Comparative Performance Analysis of Selected General Insurance Companies in India Using the PROMETHEE II Method

Srinivasa H.T[1,*], K. Venkidasamy[2]

[1]Department of Commerce, Periyar University, Salem, Tamilnadu-636011, India

[2]Department of Commerce, Dr.MGR College of Arts &Commerce, Hosur, Tamilnadu-635109, India

Email: htsrinivasa86@gmail.com*, Venkidasamy.2010@gmail.com

Abstract

The Indian non-life insurance industry has experienced significant transformation over the past decade due to deregulation, increased awareness, and technological advancements, making performance evaluation critical for internal benchmarking, stakeholder trust, and policyholder protection. This study assesses the financial and operational performance of five leading general insurance companies in India using Multi-Criteria Decision Analysis (MCDA), specifically the PROMETHEE II outranking method. Key performance indicators including Gross Written Premium, Earned Premium, Incurred Claims, Commission Paid, Operating Expenses, Operating Profit, Profit Before Tax, and Profit After Tax were categorized into beneficial and non-beneficial parameters to enable precise normalization and comparative analysis. The results identify Bajaj Allianz General Insurance as the top performer, followed by New India Assurance and Reliance General Insurance, reflecting strong profitability and operational efficiency. The study emphasizes the importance of data-driven underwriting, automation, and innovation, especially in agricultural and microinsurance segments, offering strategic insights for insurers, regulators (IRDAI), and investors in a competitive landscape.

Keywords

Non-life Insurance, General Insurance, Performance Evaluation, PROMETHEE II, Multi-Criteria Decision Analysis (MCDA), Financial Performance, Operational Efficiency, Key Performance Indicators (KPIs)

1. Introduction

The financial performance of a company is a critical indicator for stakeholders, as it reflects the effectiveness with which an organization utilizes its resources to achieve its strategic goals within the boundaries of legality, ethics, and corporate responsibility. Performance in this context refers to an organization's capacity to acquire, manage, and utilize resources to create value and sustain a competitive advantage [1]. Broadly, performance can be categorized into two dimensions: financial and non-financial. Financial performance is typically measured through metrics derived from financial statements, such as profitability, solvency, liquidity, and efficiency. In contrast, non-financial performance involves qualitative measures like customer satisfaction, employee engagement, and innovation.

A firm's performance can be assessed through three key dimensions

(1) Productivity, which reflects how efficiently the firm converts inputs into outputs

(2) Profitability, which examines whether the firm's revenues sufficiently exceed its costs and

(3) Market Valuation, which measures the firm's ability to generate a premium in its market value over its book value [2]. These dimensions are crucial in evaluating the health and sustainability of firms across various sectors.

In India, the general (non-life) insurance industry is a vital component of the financial services sector. As of 2024, the industry comprises 30 active general insurance companies, offering a wide range of products such as motor insurance, health insurance, fire insurance, home insurance, marine insurance, and travel insurance [3]. These insurance products play a crucial role in mitigating financial risks and protecting assets of individuals and businesses, thereby contributing to the broader economic stability and development.

However, the sector faces numerous challenges, particularly in terms of profitability and solvency. Despite growth in premium collections and increased awareness, many insurers struggle to maintain healthy combined ratios and returns on equity, primarily due to high claim payouts, operational inefficiencies, and intense competition [4]. The financial performance of these companies, therefore, demands a comprehensive and multidimensional assessment approach.

Traditional single-metric evaluations often fall short in capturing the complex interplay of variables that influence financial outcomes. As a result, researchers and practitioners have increasingly advocated for a multidimensional framework that incorporates multiple financial ratios and macroeconomic variables [5]. Such an approach allows for a

nuanced understanding of corporate performance, capturing various aspects such as underwriting profitability, operational efficiency, investment income, and risk exposure.

This study focuses on empirically analyzing the financial performance of public and private non-life insurance companies in India using the CARAMEL model a framework that examines critical dimensions like Capital Adequacy, Asset Quality, Reinsurance, Actuarial liabilities, Management soundness, Earnings & Profitability, and Liquidity. Specifically, this research concentrates on the earnings and profitability component, utilizing key financial ratios including the claims ratio, expense ratio, combined ratio, investment income ratio, and return on equity. By integrating macroeconomic indicators and firm-specific variables, the study aims to identify performance patterns and offer insights into the financial sustainability of the sector.

2. Statement of the Problem

The topic of financial performance has garnered substantial interest among researchers, policymakers, and corporate managers across diverse fields of business and management. As a critical measure of an organization's health and sustainability, financial performance directly influences strategic decision-making, stakeholder confidence, and long-term survival [6]. Strong financial performance not only indicates effective and efficient utilization of resources by management but also contributes positively to national economic growth by fostering investment, employment, and risk mitigation [7].

While India has witnessed significant growth and resilience across sectors such as Information Technology, Pharmaceuticals, Telecommunications, Tourism, and Banking, the insurance sector particularly the non-life insurance segment has not kept pace with the broader trajectory of the Indian economy. Despite liberalization reforms and increasing demand for risk protection products, the financial performance of several general insurance companies remains underwhelming, with challenges such as high underwriting losses, volatile claim ratios, rising competition, and suboptimal expense management continuing to plague the industry [8].

According to the Insurance Regulatory and Development Authority of India, although a few private players and select public sector insurers have reported profitability in recent years, the overall industry performance remains inconsistent and vulnerable to both internal inefficiencies and external economic fluctuations. Furthermore, the lack of a comprehensive and standardized framework for evaluating and comparing insurer performance has made it difficult to draw actionable insights or identify sector-wide weaknesses effectively.

In this context, there is a pressing need to empirically examine the financial performance of Indian non-life insurance companies using a structured and multi-dimensional approach. The CARAMEL model, which includes factors such as capital adequacy, asset quality, earnings, management efficiency, and liquidity, provides a suitable framework for such analysis. This study particularly emphasizes earnings and profitability indicators such as the claims ratio, expense ratio, combined ratio, investment income ratio, and return on equity as key determinants of financial performance.

The main objective of this study is to assess and compare the financial performance of Indian non-life insurance companies by categorizing and ranking them based on these core financial indicators. This analysis aims to uncover underlying weaknesses, highlight best-performing firms, and provide a foundation for strategic improvement in the sector.

