 2022 to March 2023.

4. **Data Organization and Storage:**

- Structuring the extracted data in tabular format and proficiently saving it in Excel files. This organized data set serves as the foundation for subsequent in-depth analyses.

This meticulous data collection process ensures a robust foundation for our analysis, enabling us to delve into meaningful insights derived from the rich repository of information provided by the RBI.

Data Preparation:

Following the acquisition of data through web scraping, the subsequent imperative phase involved meticulous data preparation within the Excel environment. The raw data underwent a comprehensive cleaning and transformation process to render it conducive to thorough analysis and visualization. Key data preparation steps encompassed:

- **Stripping Irrelevant Data:**

- A focused approach was adopted, with a discerning eye towards credit and debit card data exclusively. Extraneous data, such as information pertaining to prepaid cards, was systematically eliminated from the dataset to refine its relevance.

- **Unmerging Cells:**

- Recognizing the hindrance posed by merged cells in the raw data, an unmerging process was executed. This meticulous step aimed at enhancing the usability of the data for subsequent analysis and visualization, ensuring data integrity and accuracy.

- **Aggregating Transaction Values:**

- For each bank, a judicious aggregation of transaction values transpired across distinct transaction modes (Point of Sale, Online, and Others). This facilitated the derivation of the total spending in Indian Rupees (₹) for each month. Notably, "Cash Withdrawal" data was excluded from the analysis, as it was deemed inconsequential to the assessment of the bank's card usage performance.

- **Categorizing Banks:**
 - The raw data initially presented bank names grouped by bank type (Public, Private, and Foreign). A systematic categorization ensued, omitting entries corresponding to "Payment" and "Small Finance" banks to streamline the dataset.
- **Deleting Empty Rows and Columns:**
 - Upholding the commitment to a clean and structured dataset, all empty rows or columns devoid of meaningful information were expeditiously removed. This stringent process further contributed to ensuring the dataset's clarity and coherence.

This meticulous data preparation regimen lays the groundwork for a robust analytical framework, positioning the dataset for nuanced exploration and interpretation in subsequent phases of the project.

Dashboard Overview

This comprehensive dashboard was meticulously crafted to provide insightful monitoring of credit card and debit card usage trends across India. It specifically addresses the imperative for HDFC Bank to gain a transparent understanding of its industry performance in comparison to other prominent banks. The dashboard's focal points include key performance indicators (KPIs) critical to assessing overall industry dynamics:

- **Number of Cards Issued**
- **Transactions**
- **Spending**
- **Spend per Card**
- **Average Transaction Size**

A detailed visualization of market share was curated based on transaction volume, cards issued, and spending metrics. The dashboard further presents both overall and month-wise data for the KPIs, market share, and highlights the top-performing banks. This nuanced analysis is made possible through the application of various filters, including card type (Credit/Debit), bank, and month.

To meet these objectives, data spanning April 2022 to March 2023 was meticulously collected from the RBI website utilizing web scraping techniques. The acquired data underwent thorough cleaning and merging processes. Utilizing this refined dataset, the dashboard unfolds across three distinct aspects:

1. **HDFC Bank's Performance vs. Other Banks:**

- An insightful comparison delineates HDFC Bank's performance against its industry peers, offering a comprehensive view of its standing in the market.

2. **KPI Trends:**

- The dashboard illuminates trends in key performance indicators, providing a dynamic perspective on the industry's health and potential areas for improvement.

