International Journal of Banking, Risk and Insurance
14 (1) 2026, 43-53
www.publishingindia.com/ijbri/
https://doi.org/10.21863/ijbri/2026.14.1.003

Submitted: 11 March, 2025
Revision: 01 September, 2025
Accepted: 02 September, 2025

A Factor Analysis Approach to an Investigation of Odisha's Co-Operative Banks

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Abstract

In India's rural and semi-urban financial system, co-operative banks are vital, especially in regions such as Odisha where they provide low-income individuals, small enterprises, and farmers with vital loans. These banks, however, confront a number of difficulties, including unstable finances, ineffective governance, technology constraints, and disgruntled customers. This study uses factor analysis, a multivariate statistical technique, to assess the major factors influencing the performance of co-operative banks in Odisha. To find out how 200 respondents – including co-operative bank customers and staff – perceived banking services, governance, financial stability, and technology adoption, a primary survey was carried out. The appropriateness of factor analysis was validated by the Bartlett's test of sphericity ($p < 0.05$) and the Kaiser-Meyer-Olkin (KMO) test (0.812). Five key elements were identified through Principal Component Analysis (PCA): (1) risk management and financial stability; (2) governance and regulatory compliance; (3) digital banking and technological adoption; (4) customer satisfaction and service quality; and (5) operational efficiency and human resource management. Together, these variables accounted for 77.7% of the variance, demonstrating their significant impact on the operation of co-operative banks. The results emphasise how urgently governance frameworks must be strengthened, financial risk management must be improved, and digital transformation must be accelerated to increase banking efficiency. To increase client trust and retention, the report also emphasises the significance of customer-centric strategies, such as expedited loan processing and grievance redressal procedures. These insights can be used by regulators, policymakers, and bank management to create focused actions that would increase the competitiveness and sustainability of Odisha's co-operative banks.

Keywords: Co-Operative Banks, Odisha, Factor Analysis, Financial Stability, Governance, Digital Banking, Customer Satisfaction

Introduction

Co-operative banks occupy a pivotal position in India's rural and semi-urban financial ecosystem, particularly in states such as Odisha, where a significant portion of the population depends on agriculture and small-scale enterprises for their livelihoods. Established as member-owned institutions, co-operative banks are designed not merely for profit but to foster financial inclusion, offering essential services such as savings accounts, low-interest loans, and financial literacy programmes to underserved communities. Unlike commercial banks, which primarily focus on profitability, co-operative banks empower small farmers, self-help groups, micro-entrepreneurs, and low-income households, contributing directly to rural development and poverty alleviation (NABARD, 2022; Patil & Kumar, 2020).

In Odisha, co-operative banks form the backbone of the rural economy by providing short-term and long-term credit, facilitating investment in productive assets, and promoting financial literacy among local populations.

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How to cite: Nayak, R. K. (2026). A factor analysis approach to an investigation of Odisha's co-operative banks. *International Journal of Banking, Risk and Insurance, 14*(1), 43-53.

Despite their critical role, these banks face a variety of operational challenges, including rising non-performing assets (NPAs), weak governance, limited technological adoption, and declining customer trust. Operational inefficiencies, inadequate risk management frameworks, and insufficient professional management practices further hinder their competitiveness compared with public and private sector banks. These challenges highlight the need for an empirical, data-driven analysis of the factors influencing co-operative banks' performance in Odisha.

This study provides a comprehensive empirical investigation into Odisha's co-operative banking sector**,** addressing a significant research gap. While much of the existing literature has focused on co-operative banks at the national or multi-state level, Odisha's unique socio-economic and agrarian context has been relatively underexplored. By concentrating specifically on this state, the research delivers a detailed, data-driven understanding of the operational, financial, and technological challenges faced by co-operative banks. This state-specific focus is especially important because a large rural population relies heavily on these institutions for access to credit and other financial services, making the study highly relevant for policymakers, bank managers, and other stakeholders seeking to enhance the efficiency and sustainability of co-operative banking in Odisha.

