ISSN: 2454-4256

HIND BUSINESS REVIEW

A Peer Reviewed and Referred Research journal

Vol 10. | No. 01 | May 2024

HIND BUSINESS REVIEW (HBR) **ISSN 2454-4256**

A Peer Reviewed and Referred Research Journal of Commerce Forum, Department of Commerce, Assam University, Silchar.

Vol. 10, No. 01 May 2024

Editorial Advisory Board

Published by: Chairman, Commerce Forum, Department of Commerce, Assam University, Silchar

Printed at: *SCUBE, N.S. Avenue, Hailakandi Road, Silchar, Assam*

Communication: All correspondence may be made to the Chief Editor, Hind Business Review, Commerce Forum, Department of Commerce, Assam University, Silchar, Assam, India.

GUIDELINES FOR AUTHORS

Author(s) should carefully read the entire submission guidelines before submitting the manuscript for publication in **Hind Business Review (HBR)**.

a) The journal will consider all manuscripts on the strict condition that they have not yet been published, nor they are under consideration for publication elsewhere.

b) The decision of the editorial board is final and reviewers' identity is kept strictly confidential.

c) Articles prepared in English in MS word in Times New Roman typeface not exceeding 4500 words should be submitted electronically.

d) Author(s) must ensure that manuscripts are free of grammatical, spelling and punctuation errors. These must be thoroughly edited before submission.

e) The editorial board is fully empowered to edit, adjust or trim the manuscript in order to match the requirements and standards set by "Hind Business Review".

f) Footnotes to the text should be avoided. If required, they should be numbered consecutively and presented as endnotes.

g) A declaration should be made by the authors to the effect that the material submitted is original and has not been published or submitted for publication earlier for any other journal or publications.

MANUSCRIPT SUBMISSION FORMATS

First Page Title & Authors' Detail

a) The first p page should mention title of the article and author (s) details. The title of the article should be bold, centered and typed in capital letters in a 14-point Times New Roman Font.

b) The author(s) details i.e., full name, designation, name of the organization, city, state, country, e-mail id, contact details in 11-point Times New Roman should be centered below the title. The author name (s) must not be mentioned in the manuscript.

Second Page: Abstract & Keywords

a) All manuscripts must be accompanied by a brief abstract. Abstract including key words must not exceed 300 words. It should be in fully justified and italicized text.

b) Authors must mention 3-5 keywords.

Subsequent pages: Manuscript

a) **Manuscript:** It should be typed in 11 point-Times New Roman Font in English with a single space and single column 1" margin on a standard A4 size paper. The text should be fully justified. The research article/paper should not exceed 4500 words.

b) **Sub-Headings:** The sub-heading must be bold typed, fully capitalized and left aligned. The text matter must be in all point-Times New Roman Font and single spaced.

c) **Figures and Tables:** The titles must be above the table figure and sources of data should be mentioned below the table / figure. Figures and tables should be centered and separately numbered.

d) **Equations:** All the equations used in research paper article should be consecutively numbered in parentheses, horizontally centered with equation number placed at the right.

e) **References:** The authors should list all references by following APA Style. Please make sure that every reference cited in the text must also be presented in the reference list and vice versa. Authors should avoid using citations in the abstract of the manuscript.

EDITORIAL

The Commerce Forum of the Department of Commerce, Assam University, Silchar, is pleased to present the tenth issue of ***Hind Business Review (HBR)***. This issue reflects a conscious effort by the Editorial Board to broaden the scope of the journal by incorporating research papers from varied domains of business studies, recognizing the dynamic and multidisciplinary character of business research.

Hind Business Review aspires to establish itself as a leading journal in the field of business and management research. I sincerely acknowledge and thank all the contributors whose scholarly work has made this issue possible. I am confident that the research works published herein will engage the academic community and contribute meaningfully to ongoing scholarly discourse. The Editorial Advisory Board of HBR comprises distinguished academicians from reputed institutions across India, and I gratefully acknowledge their valuable guidance and support.

I extend my appreciation to all the members of the Commerce Forum for their dedication and co-operation in bringing out this publication. I am also thankful to the Head of the Department of Commerce and the Chairman, Commerce Forum, for their continued encouragement and support. While every effort has been made to ensure quality, some inadvertent errors may remain. We therefore welcome constructive feedback and suggestions from readers, as we believe that continuous improvement and collective insight are essential for strengthening future issues of *Hind Business Review*.

Dr. Kingshuk Adhikari
Chief Editor

CONTENTS

A Comparative Analysis of Food Security in Assam and the Northeastern States

Sameer Goswami
Research Scholar, Department of Economics, Assam University, Silchar
Alok Sen
Professor, Mahatma Gandhi School of Economics and Commerce, Assam University, Silchar

Abstract

This study aims to evaluate the relative status of food security in Assam in comparison to other north eastern states of India. Food security remains a critical issue in the region, with diverse socio-economic factors impacting access, availability, and utilization of food resources. To provide a comprehensive analysis, the study employs a Food Security Index (FSI), constructed based on three core dimensions: food availability, food accessibility, and food utilization. The index serves as a holistic tool to quantify and compare food security across the region. Through a comparative analysis, this research identifies the strengths and weaknesses of Assam's food security status relative to neighbouring north eastern states, highlighting key disparities. The findings provide valuable insights into the nature of food security in the region, guiding policy interventions and targeted measures to improve food security

Keywords*: Food Security Index, Northeast India, Assam*

Introduction

Food security is a multifaceted and dynamic concept. According to Hoddinott (1999), defining food security has progressed significantly over time, with more than 200 definitions and 450 indicators being identified. The concept was developed in the mid-1970s, during a period of global food crisis (1972-1974). The first world food conference was held in Rome in 1974, which focused on the problem of global production, commerce, and stocks due to widespread malnutrition. The conference recommended the adoption of an international undertaking on World Food Security (WFS) at the World Food Conference (WFC), and asked governments to examine the global problem of food production and consumption, and solemnly proclaimed that "every man, woman and child have the inalienable right to be free from hunger and malnutrition to develop their physical and mental faculties" (OHCHR 1974).

As per FAO (1996, part 1) "Food security, at the As per FAO (1996, part 1) "Food security, at the individual, household, national, regional and global level is achieved when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." This definition of food security stipulates that sufficient quantity as well as the quality of food should be culturally acceptable and should be available at all times throughout the year.

Food and nutrition security can be defined as a situation that exists when all people at all times have physical, social and economic access to food, which is consumed in sufficient quantity and quality to meet their dietary needs, requirements for growth, and food preferences, and is supported by an environment of adequate sanitation, health services, and caregiving.

Evolving Definition of Food Security

1. WFC, 1974

Definition: "Availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and offset fluctuations in production and prices.

2. FAO, 1983

Definition: "Ensuring that all people at all times have both physical and economic access to the basic food that they need."

3. World Bank, 1985

Definition: "Access of all people at all times to enough food for an active, healthy life."

4. World Food Summit, 1996

Definition: "Food security, at the individual, household, national, regional and global levels, is achieved when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life."

5. FAO, 2001

Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

This progression demonstrates the evolving understanding and broadening scope of food security over time, highlighting a shift from a focus on mere availability to a comprehensive inclusion of accessibility, nutrition, and preferences.

Food security encompasses four interrelated dimensions, each essential for ensuring that populations maintain access to sufficient, safe, and nutritious food. Firstly, food availability pertains to the consistent availability of adequate quantities of food of suitable quality. This dimension underscores the importance of a stable supply of food, whether produced domestically or imported, to meet the nutritional needs of the population. Secondly, food access highlights the capacity of households to obtain appropriate foods for a nutritious diet. This involves not just the economic ability to purchase food but also the resources necessary to procure and produce food. Adequate food access ensures that people can acquire enough food to sustain their dietary needs. Thirdly, food utilization refers to the proper use of food through adequate diet, clean water, sanitation, and healthcare. This aspect focuses on the biological ability of individuals to absorb and metabolize nutrients from the food they consume. Proper food utilization means that individuals not only have access to food but also the means to utilize it conceptual framework of the study effectively for their well-being. Finally, food stability addresses the necessity of having access to adequate food at all times. Stability ensures that food security is not disrupted by adverse events such as economic crises, climatic changes, or sudden shocks. For a population to be food secure, they must consistently have access to food without the risk of unforeseen interruptions.

Food Security

This study adopts the food security definition from the FAO (1996) and IFPRI (2002). Food security is achieved when everyone at all times has both physical and economic access to enough safe and nutritious food to meet their dietary needs and preferences for an active and healthy life. This broad definition breaks food security down into three main components: ***food availability, food accessibility, and food utilization or absorption.***

Food Availability

Food availability refers to the presence of sufficient quantities of food within a country, primarily through domestic agricultural production and, to some extent, food imports. However, due to the unavailability of reliable data on food imports, our study focuses exclusively on the food produced domestically. This component is crucial as it ensures that there is enough food in the market to meet the population's needs. Domestic agricultural production is a key indicator here, reflecting the capacity of local agriculture to supply adequate food to the population.

Food Accessibility

Food accessibility involves two critical aspects: physical access and economic access. Physical access refers to the physical availability of food in local markets and stores, which can be influenced by factors such as transportation infrastructure and market locations. Economic access, on the other hand, is more significant as it relates to the financial ability of individuals and households to buy food. This economic aspect is largely determined by household income and purchasing power, which in turn are influenced by employment, wages, and social safety nets like food subsidies. Thus, even if food is available, it must also be affordable for all individuals to ensure food security.

Utilization of Food

The utilization dimension of food security addresses how effectively food meets the dietary and nutritional needs of individuals. It considers the nutritional quality of the food and how it is used within households. The nutritional needs of household members vary based on age, sex, health status, and physiological conditions, such as pregnancy or illness. The pattern of food utilization is shaped by cultural preferences, knowledge about nutrition, and caregiving practices within households. Distributional factors, such as how food is allocated among household members, also play a role. Additionally, food utilization depends on the body's ability to absorb nutrients, which can be affected by the quality of drinking water, sanitation, overall health, and the quality of the food itself. Proper utilization ensures that food intake translates into adequate nutrition and health.

Methods and Dataset

To compare the status of food security of Assam with some of the North Eastern states

In this study, we aim to analyze the status of food security in Assam relative to other northeastern states by constructing a composite Food Security Index (FSI). This index is formulated using three key indicators: food availability, food accessibility, and food utilization.

Most of the variables selected for the Food Security (FS) index are developmental variables. To calculate the FS index, all variables have been standardized to ensure they move in the same direction. In this context, a higher FS index value indicates greater food security for a district, while a lower index value suggests lower food security.

To construct the FS index, we have employed Range Equalization Method (REM). Range Equalization Method (REM), is used to calculate both the dimensional indices and the overall FS index. The REM method, adopted by the United Nations Development Programme (UNDP) for calculating the Human Development Index (HDR 2005), is used to ensure comparability across different indicators.

The FS index is a composite measure covering three dimensions: access to food, availability of food, and utilization of food. The REM, also known as the Max-Min Approach, is used to standardize each variable by applying the following general formula:

$$\text{Variable Index} = \frac{X_i - \min(X)}{\max(X) - \min(X)}$$

where:

- Xi is the value of the variable for a specific district. min(X)
is the minimum value of the variable across all districts.
-max(X) is the maximum value of the variable across all districts.

In this approach, each variable index is adjusted for its minimum value and divided by the range (difference between the maximum and minimum values), resulting in scale-free values that range between 0 and 1. The highest value in each index will be less than 1, representing the top-ranking state that has not yet reached the

ideal goalpost of 1. Conversely, values close to 0 indicate state that have achieved the least in terms of food security and need significant improvement.

By adopting the REM, we ensure that the FS index provides an accurate and meaningful comparison of food security across different states, highlighting areas that are performing well and those that require more attention.

Indicators used to Compute Food Security Index	
Indicators / Variables	Sources
(a) Availability	
Per capita Production of food grains	Statistical Handbook Of RBI
Percentage of Net Irrigated Area to Net Sown Area	Ministry of Agriculture, GOI
Percentage of non- forest area to total geographical area	State of Forest Report
(b) Accessibility	
Percentage other than agricultural labourers to all labourers	Census of India, 2011
Non- dependency Ratio	Census of India, 2011
Average Per Capita Consumption Expenditure	PLFS Report
Casual wage rate	Census of India, 2011
Percentage of Village Having Access to Paved Road	Census of India, 2011
Percentage of SC & ST Population	Census of India, 2011
© Utilization of Food	
Percentage of Household Having Access to Safe Drinking Water	NFHS
No of Primary Health Care per lakh Population	Ministry of Health and Welfare, GOI
Female Literacy	NFHS

We will construct an index for each dimension of food security under study and then the Food Security Index will be constructed by taking simple averages of dimensional indices.

$$\text{Food Security Index (FSI)} = \frac{Availability\ Index + Accessibility\ Index + Utilization\ Index}{3}$$

Results and Discussion

Table 1: Classification of the Level of Food Security

FSI Value	Level of Food Security
$0 \leq FSI \leq 0.25$	Low
$0.25 \leq FSI \leq 0.50$	Moderate
$0.50 \leq FSI \leq 0.75$	High
$0.75 \leq FSI \leq 1$	Very High

Table 2: Food Availability Index

State	Score in Food Availability Index	Rank
Arunachal Pradesh	0.60	1
Assam	0.54	2
Manipur	0.40	7
Meghalaya	0.45	4
Mizoram	0.01	8
Nagaland	0.43	6
Sikkim	0.44	5
Tripura	0.46	3

Note: Estimated by Researchers

The highest score in the Food Availability Index is observed in Arunachal Pradesh (0.60), followed by Assam (0.54), while Mizoram has the lowest score (0.01).

Table 2(a): Food Accessibility Index

State	Score in Food Accessibility Index	Rank
Arunachal Pradesh	0.51	3
Assam	0.18	8
Manipur	0.44	5
Meghalaya	0.28	7
Mizoram	0.54	2
Nagaland	0.42	6
Sikkim	0.81	1
Tripura	0.47	4

Note: Estimated by Researchers

Sikkim (0.81) ranks highest in food accessibility, followed by Mizoram (0.54) and Arunachal Pradesh (0.51), whereas Assam (0.18) has the lowest accessibility score.