3. **Top Banks based on Trends:**

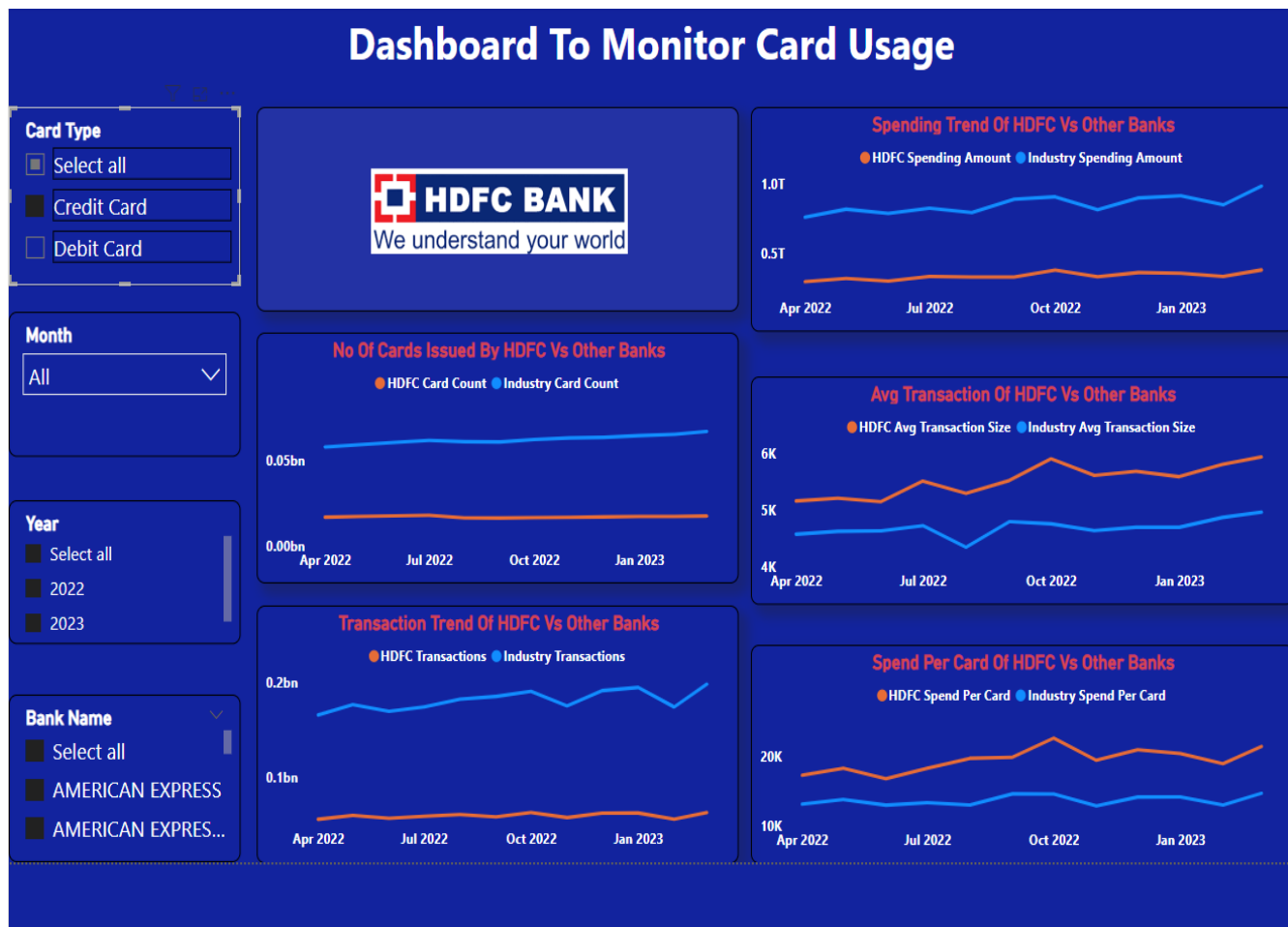
- A focused presentation of top-performing banks emerges, showcasing their performance trajectories and contributing to a nuanced understanding of industry dynamics.

This section delves into the intricacies of the Power BI dashboard meticulously designed for the comprehensive monitoring and evaluation of debit and credit card usage at HDFC Bank within the expansive banking landscape. Emphasizing key visualizations, interactive functionalities, and strategic filters, this section underscores the tailored features incorporated to meet the specific needs of HDFC Bank's leadership.