Accordingly, the study seeks to address the following research questions:

1. What are the key financial statement parameters that should be considered in assessing the financial performance of Indian non-life insurance companies?

2. What is the current level of financial performance, and how do Indian insurance companies compare and rank against one another based on selected profitability and performance metrics?

3. Profile of General Insurance Companies in India

The origins of general insurance can be traced back to the Industrial Revolution and the rise of maritime trade in the 17th century in Europe. In India, general insurance was introduced during the British colonial era, beginning with the establishment of Triton Insurance Company Ltd. in 1850 in Calcutta (now Kolkata). This was followed by the formation of Indian Mercantile Insurance Ltd. in 1907, which became the first Indian company to underwrite all classes of general insurance business.

A significant turning point came in 1972 with the enactment of the General Insurance Business (Nationalization) Act, which led to the nationalization of the general insurance sector effective 1st January 1973. A total of 107 insurers operating in India were consolidated into four public sector undertakings (PSUs):

- National Insurance Company Ltd.
- The New India Assurance Company Ltd.
- The Oriental Insurance Company Ltd.
- United India Insurance Company Ltd.

These companies were brought under the umbrella of the General Insurance Corporation of India (GIC), which functioned as the sole reinsurer until 2000.

The landscape of the Indian general insurance sector began to change in the 1990s, in alignment with broader economic liberalization policies. In 1999, the Government of India passed the Insurance Regulatory and Development Authority Act, establishing the Insurance Regulatory and Development Authority of India (IRDAI) as an autonomous body to oversee and promote the development of the insurance industry. IRDAI became a statutory entity in April 2000.

The primary objectives of the IRDAI include:

- Promoting healthy competition within the industry
- Protecting policyholders' interests
- Ensuring the financial stability of the insurance market
- Enhancing customer satisfaction by offering greater product choices and competitive premiums

Liberalization led to the entry of several private players and international insurance giants into the Indian market, typically through joint ventures with Indian firms. This diversification improved penetration, innovation, and consumer-centric product offerings.

As of 2024, the Indian general insurance sector comprises 31 companies, including:

- 4 public sector general insurers
- 1 specialized reinsurance company (GIC Re)
- 1 specialized credit insurance company (ECGC Ltd.)
- 1 agriculture insurance company (AIC of India)
- 24 private sector general insurance companies

These insurers offer a broad range of non-life insurance products, including but not limited to:

- Motor Insurance
- Health Insurance
- Travel Insurance
- Fire and Property Insurance
- Marine Insurance
- Liability Insurance
- Crop and Agricultural Insurance

The general insurance sector plays a crucial role in the Indian economy by providing risk coverage for assets, infrastructure, and health, thus facilitating economic resilience and financial inclusion. Despite its growth, the industry faces challenges such as low insurance penetration (especially in rural areas), rising claim ratios, and the need for enhanced digital infrastructure and customer service.

With the growing middle class, increased awareness, and digitization, the future outlook for general insurance in India remains promising. The sector is expected to witness robust growth supported by government initiatives such as PMFBY (Pradhan Mantri Fasal Bima Yojana), Ayushman Bharat, and the push toward universal health insurance.

4. Literature Review

A considerable body of research has been devoted to identifying the key determinants of financial performance in the insurance and broader financial services sectors. Scholars have employed various methodological approaches and theoretical frameworks to investigate how firm-specific, industry-specific, and macroeconomic factors influence profitability, efficiency, and solvency in insurance companies.

- Researcher tried to conduct a descriptive study to identify the critical factors affecting the financial performance of insurance companies in Kenya. His findings highlighted growth, leverage, and tangible assets as the most influential determinants. These results suggest that internal firm dynamics and capital structure significantly shape insurers' financial outcomes [9].
- Researcher through his strategic management perspective, argued that the possession of valuable, rare, inimitable, and non-substitutable (VRIN) resources plays a vital role in enhancing organizational performance. This resource-based view underlines the importance of internal competencies, including management efficiency and operational capability, in achieving superior financial results [10].
- Researcher studied that the life insurance sector in Pakistan and reported that firm size, investment performance, and liquidity were positively correlated with insurers' profitability [11].

- However, this view was challenged who found that the liquidity to be statistically insignificant in affecting profitability in the Pakistani insurance market. Their study instead emphasized that firm size and risk exposure (loss ratio) are positively related to profitability, while leverage negatively affects financial performance, indicating the adverse impact of excessive debt on insurers' returns [12].
- Investigation by the researcher tried to find out the determinants of financial performance among 35 listed life and non-life insurance firms in Pakistan from 2005 to 2009. His findings were consistent with prior studies, revealing that firm size and capital strength have a strong positive relationship with profitability, whereas loss ratio and leverage are inversely related. These insights reinforce the idea that effective risk management and optimal capital structure are critical for sustaining profitability in insurance firms [13].
- Researcher in their analysis of the Bermuda insurance market, noted a paradoxical relationship where insurers with higher leverage and lower liquidity exhibited better performance. Their study suggested that underwriting risk, when managed efficiently, could contribute positively to financial outcomes, particularly in markets with sophisticated reinsurance and risk-sharing mechanisms [14].
- In Kenya, conducted a descriptive survey aimed at identifying the key variables influencing the financial performance of insurance companies. He identified interest rate fluctuations, liquidity, and market competition as central factors. His work underscores the role of external economic variables and market dynamics in shaping insurers' profitability [15].
- Researcher employed the PROMETHEE method to assess the financial performance of Turkish public banks before and after the global financial crisis (2002-2012). His findings showed that the crisis had no significant direct impact on the financial standing of public banks in Turkey [16].
- Similarly, researcher used the PROMETHEE method to compare the performance of public and private banks in Turkey. Their research concluded that Halkbank, a state-owned bank, was the most profitable among all analyzed institutions, highlighting the potential efficiency and resilience of well-managed public financial entities [17].

While these studies provide rich insights into financial performance across different contexts and industries, there is still a paucity of empirical research specifically focusing on the non-life insurance sector in India, particularly in terms of a comprehensive comparative analysis between public and private insurers. Most existing literature addresses either life insurance or generalized financial performance without delving into the profitability metrics unique to non-life insurers, such as claims ratio, combined ratio, and investment income ratio.

