

ISSN 2063-5346



THE CAMEL ADVANTAGE: EVALUATING BANK PERFORMANCE FOR FUTURE SUCCESS

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Article History: Received: 01.02.2023**Revised: 07.03.2023****Accepted: 10.04.2023**

Abstract

The performance analysis of banks plays a pivotal role in understanding their financial stability and competitiveness in the market. To perform a comprehensive evaluation, researchers and financial analysts often employ various models and frameworks. One such widely recognized and effective framework is the CAMEL model, which stands for Capital adequacy, Asset quality, Management efficiency, Earnings capability, and Liquidity position. Each component of this model enables stakeholders to gain valuable insights into the strengths and weaknesses of these institutions, helping them to make informed decisions about investments, risk management, and regulatory oversight, and collectively, help in evaluating the institution's overall stability and potential for future success.

In this study, the author applies the CAMEL model to conduct performance analysis of selected banks in India. Through a systematic examination of their capital adequacy, asset quality, management efficiency, earnings capability, and liquidity position, the study aims to provide valuable insights into banks overall performance and identify areas for improvement. This research holds significance not only for investors and financial institutions but also for regulators, policymakers, and academics. It contributes to the existing body of knowledge on bank performance evaluation and aids in decision-making processes that promote a stable and resilient banking sector.

Keywords: *banking sector, CAMEL, capital adequacy, financial stability, future success, performance analysis, resilient*

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DOI:10.31838/ecb/2023.12.s1-B.413

INTRODUCTION

The importance of performance evaluation in the banking industry for long-term growth and development has been acknowledged, however, a system is still needed that first assesses all areas of banks before highlighting their strengths and deficiencies to enable ongoing development. Performance evaluation systems have grown over time from single aspect systems to more comprehensive systems encompassing all elements of banks thanks to advancements in computational tools. In light of the shifting demands of this industry, one rating system that has shown to be more effective for performance assessment, evaluation, and strategic planning for future growth and development of Indian banks is the CAMEL Model.

The Indian banking sector plays a pivotal role in the country's economic development, providing financial services to individuals, businesses, and government entities. Banks have experienced steady development thanks to simple access to capital, larger loan ticket sizes, and low

crime rates among microfinance participants (Dulloo, 2021). In India, the regulatory body responsible for overseeing banks is the Reserve Bank of India (RBI). The structure of banks in India comprises various categories of banks each with its distinct characteristics as shown in Figure 1. PSBs, being government-owned banks, serve as the backbone of the Indian banking system. They ensure financial inclusion and cater to the banking needs of various sectors and regions. Private Sector Banks, both domestic and foreign, operate with private ownership, providing innovative products and services with a customer-centric approach. Foreign Banks, either through subsidiary models or branches, bring global expertise and contribute to the diversification of the banking sector. RRBs, established to cater to rural areas, focus on promoting financial inclusion and supporting rural development. Lastly, Cooperative Banks, owned and operated by cooperative societies, serve specific regions or communities and contribute to the growth of the cooperative movement in India.

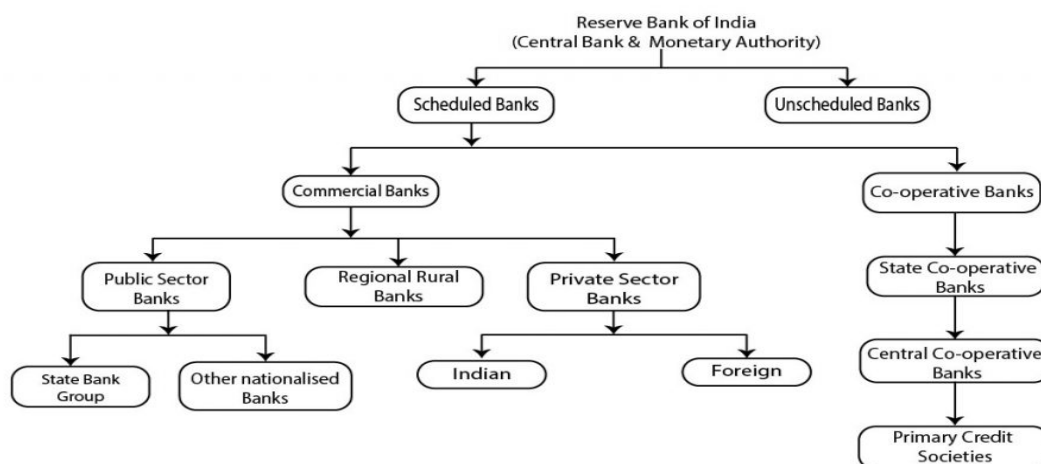


Figure 1 : Structure of Indian Banking

The RBI uses the CAMEL model, along with its own specific guidelines and regulations, to evaluate banks operating in the country. It enables a comprehensive assessment of key components, providing insights into the risk profile, financial health, and operational efficiency of banks.