Table 2(b): Food Utilization Index

State	Score In Food Utilisation Index	Rank
Arunachal Pradesh	0.41	4
Assam	0.58	2
Manipur	0.23	8
Meghalaya	0.31	6
Mizoram	0.71	1
Nagaland	0.52	3
Sikkim	0.27	7
Tripura	0.33	5

Note: Estimated by Researchers

Mizoram (0.71) has the highest food utilization index, indicating efficient use of food resources, while Manipur (0.23) has the lowest score.

Table 2(c): Food Security Index

State	Score in Food Security Index	Rank
Arunachal Pradesh	0.50	2
Assam	0.43	4
Manipur	0.36	7
Meghalaya	0.35	8
Mizoram	0.42	6
Nagaland	0.46	3
Sikkim	0.51	1
Tripura	0.41	5

Note: Estimated by Researchers

Based on the Food Security Index (FSI), the North-Eastern states have been classified into four levels of food security: low, moderate, high, and very high.

- **Low Food Security ($0 \leq FSI \leq 0.25$):** None of the states fall under this category.
- **Moderate Food Security ($0.25 \leq FSI \leq 0.50$):** Assam (0.43), Manipur (0.36), Meghalaya (0.35), Mizoram (0.42), Tripura (0.42).
- **High Food Security ($0.50 \leq FSI \leq 0.75$):** Arunachal Pradesh (0.50), Nagaland (0.46), Sikkim (0.50).
- **Very High Food Security ($0.75 \leq FSI \leq 1$):** None of the states fall under this category.

This classification suggests that no state in the North-East has attained a very high level of food security. While Arunachal Pradesh and Sikkim have relatively better food security indices, states like Meghalaya and Manipur have lower scores, indicating the need for focused policy interventions.

Table 2(d): Descriptive Statistics of Various Dimensional Indices and FSI of North Eastern States

Statistical Measures	Food Availability Index	Food Accessibility Index	Food Utilization Index	Food Security Index
Mean	0.41	0.46	0.42	0.43
SD	0.18	0.18	0.17	0.56
Range	0.6	0.63	0.43	0.15

Note: Estimated by Researchers

The mean availability index for the region is 0.41, indicating a moderate level of food availability. The standard deviation of 0.18 suggests notable variation among the states. The mean accessibility index is 0.46, with a standard deviation of 0.18, highlighting disparities in access to food. The mean utilization index is 0.42, with a standard deviation of 0.17, reflecting regional variations in nutritional practices. The mean FSI score for the North Eastern states was 0.43, indicating a moderate level of food security across the region. The standard deviation was 0.18, showing significant variability among the states. The range of scores 0.15 highlights disparities, necessitating targeted interventions to improve food security in states with lower scores.

Conclusion

In conclusion, we can say that Sikkim is goodly positioned in terms of food security. States like Assam, Manipur, Meghalaya, Mizoram and Tripura needs policy interventions for their upliftment in food security scale

References

Bartfeld, J., Dunifon, R., Nord, M., & Carlson, S. (2006). What factors account for state-to-state differences in food security?.

Leroy, J. L., Ruel, M., Frongillo, E. A., Harris, J., & Ballard, T. J. (2015). Measuring the food access dimension of food security: a critical review and mapping of indicators. Food and nutrition bulletin, 36(2), 167-195.

Manikas, I., Ali, B. M., & Sundarakani, B. (2023). A systematic literature review of indicators measuring food security. Agriculture & food security, 12(1), 10.

Nord, M., & Hopwood, H. (2008). A comparison of household food security in Canada and the United States (Economic Research Report No. 67). U.S. Department of Agriculture, Economic Research Service.

Owens, M. R., Brito-Silva, F., Kirkland, T., Moore, C. E., Davis, K. E., Patterson, M. A., ... & Tucker, W. J. (2020). Prevalence and social determinants of food insecurity among college students during the COVID-19 pandemic. Nutrients, 12(9), 2515.

Staatz, J. M., D'Agostino, V. C., & Sundberg, S. (1990). Measuring food security in Africa: conceptual, empirical, and policy issues. American Journal of Agricultural Economics, 72(5), 1311-1317.

Sukereman, A. S., Ab Rahim, N., Zainol, N. N., Azmi, N. A., & Nordin, M. S. A. (2022, October). The state of food security: A comparative study between Malaysia, Singapore, and Indonesia. In IOP Conference Series: Earth and Environmental Science (Vol. 1067, No. 1, p. 012009). IOP Publishing.

A Comparative Analysis between Banking and Non-Banking Financial Institutions of Selected Mutual Funds in India with Special Reference to ELSS

Shubhasish Das
Research Scholar, Department of Commerce, Assam University, Silchar
Rajat Sharmacharjee
Assistant Professor, Department of Commerce, Assam University, Silchar

Abstract

In India mutual funds are one of the growing financial institutions which play an important role to diversify the investments of the investors in a proper way of channel. Banking and non- banking financial institutions plays a vital role in the mutual fund industry as a whole and as an investor a person has to choose between various banking and non-banking mutual fund schemes keeping in mind the return and the risk factors related to that particular scheme. This research intends to analyse the comparison between selected banking and non-banking mutual fund financial institutions of India with special reference to Equity Linked Saving Schemes (ELSS) on the basis of their risk and return. The study is primarily based on secondary data and data were collected from various sources such as SEBI, AMFI, Bluechip India, Journals and various another website related to the topic. In order to assess the performance, the various statistical tools have taken such as Returns, Standard deviation, Beta, Sharpe ratio, Treynor Ratio, Sortino Ratio etc.

Keywords*: Capital appreciation, Tax exemption, ELSS, S&P BSE 200, SEBI and AMFI.*

Introduction

The financial ecosystem of any economy is shaped by the interplay between numerous institutions that promote resource mobilization and capital generation. In India, two primary classifications of financial entities—Banking Financial Institutions (BFIs) and Non-Banking Financial Institutions (NBFIs)—are essential in directing savings into productive investments. Among the various investment options provided by these institutions, mutual funds are particularly favored by both retail and institutional investors. Equity Linked Savings Schemes (ELSS), a kind of mutual funds, have acquired notoriety for its twin benefits of wealth accumulation and tax deductions under Section 80C of the Income Tax Act, 1961.

ELSS mutual funds provide investors the chance to engage in stock markets while benefiting from tax advantages. These funds are promoted by both BFIs, such as commercial banks, and NBFIs, including asset management firms (AMCs) and non-banking finance companies (NBFCs). Nonetheless, the goals, operational efficiencies, and risk management methodologies of these two categories of financial institutions vary considerably, impacting the performance, market penetration, and investor perception of ELSS products.

This study aims to provide a comparative examination of the role and efficacy of banking and non-banking financial institutions in promoting ELSS mutual funds in India. This analysis seeks to elucidate the strengths and problems of each organization by evaluating factors like as fund performance, investor engagement, and risk-return dynamics. The study aims to investigate the role of these companies in advancing the financial inclusion objective and the evolution of the Indian mutual fund market.

In a fast-shifting financial landscape, typified by regulatory changes and increased competition, understanding the comparative dynamics of BFIs and NBFIs in the ELSS market is vital for regulators, investors, and financial institutions. This research addresses deficiencies in current literature and offers a framework for informed decision-making on mutual fund investments in India.

Statement of the Problem

The mutual fund business in India has undergone extraordinary growth over the past few decades, driven by rising awareness of financial planning and investment options. Equity Linked Savings Schemes (ELSS) have received substantial interest due to its tax-saving benefits and potential for wealth growth. However, the performance, accessibility, and adoption of ELSS funds depends on the Banking Financial Institutions (BFIs) or Non-Banking Financial Institutions. A significant difficulty lies in understanding how these institutional differences effect the growth, performance, and adoption of ELSS funds.

Banking Financial Institutions employ their enormous branch networks, established customer bases, and confidence as custodians of public funds to promote ELSS mutual funds. In contrast, Non-Banking Financial Institutions, like asset management companies and fintech platforms, generally rely on innovation, digital

outreach, and specialized knowledge to attract investors. There is a need to explore how regulatory frameworks, investor perceptions, and competitive dynamics influence the comparative effectiveness of these institutions in marketing ELSS funds.

This research tries to address these difficulties by performing a comparative analysis of selected ELSS mutual funds managed by BFIs and NBFIs in India. The study attempts to identify the key elements driving their performance, investor satisfaction, and market penetration, giving actionable information for stakeholders.

Review of Literature

Santhi and Gurunathan (2012) in their study on impact of investor's perception and performance of tax saving schemes in mutual fund evaluate the performance of 32 growth oriented open-ended equity linked savings scheme using various tools such as Sharpe ratio, Treynor ratio, Jensen measure etc. At the end of the study the author founds that certain schemes performed well than the benchmark index with positive risk return relation.

Ashraf and Sharma (2014) conducted a comparative performance between equity mutual fund schemes and benchmark indexes over the five economic periods. In the study correlation is found between mutual funds and benchmark index returns are significantly high. These funds are also observed to have high R2 values (Coefficient of Determination) indicating the better diversification of the fund portfolio. The beta coefficient in most of the sample schemes was lower than one indicates that these mutual funds and Fama's reported positive net selectivity indicating superior stock selection of the fund managers. Kadambat, Raghavendra & Singh (2015) in their study shows that ELSS funds, overall has underperformed both against sample Diversified Equity Funds and Benchmark Indexes on a risk adjusted basis. The study also shows that there is inconsistency in performance of ELSS funds over time. The reason for its non popularity could be its investment underperformance. Kumar and Adhikary (2015) focused on the performance of five Tax Saving Mutual Funds Schemes of India and they find that the private sector Tax Saving Mutual Funds Schemes have outperformed as compared to its market return. However, the performances of public sector Tax Saving Mutual Funds Schemes were not satisfactory. In term of relative performance among tax saving mutual funds by applying Sharpe Index, Treynor Index and Jensen Index models, it is observed that the private sector has performed well in the mutual fund industry whereas public sector could not perform well in the market. Further, in examining the relationship between fund return and market return, it is observed that there is no linear relationship between fund return and market return. Mahajan and Sharma (2015) concluded that out of all the selected schemes, Franklin India Tax Shield ranked first as per Sharpe ratio and Treynor Ratio. It has also scored second as per Jensen Alpha. Hence the scheme is offering best risk adjusted return among top ten mutual fund companies on the basis of asset under management for the period under study. Mohanasundari and Vidhyapriya (2015) in their study found that the major investor's preference and factor analysis is being used, as a tool to know the variance using KMO and Bartlett's test and the factors have been separated. And the performance analyzed using Sharpe, Treynor and Jensen's index. Overall through the study the investor's perception towards mutual fund industry is evaluated as a whole.

Objective of the Study

This research intends to analyse the comparison between selected banking and non-banking mutual fund financial institutions of India with special reference to Equity Linked Saving Schemes (ELSS) on the basis of their risk and return.

Research Methodology

The study is primarily based on secondary data and data were collected from various sources such as SEBI, AMFI, Bluechip India, Journals and various other website related to the topic. In order to assess the performance, the various statistical tools have taken such as Returns, Standard deviation, Beta, Sharpe ratio, Treynor Ratio, etc. CRISIL top five ranked funds were selected as per the ranking provided on 31st December, 2023 and out of that top five Growth oriented (Regular) banking and non-banking financial institutions of mutual fund has been selected which were in operation since April, 2010. The S&P BSE 100 benchmark is taken for the study.

The tools and techniques used to analyse the performance and to compare the Tax Saving Mutual Funds Schemes are:

Return:

Return of each mutual fund scheme (Rp) and market return (Rm) are calculated to find out the monthly mean returns of a given period. Then average return is calculated to find out mean value of a given period.

$$\text{Return} = \frac{\text{Current Value of Units of a Period} - \text{Previous Value of Units of a Period}}{\text{Previous Value of Units of a Period}} \times 100$$

Standard deviation (Ϭ):

It measures the variation in returns of a mutual fund scheme from its average expected return over a certain period of time. It evaluates the volatility of the fund. Higher SD indicates higher volatility and higher risk of the schemes.

$$\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{n}}$$

Beta:

Beta measures the volatility of returns from an investment in response to its market return (systematic risk). It is calculated by relating the return of a portfolio with return for the market.

$$\beta p = \frac{r_{pm} . Ϭ_p . Ϭ_m}{Ϭ^2 m}$$

Sharpe Ratio (SR):

Sharpe ratio is a measure of risk adjusted return on a portfolio. It is the ratio of effective/expected return to standard deviation of the portfolio. In this study *bank term deposit* rate is taken as risk free investment. The higher Sharpe ratio is better because it implies that the fund has generated higher returns for every unit of risk taken. Again a negative Sharpe ratio is an indicator of low return generated by a portfolio.

$$\textit{Sharpe Ratio (SR)} = \frac{\textit{Effective Return}}{\textit{Standard Deviation}} = \frac{Rp - Rf}{SD}$$

Treynor Ratio (TR):

Treynor ratio is the ratio of a fund's average excess return to the fund's beta. It evaluates the performance of a portfolio based on the systematic risk of a fund. A high and positive Treynor ratio indicates a better risk adjusted performance of a fund while a low and negative Treynor ration indicates a poor performance.

$$\textit{Treyner Ratio (TR)} = \frac{\textbf{Portfolio Return} - \textbf{Risk Free Rate of Return}}{\textbf{Portfolio Beta}}$$

$$TR = \frac{Rp - Rf}{\beta p}$$

Jensen Measure (∝):

It is a measure of absolute performance on a risk-adjusted basis. This measures the differential between the actual return of portfolio and its expected return given the level of risk i.e. beta. It measures the ability of active management. A positive alpha indicates that the funds have earned a better return due to superior management skills. A negative alpha indicates that the fund is not performing well. When alpha is equal to zero (0), it indicates neutral performance.