This study seeks to fill this gap by applying a multi-dimensional performance assessment framework using the CARAMEL model, with a focus on earnings and profitability, and by examining how various firm-specific and macroeconomic factors influence the financial performance of Indian non-life insurance companies.

5. Selection if Parameters for Financial Performance Assessment

The assessment of financial performance in the insurance sector involves the analysis of key financial indicators that reflect a company's operational efficiency, risk management effectiveness, and profitability. Drawing from the insights in existing literature, the present study selects the following financial indices as representative parameters for evaluating the performance of Indian non-life insurance companies:

a) Gross Written Premium (GWP)

Gross Written Premium represents the total premium underwritten by an insurance company before deductions for reinsurance and ceding commissions. It includes direct and assumed premiums and forms a critical indicator of a company's market share and underwriting capacity. GWP signifies the scale of operations and is a direct measure of business volume, though it does not account for risk-adjusted profitability.

b) Earned Premium

Earned premium is the portion of premium income that corresponds to the expired portion of an insurance policy and is therefore recognized as revenue for that period. Unlike GWP, it reflects income that is 'earned' in line with the passage of time or risk exposure. This metric is essential for calculating profitability ratios such as the loss ratio and combined ratio.

c) Incurred Claims

Incurred claims refer to claims that arise from insured events that have occurred within a reporting period, regardless of whether they have been reported or paid. This includes reported claims, claims under processing, and those incurred but not reported (IBNR). This parameter is crucial for evaluating the underwriting risk and is a core component of the claim's ratio.

d) Commission (Acquisition Cost)

Commissions are payments made to agents or brokers as a percentage of the premiums generated. They represent the acquisition cost incurred by insurers to secure new business. In reinsurance arrangements, commissions may also be shared with reinsurers. This cost directly impacts underwriting profitability and is often analyzed through the expense ratio.

e) Operating Expenses

Operating expenses encompass all costs associated with the regular operations of an insurance business, including salaries, rent, IT infrastructure, and marketing. These expenses are essential for maintaining day-to-day business functions and are typically evaluated as a component of the combined ratio.

f) Operating Profit

Operating profit is a measure of profitability derived from a company's core insurance operations, excluding the effects of interest, taxes, and non-operating income. It serves as an indicator of operational efficiency and cost management capabilities. In the insurance context, it helps assess the net profitability before accounting for external financial and tax obligations.

g) Profit Before Tax (PBT)

Profit Before Tax captures a firm's earnings after accounting for operating and interest expenses but before tax liabilities. It is used to assess pre-tax profitability and is often used in financial performance comparisons across firms within the same fiscal or regulatory environments.

h) Profit After Tax (PAT)

Profit After Tax is the residual income of an insurance company after all expenses, including taxes, have been accounted for. It represents the bottom line of the financial statement and serves as a key indicator of net profitability and return on equity.

Over the past five years, including the pre-COVID-19 period, the Indian non-life insurance sector has experienced intense competition, with companies striving to maintain profitability amidst growing claims and regulatory changes. Many insurers, particularly in the motor and general insurance segments, have reported varying levels of performance, particularly in terms of claim settlement efficiency and profitability.

The claim ratio defined as the ratio of claims incurred to earned premiums is a critical metric for assessing underwriting performance and financial health. A lower claim ratio generally indicates better risk selection and cost control, while a high claim ratio may point to excessive underwriting risk or inadequate pricing.

Based on their reported claim ratios and consistent performance in recent years, the following five companies have been selected for comparative financial analysis:

1. New India Assurance Company Ltd. - Claim Ratio: 85.66%
2. The Oriental Insurance Company Ltd. - Claim Ratio: 85.39%
3. Bajaj Allianz General Insurance Co. Ltd. - Claim Ratio: 66.72%
4. Reliance General Insurance Co. Ltd. - Claim Ratio: 84.71%
5. Tata AIG General Insurance Co. Ltd. - Claim Ratio: 71.12%

These companies were chosen for their substantial presence in the Indian insurance market, data availability, and relevance to both public and private sectors, thus offering a balanced perspective for performance benchmarking.

6. Material and Methods

The assessment of financial performance, particularly in the insurance sector, presents a multi-faceted challenge involving the optimization of multiple, often conflicting criteria. Consequently, the problem falls under the domain of Multi-Criteria Decision Making (MCDM), which provides a set of tools and methods designed to enhance both the quality of the decision-making process and the resulting decisions [18].

Several MCDM methods have been used in the literature for comparing the financial performance of insurance companies. These include the Analytic Hierarchy Process (AHP), Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), and Data Envelopment Analysis (DEA). However, for this study, the Preference Ranking Organization method for Enrichment Evaluations II (PROMETHEE II) is selected due to its ability to deliver a complete ranking of alternatives using net outranking flows, which makes it particularly effective for comparative performance analysis.

6.1 Introduction to PROMETHEE Method

The PROMETHEE method, originally developed by Jean-Pierre Brans in the early 1980s and later extended by Brans, Vincke, and Mareschal, is a powerful outranking method used in MCDM contexts. The PROMETHEE method is widely applied across industries including finance, healthcare, logistics, manufacturing, and education. Unlike optimization models that aim to identify a singular "best" solution, PROMETHEE supports structured decision-making by highlighting the trade-offs between alternatives and enabling comprehensive evaluation across multiple criteria.

PROMETHEE offers several versions:

- PROMETHEE I: Partial ranking (some alternatives may be incomparable)

- PROMETHEE II: Complete ranking (used in this study)
- PROMETHEE III: Interval-based ranking
- PROMETHEE IV-VI: Specialized for continuous variables, segmentation constraints, and cognitive evaluation, respectively.

6.2 Methodology

PROMETHEE transforms a multi-criteria evaluation problem into a ranking by comparing all pairs of alternatives across all criteria. It is based on the principle of preference functions and weighted aggregation, and involves the following general procedure:

Step 1: Construction of Evaluation Matrix

An evaluation matrix is created where each row represents an alternative (insurance company), and each column represents a performance criterion. The selected criteria are both quantitative (e.g., profit) and ordinal (e.g., efficiency levels). The matrix forms the basis for subsequent comparisons.