CAMEL MODEL

CAMEL stands for Capital Adequacy, Asset Quality, Management Competence, Earning Quality, and Liquidity. This model evaluates an organization's performance based on the five factors mentioned above, which facilitates an analysis of the

organization's performance from many angles. The performance of the banks is analysed using a ratio-based approach. On a five-parameter scale, the Camel model aids in rating the banks' performance.

1. Capital Adequacy

In order to keep the trust of all of the investors and prevent the bank from becoming bankrupt, it is crucial to analyse the capital structure of the banks. It also addresses the bank's capacity to satisfy its increasing financial needs. Capital adequacy ratio measures the capital adequacy of the banks.

2. Asset Quality

This ratio aids in determining the caliber of the assets the bank has generated to generate income, or the caliber of the loans made to generate interest income. Less non-performing assets or defaulters indicate higher credit quality. This ratio's primary objective is to evaluate the non-performing assets to the overall assets. Net NPAs-to-total Asset ratio, Net NPA to total Advance ratio are the ratios used to measure the asset quality of the banks.

3. Management Competence

This ratio gauges the management team's ability to increase shareholder value and generate higher returns. It calculates the earnings based on the number of employees, which aids management in understanding their contribution to the banks. Making numerous strategic decisions involves the management of a bank. Consequently, it is crucial to gauge managerial effectiveness. Total advance to total deposit ratio is used to measure the management competence.

4. Earning Quality

In addition to measuring the bank's profits from the assets it uses, it's critical to assess the quality of those profits, which refers to their consistency over time. Return on asset ratio, Return on equity ratio is the ratio used to measure the earning quality of banks.

5. Liquidity

Managing liquidity is a big task for the bankers as they have to properly hedge their risk, earn better returns and at the same time maintain liquidity to allow the investors to withdraw their investments whenever required. Therefore the banks must have a proper balance between liquidity, risk and returns. Liquid assets to total assets and Liquid assets to total deposits are the ratios used to measure the liquidity of the banks.

REVIEW OF LITERATURE

Different scholars, academicians, and decision-makers have evaluated the financial performance of the banking industry throughout the course of different historical periods. Here is a brief summary of several significant researches that satisfies the requirements for the current study.

The CAMEL framework was originally intended to determine when to schedule onsite examination of a bank (Thomson, 1991; Whalen and Thomson, 1988). Using financial ratios of profitability, liquidity, leverage, turnover, and total assets in decision tree models and multiple discriminant models, Mous (2005) evaluated bank bankruptcy prediction models and discovered that the decision tree technique performed better. Wirnkar and Tanko (2008) examined banking performance of major banks of Nigeria using CAMEL framework. Mathuva (2009) found capital adequacy had a differential impact on the profitability of the bank. Sreeramulu *et al.* (2010) compare the performance of the Indian banking sector from 1999 to 2003 and from 2004 to 2008. It uses a Cobb Douglas stochastic frontier model to calculate the bank efficiency. According to the report, the Indian banking sector's efficiency increased significantly between 2004 and 2008 compared to 1999 to 2003. Globalisation, deregulation, and technological advancements are primarily responsible for the improvements in the

Indian banking industry. The implementation of CAMEL rules and its resultant influence on the performance of SBI Groups were empirically investigated by **Siva and Natarajan, 2011**. The study came to the conclusion that yearly CAMEL scanning assists commercial banks in determining their financial well-being and alerts them to the need to take preventive action to ensure their sustainability.