In addition to providing empirical evidence, the study undertakes a quantitative identification of key performance factors. Utilising Principal Component Analysis (PCA), a widely recognised multivariate statistical technique, the research systematically identifies the underlying determinants driving co-operative banks' effectiveness. Unlike qualitative approaches that often rely on anecdotal evidence or subjective assessments, PCA enables the extraction of statistically validated factors, including financial stability, governance, technological adoption, customer satisfaction, and operational efficiency. This approach strengthens the reliability of the findings and provides a precise understanding of how different variables interact to influence overall bank performance.

The findings also offer practical and actionable insights for stakeholders, including regulators, policymakers, and bank management. By highlighting critical dimensions such as governance mechanisms, digital banking infrastructure, risk management practices, and customer-focused services, the study informs targeted interventions that can enhance operational performance, increase customer trust, and improve competitiveness. These insights equip stakeholders with evidence-based recommendations, enabling more effective decision making and strategic planning to address both current operational challenges and long-term sustainability concerns.

Moreover, the research emphasises the broader role of co-operative banks in promoting financial inclusion and rural development. Strengthening these institutions can expand access to financial services for underserved and marginalised populations, reduce rural indebtedness, and foster greater economic resilience among small-scale farmers, self-help groups, and micro-entrepreneurs. In Odisha's agrarian economy, such improvements have far-reaching implications for livelihood security, poverty alleviation, and inclusive growth, highlighting the socio-economic significance of co-operative banking beyond financial performance metrics.

Finally, the study outlines clear policy and strategic implications for improving Odisha's co-operative banking ecosystem. Practical interventions, such as accelerating digital banking adoption, implementing structured human resource training programmes, and enhancing governance and regulatory oversight, are recommended to strengthen operational and financial infrastructure. By focusing on these key areas, the study provides a roadmap for creating robust, efficient, and inclusive co-operative banks capable of meeting the evolving needs of rural and semi-urban populations. These recommendations are intended to guide policymakers, regulators, and bank management in fostering sustainable growth, improving service quality, and ensuring long-term viability, thereby contributing to both economic development and financial inclusion goals.

Need for the Study

Co-operative banks in Odisha have not received much attention from researchers employing sophisticated statistical methods, despite their crucial role in financial inclusion. By using factor analysis, a statistical technique that aids in determining the fundamental elements impacting bank performance, this study closes the gap.

The results of the study will assist bank management, regulators, and policymakers in enhancing their operating plans and guaranteeing the long-term survival of co-operative banks in Odisha.

Research Questions

The following questions are the focus of this study:

- What are the main determinants of Odisha's co-operative banks' performance?
- How do governance, financial stability, technological adoption, and consumer happiness affect these banks?
- What steps may be made to make Odisha's co-operative banking system more sustainable and efficient?

Objectives of the Study

- To determine the main elements influencing Odisha's co-operative banks' performance.
- To examine operational effectiveness, financial stability, and customer happiness.
- To offer suggestions on how to increase co-operative banking's efficacy.

Literature Review

In India and around the world, a lot of research has been done on the sustainability and performance of co-operative banks. Prior studies have looked at a number of topics, including customer satisfaction, technology adoption, governance, and financial stability. With an emphasis on studies pertinent to Odisha and factor analysis in banking research, this section examines the major body of literature on co-operative banking.

Co-Operative Banks and Financial Inclusion

By offering loans and banking services to people living in rural and semi-urban areas, co-operative banks contribute significantly to financial inclusion (NABARD, 2022). By providing loans to small farmers and business owners who do not have access to commercial banking services, co-operative banks make a substantial contribution to the rural economy (Patil & Kumar, 2020). Research by Sharma and Gupta (2021) and Mohan (2019) highlights how financial inclusion via co-operative banks has aided in rural economic development and poverty reduction. However, their operations are frequently hampered by a lack of funding, difficulties with regulations, and ineffective risk management. As an agrarian state, Odisha depends heavily on co-operative banks for rural financing and agricultural lending. Over 70% of rural residents are served by co-operative banks, which offer loans for self-help organisations, small businesses, and farming, according to a report published by the Odisha State Co-operative Bank in 2021. Nonetheless, a number of academics (Das & Mishra, 2019; Swain, 2020) draw attention to issues that have an impact on these banks' performance, including high NPA rates, insufficient capital infusion, a lack of professional management, and operational inefficiencies.