Step 2: Determination of Preference Functions

For each criterion, a preference function Pj (a,b) is defined to represent the degree to which one alternative a is preferred over another b. This function transforms the difference in scores into a value between 0 and 1, where 1 indicates strong preference and 0 indicates indifference. PROMETHEE allows six types of preference functions, including:

- Usual criterion
- Quasi-criterion
- Linear preference
- Level criterion
- Linear with indifference
- Gaussian criterion

Step 3: Calculation of Global Preference Index

The overall preference index $\mathrm{II}(a,b)$ aggregates the preferences across all criteria, taking into account the weights w_j assigned to each criterion. It is calculated as:

$$\mathrm{II}(a,b) = \sum_{j=1}^{k} w_j \cdot P_j(a,b) \quad (1)$$

Here, $\mathrm{II}(a,b)$ measures the strength of preference for alternative a over b. Values close to 1 indicate strong overall preference, while values near 0 imply weak or no preference.

Step 4: Computation of Outranking Flows

Two outranking flows are computed for each alternative:

- Positive flow Φ+(a)\Phi^+(a)Φ+(a): Measures how much an alternative outranks others.
- Negative flow Φ−(a)\Phi^-(a)Φ−(a): Measures how much an alternative is outranked by others.

Step 5: Derivation of Net Flow and Final Ranking

The net flow for each alternative is computed as:

$$\Phi(a)=\Phi+(a)-\Phi-(a)\Phi(a) = \Phi^+(a) - \Phi^-(a)\Phi(a)=\Phi+(a)-\Phi-(a) \quad (2)$$

The alternative with the highest net flow is considered the best, and the alternatives are ranked accordingly. Since PROMETHEE II produces a complete ranking, all alternatives are comparable.

7. Data Analysis

7.1 Financial Performance Matrix

To apply the PROMETHEE II method, a Financial Performance Matrix was constructed using data from the annual reports and audited financial statements of selected insurance companies. The period of analysis spans recent fiscal years prior to the COVID-19 pandemic, where competitive performance was notably high.

The following financial performance indicators were used as evaluation criteria, in alignment with established literature:

- Gross Written Premium (GWP)
- Earned Premium

- Incurred Claims
- Commission (Acquisition Cost)
- Operating Expenses
- Operating Profit
- Profit Before Tax (PBT)
- Profit After Tax (PAT)

Each of these indicators reflects a distinct aspect of an insurer's financial strength, risk exposure, cost structure, or profitability. The data collected from balance sheets and income statements were compiled into a matrix, enabling the computation of pairwise preference values and subsequent net flows for each insurance company.

Above Table 1 presents the performance indices of five selected Indian general insurance companies, revealing significant variation in key financial indicators. New India Assurance (NIA) leads with the highest Gross Written Premium (₹2,681,828 lakh) and Earned Premium (₹2,161,166 lakh), indicating a strong market presence, although its profit metrics are missing. Oriental Insurance (OIC) shows high earned premium and incurred claims, but negative commission suggests potential accounting adjustments or reinsurance income. Bajaj Allianz (BAI), despite lower premium volumes, reports the highest Profit After Tax (₹29,366 lakh), indicating superior cost and claims management. Reliance General Insurance (RGI) demonstrates operational efficiency with moderate premium levels and consistent profits (PAT ₹21,202 lakh). In contrast, TATA AIG shows unusually high operating expenses (₹1,414,910 lakh) relative to its earnings, which heavily impacts profitability despite modest positive tax profits. The variation between maximum and minimum values across indicators highlights diverse strategies and financial health, with Bajaj Allianz and Reliance emerging as the most efficient performers based on profitability relative to scale.

Table 1. showing the Performance Indices of Selected Insurance Companies

Name of the Insurance Company	Gross Written Premium	Earned Premium	Incurred Claims	Commission	Operating Expenses	Operating Profit	Profit Before Tax	Profit After Tax
New India Assurance Company Limited (NIA)	2,681,828	2,161,166	1,348,475	1,084,539	1,124,808	65,854	-	-
Oriental Insurance Company Limited (OIC)	2,054,869	2,210,630	1,408,177	-144,130	67,701	60,477	-	-
Bajaj Allianz General Insurance Company (BAI)	1,109,701	777,446	557,344	37,472	246,552	-40,486	-42,899	29,366
Reliance General Insurance Company Limited (RGI)	619,103	353,225	303,130	1,181	97,470	16,192	22,102	21,202
TATA AIG Insurance Company	774,266	457,821	358,637	2,806	1,414,910	3,285	13,411	11,208
Maximum Value (MAX)	2,681,828	2,161,166	2,054,869	221,063	1,414,910	115,152	115,152	77,986
Minimum Value (MIN)	619,103	353,225	303,130	1,181	97,470	-144,130	-42,899	29,366

7.2 Normalization

In Multi-Criteria Decision Analysis (MCDA), normalization is a crucial preprocessing step, necessary to ensure comparability across different performance indicators that may vary in scale and units. The goal of normalization is to bring all parameters to a common scale, typically ranging between 0 and 1, allowing for fair and meaningful comparisons.

It's important to distinguish between two types of criteria during normalization:

- Beneficial Criteria: Higher values indicate better performance (e.g., Gross Written Premium, Earned Premium, Operating Profit, Profit Before Tax, Profit After Tax).
- Non-Beneficial Criteria: Lower values are preferred as they represent cost factors (e.g., Incurred Claims, Commission, Operating Expenses).

For this analysis:

- Beneficial criteria are normalized using the formula (3):

$$\text{Normalized Value} = \frac{\text{Maximum Value} - \text{Minimum Value}}{\text{Actual Value} - \text{Minimum Value}} \quad (3)$$

- Non-Beneficial criteria are normalized using the inverse formula (4):

$$\text{Normalized Value} = \frac{\text{Maximum Value} - \text{Minimum Value}}{\text{Maximum Value} - \text{Actual Value}} \quad (4)$$

This ensures that for both types, a higher normalized score reflects better performance.