Jensen's Alpha (Differential Return) = Actual Return – Expected Return

= Actual Return – {Risk Free Return + Beta (Market Return – Risk Free Return)}

$= Rp - \{Rf + \beta (Rm - Rf)\}$

Limitations of the Study

- The study has some limitations which were pointed out below:
- The result or findings of the study is limited to the authenticity of the data.
- The study is based on NAV data which fluctuates continuously.
- Only open ended (regular) Equity linked saving schemes in India was taken for performance analysis.

Analysis and Interpretation

From table 1 it can be explained that under Banking Sector Schemes the highest average return (1.188) is observed in the Axis Long Term Equity Fund-Regular-Growth, showing better performance compared to the other banking-sector funds and the lowest return (0.719) is recorded by the BOI Axa Tax Advantage Fund-Regular-Growth. Most schemes, except BOI Axa and SBI Magnum Taxgain, beat the benchmark average return (0.837).And on the other hand under Non-Banking Sector Schemes the highest return (0.969) is achieved by the Nippon India Tax Saver Fund-Regular-Growth, closely followed by JM Tax Gain Fund-Regular-Growth (0.942) and the lowest return (0.857) is recorded by the LIC MF Tax Plan-Regular-Growth, which still matches closely with the benchmark return.

The highest standard deviation (4.406) is found for banking sector is the HDFC Taxsaver-Regular-Growth, indicating greater volatility in returns. The lowest standard deviation (3.526) is found for the Axis Long Term Equity Fund-Regular-Growth, indicating more stability. And for Non-Banking Sector Schemes the highest standard deviation (4.874) is seen in the Nippon India Tax Saver Fund-Regular-Growth, indicating high volatility in returns. The lowest standard deviation (3.698) is recorded by the L&T Tax Advantage Fund-Regular-Growth, suggesting relatively lower risk.

On analysing Banking Sector Schemes the highest beta (0.243) is found for the BOI Axa Tax Advantage Fund-Regular-Growth, showing a higher correlation with market movements. The lowest beta (-0.067) is seen in HDFC Taxsaver-Regular-Growth, showing an inverse relationship with market movements.

For Non-Banking Sector Schemes the highest beta (0.195) is found in the L&T Tax Advantage Fund-Regular-Growth, showing a moderate positive correlation with market trends. The lowest beta (-0.098) is found for LIC MF Tax Plan-Regular-Growth, highlighting an inverse market relationship.

From the above table it can be observed that the Sharpe Ratio measurement of Banking Sector Schemes shows the highest Sharpe Ratio (0.166) is attained by the Axis Long Term Equity Fund, showing greater risk-adjusted performance relative to peers. Other schemes, such as SBI Magnum Taxgain and HDFC Taxsaver, hover at or below the benchmark average (0.061), reflecting modest or lower risk-adjusted returns. Under Non-Banking Sector Schemes the greatest Sharpe Ratio (0.093) is recorded in the Taurus Tax Shield Fund, followed by L&T Tax Advantage Fund (0.079). Some funds, such as JM Tax Gain Fund, underperform relative to the benchmark.

Table 1: Consolidated Return, Standard Deviation and Beta value of selected ELSS

Banking Sector Schemes	Return from 2018-2023		Standard Deviation (SD) from 2018-2023		Beta (β) value from 2018-2023	
	Schemes Average Return	Benchmark Average Return	Schemes Average SD	Benchmark Average SD	Schemes Average Beta	H.V/ L.V.
1. Axis Long Term Equity Fund-Regular-Growth	1.188	**0.837**	3.526	**3.924**	0.148	L.V.

2. Canara Robeco Equity Tax Saver-Regular-Growth	0.959	**0.837**	3.932	**3.924**	0.171	L.V.
3. BOI Axa Tax Advantage Fund-Regular-Growth	0.719	**0.837**	4.207	**3.924**	0.243	L.V.
4. SBI Magnum Taxgain-Regular-Growth	0.831	**0.837**	3.870	**3.924**	-0.008	I.R.
5. HDFC Taxsaver-Regular-Growth	0.892	**0.837**	4.406	**3.924**	-0.067	I.R.
Non-banking Sector Schemes	**Schemes Average Return**	**Benchmark Average Return**	**Schemes Average SD**	**Benchmark Average SD**	**Schemes Average Beta**	**H.V/ L.V.**
1. JM Tax Gain Fund-Regular-Growth	0.942	**0.837**	4.205	**3.924**	0.192	L.V.
2. LIC MF Tax Plan-Regular-Growth	0.857	**0.837**	3.797	**3.924**	-0.098	I.R.
3. Taurus Tax Shield-Regular-Growth	0.924	**0.837**	3.836	**3.924**	-0.028	I.R.
4. L&T Tax Advantage Fund-Regular-Growth	0.870	**0.837**	3.698	**3.924**	0.195	L.V.
5. Nippon India Tax Saver Fund-Regular-Growth	0.969	**0.837**	4.874	**3.924**	0.112	L.V.

Source: Compiled by the Researcher from AMFI Historical Data

H.V. = High volatility, L.V. =Less volatility, I.R=Inverse relation.

The BOI Axa Tax Advantage Fund demonstrates the highest Treynor Ratio (35.236), greatly exceeding both its rivals and the benchmark (21.186). Axis Long Term Equity Fund and Canara Robeco Equity Tax Saver likewise produce high Treynor Ratios, showing outstanding performance on systematic risk-adjusted returns. Under Non-Banking Sector Schemes the greatest Treynor Ratio (15.424) is recorded by the JM Tax Gain Fund, outperforming the benchmark average (11.394). Funds like Nippon India Tax Saver Fund and L&T Tax Advantage Fund have negative Treynor Ratios, indicating poor performance compared to market risk.

Under the Jensen Alpha measures the banking Sector Schemes the positive Alpha values are detected in most banking sector schemes, with Axis Long Term Equity Fund (0.341) displaying the highest Alpha, indicating persistent outperformance. Negative Alpha is detected in BOI Axa Tax Advantage Fund, signifying underperformance compared to market expectations. From the Non-Banking Sector Schemes viewpoint JM Tax Gain Fund (11.394) and LIC MF Tax Plan (4.581), exhibiting substantial excess returns. Negative Alpha is seen in plans like Nippon India Tax Saver Fund and L&T Tax Advantage Fund, suggesting underperformance.

Table 3 provides a comparative analysis of banking sector schemes and non-banking sector schemes using six key financial tools and measures such as Return, Standard Deviation (SD), Beta, Sharpe Ratio, Treynor Ratio, and Jensen Measure. Banking sector schemes outperform with three schemes achieving higher returns compared to five schemes from the non-banking sector. Both sectors exhibit similar risk levels, with three schemes each showing comparable SD values.

Table 2: Consolidated Sharpe Ratio, Treynor Ratio and Jensen Alpha Measure of selected ELSS

Banking Sector Schemes	**Sharpe Ratio (S.R.) from 2018-2023**		**Treynor Ratio (T.R.) from 2018-2023**		**Jensen Alpha Measure (J.A.) from 2018-2023**	
	Schemes Average S.R.	**Benchmark Average S.R.**	**Schemes Average T.R.**	**Benchmark Average T.R.**	**Schemes Average J.A.M.**	**H.R./L.R.**
1. Axis Long Term Equity Fund-Regular-Growth	0.166	**0.061**	-0.231	**0.480**	0.341	H.R.
2. Canara Robeco Equity Tax Saver-Regular-Growth	0.090	**0.061**	5.836	**6.963**	0.197	H.R.
3. BOI Axa Tax Advantage Fund-Regular-Growth	0.048	**0.061**	35.236	**21.186**	-0.112	L.R.

4. SBI Magnum Taxgain-Regular-Growth	0.048	**0.061**	3.078	**2.057**	0.033	H.R.
5. HDFC Taxsaver-Regular-Growth	0.072	**0.061**	2.220	**1.650**	0.087	H.R.
Non-banking Sector Schemes	**Schemes Average S.R.**	**Benchmark Average S.R.**	**Schemes Average T.R.**	**Benchmark Average T.R.**	**Schemes Average J.A.M.**	**H.R./L.R.**
1. JM Tax Gain Fund-Regular-Growth	0.037	**0.061**	15.424	**11.394**	11.394	H.R.
2. LIC MF Tax Plan-Regular-Growth	0.070	**0.061**	5.614	**4.581**	4.581	H.R.
3. Taurus Tax Shield-Regular-Growth	0.093	**0.061**	2.315	**2.200**	2.200	H.R.
4. L&T Tax Advantage Fund-Regular-Growth	0.079	**0.061**	-6.840	**-5.386**	-5.386	L.R.
5. Nippon India Tax Saver Fund-Regular-Growth	0.060	**0.061**	-7.283	**-1.713**	-1.713	L.R.

Source: Compiled by the Researcher from AMFI Historical Data.

H.R. = High return, L.R. =Less return.

As far as Beta analysis both sectors demonstrate market sensitivity with three schemes each having similar Beta values. Risk-adjusted performance is evenly distributed, with three schemes from each sector achieving notable Sharpe Ratio values. The sectors maintain comparable systematic risk-adjusted performance, with three schemes each standing out.

Table: 3 Comparative Analysis

Tools/Measures	Banking Sector Schemes	Non-banking Sector Schemes
Return	Three	Five
SD	Three	Three
Beta	Three	Three
Sharpe Ratio	Three	Three
Treynor Ratio	Three	Three
Jensen Measure	Four	Three

Source: Compiled by the Researcher

Banking sector schemes lead with four schemes achieving higher Alpha values, compared to three schemes in the non-banking sector. The banking sector schemes slightly outperform non-banking sector schemes in generating higher returns and Alpha (Jensen Measure), indicating stronger performance in risk-adjusted and excess return metrics. However, both sectors exhibit comparable performance in terms of risk (SD), market sensitivity (Beta), and systematic risk-adjusted metrics (Sharpe and Treynor Ratios).

Findings of the Study

Return Analysis:

Banking Sector Schemes: Axis Long Term Equity Fund-Regular-Growth returned 1.188, while BOI Axa Tax Advantage Fund-Regular-Growth returned 0.719. Except BOI Axa and SBI Magnum Taxgain, other schemes surpassed the benchmark (0.837).

Non-Banking Sector Schemes: Nippon India Tax Saver Fund-Regular-Growth had the greatest return (0.969), followed by JM Tax Gain Fund (0.942). LIC MF Tax Plan-Regular-Growth had the lowest return (0.857), close to the benchmark.

SD risk analysis*:*

Banking Sector Schemes: HDFC Taxsaver-Regular-Growth was most volatile (SD: 4.406) and Axis Long Term Equity Fund-Regular-Growth was most steady (SD: 3.526).

Non-Banking Sector Schemes: Nippon India Tax Saver Fund-Regular-Growth had the most volatility (SD: 4.874), while L&T Tax Advantage Fund-Regular-Growth had the lowest (SD: 3.698), indicating lesser risk.

Beta Market Sensitivity:

Banking Sector Schemes: BOI Axa Tax Advantage Fund-Regular-Growth has the greatest beta (0.243), demonstrating better association with market movements. HDFC Taxsaver-Regular-Growth has the lowest beta (-0.067), indicating an unfavorable market association.

Non-Banking Sector Schemes: L&T Tax Advantage Fund-Regular-Growth had the greatest beta (0.195), demonstrating moderate association with market developments, while LIC MF Tax Plan-Regular-Growth had the lowest beta (-0.098), indicating an inverse link.

Risk-Adjusted Performance (Sharpe Ratio):

Banking Sector Schemes: Axis Long Term Equity Fund achieved the greatest Sharpe Ratio (0.166), suggesting superior risk-adjusted performance. SBI Magnum Taxgain and HDFC Taxsaver hovered at or below the benchmark average (0.061).

Non-Banking Sector Schemes: Taurus Tax Shield Fund earned the greatest Sharpe Ratio (0.093), followed by L&T Tax Advantage Fund (0.079), while JM Tax Gain Fund lagged the benchmark.

Systematic Risk-Adjusted Performance (Treynor Ratio):

Banking Sector Schemes: BOI Axa Tax Advantage Fund got the greatest Treynor Ratio (35.236), surpassing the benchmark (21.186). Axis Long Term Equity Fund and Canara Robeco Equity Tax Saver also exhibited great returns.

Non-Banking Sector Schemes: JM Tax Gain Fund recorded the highest Treynor Ratio (15.424), beating the benchmark (11.394). Nippon India Tax Saver Fund and L&T Tax Advantage Fund had negative Treynor Ratios, indicating poor performance.

Excess Return Performance (Jensen Alpha):

Banking Sector Schemes: Most schemes had positive Alpha values, with Axis Long Term Equity Fund leading (0.341), suggesting considerable outperformance. BOI Axa Tax Advantage Fund got negative Alpha, suggesting underperformance.

Non-Banking Sector Schemes: JM Tax Gain Fund (11.394) and LIC MF Tax Plan (4.581) showed high Alpha values, indicating considerable excess returns, whereas Nippon India Tax Saver Fund and L&T Tax Advantage Fund had negative Alpha, reflecting underperformance.

Suggestions of the Study

To increase the depth and accuracy of the comparison study between banking and non-banking ELSS mutual funds, the following suggestions are suggested:

i. Include funds with diverse asset amounts, fund managers, and historical performance patterns.
ii. Evaluate fund performance over a long period (5–10 years) to account for market swings and economic cycles.
iii. Compare fund performance throughout various market circumstances (bullish and bearish periods).
iv. Analyze how cost ratios, entry/exit loads, and management fees effect investor returns.
v. Assess if banking financial institutions have cost benefits over non-banking entities.
vi. Conduct surveys or analyze investor data to discover whether investor preferences impact fund performance.
vii. Consider examining the effect of SEBI rules and tax policies on ELSS funds in both banking and non-banking financial organizations.
viii. Evaluate the convenience of investment, redemption procedures, and digital accessibility of ELSS funds across banking and non-banking channels.
ix. Compare annualized results over several periods (1-year, 3-year, 5-year) for greater insights.
x. Compare expenditure ratios between banking and non-banking ELSS funds to establish cost-efficiency.