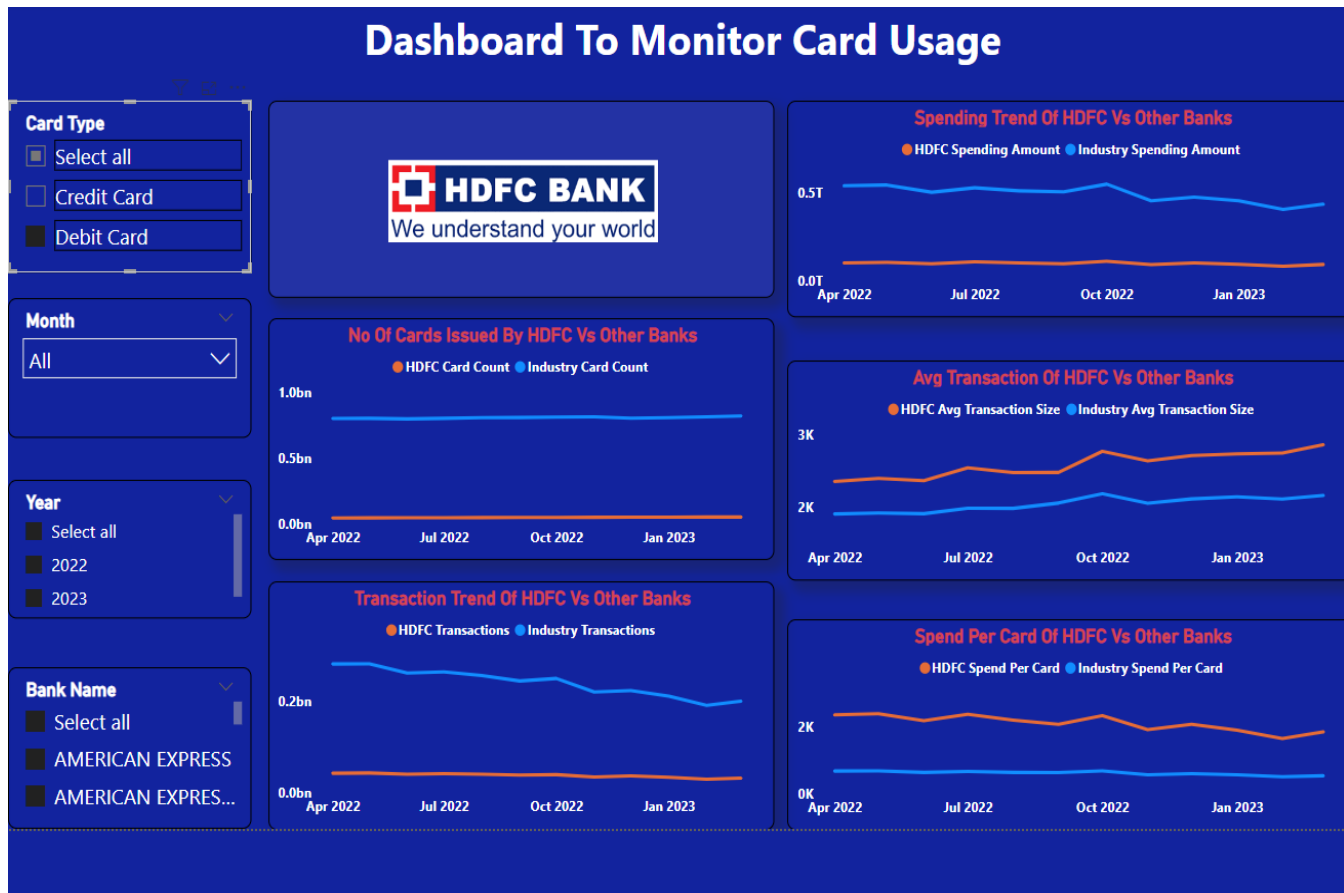
The Power BI dashboard stands as a robust and dynamic tool, facilitating real-time tracking and analysis of essential key performance indicators (KPIs) and market share metrics. With a steadfast commitment to delivering actionable insights, the dashboard positions HDFC Bank's leadership with data-driven decision-making capabilities, providing a competitive edge in the ever-evolving banking industry. This section offers a detailed exploration of the dashboard's functionalities, offering a glimpse into how it equips HDFC Bank to navigate the complexities of the financial landscape with agility and precision.

Key Visualizations

1. HDFC vs Other Banks



In the credit card segment, HDFC Bank outshines its peers with higher Average Transaction Size and Spend per Card. This indicates that, on average, HDFC credit cardholders engage in larger transactions and have higher spending per card compared to other banks. This suggests effective strategies in catering to users with a penchant for substantial transactions, positioning HDFC Bank as a leader in these performance metrics.



In the Debit Card segment, HDFC Bank has excelled, surpassing other banks in both Average Transaction Size and Spend per Card. This achievement underscores HDFC Bank's effectiveness in facilitating larger transactions and higher spending per individual debit card compared to its counterparts. This superior performance suggests effective strategies in catering to debit card users inclined toward substantial transactions, solidifying HDFC Bank's leadership in these critical performance metrics.