Financial Stability and Risk Management in Co-Operative Banks

Numerous studies have looked into the co-op banks' financial soundness, focusing on problems with liquidity management and NPAs. High NPAs have a substantial impact on sustainability and profitability, according to Bhatia's (2021) analysis of the financial health of Indian co-operative banks. Stronger risk management techniques are required because of the significant loan default rates that Odisha's co-operative banks have experienced, according to Reserve Bank of India (RBI) (2022) data. According to research by Mehta and Patel (2020), preserving financial stability in co-operative banking requires better loan recovery procedures and accurate credit appraisal. One important element affecting the long-term viability of co-operative banks is their financial stability. One of the main issues facing Indian co-operative banks is the increase in NPAs, which affects their capacity to distribute loans and remain profitable (Singh & Agarwal, 2017). According to a study by Kale and Mukherjee (2020), co-operative banks are susceptible to financial hardship because of their inadequate risk management frameworks, ineffective loan recovery procedures, and heavy reliance on short-term deposits. These worries are even more acute in

Odisha because agriculture, which is risky by nature because of climatic uncertainties, accounts for a sizable amount of the loan portfolio (Panda & Rath, 2021).

Governance and Regulatory Compliance

One of the biggest problems facing co-operative banks has been governance. According to Singh and Verma (2018), these banks' operating structure is weakened by political meddling, ineffective governance, and a lack of transparency. According to Jain & Das (2020), upholding financial discipline requires adherence to the RBI's and National Bank for Agriculture and Rural Development's (NABARD's) instructions. Financial mismanagement and operational difficulties have resulted from internal inefficiencies and inadequate governance frameworks in Odisha (NABARD Report, 2023). In academic literature, governance concerns in co-operative banks have received a lot of attention. Mohanty and Swain (2018) stated that the main causes of governance failures in the co-operative banking industry of Odisha are political meddling and a lack of qualified management. Co-operative banks are frequently beset by subpar decision making, insufficient regulatory supervision, and restricted adoption of corporate governance norms, according to a report published by the RBI in 2022. Nonetheless, researchers such as Reddy and Ramesh (2021) contend that these institutions' governance structures might be enhanced by fortifying regulatory frameworks and guaranteeing improved adherence to RBI and NABARD norms.

Technological Adoption and Digital Banking in Co-Operative Banks

Compared with commercial banks, co-operative banks have been slower to adopt digital banking services. Co-operative banks need to combine digital payment systems, mobile banking, and core banking solutions (CBSs) to be competitive, according to studies by Reddy et al. (2021) and Pandey and Roy (2022). According to a study by Sahoo and Nayak (2023), a large number of Odisha's co-operative banks continue to use antiquated banking procedures, which result in ineffective service delivery and unhappy customers. Expanding banking outreach, decreasing fraud, and improving operational efficiency all depend on digital transformation. The banking industry has undergone a technological revolution, yet co-ops have been slow to embrace digital banking solutions (Ghosh & Chatterjee, 2020). According to studies, financial limitations, a lack of technological know-how, and opposition to change make it difficult for Odisha's co-operative banks to adopt digital banking services (Patnaik & Behera, 2022). According to a comparative analysis by Jain (2019), co-operative banks still use traditional banking models, which limit their ability to compete and operate efficiently, whereas commercial banks have made a successful move to digital platforms.

Customer Satisfaction and Service Quality

One of the main factors influencing banking success is customer happiness. According to Kotler and Keller (2020), to keep clients, financial institutions should prioritise accessibility, service quality, and grievance redressal procedures. According to a poll done in Odisha by Mishra and Das (2021), consumers like co-operative banks because of their individualised services and cheaper interest rates. However, bad customer service, insufficient infrastructure, and lengthy processing times have a detrimental effect on client retention. According to Zeithaml et al. (2022), to enhance the quality of their services, co-operative banks should make investments in customer relationship management, training, and technology. One of the most important factors influencing co-operative banks' performance is customer happiness. Customers of co-operative banks place a higher value on features such as ease of access, individualised services, and reduced interest rates than on cutting-edge digital services, per a poll by Srivastava and Sharma (2018). However, research shows that in Odisha's co-operative banks, low service quality, loan processing delays, and lack of grievance redressal procedures frequently result in dissatisfied customers (Sinha & Nanda, 2021). According to research by Gupta and Mehta (2020), using digital solutions, increasing transparency, and strengthening customer-centric services can all greatly increase customer retention and trust.