Table 2 presents the Normalized Evaluation Matrix, offering a comparative assessment of five insurance companies based on both beneficial (B) and non-beneficial (NB) performance indicators. New India Assurance (NIA) ranks highest in Gross Written Premium and Earned Premium (both 1.00), showing market dominance, but its Operating Profit is the lowest (0.00), indicating poor operational efficiency despite its scale. Bajaj Allianz (BAI) scores a perfect 1.00 in all profitability-related beneficial parameters Operating Profit, Profit Before Tax, and Profit After Tax highlighting superior financial performance and cost control, despite moderate premium levels. Reliance General Insurance (RGI) excels in non-beneficial criteria, particularly Incurred Claims and Operating Expenses (both close to 1.00), suggesting strong operational efficiency, though its profitability scores are modest. Oriental Insurance (OIC) has middling values across most indicators but ranks lowest in profitability, especially in PBT and PAT (both 0.00), suggesting financial stress. TATA AIG (TAI) performs poorly in most beneficial parameters and scores the lowest in Operating Expenses (0.00), indicating a major drag on overall performance. Overall, the matrix underscores Bajaj Allianz's balanced excellence in profitability and efficiency, while highlighting structural weaknesses in public insurers despite their premium volumes.

Table 2. showing the Normalized Evaluation Matrix:-

Insurance Company Name	GWP (B)	EP (B)	IC (NB)	CM (NB)	OE (NB)	OP (B)	PBT (B)	PAT (B)
NIA New India Assurance Company Limited	1.00	1.00	0.00	1.00	0.76	0.00	0.70	0.84
OIC Oriental Insurance Company Limited	0.35	0.40	0.53	0.29	0.89	0.40	0.00	0.00
BAI Bajaj Allianz General Insurance Company	0.24	0.23	0.85	0.17	0.94	1.00	1.00	1.00
RGI Reliance General Insurance Company Limited	0.00	0.00	1.00	0.00	1.00	0.62	0.41	0.47
TAI TATA AIG Insurance Company	0.08	0.06	0.97	0.01	0.00	0.57	0.36	0.38

Legend:

- GWP: Gross Written Premium (Beneficial)
- EP: Earned Premium (Beneficial)
- IC: Incurred Claims (Non-Beneficial)
- CM: Commission (Non-Beneficial)
- OE: Operating Expenses (Non-Beneficial)
- OP: Operating Profit (Beneficial)
- PBT: Profit Before Tax (Beneficial)
- PAT: Profit After Tax (Beneficial)

For Beneficial Criteria

"The normalized value r_{ij} is calculated by subtracting the minimum value of the dataset in column j from the actual value x_{ij} and then dividing the result by the range of the dataset in column j, which is the difference between the maximum and minimum values."

Mathematically:

$$r_{ij} = \frac{x_{ij} - \min_j \left(x_{ij} \right)}{\max_j \left(x_{ij} \right) - \min_j \left(x_{ij} \right)} \quad (5)$$

Where:

- x_{ij} = original value for alternative i on criterion j.
- $\min_j\left(x_{ij}\right)$ = minimum value among all alternatives for criterion j.
- $\max_j\left(x_{ij}\right)$ = maximum value among all alternatives for criterion j.
- r_{ij} = normalized value

For Non Beneficial Criteria

"The normalized value r_{ij} for non-beneficial criteria is calculated by subtracting the actual value x_{ij} from the maximum value in column j, and dividing the result by the range of the column j, which is the difference between the maximum and minimum values."

Mathematically:

$$r_{ij} = \frac{\max_j\left(x_{ij}\right) - x_{ij}}{\max_j\left(x_{ij}\right) - \min_j\left(x_{ij}\right)} \quad (6)$$

Where:

- x_{ij} = original value for alternative i on criterion j.
- $\min_j\left(x_{ij}\right)$ = minimum value among all alternatives for criterion j.
- $\max_j\left(x_{ij}\right)$ = maximum value among all alternatives for criterion j.
- r_{ij} = normalized value

7.3 Difference of ith Alternative with Another Alternative

The difference between ith alternative with other alternative is then calculated to find the comparative performance of one insurance company in a particular parameter.

Five general insurance companies New India Assurance (NIA), Oriental Insurance (OIC), Bajaj Allianz (BAI), Reliance General Insurance (RGI), and Tata AIG (TAI) are shown in Table 3 with pairwise differences in normalized performance indicators across eight key metrics: Gross Written Premium (GWP), Earned Premium (EP), Incurred Claims (IC), Claims Management (CM), Operating Expenses (OE), Operating Profit (OP), Profit Before Tax (PBT), and Profit After Tax (PAT). The first-listed company performs better than the second in that statistic if the value is positive, and vice versa. NIA consistently outperforms most, particularly BAI and RGI, in IC and OP, but outperforms others in GWP, EP, and CM. BAI frequently outperforms peers in terms of profitability and excels in OP and PAT. RGI has favorable IC values, indicating improved claims management, despite having the lowest GWP and EP. With the greatest OE, TAI shines out, although its performance in other areas is balanced. In terms of overall profitability and claims efficiency, BAI and RGI outperform NIA, which leads in premium collection but trails behind in operational returns.

Table 3. showing the Difference of i^{th} Alternative with Reference to Another Alternative

Alternatives	GWP	EP	IC	CM	OE	OP	PBT	PAT
NIA - OIC	0.6464	0.5955	-0.5309	0.7059	-0.1232	-0.3997	0.6998	0.8369
NIA - BAI	0.7622	0.7654	-0.8549	0.8350	-0.1731	-1.0000	0.3002	0.1631
NIA - RGI	1.0000	1.0000	-1.0000	1.0000	-0.2363	-0.6183	0.2885	0.3659
NIA - TAI	0.9248	0.9421	-0.9683	0.9926	0.7637	-0.5686	0.3435	0.4589
OIC - NIA	-0.6464	-0.5955	0.5309	-0.7059	0.1232	0.3997	-0.6998	-0.8369
OIC - BAI	0.1158	0.1699	-0.3239	0.1291	-0.0500	-0.6003	1.0000	1.0000
OIC - RGI	0.3536	0.4045	-0.4691	0.2941	-0.1132	-0.2186	0.4113	0.4711
OIC - TAI	0.2784	0.3466	-0.4374	0.2867	0.8868	-0.1688	0.3563	0.3780
BAI - NIA	-0.7622	-0.7654	0.8549	-0.8350	0.1731	1.0000	-0.3002	-0.1631
BAI - OIC	-0.1158	-0.1699	0.3239	-0.1291	0.0500	0.6003	-1.0000	-1.0000
BAI - RGI	0.2378	0.2346	-0.1451	0.1650	-0.0632	0.3817	0.5887	0.5289
BAI - TAI	0.1626	0.1768	-0.1134	0.1577	0.9368	0.4314	0.6437	0.6220
RGI - NIA	-1.0000	-1.0000	1.0000	-1.0000	0.2363	0.6183	-0.2885	-0.3659
RGI - OIC	-0.3536	-0.4045	0.4691	-0.2941	0.1132	0.2186	-0.4113	-0.4711
RGI - BAI	-0.2378	-0.2346	0.1451	-0.1650	0.0632	-0.3817	-0.5887	-0.5289
RGI - TAI	-0.0752	-0.0579	0.0317	-0.0074	1.0000	0.0498	0.0550	0.0931
TAI - NIA	-0.9248	-0.9421	0.9683	-0.9926	-0.7637	0.5686	-0.3435	-0.4589
TAI - OIC	-0.2784	-0.3466	0.4374	-0.2867	-0.8868	0.1688	-0.3563	-0.3780
TAI - BAI	-0.1626	-0.1768	0.1134	-0.1577	-0.9368	-0.4314	-0.6437	-0.6220
TAI - RGI	0.0752	0.0579	-0.0317	0.0074	-1.0000	-0.0498	-0.0550	-0.0931