2. KPI Trends

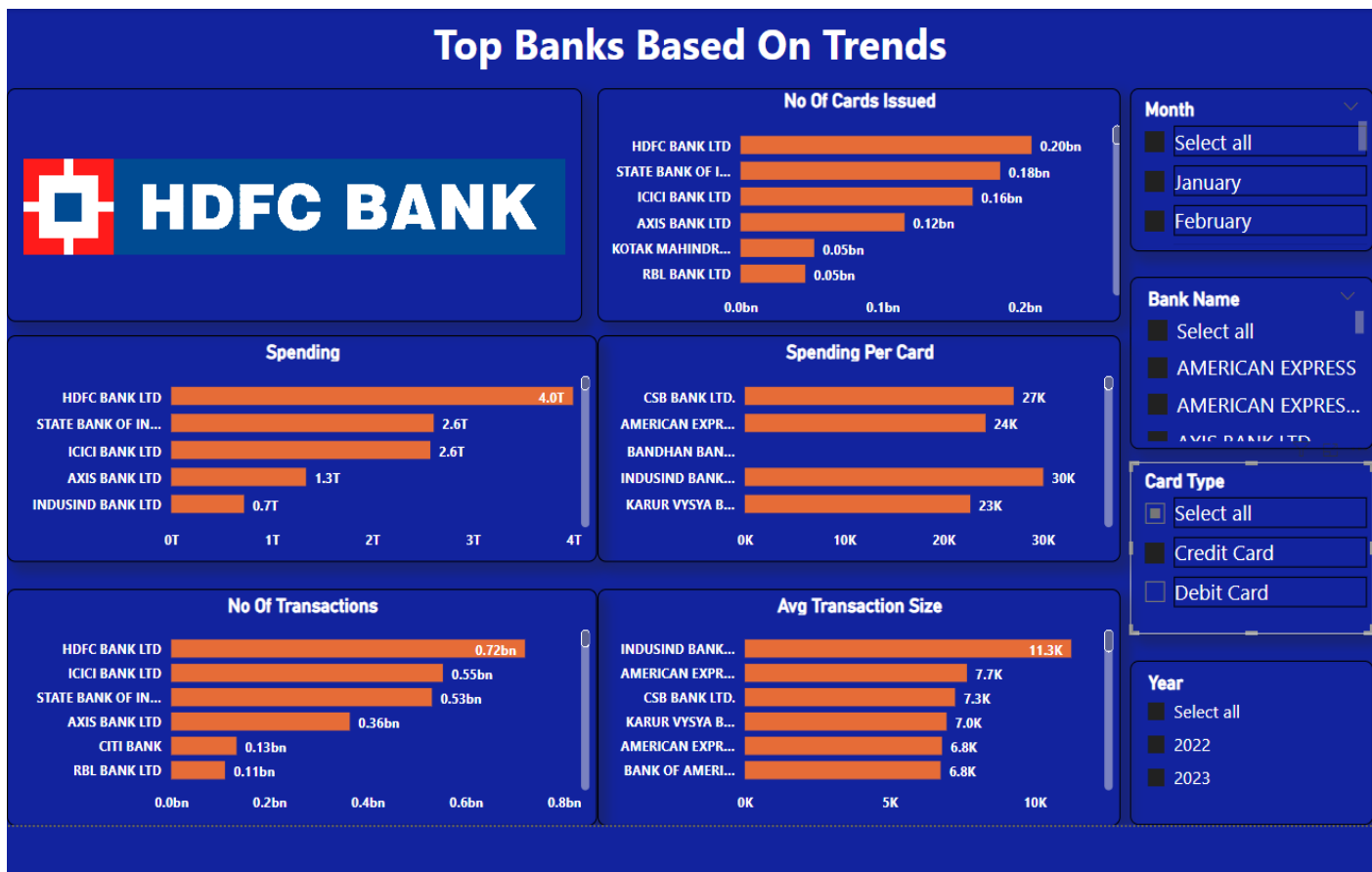


In the Credit Card segment, HDFC Bank commands a substantial market presence, capturing a significant 28% market share in spending, 21% market share in total cards issued, and 24% market share in transactions. This robust market share underscores HDFC Bank's prominence and competitive standing in the credit card landscape, affirming its strong position in influencing overall spending patterns and transaction volumes within the industry.