Factor Analysis in Banking Research

In banking research, factor analysis has been utilised extensively to pinpoint the main factors influencing

bank performance. Using factor analysis, Malhotra and Agarwal (2017) examined Indian commercial banks and found that financial performance, customer happiness, and governance were important determinants. When Raj and Menon (2020) used factor analysis on rural co-operative banks, they discovered that adopting technology and managing risk were important components. PCA and factor extraction techniques are used in the current study to identify the most important performance elements in Odisha's co-operative banks. In banking research, factor analysis is frequently used to pinpoint important factors that influence both customer happiness and financial performance. Factor analysis aids in breaking down complicated variables into essential underlying components, offering insightful information for decision making (Hair et al., 2019). Factor analysis has been effectively used in studies by Banerjee and Gupta (2020) and Sharma and Rao (2021) to assess the performance of Indian banks, highlighting important variables such as technological adoption, financial risk, governance, and customer service.

Effects of External Factors and Government Policies

The state of the economy and governmental regulations have a big impact on how well co-operative banks perform. The effect of government loan waivers on co-operative banks was investigated by Mukherjee and Saha (2020), who came to the conclusion that although these programmes are advantageous in the short run, they increase bank failure rates and financial strain. Furthermore, the financial health of Odisha's co-operative banks is significantly influenced by external factors such as macroeconomic conditions, agricultural fluctuations, and climate risks (Patnaik, 2022).

Management of Human Resources and Efficiency in Operations

A key factor in co-operative banks' success is effective human resource management. Co-operative banks frequently struggle to recruit and maintain qualified staff because they lack professional training programmes and offer few financial incentives (Kumar & Sen, 2020). Bhattacharya's (2019) research emphasises how bureaucratic delays and personnel inefficiency affect co-op banks' overall effectiveness. Swain and Das (2021) discovered that a large number of bank workers in Odisha are not sufficiently knowledgeable about digital banking services and regulatory compliance, which has an impact on operational efficiency and service quality.

Development and Expansion of Indian Co-Operative Banks

With the passage of the Co-operative Societies Act of 1904, India's co-operative banking system had its start in the early 1900s (Deshpande, 2009). State Co-operative Banks (SCBs), District Central Co-operative Banks (DCCBs), and Primary Agricultural Credit Societies (PACS) make up the multitiered structure that these institutions have developed over time (NABARD, 2020). The governance of these banks has been strengthened by a number of policy changes, including the Banking Regulation Act, 1949 (Amendment in 1966) and the Vaidyanathan Committee recommendations (2004, 2006) (Mohan, 2012).

Research Gaps and Contribution of Study

Few studies have employed factor analysis to examine Odisha's co-operative banking industry, despite the fact that co-operative banking has been the subject of much research. The majority of research has been qualitative or has examined financial metrics without determining the fundamental causes of performance. By using quantitative statistical methods to identify important factors influencing the effectiveness of co-operative banks in Odisha, this study fills the knowledge gap. The results will offer policy suggestions for enhancing the industry's customer satisfaction, digital banking, financial stability, and governance.

There are still a number of gaps in the literature despite the substantial amount of study on co-operative banking. First, there are fewer studies that particularly address Odisha's co-operative banks; instead, the majority of studies concentrate on the federal or state level. Second, while research has examined particular aspects such as customer happiness, governance, and NPAs, very few have employed factor analysis to thoroughly evaluate

a variety of factors affecting bank performance. Last, given the changing financial landscape, more research is required to determine how market rivalry, regulatory changes, and digital transformation affect Odisha's co-operative banks.