Conclusion

The comparative examination of banks and non-banking financial institutions of selected mutual funds in India, with special reference to ELSS (Equity Linked Savings Schemes), highlights crucial insights into their performance, risk management, and investor suitability. Banking sector ELSS plans often display slightly greater risk-adjusted returns (measured through Sharpe and Treynor Ratios) and more consistency in excess returns (Jensen Alpha). Non-banking financial organizations also perform competitively, with certain funds exceeding banking sector funds in individual metrics, highlighting the diversity in fund management practices. Both sectors demonstrate equal levels of volatility (Standard Deviation) and market sensitivity (Beta), indicating a similar risk profile for ELSS funds irrespective of the kind of institution. However, banking sector funds

frequently provide more steady and predictable returns, making them attractive to risk-averse investors. The increased usage of digital technology and investor awareness programs gives opportunity for both industries to expand their reach and enhance their products. Collaborations between banking and non-banking firms could lead to novel ways for marketing ELSS and satisfying varied investor needs. A balanced and well-informed strategy is vital for reaping the benefits of ELSS as a tax-saving and wealth-building tool.

References

Asharaf, S. H., & Sharma, D. (2014). Performance Evaluation of Indian Equity Mutual Funds against Established Benchmarks Index. *International Journal of Accounting Research* , 1-7.

Gala, J., & Gala, A. (2017). *Guide to Indian Mutual Fund.* Mumbai: Buzzingstock Publishing House.

Kadambat, K. K., S, R. T., & Singh, B. M. (2015). Investment Performance of Equity Linked Savings Schemes (ELSS) of Indian Mutual Funds. *International Journal of Recent Scientific Research* , 4076-4083.

Kumar, J., & Adhikary, A. (2015). Comparative Analysis of Performance of Tax Saving Mutual Funds: A Case Study of Selected Asset Management Companies. *International Journal of Multidisciplinary Approach and Studies* , 61-72.

Mahajan, A., & Sharma, A. (2015). Risk and Return Evaluation of Equity Linked Saving Schemes Offered by Top 10 Mutual Fund Companies on The Basis of Asset under Management. *International Journal of Research in Management & Business Studies* , 37-40.

Mohanasundari, M., & Vidyapriya, P. (2015). Indian Mutual Fund Industry: An Impact of Investor's Perception and Performance of Tax Saving Schemes in Mutual Fund. *International Business Management* , 267-272.

Pathak, B. V. (2011). *The Indian Financial System.* Noida: Pearson.

Santhi, N., & Gurunathan, K. (2012). Risk and Return analysis of Equity Linked Savings Schemes of Mutual Funds in India. *Financial Risk Management* , 54-71.

Venkatesh, N. S., & Kini, B. (1995, August 22). *Association of Mutual Fund of India*. Retrieved March 5, 2018, from Google: https://www.amfiindia.com/nav-history-download

CSR Practices in the Indian IT Sector: A Case Study on Infosys and Wipro

Marzia Sultana Choudhury
Research Scholar, Department of Commerce, Assam University, Silchar

Sneha Barman
PG Student, Department of Commerce, Assam University, Silchar

Parag Shil
Professor, Department of Commerce, Assam University, Silchar

Abstract

The Indian IT sector, a cornerstone of the country's economic growth, plays a pivotal role in driving technological advancements and contributing to national development. Companies like Infosys and Wipro have emerged as leaders not only in technological innovation but also in CSR. In India, CSR gained legal recognition with the introduction of the Companies Act, of 2013, which made it mandatory for companies meeting specific financial thresholds to allocate at least 2% of their average net profits (calculated over the last three years) toward CSR activities. These thresholds include a net worth of ₹500 crore or more, a turnover of ₹1,000 crore or more, or a net profit of ₹5 crore or more in a given financial year. The main objective of this study is to study and compare the CSR activities of Infosys and Wipro and also to assess the impact of their CSR efforts on society and the environment. The research covers CSR initiatives from 2019 to 2023.This study highlights that Infosys has been more consistent and committed to CSR compared to Wipro, with a significantly higher total CSR expenditure of ₹1,924.51 crore versus Wipro's ₹1,142.60 crore over five years. Overall, Infosys leads in CSR spending and strategy, while Wipro continues to make meaningful contributions. Both companies demonstrate the importance of robust CSR practices in achieving long-term societal benefits.

Keywords: *CSR, CSR practices, CSR strategies, Infosys, Wipro.*

Introduction

Corporate Social Responsibility (CSR) is a vital component of modern business practices, reflecting a company's commitment to ethical operations and its responsibility toward societal and environmental development. In India, CSR gained legal recognition with the introduction of the Companies Act, of 2013, which made it mandatory for companies meeting specific financial thresholds to allocate at least 2% of their average net profits (calculated over the last three years) toward CSR activities. These thresholds include a net worth of ₹500 crore or more, a turnover of ₹1,000 crore or more, or a net profit of ₹5 crore or more in a given financial year. The Act has institutionalized CSR and encouraged businesses to address key societal challenges such as poverty alleviation, healthcare, education, and environmental sustainability.

The Indian IT sector, a cornerstone of the country's economic growth, plays a pivotal role in driving technological advancements and contributing to national development (2020). Companies like Infosys and Wipro have emerged as leaders not only in technological innovation but also in CSR. Infosys, through its Infosys Foundation, has focused on building schools, promoting digital literacy, and improving healthcare access. Similarly, Wipro has implemented sustainability initiatives, emphasized renewable energy, and worked to enhance educational opportunities through its Wipro Cares programs.

Despite significant contributions by these companies, limited research exists on how their CSR initiatives compare in focus areas, implementation strategies, and long-term impact. This study seeks to bridge this gap by analyzing and comparing Infosys's and Wipro's CSR practices. It aims to evaluate their approaches, highlight best practices, and provide insights into the role of CSR in achieving sustainable development while maintaining business excellence. By focusing on the Indian IT sector, this study sheds light on how corporate entities can address societal challenges effectively while aligning with global sustainability goals. This study explores the CSR initiatives of Infosys and Wipro, analyzing their strategies and contributions to societal development. It aims to compare their approaches, assess the outcomes of their efforts, and identify best practices for integrating CSR with corporate goals. By examining the role of CSR in the IT sector, this research seeks to highlight how companies can balance profitability with social responsibility, contributing to sustainable development and improved societal well-being.

Significance of the Study

This study is significant as it seeks to achieve a deeper understanding of the CSR activities of Infosys and Wipro, two leading IT companies in India. By fulfilling its objectives, the research provides a comparative analysis of their CSR initiatives, highlighting differences in focus areas, implementation strategies, and overall

effectiveness. This comparative perspective helps identify best practices that can guide other organizations in designing impactful CSR programs. Assessing the impact of CSR efforts on society and the environment is crucial for understanding how corporate initiatives address pressing social and ecological challenges. The findings of this study will shed light on the tangible outcomes of these efforts, offering insights into how businesses can effectively contribute to sustainable development.

Objectives of the Study

The main objectives of the study are:

1.To study and compare the CSR activities of Infosys and Wipro.

2.To assess the impact of their CSR efforts on society and the environment.

Review of Literature

Agarwal & Patel (2021) this study focused on the integration of CSR initiatives with corporate strategy in Indian IT firms. Data was gathered through CSR reports, annual reports, and interviews with senior management, and analyzed using qualitative analysis techniques. The study revealed that CSR strategies integrated into business practices lead to both societal and financial benefits, with Infosys focusing on rural development and Wipro concentrating on sustainability practices. Bhatia & Sharma (2020) this research analyzed the effect of CSR on financial performance in the Indian IT sector, focusing on Infosys and HCL Technologies. Data was collected from their annual reports and CSR disclosures and analyzed using correlation and regression analyses. The study found a positive relationship between CSR practices and profitability, indicating that companies investing in impactful CSR programs experience higher investor trust and market valuation. Chowdhury & Rao (2019) this study explored how employee participation in CSR activities affects corporate reputation. The researchers used surveys and interviews with employees and external stakeholders, and the data was analyzed using qualitative analysis techniques. The study found that active participation by employees in CSR projects improves public perception, fostering greater brand loyalty and customer trust. The research highlights the mutual benefits of employee-driven CSR initiatives for both the workforce and the organization. Gupta & Desai (2020) this research focused on the integration of CSR into corporate strategy in Indian IT firms. The data was collected from annual reports, corporate strategy documents, and interviews with top management. The study used SWOT analysis and thematic content analysis to interpret the data. The study concluded that companies that integrate CSR into their core business strategies experience long-term benefits in terms of improved brand image, market performance, and employee loyalty. Gupta & Tiwari (2021) **t**his study examined the effects of CSR on employee retention in Indian IT companies. The researchers collected data through surveys from employees in various IT firms and analyzed it using descriptive statistics and regression models. The study concluded that firms actively involved in community welfare and environmental sustainability programs tend to have higher retention rates. Employees who perceive that their values align with those of the company experience greater satisfaction, leading to reduced turnover and a stable workforce. Iyer & Tiwari (2020) this study investigated the link between CSR and employee productivity in IT firms. Data was gathered through employee surveys focusing on involvement in skill development and community engagement programs. The analysis was done using statistical modeling. The study concluded that CSR initiatives aimed at skill development and community engagement boost productivity. Employees involved in these programs reported a stronger sense of purpose, leading to improved performance and innovation. Jadhav & Patel (2019) the research explored the role of CSR in talent acquisition within the IT sector. Data was collected through surveys of prospective employees and analyzed using quantitative techniques. The findings revealed that potential employees are more likely to join organizations with strong CSR commitments, as these initiatives enhance the company's reputation. CSR programs that align with social and ethical values attract socially conscious talent, giving such companies a competitive advantage in the job market.

Research Gap

Research on Corporate Social Responsibility (CSR) in the Indian IT sector has grown, but some areas are still unexplored. Few studies look at the long-term impact of CSR on a company’s performance, employee behavior, and community development, as most research focuses on short-term results. Another area that needs attention is how CSR affects supply chain partners, vendors, and contractors since most studies focus only on the

company itself. Additionally, the IT sector, which depends heavily on skilled employees, lacks a clear CSR framework designed to meet its specific needs. These gaps show the need for more detailed and inclusive research in this area.

Research Methodology

This study employed a case study research design to compare CSR strategies in Indian IT sectors considering mainly two sectors i.e. Infosys and Wipro. The research covers CSR initiatives from 2019 to 2023. In this study for the collection of Secondary data CSR reports, annual reports, and sustainability disclosures of Infosys and Wipro and for analyzing the collected data software tools like M.S used in the study.

Analysis Based on the objective "To study and compare the CSR activities of Infosys and Wipro".

Descriptive statistics: Descriptive statistics is used in this study to analyze and interpret the CSR activities of Infosys and Wipro, focusing on their efficiency, trends, and patterns over time. It provides insights into how these companies allocate resources and assess the impact of their CSR strategies on society and the environment.

Table A: Descriptive statistics analysis of Infosys and Wipro 2019-2023

Metrics	2019-20	2020-21	2021-22	2022-23	2023-24	Mean	Range
Infosys(₹Crore)	360.0	370.5	390.1	410.3	430.8	392.34	70.8
Wipro (₹Crore)	181.0	190.2	200.4	210.7	221.3	200.27	40.3

Source: Annual Reports of Infosys and Wipro

The financial performance of both Infosys and Wipro shows a consistent upward trend from 2019–20 to 2023–24. Infosys demonstrates stronger revenue growth, rising from ₹360 crore in 2019–20 to ₹430.8 crore in 2023–24. This steady rise indicates robust business expansion and sustained market growth. Wipro also shows positive growth, rising from ₹181 crore in 2019–20 to ₹221.3 crore in 2023–24. Although the revenues of Wipro are comparatively lower than Infosys, the year-to-year improvement highlights gradual business development and stable operational performance. The mean values further reflect long-term stability, with Infosys having a higher average revenue (₹392.34 crore) compared to Wipro (₹200.27 crore). The range indicates that Infosys experiences greater variation (₹70.8 crore) in annual revenues compared to Wipro (₹40.3 crore), suggesting stronger but more dynamic growth in Infosys. Overall, both companies show consistent expansion during the given period, with Infosys outperforming Wipro in terms of revenue scale and growth magnitude.

Analysis Based on the objective "To assess the impact of their CSR efforts on society and the environment".

Trend Analysis: Trend analysis in this study examines the patterns and changes in Corporate Social Responsibility (CSR) spending and initiatives by Infosys and Wipro over a specific period (2019–2023). It helps to identify growth patterns, assess stability, and measure the consistency of their CSR strategies.

Table B: Trend Analysis of Infosys and Wipro (2019-2023)

Year	Infosys (₹Crore)	Wipro (₹Crore)	Growth Rate (Infosys)	Growth Rate (Wipro)
2019-2020	360.0	181.8	-	-
2020-2021	370.5	190.2	2.92%	4.63%
2021-2022	390.1	200.4	5.29%	5.36%
2022-2023	410.8	210.7	5.18%	5.15%
2023-2024	430.8	220.9	5.00%	4.84%

Source: Annual Reports of Infosys and Wipro

From 2019 to 2023, Infosys and Wipro demonstrated consistent growth in CSR spending, with Infosys increasing from ₹360.0 crore to ₹410.3 crore and Wipro rising from ₹181.8 crore to ₹210.7 crore. Infosys recorded growth rates between 2.92% and 5.29%, while Wipro showed slightly higher rates ranging from 4.63%

to 5.36%. Infosys focused on areas like education, healthcare, and rural development, whereas Wipro emphasized skill development and environmental sustainability. Infosys had a higher average CSR spending of ₹382.7 crore, with greater variation, while Wipro maintained a stable average of ₹195.8 crore. Both companies exceeded mandatory CSR requirements, highlighting their commitment to sustainable development and social impact.