By examining the effects of the financial reforms on asset quality, **Chaudhry and Singh (2012)** examined how they will affect the soundness of Indian banking. Risk management, NPA levels, efficient cost management, and financial inclusion were highlighted as the study's main actors. Based on market capitalization, **Mishra et al. (2013)** evaluated the efficiency and soundness of 12 public and private sector banks. Using the CAMEL technique over a twelve-year period (2000–2011), it has been determined that private sector banks are at the top of the list and have the best soundness performances. In Turkey between 2001 and 2009, **Erol et al. (2014)** compared the performance of Islamic banks to that of regular banks. The findings demonstrated that Islamic banks outperformed conventional banks in terms of profitability and asset management ratios, but lagged behind in terms of sensitivity to market risk criteria. **Rostami (2015)** examined how the CAMEL model's various parameters affected the efficiency of Iranian banks. In this study, the Q-Tobin's ratio used as a performance measure. It was discovered that the Q-Tobin's ratio, which measures a bank's performance, and each category of camel models had a strong relationship. **Sivasakthi et al., 2017** used the CAMEL technique to analyse the State Bank of India's financial performance for the research period of 2012–2016. It was determined that action must be taken to strengthen SBI's position in relation to a few factors, including debt-to-equity, operational profit, and non-interest income to total revenue. For the years 2006 to

2015, **Gupta and Biswas (2018)** performed research to assess the banks listed on the BSE's liquidity as of June 23, 2016. The information was gathered from 1999–2000 through 2015–2016. The study demonstrates that when advances exceed deposits, banks experience issues. The CAMEL model helps identify potential risks and vulnerabilities in the GST compliance process, ensuring that banks meet regulatory standards and avoid penalties or legal issues. **Dulloo et al., 2022** argues GST framework aims to simplify the tax structure, eliminate cascading effects, enhance transparency, and promote ease of doing business.

Data was gathered between 2005 and 2017 for a research by **Verlekar and Kamat (2019)** that focused on 44 Indian banks. In this study, the credit risk of public and private banks was evaluated using the Altman Z-score, Springate, and Grover and Zmweskis models. According to the assessment, Dena Bank and Catholic Syrian Bank, came in first place, demonstrating their very stable financial standings. **Singhal (2020)** utilised the CAMEL model in his study to assess the performance of the banks. According to the results of this investigation, Indian public sector banks are making an effort to retain sufficient capital, and in the coming years, all banks should work to achieve more than the necessary level. Public sector banks must come up with creative solutions that will enable them to deploy money after a thorough assessment of the risk exposure. **Magoma et al., 2022** analyzed financial performance of 7 listed commercial banks using CAMEL model in Tanzania. They found commercial banks in Tanzania are majorly influenced by management efficiency and capital adequacy. In her study, **Dulloo, 2022** emphasised that banks should offer better services, such as lowering yearly maintenance fees and using fewer brokerages to increase satisfaction among customers. **Arun and Dulloo (2023)** highlighted the need for banks to adapt and innovate continuously

to navigate the evolving landscape shaped by digital disruption.

RESEARCH METHODOLOGY

This study employs a descriptive and analytical research strategy that involves a thorough analysis of the information that is already accessible in an effort to explain complicated phenomena. Only secondary data gathered from annual reports provided by the relevant firms as well as data gathered from money control, BSE, and NSE are used in this analysis. In the current study, five private banks in India are chosen, and camel ratios are used to assess each bank's effectiveness and performance to determine which bank is leading the group. HDFC Bank, ICICI Bank, AXIS Bank, KOTAK Bank, and PNB Bank are the five banks chosen for the sample. The analysis takes into account data from 2017 to 2021, which is the most recent five years.

Tools used for analysis is CAMEL MODEL:

C-capital adequacy, A-asset quality, M-management E-earning and profitability, L-liquidity (also called asset liability management).

Table 1: CAPITAL ADEQUACY RATIOS (CAR) FOR SELECTED BANKS

YEAR/BANKS	ICICI	HDFC	AXIS	KOTAK	PNB
2017	17	15	15	17	12
2018	18	15	17	18	9
2019	19	17	16	17	10
2020	16	19	17.53	18	14
2021	19.12	18.79	19.12	22.26	14.32
AVERAGE	17.82	16.95	16.93	18.45	11.86
RANK	2	3	4	1	5

Better solvency and financial soundness of the banks are indicated by higher CAR ratio values. Every year, the CAR ratio varies for all the chosen institutions. Here, KOTAK's average CAR is 18.45, which is

OBJECTIVES OF STUDY

Even though several CAMEL model-based studies have shown the performance of private sector banks, ongoing evaluations are still important to track their efficacy and assure their genuine financial standing. The following are the objectives of the current study:

- 1) Examine the performance analysis of selected private banks using the CAMEL approach.
- 2) To evaluate the financial growth of selected banks.
- 3) To compare the performance and effectiveness of the banks included in the research.