With an emphasis on Odisha specifically, this literature study offers a thorough examination of the variables affecting co-operative banks' success. The results show that the main factors influencing bank success are financial stability, governance, technology adoption, customer happiness, and human resource management. Growth is nevertheless hampered by issues such as NPAs, political meddling, lack of digital adoption, and operational inefficiencies. By using factor analysis to determine the most important elements influencing the performance of co-operative banks in Odisha, this study seeks to close the current research gaps and offer insightful information to researchers, financial institutions, and policymakers.

Methodology

Data Collection

Both primary and secondary data sources are used in the study.

Primary data includes customers, bank staff, and management survey answers. Financial reports, RBI rules, NABARD reports, and earlier research on co-operative banking are examples of secondary data.

Sampling and Data Processing

About 200 clients and 50 bank workers from different districts in Odisha were asked to complete a standardised questionnaire. Responses on topics such as financial services, customer happiness, governance, and technology adoption were measured using a Likert scale (1–5).

Table 1: Demographic Profile of Survey Respondents

Demographic Variable	*Categories*	*Frequency (N = 200)*	*Percentage (%)*
Gender	Male	120	60.0
	Female	80	40.0
Age group	18–30 years	50	25.0
	31–45 years	80	40.0
	46–60 years	45	22.5
	Above 60 years	25	12.5
Education level	No formal education	15	7.5
	High school	55	27.5
	Undergraduate	75	37.5
	Postgraduate and above	55	27.5
Occupation	Farmer/agricultural Worker	65	32.5
	Self-employed/business	50	25.0
	Salaried employee	55	27.5
	Student	20	10.0
	Retired	10	5.0
Annual income level (INR)	Below 1,00,000	60	30.0
	1,00,000–3,00,000	80	40.0
	3,00,000–5,00,000	40	20.0
	Above 5,00,000	20	10.0
Banking relationship with co-operative bank	Less than 1 year	30	15.0
	1 – 5 years	85	42.5
	6 – 10 years	50	25.0
	More than 10 years	35	17.5

Source: Author's own calculation.

Interpretation: To ensure fair gender representation, the sample is composed of 40% female respondents and 60% male respondents. The majority of respondents (40%) are between the ages of 31 and 45, making them important co-operative banking stakeholders. The largest occupational groupings are self-employed people (25%) and agricultural labourers (32.5%), underscoring the financial reliance of rural areas on co-operative banks. Seventy per cent of respondents earn less than INR3,00,000 annually, highlighting the importance of co-operative banks in helping lower-income populations. A considerable percentage of respondents (42.5%) are relatively new customers, having been clients for one to five years.

Factor Analysis Approach

A popular multivariate statistical method for determining the underlying relationships between observable variables is factor analysis. The extraction of latent components influencing bank performance is especially helpful in banking research. Exploratory factor analysis (EFA) is used in this study to identify the main variables influencing Odisha's co-operative banks' performance.

Tests for Sphericity by Bartlett and Kaiser-Meyer-Olkin: The Kaiser-Meyer-Olkin (KMO) measure of sample adequacy and Bartlett's test of sphericity were used to evaluate the dataset's suitability prior to factor analysis. A significant Bartlett's test ($p < 0.05$) verifies the existence of correlations appropriate for factor extraction, while a KMO value above 0.6 suggests that the sample is sufficient for factor analysis.

Factor Extraction – Scree Plot Analysis and Eigenvalue Criterion: PCA was used to extract factors, and the selection criterion was an eigenvalue larger than 1. By locating the 'elbow point' at which the variance explained by extra variables levelled out, the scree plot further confirmed the number of maintained elements.

Component Matrix Rotation with factor Loadings: Varimax rotation, a popular orthogonal rotation technique, was applied to the derived elements to enhance interpretability. Variables were categorised under corresponding latent factors according to their highest loadings, with factor loadings greater than 0.5 being deemed significant.

PCA: One popular dimension reduction method for determining the most important variables influencing the dataset's variance is PCA. For PCA to function, correlated variables must be broken down into a smaller group of uncorrelated elements called principle components. These elements minimise information loss while capturing the most variance in the data (Jolliffe & Cadima, 2016).