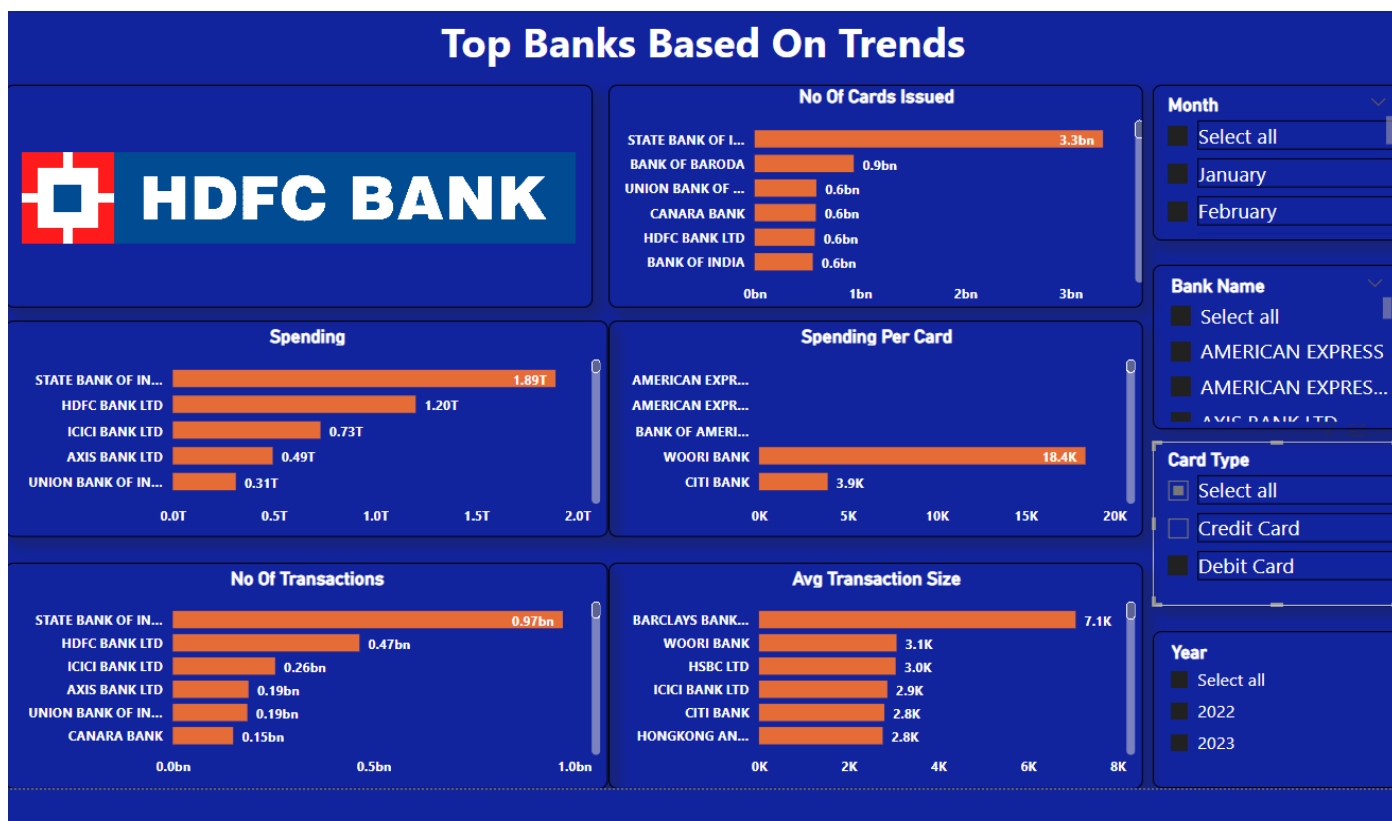


In the Debit Card segment, HDFC Bank holds a notable market position, claiming an 18% market share in spending, a 6% market share in total cards issued, and a 14% market share in transactions. This signifies HDFC Bank's substantial influence in shaping spending patterns and transaction volumes within the debit card landscape. Despite a smaller market share in total cards issued, HDFC Bank's significant share in spending and transactions reaffirms its impactful presence in the debit card segment.