RESULTS & DISCUSSION

1. C - CAPITAL ADEQUACY RATIOS FOR SELECT BANKS

A bank's capital adequacy is seen to be a key indicator of its financial stability. It is believed that capital acts as a safety net for stakeholders and improves the stability and productivity of banks. The adequacy of a bank's capital reflects its entire financial standing. It shows the bank's leverage and if it has enough capital to absorb potential unforeseen losses.

higher than the CARs of all the other banks, making KOTAK Bank better able to withstand losses than the other 4 banks. Therefore, it can be concluded that KOTAK performs better than the other

chosen banks in terms of ratios.

2. A- ASSET QUALITY RATIOS FOR SELECT BANKS

A key factor in determining a bank's level of financial health is the quality of its

assets. Determining the composition of non-performing assets (NPAs) as a percentage of all assets is the main goal of asset quality measurement. The strength of a bank's credit portfolio reflects its financial health.

Table 2: NET NPA TO TOTAL ASSETS RATIOS FOR SELECTED BANKS

YEAR/BANKS	ICICI	HDFC	AXIS	KOTAK	PNB
2017	5	0	2	1	8
2018	5	0	4	1	11
2019	2	0	2	1	7
2020	2	0	2	1	6
2021	2	0	1	1	6
AVERAGE	3.2	0	2.2	1	7.6
RANK	4	1	3	2	5

We can determine the effectiveness of the bank's Credit Risk Management system by looking at the Net NPA levels. The quality of the banks' assets and advances is gauged by the ratio of Net NPAs to Net Advances. The quality of the bank's assets is determined by how low the Net NPA level is. In comparison to the other chosen banks, HDFC Bank has a lower average NET NPA to Total Advances Ratio. HDFC BANK is hence outperforming other banks. Comparing the financial year 2020–2021 to the financial year 2019–2020, there is no increase in the NET NPA to Total Advances Ratio of any of the chosen banks. Therefore, based on ratios taken into account for banks', ASSET QUALITY,

HDFC and KOTAK banks are performing better than other banks under the study.

3. M- MANAGEMENT QUALITY RATIOS FOR SELECT BANKS

Management efficiency is a crucial component of the CAMELS model, which ensures the survival and expansion of a bank. Management effectiveness denotes adherence to established standards, the bank's ability to manage and administer itself, and its capacity to deal with a changing environment.

Table 3: RETURN ON ASSETS (ROA)

RATIOS FOR SELECT BANKS

YEAR/BANKS	ICICI	HDFC	AXIS	KOTAK	PNB
2017	1.26	1.68	0.61	1.58	0.18
2018	0.77	1.64	0.03	1.54	-1.6
2019	0.34	1.69	0.58	1.55	-1.28
2020	0.72	1.71	0.17	1.65	0.04
2021	1.31	1.78	0.66	1.81	0.16
AVERAGE	0.88	1.7	0.41	1.626	-0.5
RANK	3	2	4	1	5

Return on Assets gauges bank earnings in relation to asset value. It is a sign of how effectively an organisation manages its assets. It is one of the RBI's recommendations for the evaluation of bank balance sheets. A higher number for this ratio suggests that banks are more financially productive and profitable, while a lower value indicates that banks are less productive. According to Table 3, HDFC Bank has a higher average RETURN ON ASSETS ratio than all other banks that were chosen. As a result, the HDFC BANK outperforms the other chosen banks in terms of financial efficiency and profitability. Therefore, it is clear that among the five selected banks, HDFC and

KOTAK banks are performing well when two EFFICIENCY ratios are taken into account.