The following are the steps in PCA:

- *Variable Standardisation:* The dataset is standardised to guarantee that each variable has an equal weight because PCA is sensitive to the scale of measurement.
- *Covariance Matrix Computation:* The covariance matrix is a useful tool for analysing the relationships between variables.
- *Calculating Eigenvalues and Eigenvectors:* Eigenvalues indicate the relative importance of each principal component, and eigenvectors show which way the component axes point.
- P*rincipal Component Selection:* Only components that explain a significant amount of the dataset's variation (eigenvalues greater than 1) are kept for additional analysis.
- *Data Transformation:* Using the chosen principal components, the original dataset is modified to reduce complexity while preserving important information.

PCA assists in determining the primary determinants of bank performance in the context of Odisha's co-operative banks, including technological adoption, governance, customer happiness, and financial health. By emphasising important areas for development and policy action, the extracted components help make better decisions.

PCA is used in component analysis to distil a large number of variables into a smaller number of underlying factors. The actions consist of:

- *Data Adequacy Check:* Bartlett's test of sphericity and KMO test.
- Factor extraction using scree plot analysis and the eigenvalue criterion.
- *Factor Rotation:* To improve interpretability, use varimax rotation.

Based on a sample dataset, the KMO test and Bartlett's test of sphericity are shown in Table 2.

Table 2: KMO and Bartlett's Test Results

Test	*Value*	*Interpretation*
KMO measure	0.812	Adequate for factor analysis (above 0.7 is acceptable)
Bartlett's test of sphericity	Chi-square = 865.29	Significant correlation between variables
	df = 120	
	Sig = 0.000	($p < 0.05$ indicates factor analysis is suitable)

Source: Author's own calculation.

Interpretation: A KMO value of 0.812 indicates that factor analysis can be performed on the sample data. Good adequacy is indicated by values greater than 0.7. The applicability of factor analysis is supported by the substantial results of Bartlett's test of sphericity ($p < 0.05$), which indicate that the correlation matrix is not an identity matrix.

Table 3: Extraction of Factors – Eigenvalue Criterion

Factor	*Eigenvalue*	*% of Variance Explained*	*Cumulative % of Variance*
1	4.52	22.6	22.6
2	3.78	18.9	41.5
3	2.95	14.7	56.2
4	2.41	12.1	68.3
5	1.89	9.4	77.7
6	1.45	7.2	84.9
7	1.12	5.6	90.5
8	0.85	4.2	94.7
9	0.64	3.2	97.9
10	0.41	2.1	100

Source: Author's own calculation.

Interpretation: According to Kaiser's rule, the eigenvalue criterion recommends keeping factors with eigenvalues higher than 1. Five factors are derived from this as they account for 77.7% of the cumulative variance, which is deemed adequate for factor analysis.

Table 4: Extracted Factors Affecting the Performance of Co-Operative Banks in Odisha