Table C: Comparative Analysis of Infosys and Wipro 2019-2023

Criteria	Infosys (2019-2023)	Wipro (2019-2023)
Total CSR Expenditure (₹ Crore)	₹1,961.20crore	₹1,003.10 crore
Prescribed CSR Requirement (₹ Crore)	₹1,950.00 crore	₹950.00 crore
Amount Spent (₹ Crore)	₹1,961.20crore	₹1,003.10 crore
Average CSR Expenditure (₹ Crore)	₹392.24 crore per year	₹200.62 crore per year
Mean CSR Expenditure (₹ Crore)	₹392.24 crore	₹200.62 crore
Minimum CSR Expenditure (₹ Crore)	₹360.00 crore	₹181.80 crore
Maximum CSR Expenditure (₹ Crore)	₹430.30 crore	₹220.00 crore
Range (₹ Crore)	₹70.30 crore	₹38.20 crore
Median CSR Expenditure (₹ Crore)	₹390.10 crore	₹200.40 crore

Source: Annual Reports of Infosys and Wipro

The table compares the CSR expenditure of Infosys and Wipro from 2019 to 2023. Infosys spent a total of ₹1,961.20 crore on CSR activities, significantly higher than Wipro's ₹1,003.10 crore. Both companies exceeded their prescribed CSR requirements, with Infosys surpassing ₹1,950.00 crore and Wipro exceeding ₹950.00 crore. On average, Infosys allocated ₹392.24 crore annually to CSR, while Wipro spent ₹200.62 crore per year. The mean CSR expenditure was ₹60.72 crore for Infosys and ₹77.14 crore for Wipro, indicating that Wipro's spending was generally higher despite its lower total. The minimum CSR expenditure for Infosys was ₹360.00 crore, compared to Wipro's ₹181.80 crore, highlighting a relatively larger baseline commitment for Infosys. The maximum CSR expenditure for Infosys was ₹430.30 crore, while Wipro's was ₹220.00 crore, reflecting Infosys's broader spending scope. Infosys's CSR spending had a range of ₹70.30 crore, while Wipro's was narrower at ₹38.20 crore. The median CSR expenditure for Infosys was ₹390.10 crore, compared to Wipro's ₹200.40 crore, suggesting Infosys had a higher central tendency in CSR spending. Overall, both companies demonstrated strong CSR performance, with Infosys focusing on larger and more varied spending, while Wipro maintained consistent allocation patterns across the five years.

Conclusion

In conclusion, this study highlights that Infosys has been more consistent and committed to CSR compared to Wipro, with a significantly higher total CSR expenditure of ₹1,924.51 crore versus Wipro's ₹1,142.60 crore over five years. Both companies have shown an increase in their CSR spending, with Infosys exceeding its prescribed obligations each year, while Wipro met its requirements. The impact of their efforts has positively influenced various social and environmental causes, with Infosys likely making a larger contribution due to its higher investment. Overall, Infosys leads in CSR spending and strategy, while Wipro continues to make meaningful contributions. Both companies demonstrate the importance of robust CSR practices in achieving long-term societal benefits.

In addition, both Infosys and Wipro have demonstrated strong CSR strategies aligned with their corporate values, focusing on social responsibility and environmental sustainability. Infosys's higher CSR expenditure is reflective of its broader initiatives, which likely include a greater reach and deeper impact on communities, especially in education, healthcare, and environmental preservation. On the other hand, Wipro, while slightly behind in terms of financial commitment, has shown steady progress and commitment to meeting its CSR obligations. Both companies contribute to the nation's development, and their increasing investments in CSR signal a growing recognition of the importance of corporate responsibility. Moving forward, Wipro could benefit from expanding its CSR activities to further align with the scale and depth seen in Infosys's initiatives.

References

Agarwal, R., & Patel, D. (2021). Corporate social responsibility initiatives with corporate strategy in Indian IT firms.

Anand, R., & Kumar, A. (2021). Corporate social responsibility in India's IT sector: A case study approach on Infosys and Wipro. Global Business and Economics Review, 22(2), 202–215.

Banerjee, S., & Gupta, R. (2020). Corporate social responsibility and sustainability: A study of Indian IT firms. Journal of Indian Business Research, 12(4), 298–312.

Bhatia, V., & Sharma, K. (2020). Effect of CSR on financial performance in the Indian IT sector: A study on Infosys and HCL Technologies.

Chatterjee, S., & Saha, P. (2021). Comparative analysis of corporate social responsibility in Infosys and Wipro: A case study. International Journal of Corporate Social Responsibility, 11(1), 99–115.

Chowdhury, S., & Rao, K. (2019). How employee participation in CSR activities affects corporate reputation.

Das, P., & Kumar, V. (2020). Evaluating the impact of CSR initiatives by Indian IT companies on community development. Social Responsibility Journal, 16(7), 505–519.

Dubey, A., & Yadav, M. (2021). CSR strategies of Indian IT giants: A focus on Infosys and Wipro. Global Journal of Management and Business Research, 21(6), 102–115.

Garg, S., & Jain, S. (2021). The CSR journey of Infosys and Wipro: An analysis of their sustainable business practices. Business Strategy Review, 34(1), 88–95.

Gupta, A., & Desai, P. (2020). Integration of CSR into corporate strategy in Indian IT firms.

Gupta, A., & Tiwari, R. (2022). The relationship between CSR and corporate performance: Evidence from Indian IT firms. Journal of Business Research and Practice, 19(2), 202–213.

Iyer, S., & Tiwari, R. (2020). CSR and employee productivity in IT firms.

Jadhav, S., & Patel, V. (2019). The role of CSR in talent acquisition within the IT sector.

Kaur, P., & Rathi, M. (2020). CSR policies and practices of IT companies in India: Case study of Infosys and Wipro. International Journal of Corporate Responsibility, 7(2), 98–112.

Beyond the Balance Sheet: A Comparative Analysis of ESG Performance in Indian Banking and Non-Banking Financial Sector

Pranesh Debnath
Assistant Professor, Department of Commerce, Assam University, Silchar
Rishav Kanoo
Lecturer (Commerce), Department of Humanities, Silchar Polytechnic, Silchar

Abstract

This study evaluates the Environmental, Social and Governance (ESG) performance of Banking and Non-Banking Financial Companies (NBFCs) operating in India. The present study selected 91 companies in the banking and NBFC sectors out of 1008 companies across 65 sectors from the CRISIL ESG Compendium, 2023. Descriptive statistics, t-tests, and box plots were employed to analyze the data. The findings reveal that the banking sector exhibits better ESG performance than NBFCs, showcasing higher mean ESG scores and less variability in their ESG initiatives. The application of the t-test further confirms a statistically significant difference in ESG performance between the selected sectors. Furthermore, a deeper dive into the individual companies within the sectors reveals that Axis Bank and HDFC Bank Ltd emerge as the top performers among banks. At the same time, Credit Access Grameen Ltd leads among NBFCs. This study contributes to the existing literature on ESG performance in the financial sector, highlighting the need for NBFCs to improve their ESG practices.

Keywords: *ESG Performance, Financial Sector, Banks, NBFCs, CRISIL.*

Introduction

The increasing global focus on sustainability and corporate accountability has brought Environmental, Social, and Governance (ESG) principles to the forefront of corporate practices and financial decision-making (Debnath et al., 2024a, 2024b). ESG frameworks evaluate a company's commitment to sustainable development and ethical governance, shaping investor preferences and regulatory policies (Debnath et al., 2024c; Kanoo et al., 2024). In India, the importance of ESG has grown significantly, driven by regulatory mandates from bodies like the Securities and Exchange Board of India (SEBI), the introduction of the Business Responsibility and Sustainability Reporting framework, and the rising demand for responsible investments (Debnath & Kanoo, 2022). While ESG adoption in Indian firms has advanced, its implementation across different financial sectors, especially in Banking Financial Companies (BFCs) and Non-Banking Financial Companies (NBFCs), remains an underexplored area. Therefore, this study investigates the status and inequalities of ESG practices between BFCs and NBFCs. Although ESG practices in India have garnered attention recently, existing studies have primarily focused on overall ESG performance across industries (Gupta et al., 2022; Adhikari & Ghosh, 2022). Despite their distinct roles in the financial sector, limited research has examined the comparative status of ESG implementation between BFCs and NBFCs. BFCs are traditionally highly regulated and often set industry benchmarks for ESG practices. Conversely, NBFCs, which cater to niche markets, face unique challenges and opportunities in adopting ESG standards. The lack of comprehensive insights into ESG practices in the financial sector creates a significant knowledge gap in the literature.

This paper contributes to the existing body of knowledge in multiple ways. Firstly, it offers a comparative picture of ESG practices between BFCs and NBFCs in India. Secondly, it highlights sector-specific trends and distribution, providing a nuanced understanding of ESG adoption in the Indian financial landscape. Thirdly, findings will be a wake-up call for regulators and legislators to frame stringent regulations for industries that disregard social and environmental norms. Lastly, unlike the previous studies, the novelty of this study is that it has taken ESG scores from CRISIL to demystify the variation between the selected sectors.

Literature Review

Plenty of studies have been undertaken across India and worldwide to examine the corporate sustainability performances of companies in diverse industrial sectors. Considering the substantial hazards caused by non-financial companies to the environment and society, prior literature exclusively concentrates on the ESG performance of the non-financial sector (Sana & Basak, 2022; Kumar et al., 2021). For instance, Kumar et al. (2021) studied Energy and Mining Companies in India. Likewise, Sana & Basak (2022) make an effort to highlight the sustainability reporting practices of Oil and Gas companies operating in India. Naeem and

Cankaya (2022) shed light on global energy and power companies, while Sandberg et al. (2022) make an effort to highlight the ESG performance of the European food industry. Similarly, Garcia et al. (2017) investigated the ESG performance of sensitive industries among BRICS countries. Gaudencio et al. (2020) focus on disclosing environmental and social indicators among five Oil and Gas Companies operating in Brazil. In addition, Bohling et al. (2019) shed light on the environmental and social disclosure practices based on the global frameworks of the mining sector operating in Argentina, while Orazalin and Mahmood (2018) conducted a study on the 58 largest energy companies operating in Russia to assess the impact of determinants of sustainability reporting.

Several studies have focused on the non-financial sector, while only a limited number have examined the financial sector, such as banking and financial companies, both in India and globally. For instance, Agarwal et al. (2023) analyzed the impact of ESG activities on the FP of Indian health sector firms. Ersoy et al. (2022) employed both linear and non-linear panel regression models to examine the effects of ESG and ESG pillar scores on the market value of the US commercial banks between 2016 and 2020. Likewise, Menicucci and Paolucci (2022) utilized panel data regression analysis to examine the relationship between the diversity of the board of directors and the ESG performance of 105 Italian banks from 2017 to 2021. Various studies support a positive association between ESG Reporting and the Financial Performance of the banking industry (Ersoy et al., 2022; Rahi et al., 2021; Menicucci & Paolucci, 2023). Previous studies also reported significant difference in ESG performances between Indian public and private Sector banks (Debnath & Kanoo, 2023). Some other studies exhibit a negative relationship between ESG Practices adopted by the bank and their impact on financial performance (Peng & Yang, 2014). Studies also report no relationship between sustainability and financial performance (Fauzi et al., 2007; Weston & Nnadi, (2021).

As far as the literature review is concerned and to the best of the authors' knowledge, there is a dearth of research making a comparative study on the banking and non-banking financial companies in the Indian context. Therefore, the following hypotheses have been proposed:

$H1_A$: There is a significant difference in overall ESG score between banking and non-banking financial companies in the Indian context.

$H1_B$: There is a significant difference in Environmental, Social, and Governance Scores between banking and non-banking financial companies in the Indian context.

Objective of the Study

1. To evaluate the status and inequalities in ESG performance between Banking and Non-banking financial companies operating in India.

Research Methodology

So far as the methodology is concerned, ESG data have been collected from CRISIL ESG Compendium, 2023, which includes both overall ESG scores and the scores of each of its three specific dimensions, i.e., environmental, social, and governance. The report contains 1008 companies across 65 sectors in India. CRISIL has obtained information from annual reports, sustainability reports, and company websites available in the public domain to arrive at these scores. To select an appropriate sample, 91 companies were drawn from a pool of 1008 companies across 65 sectors, using a two-stage selection process. In the first stage, two sectors, VIZ-banking and non-banking financial companies (NBFC), were identified, narrowing the focus to these two sectors. All companies within these sectors were included in the second stage, resulting in a final sample of 34 banking companies and 57 NBFCs. Thus, the study comprised 91 companies from the banking and NBFC sectors.

Description of Variables and CRISIL ESG Scoring Methodology

So far as the variables are concerned, the overall ESG score and the individual dimensional scores, i.e. ENV, SOC, and GOV scores computed by CRISIL, were considered for comparing the ESG performance of the banking and NBFC sectors. The CRISIL has enhanced its ESG scoring methodology in its latest report of 2023 by expanding the number of parameters and data points across the environmental, social, and governance dimensions. The number of environmental parameters increased from 35 to 65, social parameters from 40 to 100, and governance parameters from 60 to 100 compared to the fiscal year 2021.

The ESG evaluation also incorporates sector-specific parameters, including additional metrics for banks and NBFCs, such as funding for green projects, rural and semi-urban reach, and priority sector lending. Environmental aspects are assessed based on factors such as resource consumption and waste management, while social factors cover areas such as wage equality, gender diversity, and community engagement. Governance is evaluated based on board diligence, disclosure practices, and shareholder relations, with

additional consideration for negative risk factors, including penalties and compliance lapses. The weightage for each dimension varies, with governance having the highest weight at 40%, followed by environmental at 35% and social at 25%. The final ESG score, ranging from 0 to 100, incorporates both positive and negative parameters, providing a comprehensive view of a company's ESG performance, with categories from "Weak" (0-40) to "Leadership" (71-100).

Statistical Techniques

Descriptive statistics and the t-test have been employed to analyze the data. The t-test, in particular, was used to assess whether significant differences exist between the selected sectors, as it is designed to determine differences between the distributions of two independent groups. Moreover, for visual presentation, box plot has been employed to show the ESG performance distribution of the selected sectors.