4. E - EARNINGS CAPACITY RATIOS FOR SELECTED BANKS

A company's present operational performance should be reflected in its high profits quality, which is also a reliable predictor of future operating performance. The quality of profits is a very important indicator since it indicates the profitability and capacity of a bank to maintain quality and earnings over time. To determine earning quality, the following ratios must be used:

Table 4: RETURN ON EQUITY (ROE) RATIOS FOR SELECT BANKS

YEAR/BANKS	ICICI	HDFC	AXIS	KOTAK	PNB
2017	10.11	16.26	6.59	12.35	3.47
2018	6.63	16.45	0.43	10.89	-32.85
2019	3.19	14.12	7.01	11.47	-24.2
2020	6.99	15.35	1.91	12.25	0.58
2021	11.21	15.27	6.48	11.01	2.41
AVERAGE	7.626	15.49	4.484	11.594	-10.104
RANK	3	1	4	2	5

The ratio of net interest income to total assets is known as net interest margin. If the net interest margin is positive, the investment plan is paying out more interest than it is incurring. In contrast, a negative net interest margin indicates that the investing approach is more expensive than it is profitable. As seen in the table, HDFC has a higher average RETURN ON EQUITY ratio than a few other banks, and its performance is superior to that of other banks.

5. L - LIQUIDITY RATIOS FOR SELECT BANKS

Increased liquidity has a negative impact

on financial institutions because, although it improves their capacity to obtain capital quickly, it also makes it harder for management to commit credibly to an investment plan that safeguards investors. Another important factor that indicates the financial success of banks is liquidity. The capacity of the bank to fulfil its commitments to depositors is referred to as liquidity. By fast turning its assets into cash or by raising its current obligations, a bank can maintain a sufficient liquidity position. It also refers to the money that the bank has on hand to satisfy its needs for lending and cash flow.

Table 5: LIQUID ASSETS TO TOTAL ASSETS (LATA) RATIOS FOR SELECT BANKS

YEAR/BANKS	ICICI	HDFC	AXIS	KOTAK	PNB
2017	9.18	5.67	8.4	10.51	9.09
2018	9.78	6.32	8.52	9.15	7.63
2019	8.65	8.38	7.32	9.23	6.51
2020	8.96	8.56	6.89	6.85	5.57
2021	8.36	9.12	7.12	7.96	5.62
AVERAGE	8.98	7.61	7.65	8.74	6.88
RANK	1	4	3	2	5

The ratio of liquid assets to total assets shows what proportion of the total amount of assets is kept in liquid assets. It may be said that this liquidity is sufficient to cover the banks' immediate obligations. This ratio demonstrates how much the Bank favors liquidity. More values of this ratio represent more bank liquidity, whereas

lower values represent lower bank liquidity. The liquidity efficiency of all the chosen banks has increased in the financial year 2020–2021 compared to the financial year 2017–18, as can be seen from table 5. ICICI has a higher average LIQUID ASSETS TO TOTAL ASSETS ratio (8.98) than all other banks that were considered.

Table-6: LIQUID ASSETS TO TOTAL DEPOSITS (LATD) RATIOS FOR SELECT BANKS

YEAR/BANKS	ICICI	HDFC	AXIS	KOTAK	PNB
2017	15.45	8.61	12.12	14.33	11.32
2018	16.25	9.65	11.25	12.36	12.10
2019	17.32	12.23	10.32	11.45	10.89
2020	14.32	14.69	11.68	12.63	11.32
2021	14.78	15.63	12.63	11.32	12.52
AVERAGE	15.62	12.162	11.62	12.41	10.31
RANK	1	3	4	2	5

The percentage of total deposits retained as liquid assets is shown by the liquid assets to total deposits ratio. Higher values of this ratio imply greater bank liquidity, whereas lower values indicate less bank liquidity. In comparison to the other chosen banks, ICICI has a higher average LIQUID ASSETS TO TOTAL DEPOSITS ratio (15.62). As a result, ICICI Bank has a

superior liquidity position than other banks. In comparison to the fiscal year 2017–2018, the liquidity situation of the HDFC, KOTAK, AXIS, and PNB BANKS has improved. Therefore, based on two liquidity measures, it can be concluded that among the five banks that were chosen, ICICI and KOTAK banks are performing well in terms of liquidity.