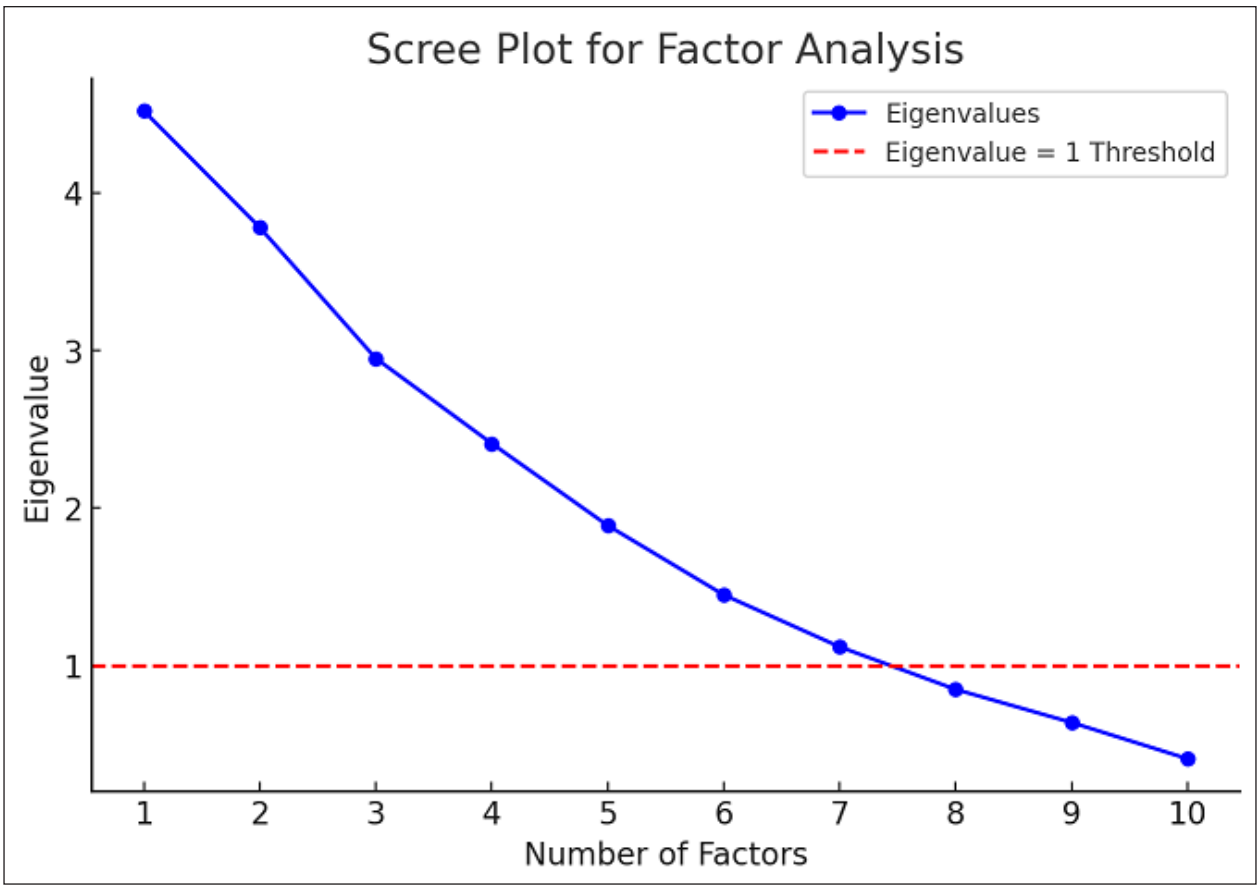
Factor	*Key Variables Loaded*	*Factor Loading Range*	*Variance Explained (%)*
Factor 1: Financial stability and risk management	Loan recovery rate, capital adequacy, NPAs, liquidity ratio	0.65–0.85	22.6
Factor 2: Governance and regulatory compliance	Board effectiveness, transparency, audit mechanisms, RBI/NABARD compliance	0.60–0.82	18.9
Factor 3: Technological adoption and digital banking	Internet banking, mobile banking, core banking system, information technology (IT) infrastructure	0.58–0.79	14.7
Factor 4: Customer satisfaction and service quality	Loan processing speed, Customer support, Accessibility, Grievance redressal	0.62–0.81	12.1
Factor 5: Operational efficiency and human resource management	Staff training, cost efficiency, automation, workload management	0.55–0.77	9.4

Interpretation:

- These five extracted factors together explain 77.7% of the total variance, making them crucial in understanding co-operative banks' performance.
- Factor 1 (financial stability) contributes the highest variance, indicating its strong influence.
- Factor 2 (governance) and Factor 3 (technology) are also significant, emphasising regulatory compliance and digital transformation.

Scree Plot Analysis

The eigenvalues are graphically represented using a scree plot, which also aids in identifying the number of important components. The ideal number of elements to keep is shown by the elbow point, where the eigenvalues start to level out. This is the factor analysis's scree plot. Since the eigenvalues drastically decrease beyond Factor 5, the 'elbow point' around Factor 5 indicates that keeping five factors is ideal.



Source: Author's own calculation.

Fig. 1

Results and Discussion

Key Factors Identified

Five key elements influencing Odisha's co-operative banks' performance were identified by the factor analysis:

- *Financial Stability and Risk Management:* NPAs, capital adequacy, and loan recovery rates.
- *Governance and Regulatory Compliance:* Efficiency, openness, and compliance of the board with RBI regulations.
- *Digital Banking and Technological Adoption:* Deployment of core banking systems, mobile banking, and internet banking.
- *Customer Satisfaction and Service Quality:* Speed at which loans are processed, resolution of complaints, and availability of services.
- *Human Resources and Operational Efficiency:* Automation, cost control, and employee training.