Results and Discussions

Table 1 presents descriptive statistics comparing Environmental (ENV), Social (SOC), Governance (GOV), and composite ESG scores between Banking Companies and Non-Banking Financial Companies (NBFCs). Banking Companies demonstrate higher mean scores across all dimensions, indicating stronger ESG performance than NBFCs. However, SOC in NBFCs displays the highest variability with Coefficient of Variation (CV) of 19.09%, suggesting inconsistencies in their social practices. On the other hand, Banking Companies exhibit relatively stable ESG scores, with the lowest CV in SOC. These findings align with recent studies highlighting that banking companies often lead ESG integration due to regulatory pressures and stakeholder expectations (Debnath et al., 2024d), while NBFCs lag due to resource constraints and less stringent governance frameworks (Kanoo et al., 2024). This divergence underscores the need for tailored strategies to enhance ESG adherence in NBFCs.

Table 1: Descriptive Statistics

Descriptive Statistics	Banking Companies				Non-Banking Financial Companies			
	ENV	**SOC**	**GOV**	**ESG**	**ENV**	**SOC**	**GOV**	**ESG**
Mean	56.97	60.68	70.44	63.38	49.96	51.28	66.19	56.82
SD	5.56	3.92	6.89	3.91	4.49	9.79	5.54	5.09
Min.	47	53	58	55	43	34	43	46
Max.	70	68	80	71	59	67	74	66
CV	9.76	6.46	9.78	6.17	8.99	19.09	8.37	8.96

Source: Authors Calculation

Table 2 displays the t-test results, which assessed the proposed hypothesis ($H1_A$ and $H1_B$) that there are significant differences in ESG performance between banking and non-banking financial companies (NBFCs). The test results showed a remarkable difference in aggregated and disaggregated ESG performance between the banking and non-banking financial companies at a 0.01 significance level. Therefore, our proposed hypotheses, $H1_A$ and $H1_B$, are accepted. However, a panoramic glance at the table reveals that banking companies are outperforming non-banking financial companies (NBFCs)in all the dimensions of ESG.

Table 2: Results of t-test mean comparison between Banking and NBFCs

Variables	Group	Obs.	Mean	Std.Dev	dof.	t stat.	P value
ENV	Banks	34	56.97	5.56	89	6.5795	0.0000*
	NBFCs	57	49.96	4.49			
SOC	Banks	34	60.68	3.92	89	5.3323	0.0000*
	NBFCs	57	51.28	9.79			
GOV	Banks	34	70.44	6.89	89	3.2258	0.0018*
	NBFCs	57	66.19	5.54			
ESG	Banks	34	63.38	3.91	89	6.4484	0.0000*
	NBFCs	57	56.82	5.09			

*Source: Authors Compilation, Notes: *, **, and *** indicate significance at the 1%, 5%, and 10% levels, respectively.*

The box plot in Figure 1 compares the ESG ratings of Banking and Non-Banking Financial Companies (NBFCs). It highlights that banks generally have a higher median ESG rating than NBFCs, indicating better ESG performance. The interquartile range (IQR) for banks is narrower, suggesting less variability in ESG scores within this group. NBFCs exhibit a wider IQR, indicating a greater variability in their ESG ratings. The whiskers also reveal that banks tend to have higher maximum ESG ratings. These differences suggest that banks may have more consistent and higher practices than NBFCs.

Figure 1: Box plot for ESG ratings between Banking and Non-Banking Financial Companies

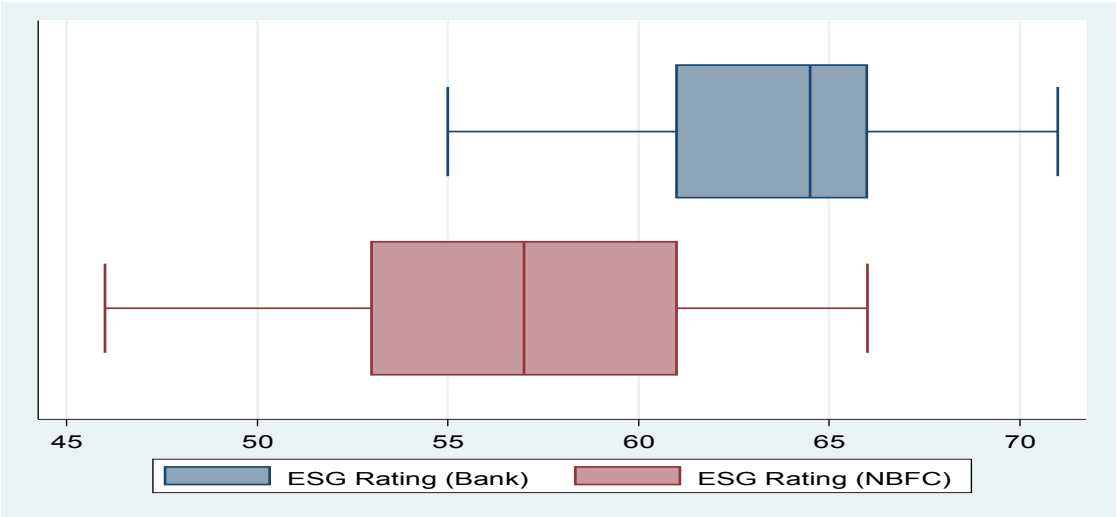


Table 3 compares the top and least performing companies in the banking and NBFC sectors based on their overall ESG scores and individual dimensional scores (ENV, SOC, GOV). In the banking sector, Axis Bank achieved the highest Environmental (ENV) score, showcasing substantial environmental contributions. In contrast, the Bank of India scored the lowest, indicating minimal effort towards safeguarding the environment. Central Bank and State Bank of India excelled in the Social (SOC) dimension, reflecting significant societal contributions, while RBL Bank lagged behind with the lowest SOC score. For Governance (GOV), City Union Bank emerged as the top performer, signifying robust governance practices, while Indian Overseas Bank recorded the lowest score in this category. Overall, Axis Bank and HDFC Bank led with the highest ESG scores, whereas Bank of India had the lowest ESG score. In the NBFC sector, Bajaj Finance, IIFL Home Finance, and L & T Finance Ltd topped the ENV dimension. At the same time, Tata Motors Finance and John Deere Finance India Private Ltd underperformed in the environmental dimension. Fusion Finance Ltd stood out in the SOC dimension, whereas John Deere Finance India Private Ltd ranked the lowest. Governance leaders include Capri Global Capital, Credit Access Grameen, Home First Finance, LIC Housing Finance, and Manappuram Finance Ltd, with PTC India Ltd underperforming in the GOV dimension, indicating poor governance. Notably, Credit Access Grameen led in the overall ESG performance, while John Deere Finance India Private Ltd was identified as the least performing company across multiple dimensions.

Table 3: Summary of Top Performers and least Performers

<table>
<tr><th rowspan="2">Variable</th><th colspan="2">Banking Companies</th><th colspan="2">Non-Banking Financial Companies</th></tr>
<tr><th>Highest Performer</th><th>Least Performer</th><th>Highest Performer</th><th>Least Performer</th></tr>
<tr><td rowspan="3">ENV</td><td rowspan="3">Axis Bank</td><td rowspan="3">Bank of India</td><td>Bajaj Finance Ltd</td><td rowspan="2">Tata Motors Finance Ltd</td></tr>
<tr><td>IIFL Home Finance Ltd.</td></tr>
<tr><td>L&T Finance Ltd</td><td rowspan="2">John Deere Finance India Private Ltd</td></tr>
<tr><td rowspan="2">SOC</td><td>Canara Bank</td><td rowspan="2">RBL Bank Ltd.</td><td rowspan="2">Fusion Finance Ltd</td><td rowspan="2">John Deere Finance India Private Ltd</td></tr>
<tr><td>State Bank of India</td></tr>
<tr><td>GOV</td><td>City Union Bank Ltd</td><td>Indian Overseas Bank</td><td>Capri Global Capital Limited</td><td>PTC India Financial Services Limited</td></tr>
</table>

			Credit Access Grameen Limited	
			Home First Finance Company India Ltd	
			LIC Housing Finance Limited	
			Manappuram Finance Limited	
ESG	Axis Bank Ltd	Bank of India	Credit Access Grameen Limited	John Deere Finance India Private Ltd
	HDFC Bank Ltd			

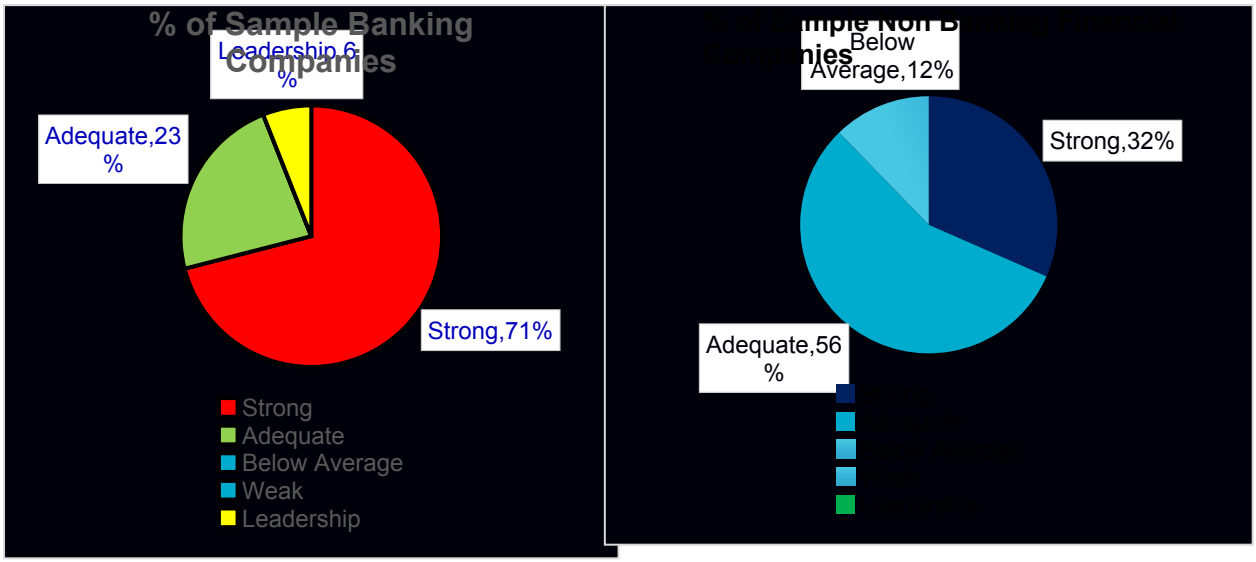
Source: Authors Compilation

Tables 4A and 4B present the distribution of companies based on the CRISIL ESG rating category:

CRISIL ESG Category	Score Range	% of banking Companies	CRISIL ESG Category	Score Range	% of NBFC Companies
Strong	61-70	71%	Strong	61-70	32%
Adequate	51-60	23%	Adequate	51-60	56%
Below Avg.	41-50	-	Below Avg.	41-50	12%
Weak	0-40	-	Weak	0-40	-
Leadership	71-100	6%	Leadership	71-100	-

Source: Authors Calculation

Figure 2 presents the distribution of companies based on the CRISIL ESG rating category:



Source: Authors Calculation

The CRISIL ESG ratings for banking and non-banking financial companies (NBFCs) exhibit notable differences in their distribution across categories, as shown in Figures 2A and 2B. For NBFCs, 32% of companies fall in the "Strong" category (61-70), 56% in "Adequate" (51-60), and 12% in "Below Average" (41-50), with no companies in the "Leadership" (71-100) or "Weak" (0-40) categories. Similarly, banking companies show a higher percentage in the "Strong" category at 71%, with 23% in "Adequate" and 6% in "Leadership," while no companies are rated as "Below Average" or "Weak." These results indicate that banks exhibit a stronger ESG performance with higher representation in the "Strong" and "Leadership" categories. NBFCs predominantly fall within the "Adequate" and "Strong" ratings, suggesting room for improvement in ESG leadership among both segments. The comparison suggests that banking companies are more advanced in their ESG initiatives, with a notable portion reaching leadership levels, while NBFCs lag in achieving top-tier ESG performance. However, the absence of weak ratings in both sectors is encouraging, reflecting a minimum level of ESG compliance. These insights underscore the need for targeted strategies to elevate ESG performance in NBFCs and further enhance leadership in banking companies to drive sustainable development in the financial sector.

Conclusion

In conclusion, this study offers an insightful comparative analysis of ESG performance between Banking and Non-Banking Financial Companies (NBFCs) operating in India, revealing significant disparities between the two sectors. By analyzing the CRISIL ESG compendium, 2023, which includes the ESG scores of 1008 companies across 65 sectors, this research focuses specifically on 91 companies within the banking and NBFC sectors. The findings suggest that, on average, banks exhibit superior ESG performance compared to NBFCs, as evidenced by their higher mean ESG scores and less variability in ESG initiatives. This trend is further supported by the T-test results, which show a statistically significant difference in ESG performance between the banking and NBFC sectors, indicating that banks are generally more consistent and effective in implementing ESG practices. Further examination of individual companies within these sectors reveals that, within the banking industry, Axis Bank and HDFC Bank Ltd. are the top performers, with strong overall ESG ratings.

In contrast, the Bank of India is identified as the least effective in ESG initiatives. Further, among NBFCs, Credit Access, and Grameen Ltd. stand out as the leaders in overall ESG performance. At the same time, John Deere Finance India Private Ltd. is found to be lagging in several ESG dimensions, reflecting weaknesses in their sustainability efforts. These findings highlight the need for a deeper understanding of the factors influencing ESG performance across these sectors and underscore the importance of promoting more robust ESG frameworks, particularly within the NBFC sector. Despite these significant findings, the research has some limitations. Firstly, the study is limited to a sample of only 91 companies, which may only partially represent part of the spectrum of banking and NBFCs in India, thus limiting the generalizability of the results. Moreover, the reliance on the CRISIL ESG compendium as the sole data source means that the results are based on the ESG criteria defined by this organization, which might not capture the full range of ESG practices or may be subjective to some degree. The analysis also focuses exclusively on ESG scores without considering the impact of other financial or operational variables, which could provide a more nuanced understanding of ESG performance. In a nutshell, this research serves as a foundational study for assessing ESG performance within the Indian financial sector, with important implications for both industry stakeholders and policymakers in fostering a more sustainable economic system in India.