Table 7: Overall ranking for select banks based on CAMEL Rating

RATIOS/BANKS	ICICI	HDFC	AXIS	KOTAK	PNB
CAPITAL ADEQUACY RATIO	2	3	4	1	5
NET NPA TO TOTAL ADVANCES	4	1	3	2	5
RETURN ON ASSETS	3	2	4	1	5
RETURN ON EQUITY	3	1	4	2	5
LIQUID ASSETS TO TOTAL ASSETS	1	4	3	2	5
LIQUID ASSETS TO TOTAL DEPOSITS	1	3	4	2	5
FINAL RANKS OF BANKS	1	3	4	2	5

The liquid assets to total assets ratio and the liquid assets to total deposits ratio show that ICICI bank performs best, according to table 7. In terms of Return on Equity and Net NPA to Total Advances, HDFC Bank performs best. The KOTAK Bank has the highest capital adequacy ratio performance. By taking into account rankings on the chosen ratios from the CAMEL MODEL, ICICI is rated first while PNB is ranked last in terms of performance.

The major findings under each parameter of CAMEL model for two hypotheses framed,

Null Hypothesis 1: whether there is a significant difference in a ratio among banking companies selected for the study, and

Null Hypothesis 2: whether there is a significant difference in a ratio among Selected sector banking companies selected for the study, has been depicted as under:

1. Major Findings under Capital Adequacy

There is a statistically significant difference in CRAR ratio among banking companies selected for the study. There is also a statistically significant difference in CRAR ratio of banking companies selected for the study.

✓ In terms of CRAR ratios among the banking firms chosen for the study, Kotak Mahindra Bank had the highest average.

✓ The average CRAR ratio for Punjab National Bank was the lowest among the study's banking businesses.

2. Major Findings under Asset Quality

There is a statistically significant difference in gross NPA ratio among banking companies selected for the study. There is also a statistically significant difference in gross NPA ratio among banking companies selected for the study.

✓ The average gross NPA ratio for HDFC Bank was the highest among the study's banking organisations.

✓ Among the financial firms included for the survey, Punjab National Bank had the lowest average gross NPA ratio.

3. Major Findings under Management Quality

There is a statistically significant difference in credit-deposits ratio among banking companies selected for the study, but there is no statistically significant difference in credit-deposits ratio among banking companies selected for the study.

✓ The average credit-deposit ratio for the banking firms chosen for the study was greatest at ICICI Bank.

✓ Among the banks included for the study, Punjab National Bank had the lowest average credit-deposits ratio.

4. Major Findings under Earnings

There is a statistically significant difference in operating profit to average working fund ratio among banking companies selected for the study. There is also a statistically significant difference in operating profit to average working fund ratio among banking companies selected for the study.

- ✓ Of the financial institutions chosen for the study, HDFC Bank had the highest average operating profit to average working fund ratio.
- ✓ Of the financial firms included for the study, Punjab National Bank had the lowest average operating profit to average working fund ratio.

5. Major Findings under Liquidity

There is a statistically significant difference in liquid assets to total assets ratio among banking companies selected for the study, but there is no statistically significant difference in liquid assets to total assets ratio among public and private sector banking companies selected for the study.

- ✓ Among the banks included for the study, ICICI Bank had the highest average liquid assets to total assets ratio.
- ✓ Among the banking institutions included for the study, Punjab National Bank had the lowest average liquid assets to total assets ratio.

CONCLUSION

In conclusion, the performance analysis of selected banks using the CAMEL model has proven to be an invaluable tool in assessing and understanding the financial health and stability of banking institutions. Through the comprehensive evaluation of five key factors - capital adequacy, asset quality, management efficiency, earnings capability, and liquidity - the CAMEL model offers a systematic approach to

measure and compare the performance of banks. Numerous industrialized nations currently use the CAMEL RATING, as financial rating system in addition to other widely used methods and procedures for assessing the performance of banks. The present research is a modest attempt to summarize the numerous measures that are useful for gauging the financial performance of the banking industry. By applying the CAMEL model to the selected banks, we have gained valuable insights into their strengths, weaknesses, and overall performance. Furthermore, the model's standardized framework has facilitated meaningful comparisons between banks, enabling stakeholders to make more informed investment decisions. This study has highlighted the significance of performance analysis in the banking sector, emphasizing the importance of a robust evaluation methodology such as the CAMEL model. The findings have underlined the need for continuous monitoring and assessment of banks to ensure their stability and sustainability in an increasingly complex and competitive financial landscape. This study contributes to the body of knowledge in banking and finance, providing stakeholders with valuable insights for making informed decisions and promoting the long-term success of banking institutions.