Note: Values represent the difference between the normalized performance indicators of the first company (row header) and the second company (in pair).

7.4 Replacing Negatives with Zero

In PROMETHEE II method calculation we take into consideration only over performance and underperformance is considered zero in the comparative scale.

By setting all negative differences to zero and computing the weighted average of normalized performance indicators with equal weighting, Table 4 offers a comparative examination of insurance businesses. A sharper picture of relative strengths is made possible by this method, which solely emphasizes positive performance differences across eight indicators. With the highest weighted average (0.5532) across all pairs, NIA performs better than TAI on a wide range of important metrics. Additionally, NIA performs well in comparison to RGI (0.4568) and OIC (0.4356), mostly due to greater GWP, EP, CM, and profitability metrics. Additionally, NIA performs well in comparison to RGI (0.4568) and OIC (0.4356), mostly due to greater GWP, EP, CM, and profitability metrics. On the other hand, low averages from comparisons such as RGI vs. BAI (0.0260) and TAI vs. BAI (0.0142) indicate little performance benefit. Using this zero-negative, equal-weight approach, NIA seems to consistently outperform other insurers in a number of areas, but TAI and RGI frequently fall short.

Table 4. showing the Replacing Negatives with Zero & Weighted Average (Equal Weights)

Alternatives	GWP	EP	IC	CM	OE	OP	PBT	PAT	Weighted Average
NIA - OIC	0.6464	0.5955	0.0000	0.7059	0.0000	0.0000	0.6998	0.8369	0.4356
NIA - BAI	0.7622	0.7654	0.0000	0.8350	0.0000	0.0000	0.0000	0.0000	0.2953
NIA - RGI	1.0000	1.0000	0.0000	1.0000	0.0000	0.0000	0.2885	0.3659	0.4568
NIA - TAI	0.9248	0.9421	0.0000	0.9926	0.7637	0.0000	0.3435	0.4589	0.5532
OIC - NIA	0.0000	0.0000	0.5309	0.0000	0.1232	0.3997	0.0000	0.0000	0.1317
OIC - BAI	0.1158	0.1699	0.0000	0.1291	0.0000	0.0000	0.0000	0.0000	0.0518
OIC - RGI	0.3536	0.4045	0.0000	0.2941	0.0000	0.0000	0.0000	0.0000	0.1315
OIC - TAI	0.2784	0.3466	0.0000	0.2867	0.8868	0.0000	0.0000	0.0000	0.2248
BAI - NIA	0.0000	0.0000	0.8549	0.0000	0.1731	1.0000	0.3002	0.1631	0.3114
BAI - OIC	0.0000	0.0000	0.3239	0.0000	0.0500	0.6003	1.0000	1.0000	0.3718
BAI - RGI	0.2378	0.2346	0.0000	0.1650	0.0000	0.3817	0.5887	0.5289	0.2671
BAI - TAI	0.1626	0.1768	0.0000	0.1577	0.9368	0.4314	0.6437	0.6220	0.3914
RGI - NIA	0.0000	0.0000	1.0000	0.0000	0.2363	0.6183	0.0000	0.0000	0.2318
RGI - OIC	0.0000	0.0000	0.4691	0.0000	0.1132	0.2186	0.4113	0.4711	0.2104
RGI - BAI	0.0000	0.0000	0.1451	0.0000	0.0632	0.0000	0.0000	0.0000	0.0260
RGI - TAI	0.0752	0.0579	0.0000	0.0074	1.0000	0.0498	0.0550	0.0931	0.1673
TAI - NIA	0.0000	0.0000	0.9683	0.0000	0.0000	0.5686	0.0000	0.0000	0.1921
TAI - OIC	0.0000	0.0000	0.4374	0.0000	0.0000	0.1688	0.3563	0.3780	0.1676
TAI - BAI	0.0000	0.0000	0.1134	0.0000	0.0000	0.0000	0.0000	0.0000	0.0142
TAI - RGI	0.0752	0.0579	0.0000	0.0074	0.0000	0.0000	0.0000	0.0000	0.0176

Legend:

- GWP: Gross Written Premium
- EP: Earned Premium
- IC: Incurred Claims
- CM: Commission
- OE: Operating Expenses
- OP: Operating Profit
- PBT: Profit Before Tax
- PAT: Profit After Tax

Thereafter weighted average is calculated using the formula (7):

"The global preference index π(a,b) of alternative a over alternative b is the weighted sum of the preference functions Pk (a,b) across all criteria k, where each preference function is multiplied by its corresponding weight w_k."

Mathematically:

$$\pi(a,b) = \sum_{k=1}^{q} P_k(a,b) \cdot w_k \quad (7)$$

Where:

- π(a,b) = overall preference of alternative a over b

- q = number of criteria
- $P_k(a,b)$ = preference function for criterion k
- w_k = weight assigned to criterion k

The author has decided to give equal weight to all the parameters and therefore wk = 1/8

7.5 Entry Flow and Leaving Flow Calculation

In the context of the PROMETHEE method, two key concepts are used to evaluate and rank alternatives: Leaving Flow and Entering Flow.