3.Top banks Based on KPIs

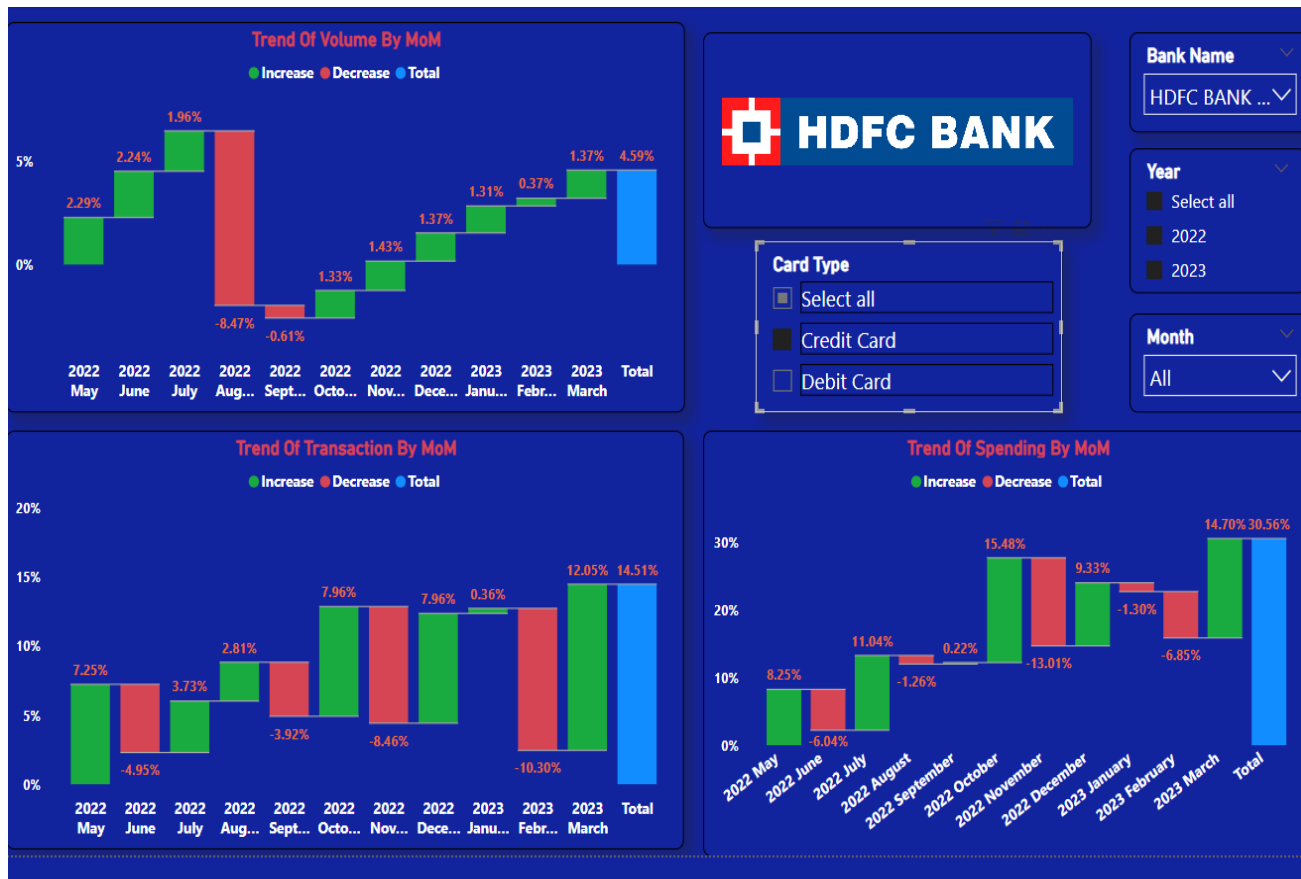


In the Credit Card segment, HDFC Bank holds the leading position, securing the first rank in the Number of Cards Issued, Total Spending, and Total Number of Transactions. This comprehensive dominance highlights HDFC Bank's formidable presence and success in issuing credit cards, facilitating significant spending, and orchestrating a substantial volume of transactions. This top-tier performance solidifies HDFC Bank's leadership in the credit card market, reflecting its effectiveness in attracting, serving, and engaging credit cardholders.



In the Debit Card segment, HDFC Bank secures the second position in Total Spending and Total Number of Transactions, while holding the fifth position in the Number of Cards Issued. This positioning underscores HDFC Bank's significant role in driving spending and transaction volumes, even as it maintains a substantial presence in the number of cards issued within the credit card landscape.

3. Month Over Month Growth



In the Credit Card segment, HDFC Bank exhibits distinct trends:

Volume Trend:

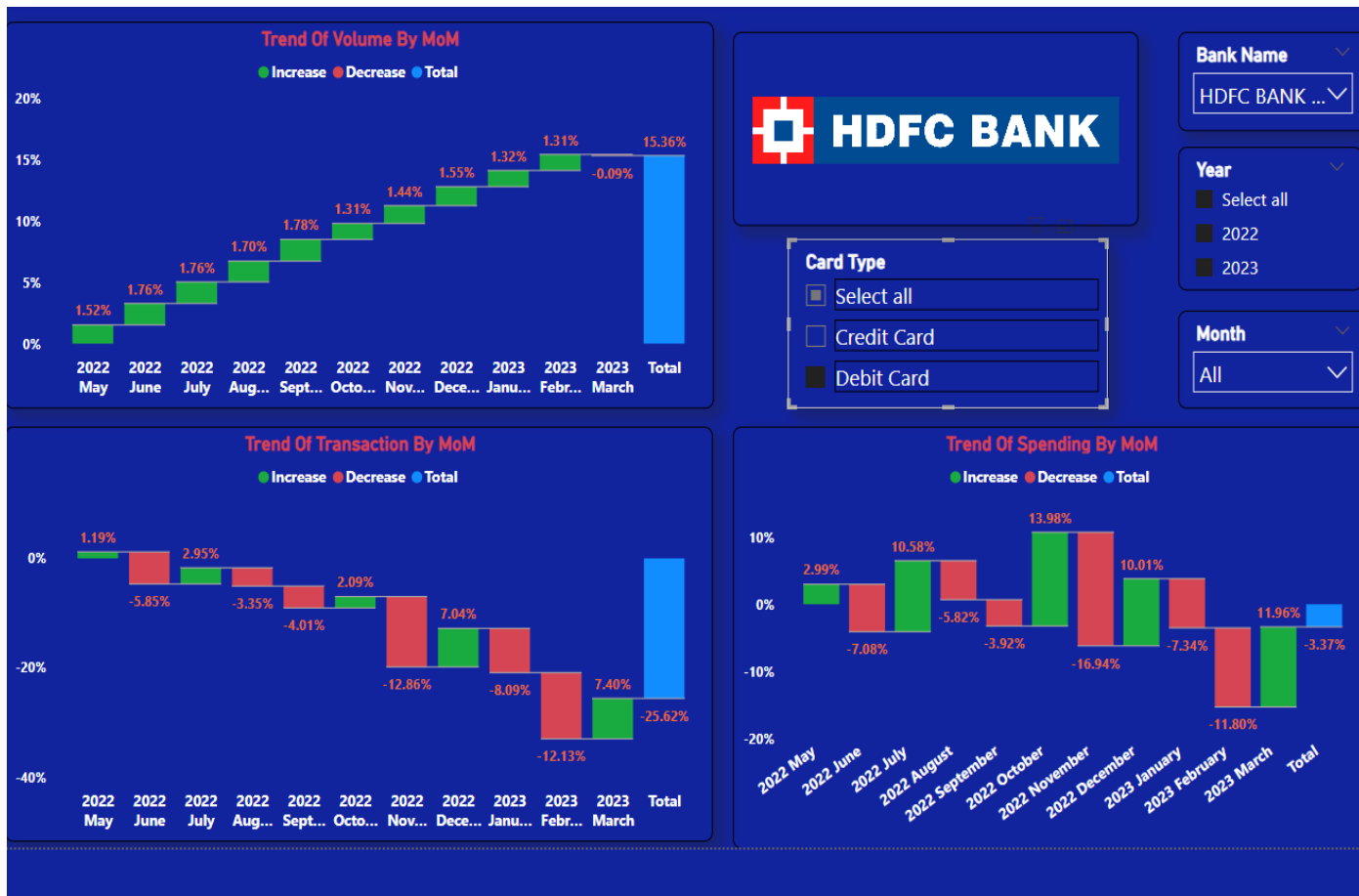
HDFC Bank experiences a notable decline trend in the number of cards issued, particularly evident in August 2022 and September 2022.

Transaction Trend:

The bank shows a pronounced decline trend in total transactions, with a sharp decrease observed in February 2023. Additionally, decline trends are noted in the months of June, September, and November 2022.

Spending Trend:

HDFC Bank demonstrates a significant decline trend in total spending, notably in November 2022. Further, decline trends are observed in the months of June 2022, August 2022, January 2023, and February 2023. These trends collectively offer insights into the dynamic shifts in HDFC Bank's credit card segment, influencing both card issuance and user spending behaviours during specific periods.



In the Debit Card segment, HDFC Bank's trends unfold as follows:

Volume Trend:

HDFC Bank experiences a decline trend in the number of debit cards issued, particularly noticeable in March 2023.

Transaction Trend:

A sharp decline trend is observed in total transactions, notably in November 2022. Additionally, decline trends are noted in June 2022, August 2022, September 2022, January 2023, and February 2023.

Spending Trend:

HDFC Bank demonstrates a significant decline trend in total spending, particularly in November 2022. Further, decline trends are observed in June 2022, August 2022, September 2022, January 2023, and February 2023. These trends collectively provide insights into HDFC Bank's debit card segment dynamics, showcasing fluctuations in card issuance, transaction volumes, and user spending behaviours during specific periods.

Analysis and Insights:

The examination of the Power BI dashboard reveals compelling insights into HDFC Bank's debit and credit card usage performance within the Indian banking industry. The key findings can be summarized as follows:

1. Total Transactions:

HDFC Bank emerges as the leading bank in total credit card transactions, highlighting its dominant market presence and strong customer engagement in the credit card segment.

However, in debit card transactions, HDFC Bank secures the second position, with the State Bank of India (SBI) claiming the top spot.

2. Total Spending Trend per Month:

HDFC Bank consistently demonstrates a high monthly spending trend, showcasing the bank's popularity and the spending habits of its customers.