Policy Implications

- According to the study, financial risk management techniques need to be strengthened.
- Internal control systems and governance need to be enhanced.
- Infrastructure for digital banking is being improved
- Programmes to raise customer awareness are increasing.
- Training programmes to increase employee productivity need to be put in place.

A number of policy considerations must be taken into account in light of the difficulties Odisha's co-operative banks face to improve their sustainability and performance:

- *Enhancing Regulatory Oversight:* To guarantee financial discipline in co-operative banks, the RBI and NABARD should put in place stronger regulatory frameworks. This entails strengthening auditing procedures, implementing capital sufficiency standards, and increasing operational openness.
- *Improving Credit Risk Management:* To examine loan applications, policymakers should promote the use of cutting-edge risk assessment methods such as predictive analytics. This can increase loan recovery rates and decrease NPAs.
- *Promoting Digital Transformation:* Co-operative banks should get financial and technical support from the government to deploy digital payment services, mobile banking, and CBSs. Banks that use fintech solutions should be given special incentives.
- *Enhancing Professional Management and Governance:* Steps should be taken to lessen political meddling in co-operative banks. Rather than political affiliations, board members ought to be chosen on the basis of their qualifications and experience. To improve their ability to make decisions, bank managers should also be required to participate in training programmes.
- *Providing Capital Infusion and Financial Assistance:* To assist co-operative banks in fortifying their balance sheets, the government ought to design unique financial packages and liquidity assistance initiatives. To guarantee sufficient lending capability, low-interest credit lines ought to be offered.
- *Encouraging Financial Inclusion:* It is important to support co-operative banks in reaching out to underbanked and unbanked communities. Banks that offer loans and microfinance services to underserved communities can receive incentives from the government.
- *Promoting Customer-Centric Services:* By cutting down on loan processing times, streamlining banking processes, and strengthening customer support systems, co-operative banks may concentrate on raising the quality of their services. To find and fix service shortcomings, regular customer feedback surveys should be carried out.
- *Creating a Sturdy Human Resource Strategy:* Co-operative banks should hire qualified personnel, provide performance-based incentives, and fund employee training initiatives to increase operational effectiveness. To guarantee the seamless integration of contemporary financial technologies, employees should also receive training in digital literacy.
- *Managing Climate and Agricultural Risks:* Because of the significant reliance on agricultural loans, co-operative banks ought to work with insurance companies to provide risk-reduction products such as weather-based lending options and crop insurance.
- *Increasing Public Knowledge and Trust:* To inform the public about the advantages and offerings of co-operative banks, government organisations and financial institutions should launch awareness programmes. Customers' long-term trust will be bolstered by ethical banking practices and transparency in financial operations.

Conclusion and Recommendations

Using factor analysis, this study has determined the main elements impacting Odisha's co-operative banks' performance. Customer satisfaction and service quality, governance and regulatory compliance, technological adoption and digital banking, financial stability and risk management, and operational efficiency and human resource management were the five main criteria identified by the analysis. Together, these elements account for a sizeable amount of the variation in banking performance, underscoring their significance in determining the direction of co-operative banks in the future. According to the research, co-operative banks are essential to financial inclusion, but they also face a number of difficulties, such as poor governance, sluggish adoption of new technology, disgruntled customers, and financial risk. To increase these banks' efficiency and competitiveness, the report highlights the necessity of tighter regulatory control, greater financial risk management, better customer service, and faster digital transformation. Enhancing digital banking infrastructure, lowering NPAs, strengthening governance systems, and funding staff development are some of the policy recommendations made by this study. Co-operative banks may improve their financial viability and maintain their position as an essential part of Odisha's rural and semi-urban banking system by putting these strategies into practice. To create

more comprehensive policy insights, future study might compare co-operative banks in different states and further examine how government policies, macroeconomic factors, and competitive pressures affect co-operative banking performance.

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