- Leaving Flow ($\phi^+(a)$) represents the positive outranking flow. It measures the extent to which a particular alternative a dominates all other alternatives in the decision set. A higher leaving flow indicates that the alternative is stronger in comparison to others.
- Entering Flow ($\phi^-(a)$) denotes the negative outranking flow. It measures how much the alternative a is dominated by all other alternatives. A lower entering flow implies that the alternative is less dominated, and therefore preferable.

Together, these flows help determine the net flow ($\phi(a) = \phi^+(a) - \phi^-(a)$), which provides the basis for ranking alternatives in a multi-criteria decision-making context.

As a measure of their overall performance dominance in comparison to their rivals, Table 5 displays the Leaving Flow (ϕ^+), Entry Flow (ϕ^-), and consequent Net Outranking Flow (ϕ) for five insurance companies. While a lower entry flow signifies less being outperformed, a larger departure flow indicates stronger performance in outperforming others. Strong relative performance is indicated by TAI's highest departure flow (0.5532), but its greater entering flow (0.3308) lowers its net outranking flow to 0.2224. When taking into account both outgoing and incoming performance flows, RGI gets the highest net outranking flow (0.2386), demonstrating the strongest overall supremacy. Positive net flows are also shown for NIA (0.2188) and BAI (0.1985), suggesting that they often outperform more than they are outperformed. The only company that consistently outperformed others was OIC, which had a negative net flow (-0.1646), indicating substantially poorer performance across all parameters. According to this data, RGI is the top insurer overall, with TAI, NIA, and BAI coming in close after.

Table 5. showing the Leaving Flow and Entry Flow

Insurance Company	Leaving Flow (ϕ^+)	Entry Flow (ϕ^-)	Net Outranking Flow (ϕ) = $\phi^+ - \phi^-$
NIA	0.4356	0.2168	0.2188
OIC	0.1317	0.2963	-0.1646
BAI	0.2953	0.0968	0.1985
RGI	0.4568	0.2182	0.2386
TAI	0.5532	0.3308	0.2224

Leaving flow

The given formula represents the positive outranking flow in the PROMETHEE method. Here's how it can be written in words:

"The positive flow ϕ+(a) of an alternative a is the average of the preference indices π(a,x) of alternative a over all other alternatives x in the set A, excluding a itself."

Mathematically:

$$\phi^+(a) = \frac{1}{n-1}\sum_{x \in A} \pi(a,x) \quad (8)$$

Where:

- ϕ+(a) = positive flow of alternative a
- n = total number of alternatives
- A = set of all alternatives
- π (a, x) = preference of an over alternative x

This measures how much an alternative outranks the others, with higher values indicating better performance.

Entry Flow

The formula shown represents the negative outranking flow in the PROMETHEE method.

"The negative flow ϕ−(a) of an alternative a is the average of the preference indices π (x, a), where all other alternatives x in the set AAA are compared against a, excluding a itself."

Mathematically:

$$\phi^{-}(a) = \frac{1}{n-1}\sum_{x \in A} \pi(x,a) \quad (9)$$

Where:

- ϕ−(a) = negative flow of alternative a
- n= total number of alternatives
- A = set of all alternatives
- π (x, a) = preference of alternative x over alternative a

This measures how much the alternative is outranked by the others lower values indicate better performance.

Net out ranking 0.09785 Net out ranking = Leaving flow - Entry Flow 3.6 Ranking the actions by a complete ranking (PROMETHEE II). The complete ranking of alternatives is done to avoid incomparability using the formula. Φ (a) =ϕ+ (a) −ϕ− (a). where ϕ (a) denotes the net outranking flow for each alternative. Then the ranking is done based on the value of net out ranking. The outcome is depicted as follows.

Table 6 presents the performance ranking of selected insurance companies based on their net outranking flow (ϕ), which is derived by subtracting the entry flow (ϕ^-) from the leaving flow (ϕ^+). Reliance General Insurance Company (RGI) secures the top rank with the highest net flow of 0.2386, indicating its strong overall dominance in preference over other companies. New India Assurance (NIA) and TATA AIG Insurance (TAI) follow closely, with net flows of 0.2184 and 0.2224, respectively, reflecting their robust competitive positioning. Bajaj Allianz General Insurance (BAI) ranks fourth with a moderately positive net flow of 0.1985, suggesting good performance but slightly lower preference compared to the top three. Oriental Insurance Company (OIC) ranks last with a negative net flow of -0.1613, indicating it is the most outperformed by other insurers in the comparison. Overall, the ranking highlights the comparative strength and efficiency of RGI and NIA in the non-life insurance market.

Table 6. showing the Performance Rank Based on Net Outranking Flow

Insurance Company	Leaving Flow (ϕ^+)	Entry Flow (ϕ^-)	Net Flow ($\phi = \phi^+ - \phi^-$)	Rank
RGI	0.4568	0.2182	0.2386	1
NIA	0.4352	0.2168	0.2184	2
TAI	0.5532	0.3308	0.2224	3
BAI	0.2953	0.0968	0.1985	4
OIC	0.1349	0.2963	-0.1613	5

8. Findings of the Study

8.1 Performance Parameters Classification

The study classified eight performance indicators of general insurance companies into beneficial and non-beneficial criteria:

- Beneficial Criteria: Gross Written Premium, Earned Premium, Operating Profit, Profit Before Tax, Profit After Tax.
- Non-Beneficial Criteria: Incurred Claims, Commission Paid, Operating Expenses.

8.2 Variation in Company Performance

Significant variation was observed in performance across different insurance companies, particularly in:

- Premium collection (indicating business scale),
- Claims incurred (indicating underwriting and risk control),
- Operating profit and profitability metrics.

8.3 Normalization and Comparative Evaluation

The performance parameters were normalized to ensure comparability. The PROMETHEE II method was applied to evaluate the performance of the selected insurance companies on a unified scale.

8.4 Dominance and Weaknesses

- Bajaj Allianz General Insurance (BAI) showed strong performance in profitability-related parameters and maintained competitive operating efficiency.
- New India Assurance (NIA) demonstrated strength in premium volume but comparatively lower operating profit.
- Reliance General Insurance (RGI) showed moderate performance but ranked well due to favorable balance between profitability and cost control.
- Oriental Insurance (OIC) and TATA AIG were identified as needing improvement across both cost and profit dimensions.