REFERENCES

- Arun, G., & Dulloo, R. (2023). **DIGITAL DISRUPTION: TRANSFORMING THE BANKING LANDSCAPE.** *European Chemical Bulletin*, 12(S2), 2542-2549
- Chaudhry, S., & Singh, S. (2012). **Impact of Reforms on the Asset Quality in Indian banking.** *International Journal of Multidisciplinary*, 5(2), 17-24.
- Dulloo, R. (2022). **Information Technology Reshaping Trading: Study on Customer Perception towards Online Trading.** *Journal of Services*

- Research*, 22(1), 42-68.
- Dulloo, R., Naveen, G., Namitha, Y. S., Trowbridge, M. J. (2022). ***GST in India: Not the end but start of the journey.*** *International Journal of Commerce and Management Research*, 8(5), 51-56.
- Dulloo, R. (2021). ***MICROFINANCE: FOSTERING INCLUSIVE GROWTH IN INDIA.*** *Pacific Business Review International*, 13(11), 79-87
- Erol, C., F. Baklaci, H., Aydoğan, B., & Tunç, G. (2014). ***Performance comparison of Islamic (participation) banks and commercial banks in Turkish banking sector.*** *EuroMed Journal of Business*, 9(2), 114-128.
- Gupta, M. D., & Biswas, P. R. (2018). ***An empirical assessment on liquidity management of Indian public Sector Banks' Performance using CAMEL Rating Model 37 sector banks.*** *International Journal of Banking, Risk, and Insurance*, 6(1), 1-15.
- Magoma, A., Mbwambo, H., Sallwa, A., & Mwashu, N. (2022). ***Financial Performance of Listed Commercial Banks in Tanzania: A CAMEL MODEL Approach.*** *African Journal of Applied Research*, 8(1), 228-239.
- Mathuva, D. M. (2009). ***Capital adequacy, cost income ratio and the performance of commercial banks: The Kenyan scenario.*** *International Journal of Applied Economics and Finance*, 3(2), 35-47.
- Mishra, S., & Agarwal, K. (2013). ***MEASURING PERFORMANCE OF BANKS USING CAMELS MODEL: A COMPARATIVE STUDY OF CBI AND IB.*** *International Journal of Management Research and Reviews*, 3(5), 2914.
- Mous, L. (2005), ***"Predicting bankruptcy with discriminant analysis and decision tree using financial ratios,"*** Working Paper Series, University of Rotterdam
- Rostami, M. (2015). ***Determination of Camels model on bank's performance.*** *International journal of multidisciplinary research and development*, 2(10), 652-664.
- Singhal, P. K. (2020). ***An Analysis of Public Sector Banks' Performance using CAMEL Rating Model.*** *International Journal of Financial Management*.
- Siva, S., & Natarajan, P. (2011). ***Camel rating scanning (CRS) of SBI groups.*** *Journal of Banking Financial Services and Insurance Research*, 1(7), 1-17.
- Sivasakthi, D., Ramya, N., & Brindha, S. (2017). ***Evaluating the performances of selected public sector banks using camel model.*** *IJAR*, 3(9), 509-513.
- Sreeramulu, M., Vaz, N. H., & Kumar, S. (2010). ***Efficiency of Indian banks during 1999-2008: a stochastic frontier approach.*** *International Journal of Financial Services Management*, 4(4), 298-310.
- Thomson, J. B. (1991), ***"Predicting Bank Failures in the 1980s,"*** Federal Reserve Bank of Cleveland Economic Review, 27.
- Verlekar, R. P., & Kamat, M. (2019). ***An Application and Comparison of Bankruptcy Models in the Indian Banking Sector.*** *International Journal of Financial Management*, 9(4).
- Whalen, G., & Thomson, J. B. (1988). ***Using Financial Data to Identify Changes in Bank Conditioning.*** *Federal Reserve Bank of Cleveland. Economic Review*, 24(1), 17-26
- Wirnkar, A.D., & Tanko, M. (2008), ***"CAMELS and Banks Performance Evaluation: The Way Forward,"*** Working Paper Series, SSRN: <http://ssrn.com/abstract=1150968>