The sustained growth in total spending per month reflects the effectiveness of HDFC Bank's marketing strategies and customer-centric approach.

3. Spend per Card:

HDFC Bank holds a prominent position in spend per card, ranking among the top 5 banks for credit cards and top 4 banks for debit cards.

Particularly noteworthy is HDFC Bank's top ranking among private banks in debit card transactions, indicating success in attracting high-value spending customers.

4. Average Transaction Size:

HDFC Bank secures the 4th position in average transaction size, suggesting a balanced mix of small and large transactions by its cardholders.

The bank's robust performance in this metric underscores effective customer segmentation and targeted marketing strategies.

5. Market Share:

Key performance indicators reflecting market share based on the number of cards issued, total transactions, and spending showcase HDFC Bank's significant market share in both debit and credit card segments.

HDFC Bank's substantial market share percentages affirm its leadership position and market dominance compared to competitors.

6. Transaction and Spending Correlation:

A noteworthy observation is the potential correlation between transaction volumes and spending patterns. Exploring whether periods of sharp decline in transactions align with corresponding declines in spending can unveil deeper insights into customer behaviour.

This additional layer of analysis provides a more holistic perspective on the interplay between transaction volumes and spending, offering valuable insights into the factors influencing HDFC Bank's overall card usage dynamics. Together, these insights offer a comprehensive understanding of HDFC Bank's performance, shedding light on transaction behaviours, spending trends, and their potential correlations within the credit and debit card segments.

Insights and Implications

1. Strengthening Debit Card Transactions:

While HDFC Bank excels in total credit card transactions, there is an opportunity to enhance its market share in debit card transactions. Analysing the success factors of competitors like SBI, understanding customer preferences, and offering targeted incentives could be instrumental in driving increased usage of debit cards.

2. Leveraging High Spending Trend:

HDFC Bank's consistently high spending trend per month reflects its popularity among customers. The bank can capitalize on this trend by introducing personalized offers, exclusive partnerships, and premium rewards to further enhance customer loyalty. Additionally, understanding the specific spending categories that contribute to this trend can inform targeted promotions.

3. Focusing on Spend per Card:

HDFC Bank's competitive position in spend per card for both credit and debit cards indicates a robust customer base and a high-value clientele. The bank should continue its focus on offering premium services and introducing tailored products to not only retain but also attract affluent customers. Personalized spending insights and reward programs can further drive customer engagement.

4. Enhancing Average Transaction Size:

Improving the average transaction size presents an avenue for increased revenue and profitability. HDFC Bank could consider implementing targeted marketing campaigns, exploring cross-selling opportunities, and incentivizing larger transactions. Understanding the factors that influence transaction sizes can aid in crafting effective strategies.

5. Sustaining Market Leadership:

HDFC Bank's dominant market share across various metrics reaffirms its position as a market leader. To sustain this leadership, the bank should continue leveraging data-driven insights. Proactive monitoring of customer trends, adapting strategies to evolving needs, and embracing innovative technologies will be crucial in maintaining a competitive edge.

6. Exploring Regional Variances:

Further analysis of regional variations in card usage and spending patterns could unveil localized trends. Tailoring marketing strategies and product offerings based on regional preferences can enhance HDFC Bank's effectiveness in diverse markets.

These insights offer a comprehensive roadmap for HDFC Bank, providing actionable recommendations to strategically navigate the intricacies of card transactions, spending behaviours, and market dynamics. By embracing these implications, HDFC Bank can not only solidify its current position but also proactively shape the future of its card services in response to evolving customer demands.

Conclusion:

The comprehensive analysis and insights gleaned from the dashboard underscore HDFC Bank's robust performance in the debit and credit card segment, solidifying its position as a frontrunner in the Indian banking industry. By capitalizing on its identified strengths, proactively addressing areas for improvement, and leveraging data-driven decision-making, HDFC Bank is well-positioned to not only maintain but further enhance its standing as a leading financial institution.

In the dynamic and competitive market, HDFC Bank's commitment to strategic adaptation and customer-centric approaches will be instrumental. The identified opportunities for strengthening debit card transactions, leveraging high spending trends, focusing on spend per card, enhancing average transaction size, and sustaining market leadership provide actionable pathways for the bank to navigate the evolving landscape successfully.

By aligning its strategies with these insights, HDFC Bank can continue to meet and exceed customer expectations, fostering satisfaction and loyalty. The combination of a proactive approach, innovative solutions, and a commitment to excellence positions HDFC Bank for continued success in the ever-evolving financial landscape.