References

Adhikari, K., & Ghosh, A. (2022). ESG Rating of Indian Companies of Select Sectors: A Comparative Study. *The Management Accountant Journal*, 57(3), 71-74. https://doi.org/10.33516/maj. v57i3.31-35.

Agarwal, B., Gautam, R., Jain, P., Rastogi, S., Bhimavarapu, V., and Singh, S. (2023). Impact of Environmental, Social, and Governance Activities on the Financial Performance of Indian Health Care Sector Firms: Using Competition as a Moderator. *Journal of Risk and Financial Management*, 16(2), 109; https://doi.org/10.3390/jrfm16020109

Bohling, K., Murguía, D. I., and Godfrid, J. (2019). Sustainability reporting in the mining sector: Exploring its symbolic nature. *Business & Society*, 58(1), 191–225. https://doi.org/10.1177/0007650317703658

Debnath, P., & Kanoo, R. (2022). Business Responsibility and Sustainability Reporting: A Way Forward for Indian Corporate Disclosure. *Journal of Commerce and Trade*. 17(2), 23–31. https://doi.org/doi.org/10.26703

Debnath, P., and Kanoo, R. (2023). Environmental Social and Governance Reporting Status in the Indian Banking Sector: A Comparative study between Public and Private Sector Banks. In M. Rahman (Ed.), Emerging Issues in Banking, Insurance, Micro Finance & Financial Inclusion. 98-110. Bloomsbury Publication.

Debnath, P., Bhuyan, A.K., Das, S., Saikia, B., Saha, A., Chakravarty, E., Debi, H., & Kanoo, R. (2024d). Nexus between ESG reporting and financial performance in the banking sector. Corporate Law & Governance Review, 6(4), 103-116. https://doi.org/10.22495/clgrv6i4p10

Debnath, P., Das, K., Bhuyan, A. K., Saikia, B., Das, S., Kanoo, R., Saha, A., & Debi, H. (2024a). Corporate sustainability reporting practices in the banking sector: A governance implication. *Journal of Governance & Regulation*. 13(4), 167–177. https://doi.org/10.22495/jgrv13i4art16

Debnath, P., Das, K., Goel, A., Singh, V., Bhuyan, A. K., Debi, H., Kanoo, R., & Saha, A. (2024b). Demystifying corporate social responsibility disclosure strategy and practices in the banking sector of emerging economy. *Corporate & Business Strategy Review*. 5(3), 189–198. https://doi.org/10.22495/cbsrv5i3art18

Debnath, P., Kanoo, R., & Debi, H. (2024c). Status of environmental social and governance performance of companies: Evidence from India. In K. Adhikari (Ed.), *Contemporary issues in business and social science* (pp. 76–88). Sunmarg Publishers & Distributors. https://www.researchgate.net/publication/382132843

Ersoy, E., Swiecka, B., Grima, S., Ozen, E., and Romanova, I. (2022). The Impact of ESG Scores on Bank Market Value? Evidence from the US Banking Industry. *Sustainability*, 9527, 1-14. https://doi.org/10.3390/su14159527

Fauzi, H., Mahoney, L.S. and Rahman, A.A. (2007). The link between corporate social performance and financial performance: evidence from Indonesian companies. *Issues in Social and Environmental Accounting*, 1(1), 149-159.

Garcia, A., Silva, W., Orsato, R. (2017). Sensitive industries produce better ESG performance: Evidence from emerging markets. *Journal of Cleaner Production*, 150, 135-147.

Gaudencio, L., Oliveira, R., Curi, W., and Santana, C. (2020). Oil and gas companies operating in Brazil adhere to GRI-G4 essential sustainability indicators: a critical review. *Environment Development and Sustainability*, 22(1), https://doi.org/10. 1007/s10668-018-0239-3

Gupta, S., Tuteja, R., & Dhingra, S. (2022). Examining the Sectoral Differences in ESG Practices of Select Companies in India: A Comparative Testing Based on Scores. *The Management Accountant Journal*, 73–79.

Kanoo, R., Debi, H., Bhuyan, A. K., Paul, B., Saha, A., Chakravarty, E., & Debnath, P. (2024). Does the ESG Performance Differ Across Sectors? An Insight into the Indian Corporate Landscape. *International Journal of Economics and Financial Issues*. 15(1), 246–255. https://doi.org/10.32479/ijefi.17333

Kumar, K., Kumari, R., & Kumar, R. (2021). The state of corporate sustainability reporting in India: Evidence from environmentally sensitive industries. *Business and Society Review*, 1–26. https://doi.org/10.1111/basr.12247

Menicucci, E., and Paolucci, G. (2022). Board Diversity and ESG Performance: Evidence from the Italian Banking Sector. *Sustainability 2022*, 14, 13447. https://doi.org/10. 3390/su142013447

Menicucci, E., and Paolucci, G. (2022). ESG dimensions and bank performance: an empirical investigation in Italy. *Corporate Governance Journal*. 23(3), 563-586. https://doi.org/10.1108/CG-03-2022-0094

Naeem, N., and Cankaya, S. (2022). The Impact of ESG Performance over Financial Performance: A Study on Global Energy and Power Generation Companies. *International Journal of Commerce and Finance*, 8(1), 1-25.

Orazalin, N., and Mahmood, M. (2018). Economic, environmental, and social performance indicators of sustainability reporting: Evidence from the Russian oil and gas industry. *Energy Policy*, 121. 70–79. https://doi.org/10.1016/j.enpol.2018.06.015

Peng, C.W. and Yang, M.L. (2014). The effect of corporate social performance on financial performance: the moderating effect of ownership concentration. *Journal of Business Ethics*, 123(1), 171-182.

Rahi, F., Akter, R., and Johansson, J. (2021). Do sustainability practices influence financial performance? Evidence from the Nordic financial industry. *Accounting Research Journal*, 35(4), 292-314 https://doi.org/10.1108/ARJ-12-2020-0373

Sana, A., and Basak, S. (2022). Sustainability Reporting Practices of Indian Oil and Gas Industry: An Empirical Analysis. *The Management Accountant*, 22-26.

Sandberg, H., Alnoor, A., and Tiberius, V. (2022). Environmental, social, and governance ratings and financial performance: Evidence from the European food industry. *Business Strategy and the Environment*, 32(4), 2471-2489. https://doi.org/10. 1002/bse.3259

Weston, P. & Nnadi, M. (2021). Evaluation of strategic and financial variables of corporate sustainability and ESG policies on corporate finance performance. *Journal of Sustainable Finance and Investment*, 1-17. https://doi.org/10. 1080/2043 0795.2021.1883984

Leverage and Profitability- A Study of Selected Real Estate Companies

Atul Kumar Paul

Assistant Professor, Department of Commerce, Karimganj College, Karimganj, Assam

Abstract

The relationship between leverage and profitability is a critical area of financial research, particularly in capital-intensive industries like real estate. This study examines the influence of leverage on the financial performance of selected Indian real estate companies, focusing on profitability metrics such as Return on Total Assets (ROTA) and Return on Capital Employed (ROCE). The analysis reveals a positive moderate correlation between Financial Leverage (FLEV) and ROTA (0.43) and ROCE (0.41), highlighting that firms with higher profitability often adopt greater leverage. Similarly, the Debt-to-Equity Ratio (DER) showed positive correlations with both ROTA (0.46) and ROCE (0.50), suggesting that leveraging debt capital enhances profitability. Among the companies studied, Shova Developers consistently ranked highest in leverage metrics, while Jaiprakash Associates Ltd recorded the lowest performance. Coefficient of variation rankings indicated top positions for Unitech, DLF Ltd, and Purvankara Projects, with Peninsula Land and Mahindra Lifespace Developers tied for the lowest rank. These findings emphasize the critical role of leverage in maximizing returns and optimizing capital structure in the real estate sector. The study underscores the importance of strategic financial management, encouraging firms to balance risk and return effectively through leverage decisions. Future research should explore the long-term impacts of leverage on financial stability and examine sectoral differences in leverage strategies to provide a comprehensive understanding of capital structure dynamics in emerging markets.

Keywords*: Leverage, Profitability, Ratios, Real Estate Companies*

Introduction

India's real estate sector is one of the largest contributors to the country's economic development. It provides housing for the growing middle class and plays a vital role in developing commercial spaces, hospitality facilities, shopping malls, and office complexes in urban and metropolitan areas. Contributing 6.5–7% to GDP (NAREDCO), it is anticipated to create millions of jobs. The sector is expected to grow to a $1 trillion market by 2030, up from $200 billion in 2021, and contribute 13% to GDP by 2025. While the industry supports infrastructure development, growth has been hindered by regulatory challenges and project delays.

Real estate is also India's second-largest employment sector, following agriculture. It is projected to grow by 20% over the next decade, with the construction industry ranking third among 14 primary sectors for direct and indirect employment. Increasing incomes and NRI investments are expected to drive robust demand, supporting both short- and long-term economic growth. Bengaluru ranks as the most favorable destination for living based on health and education, followed by Ahmedabad, Mumbai, Pune, Goa, Delhi, and Dehradun.

Leverage, a key financial concept, refers to the influence of one financial variable over another, measured as a ratio called the degree of leverage. It allows firms to maximize returns through fixed-cost assets or funds. While higher leverage can increase both risk and returns, poor management can lead to heightened credit risk and diminished shareholder value. James Horne (2010) defined leverage as employing fixed-cost funds or assets to boost returns, with favorable outcomes when income exceeds fixed costs. Therefore, the financial manager must understand how to measure and evaluate leverage, particularly when taking capital structure decision. In the business world, failing to do so, the interest expense and credit risk of default destroys shareholder value.

Review of Literature

Several studies have explored the impact of liquidity on profitability. Dong and Su (2010) investigated the relationship between profitability, cash conversion cycle (CCC), and its components in Vietnam, revealing a strong negative relationship between profitability and CCC. Similarly, Vijayakumar (2011) studied Indian automobile companies and found a significant negative relationship between profitability and CCC components, including inventory conversion period and accounts receivable period. Budhathoki et al. (2020), using Nepalese commercial banks, concluded that higher liquidity positively impacts profitability. Conversely, Nugraha and Sulastri (2020) found no significant effect of liquidity on financial performance in Indonesian real estate firms.

Leverage has been identified as a key determinant of profitability in multiple studies. Long and Malitz (1985) highlighted the moral hazard problem as a significant determinant of leverage but did not consider liquidity's

moderating effect. Chisti et al. (2013) analyzed Indian firms, finding that capital structure significantly impacts profitability. Hussain (2015) reported a negative relationship between leverage and profitability in selected firms, consistent with Singh and Singh (2016), who found higher debt levels correlate with lower profitability in Indian cement companies. Conversely, Goyal (2013) observed a positive relationship between short-term debt and profitability for public sector banks in India.

Masdupi et al. (2018) examined the interplay between liquidity, leverage, and profitability in Indonesian manufacturing firms, finding all three variables negatively impacting financial distress. Maha (2021) extended this approach to industrial enterprises in Jordan, highlighting a negative relationship between financial leverage and profitability while noting varying effects of liquidity and solvency on profitability. Some studies have explored the industry-specific insights and global context.

Ghosh and Maji (2006) examined Indian firms across industries, concluding that operating leverage is significantly related to profitability. Kalyani and Mathur (2017) focused on India's oil and gas sector, finding mixed associations between leverage and profitability measures. Nugraha and Sulastri (2020) reported no combined effect of liquidity and leverage on profitability in Indonesia's real estate sector. Velnampy and Niresh (2012) studied Sri Lankan banks and found a negative correlation between capital structure and profitability. Ekadjaja et al. (2019) highlighted the role of institutional ownership and firm size in determining leverage in Indonesian manufacturing firms. Ahmed and Bhuyan (2020) found that Australian service sector firms relied heavily on long-term debt, which significantly influenced their performance. Rani et al. (2016) found no association between liquidity, leverage, and solvency in Indian non-financial companies. Mahmood and Ali (2019) identified an inverted U-shaped relationship between leverage and profitability in Chinese listed firms, indicating moderating factors like firm size and industry dynamics.

Objectives of the Study

- To study the leverage position of selected real estate companies under the study
- To study the relation between the leverage and profitability of the selected real estate companies

Research Methodology

The study investigates the relationship between leverage and profitability in Indian listed real estate companies. The research focuses on 21 consistently high-performing companies listed on NSE and BSE, selected based on their net sales volume during 2011-12 to 2018-19. Secondary data from the financial statements of these companies, obtained from their annual reports, form the basis of analysis. The study employs data from 2018-19 while making necessary adjustments to annualize financial information where reporting periods vary. This approach explores the impact of long-term capital structure decisions, measured by leverage on profitability within the sector. For analyzing the data, the techniques of financial statement analysis as well as statistical tools like ratio analysis, arithmetic mean, standard deviation, co-efficient of variation, comprehensive test using average and consistency are applied. In addition, statistical techniques like Spearman's rank correlation

Analysis of Leverage Position of Real Estate Company

The employment of an asset or source of funds for which the company has to pay fixed cost or fixed return may be termed as leverage. But the earnings are closely associated with variable cost as well fixed cost. If the earnings before interest and taxes exceed the fixed return requirement, the leverage is called favorable. On the other hand, if the earnings before interest and taxes less the fixed return requirement, then the leverage is called unfavourable.