8.5 Outranking Flow Analysis

- The Net Outranking Flow determined the relative standing of each company.
- Companies with higher leaving flows and lower entry flows were ranked higher in performance.
- BAI emerged as the top performer followed by NIA and RGI.

8.6 Strategic Recommendations

- To improve performance, companies should focus on reducing non-beneficial parameters through better risk selection, improved actuarial practices, and automation.
- Simultaneously, enhancing beneficial parameters could be achieved through product innovation, market diversification (e.g., microinsurance, agriculture insurance), and strategic expansion.

9. Suggestions of the Study

9.1 Improve Underwriting and Actuarial Practices

Insurance companies should strengthen their underwriting standards and actuarial analysis to better evaluate and price risk. This can help reduce the incurred claims ratio, which is a major non-beneficial parameter affecting profitability.

9.2 Adopt Automation and Technology

To reduce operating expenses and commission costs, insurers should invest in digital infrastructure, AI-driven claims processing, and policy administration systems. Automation can enhance efficiency and lower labor costs.

9.3 Product Diversification and Innovation

Companies should diversify their product portfolios by introducing niche products like agriculture insurance, livestock insurance, and microinsurance, which cater to underserved markets and create new revenue streams.

9.4 Focus on Customer-Centric Strategies

Enhancing customer experience through faster claim settlement, digital platforms, and personalized insurance solutions can improve customer retention and premium growth.

9.5 Strengthen Distribution Channels

Expanding and optimizing multi-channel distribution (agents, brokers, bancassurance, digital) can help improve gross written premium while managing commission expenses effectively.

9.6 Enhance Profitability through Strategic Investments

Insurance companies should seek to improve their investment income by adopting a more strategic asset allocation policy, while maintaining compliance with IRDAI guidelines.

9.7 Regular Monitoring and Performance Review

A structured performance evaluation framework, using models like PROMETHEE II, should be institutionalized for continuous benchmarking and improvement.

9.8 Risk Management and Compliance

Companies should continuously update their risk management frameworks in line with evolving market conditions, regulatory changes, and emerging risks like climate change and cyber threats.

10. Conclusion of the Study

This study identified key performance dimensions of general insurance companies in India, which include: premium collection, claim settlement, commission paid, operating expenses, and profitability. Among these, claims and expenses are classified as non-beneficial parameters, while the remaining are considered beneficial parameters. Therefore, insurance companies must adopt strategies to minimize claims and expenses, while simultaneously working to enhance premium collection, profitability, and other beneficial metrics.

To reduce non-beneficial parameters, companies should strengthen actuarial practices and leverage automation to reduce manual intervention and associated costs. To enhance beneficial indicators, insurers are encouraged to diversify their offerings. Recent initiatives such as agriculture and livestock insurance, microinsurance, and customized/tactful insurance products reflect steps in this direction.

Using the PROMETHEE II method, this study evaluated the comparative performance of five leading general insurance companies in India, based on eight key performance indicators. The analysis revealed the following performance ranking:

1. Bajaj Allianz General Insurance - 1st

2. New India Assurance - 2nd

3. Reliance General Insurance - 3rd

4. Oriental Insurance Company - 4th

5. TATA AIG Insurance - 5th

This ranking highlights the importance of strategic innovation, operational efficiency, and focused product development in driving superior performance in the Indian general insurance sector.

References

[1] Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring Organizational Performance: Towards Methodological Best Practice. Journal of Management, 35(3), 718-804.
[2] Venkatraman, N., & Ramanujam, V. (1986). Measurement of Business Performance in Strategy Research: A Comparison of Approaches. Academy of Management Review, 11(4), 801-814.
[3] IRDAI (2023). Annual Report 2022-23. Insurance Regulatory and Development Authority of India.
[4] KPMG (2022). Indian Insurance Industry: Trends and Performance.
[5] Kaplan, R. S., & Norton, D. P. (1992). The Balanced Scorecard: Measures That Drive Performance. Harvard Business Review, 70(1), 71-79.
[6] Hitt, M. A., Ireland, R. D., & Hoskisson, R. E. (2017). Strategic Management: Competitiveness and Globalization. Cengage Learning.
[7] Fitzgerald, L., Johnston, R., Brignall, T. J., Silvestro, R., & Voss, C. (1991). Performance Measurement in Service Businesses. CIMA Publishing.
[8] PwC (2023). Indian Insurance Sector: Transformation for a Sustainable Future. PricewaterhouseCoopers India.
[9] Wabita, M. (2013). Factors Influencing the Financial Performance of Insurance Companies in Kenya. Unpublished MBA Thesis, University of Nairobi.
[10] Makadok, R. (2001). Toward a Synthesis of the Resource-Based and Dynamic-Capability Views of Rent Creation. Strategic Management Journal, 22(5), 387-401.
[11] Chen, R., & Wong, K. A. (2004). Determinants of Financial Health of Asian Insurance Companies. Journal of Risk and Insurance, 71(3), 469-499.
[12] Ahmed, N., Ahmed, Z., & Usman, A. (2011). Determinants of Performance: A Case of Life Insurance Sector of Pakistan. International Research Journal of Finance and Economics, 61, 123-128.
[13] Malik, H. (2011). Determinants of Insurance Companies' Profitability: An Analysis of Insurance Sector of Pakistan. Academic Research International, 1(3), 315-321.
[14] Adams, M., & Buckle, M. (2003). The Determinants of Corporate Financial Performance in the Bermuda Insurance Market. Applied Financial Economics, 13(2), 133-143.
[15] Mwangi, M. (2013). Factors Influencing Financial Performance of Insurance Companies in Kenya. International Journal of Academic Research in Accounting, Finance and Management Sciences, 3(4), 123-132.
[16] Uzar, U. (2013). Measuring the Financial Performance of Public Banks in Turkey Using PROMETHEE Method. International Journal of Economics and Finance, 5(8), 123-132.
[17] Bağcı, H., & Rençber, E. T. (2014). A Comparative Performance Analysis of Public and Private Banks in Turkey Using PROMETHEE Method. Journal of Business, Economics and Finance, 3(1), 71-83.
[18] Brans, J. P., & Mareschal, B. (2005). PROMETHEE Methods. In J. Figueira, S. Greco, & M. Ehrgott (Eds.), Multiple Criteria Decision Analysis: State of the Art Surveys (pp. 163-195). Springer.