Degree of Financial Leverage

Financial leverage refers to a company's use of fixed-cost financing sources, such as long-term bonds and debentures, to magnify the effects of changes in EBIT on earnings per share (EPS). It measures the firm's ability to generate higher returns for equity shareholders using fixed financial charges. Favorable financial leverage occurs when returns on assets exceed the fixed financing cost, while unfavorable leverage arises when returns fall short. Known as "trading on equity," financial leverage increases returns without requiring additional shareholder funds. The degree of financial leverage (DFL) is calculated as the percentage change in EPS divided by the percentage change in EBIT, with DFL > 1 indicating leverage.

$$\text{Degree of Financial Leverage (DFL)} = \frac{\text{Percentage Change in EPS}}{\text{Percentage Change in EBIT}}$$

If DFL>1, financial leverage exists.

The greater the DFL, higher is the financial leverage for the Company. The significance of DFL can be interpreted as follows:

Table 1: Spearman's Rank Correlation between FLEV & ROTA of selected Real Estate Companies

SL.No	Name of Companies	Rank of ROTA(x)	Rank of FLEV(y)	d =X-Y	d^2
1	D.B.Realty Ltd	17	8	9	81
2	Ansal Properties	15	14	1	1
3	Peninsula Land	19	18	1	1
4	HDIL	21	16	5	25
5	Parsvnath Developers	18	6	12	144
6	IndiaBulls Real Estate	12	9	3	9
7	Akruti City	14	20	-6	36
8	Prestige Estate Projects	8	17	-9	81
9	Mahindra Life space Developers	4	3	1	1
10	Anant Raj	10	7	3	9
11	National Building Const.Co	3	13	-10	100
12	Nitesh Estates Ltd	20	12	8	64
13	Unitech	16	11	5	25
14	Omaxe Ltd	11	4	7	49
15	Phoenix	13	21	-8	64
16	Shova Developers	5	5	0	0
17	DLF Ltd	7	15	-8	64
18	Godrej Properties	6	10	-4	16
19	Oberoi Realty Ltd	2	1	1	1
20	Jaiprakash Associate Ltd	1	2	1	1
21	Purvankara Projects	9	19	-10	100
					$\sum d.d$ =872

$$R = 1 - \frac{6\sum d.d}{n(n.n-1)} = 0.4337$$

Table-1 summarizes the individual ranks for ROTA and FLEV. Based on this the Spearman's rank correlation between ROTA and FLEV is 0.43. It implies ROTA and FLEV have a positive but moderate correlation. Therefore, most of the selected Real estate companies having better profitability also have higher leverage in their capital structure.

Table-2: Spearman's Rank Correlation between FLEV and ROCE of selected Real Estate Companies.

SL. No	Name of the Company	Rank of ROCE(x)	Rank of FLEV(y)	d =X-Y	d^2
1	D. B. Realty Ltd	14	8	6	36
2	Ansal Properties	15	14	1	1
3	Peninsula Land	21	19	2	4
4	HDIL	19	16	3	9
5	Parsvnath Developers	17	6	11	121
6	India Bulls Real Estate	11	9	2	4
7	Akruti City	12	20	-8	64
8	Prestige Estate Projects	3	17	-14	196
9	Mahindra Life space	6	3	3	9

	Developers				
10	Anant Raj	10	7	3	9
11	National Building Const.Co	1	13	-12	144
12	Nitesh Estates Ltd	20	12	8	64
13	Unitech	16	11	5	25
14	Omaxe Ltd	9	4	5	25
15	Phoenix	13	21	-8	64
16	Shova Developers	4	5	-1	1
17	DLF Ltd	7	15	-8	64
18	Godrej Properties	5	10	-5	25
19	Oberoi Realty Ltd	2	1	1	1
20	Jaiprakash Associate Ltd	18	18	0	0
21	Purvankara Projects	8	2	6	36
					$\sum d.d$=902

R = 1- $\frac{6\sum d.d}{n(n.n-1)}$ **= 0.4142**

The primary objective of trading-on-equity is to maximize return to the equity investors. Therefore, ROCE may be impacted by the degree of leverage in the capital structure. Using the individual ranks for ROCE and FLEV for the selected companies the Spearman's rank correlation have been calculated (table-4.3). The result shows that ROCE and FLEV have a positive moderate correlation (0.41). It implies that for the real estate companies in India, use of fixed interest-bearing debts in financing the assets may help in increasing their ROCE.

Debt-equity Ratio

The debt-to-equity ratio measures a company's financial health and its ability to repay obligations by comparing long-term debt to shareholder equity. A high ratio indicates reliance on debt, increasing bankruptcy risk, while a low ratio is preferred by investors for stability. It highlights a company's leverage, showing the balance between debt and equity financing. This ratio, crucial for analyzing financial structure, varies across industries and helps assess the risk and financial strategy of a business. D/E ratio is computed by using the following equation:

D/E Ratio = $\frac{Debenture\ Bonds+Other\ Long-term\ loans}{Equity\ Share\ Capital+Preference\ Share\ Capital+Reserve\ and\ Surplus}$

Table-3: Shows the Spearman's Rank Correlation between DER and ROTA of selected Real Estate Companies.

SL.No	Name of the Company	Rank of ROTA(x)	Rank of DER(y)	d =X-Y	d^2
1	D.B.Realty Ltd	17	21	-4	16
2	Ansal Properties	15	11	4	16
3	Peninsula Land	19	19	0	0
4	HDIL	21	7	14	196
5	Parsvnath Developers	18	20	-2	4
6	IndiaBulls Real Estate	12	18	-6	36
7	Akruti City	14	10	4	16
8	Prestige Estate Projects	8	8	0	0
9	Mahindra Life space Developers	4	9	-5	25
10	Anant Raj	10	12	-2	4

11	National Building Const.Co	3	5	-2	4
12	Nitesh Estates Ltd	20	1	19	361
13	Unitech	16	13	3	9
14	Omaxe Ltd	11	16	-5	25
15	Phoenix	13	17	-4	16
16	Shova Developers	5	4	1	1
17	DLF Ltd	7	15	-8	64
18	Godrej Properties	6	6	0	0
19	Oberoi Realty Ltd	2	3	-1	1
20	Jaiprakash Associate Ltd	1	2	-1	1
21	Purvankara Projects	9	14	-5	25
					$\sum d.d = 820$

$$R = 1 - \frac{6\sum d.d}{n(n.n-1)} = .4675$$

Debt equity ratio represents the mix of debt capital and equity capital in financing the assets of a company. An optimal mix of debt and equity may help in improving profitability from the prospective of the company as whole. The empirical analysis shows that there is a positive and moderate correlation (0.46) between DER and ROTA. It implies that higher DER for Indian real estate companies helped them to improve their profitability, measured by ROTA.

Table-4: Shows the Spearman's Rank Correlation between DER and ROCE of selected Real Estate Companies.

SL.No	Name of the Company	Rank of ROCE(x)	Rank of DER(y)	d =X-Y	d^2
1	D.B.Realty Ltd	14	2	12	144
2	Ansal Properties	15	11	4	16
3	Peninsula Land	21	19	2	4
4	HDIL	19	15	4	16
5	Parsvnath Developers	17	20	-3	9
6	IndiaBulls Real Estate	11	18	-7	49
7	Akruti City	12	10	2	4
8	Prestige Estate Projects	3	8	-5	25
9	Mahindra Life space Developers	6	9	-3	9
10	Anant Raj	10	12	-2	4
11	National Building Const.Co	1	5	-4	16
12	Nitesh Estates Ltd	20	1	19	361

13	Unitech	16	13	3	9
14	Omaxe Ltd	9	16	-7	49
15	Phoenix	13	17	-4	16
16	Shova Developers	4	4	0	0
17	DLF Ltd	7	7	0	0
18	Godrej Properties	5	6	-1	1
19	Oberoi Realty Ltd	2	3	-1	1
20	Jaiprakash Associate Ltd	18	21	-3	9
21	Purvankara Projects	8	14	-6	36
					$\sum d.d = 778$

$$R = 1 - \frac{6\sum d.d}{n(n.n-1)} = 0.4948$$

DER and Capital employed both represents the capital structures decision of a company. Hence, comparative analysis of DER and ROCE may give better insight into the financial management of a company. Spearman's rank correlation of 0.50 between DER and ROCE for the selected real estate companies implies that higher DER results in higher ROCE.

Measurement of Leverage Position of Real Estate Company

In Table 5, the present position of leverage was of the Real Estate Companies is shown calculated with the help of the selected measuring tools. Table 5 highlights the rankings of 21 real estate companies based on average values of leverage indicators. The top three companies are Shova Developers (1st), D.B. Realty Ltd (2nd), and Mahindra Lifespace Developers (3rd), while Jaiprakash Associates Ltd ranks last at 19th.When categorized by the coefficient of variation, the leading companies are Unitech, DLF Ltd, and Purvankara Projects (1st), followed by Prestige Estate Projects (2nd) and Jaiprakash Associates Ltd (3rd). Peninsula Land and Mahindra Lifespace Developers share the 15th position.

Table-5: Determine the Composite Score in order of Leverage of the Selected Real Estate Companies under the Study

SL.NO.	Name of the Company	Variable	FLEV	DER	Total & Rank	C.Score	Rank
Co-1	D.B.Reality Limited	Mean	0.7848	0.0251			
		Rank	8	2	10(2)		
		C.V	1.2462	0.6958		31	1
		Rank	9	12	21(6)		
Co-2	Ansal Properties	Mean	-0.3871	0.2226			
		Rank	1	11	12(3)		
		C.V	-8.4944	0.248		34	2
		Rank	20	2	22(9)		
Co-3	Peninsula land	Mean	-0.0824	1.245			
		Rank	2	19	21(10)		
		C.V	-6.8705	0.8783		56	13
		Rank	21	14	35(15)		
Co-4	HDIL	Mean	1.0651	0.1131			
		Rank	16	7	23(11)		
		C.V	1.479	0.4276		40	7

		Rank	10	7	17(4)		
Co-5	Parsvnath Developers	Mean	0.4541	1.2582			
		Rank	6	20	26(14)		
		C.V	2.915	0.7302		55	13
		Rank	16	13	29(13)		
Co-6	IndiaBulls Real Estate	Mean	0.7926	0.675			
		Rank	9	18	27(15)		
		C.V	0.8581	1.0894		53	12
		Rank	8	18	26(12)		
Co-7	AKruti City	Mean	3.055	0.1998			
		Rank	20	10	30(16)		
		C.V	6.705	0.6151		59	15
		Rank	18	11	29(13)		
Co-8	Prestige Estate Projects	Mean	1.1413	0.1697			
		Rank	17	8	25(13)		
		C.V	0.4425	0.6093		39	6
		Rank	4	10	14(2)		
Co-9	Mahindra Lifespace Developers	Mean	0.2242	0.186			
		Rank	3	9	12(3)		
		C.V	8.3215	0.9491		47	10
		Rank	19	16	35(15)		
C-10	Anant Raj	Mean	0.682	0.2875			
		Rank	7	12	19(8)		
		C.V	2.605	0.3837		38	5
		Rank	15	4	19(5)		
C-11	National Building Const. Co	Mean	0.948	0.0854			
		Rank	13	5	18(7)		
		C.V	0.4123	1.2512		40	7
		Rank	3	19	22(10)		
Co-12	Nitesh Estates Ltd	Mean	0.9293	0.0042			
		Rank	12	1	13(4)		
		C.V	0.2953	2.2727		36	3
		Rank	2	21	23(11)		
Co-13	Unitech	Mean	0.9202	0.2948			
		Rank	11	13	24(12)		
		C.V	1.7912	0.2027		37	4
		Rank	12	1	13(1)		
Co-14	Omaxe Ltd	Mean	0.2909	0.5295			
		Rank	4	16	20(9)		
		C.V	2.4441	0.3679		37	4
		Rank	14	3	17(4)		

Co-15	Phoenix	Mean	13.3447	0.6531			
		Rank	21	17	38(18)		
		C.V	1.8443	0.5641		60	16
		Rank	13	9	22(9)		
Co-16	Sobha Developers	Mean	0.3557	0.0757			
		Rank	5	4	9(1)		
		C.V	5.0904	0.9826		43	8
		Rank	17	17	34(14)		
Co-17	DLF Ltd	Mean	1.0558	0.4613			
		Rank	15	15	30(16)		
		C.V	0.7136	0.4263		43	8
		Rank	7	6	13(1)		
Co-18	Godrej Properties	Mean	0.8597	0.1123			
		Rank	10	6	16(5)		
		C.V	0.598	0.9236		37	4
		Rank	6	15	21(7)		
Co-19	Oberoi Reality Ltd	Mean	1.0009	0.0451			
		Rank	14	3	17(6)		
		C.V	0.114	1.3333		38	5
		Rank	1	20	21(8)		
Co-20	Jaiprakash Associates Ltd	Mean	1.2237	1.3493			
		Rank	18	21	39(19)		
		C.V	1.5133	0.4064		55	13
		Rank	11	5	16(3)		
Co-21	Purvankara Projects	Mean	2.1402	0.3075			
		Rank	19	14	33(17)		
		C.V	0.4538	0.5365		46	9
		Rank	5	8	13(1)		

For composite scores, Shova Developers secured 1st place, followed by Ansal Properties (2nd) and Nitesh Estates Ltd (3rd), with Omaxe Ltd ranking lowest at 14th.

Findings

The following important findings are considered:

a) The study reveals a positive moderate correlation between Financial Leverage (FLEV) and both Return on Total Assets (ROTA, 0.43) in table-1 and Return on Capital Employed (ROCE, 0.41) in table-2 for selected Indian real estate companies. This indicates that firms with higher profitability often adopt higher leverage in their capital structure.

b) A positive moderate correlation (0.46) exists between the Debt-to-Equity Ratio (DER) and Return on Total Assets (ROTA), indicating that higher DER helps Indian real estate companies enhance profitability in Table-3

c) A positive moderate correlation (0.50) between DER and ROCE suggests that a higher DER improves ROCE, reflecting the effectiveness of leveraging debt capital in maximizing returns in the real estate sector in table-4

d) Based on the mean value, Shova Developers achieved the highest leverage ranking, whereas Jaiprakash Associates Ltd recorded the lowest position in Table-5.

e) According to the coefficient of variation in Table-5, Unitech, DLF Ltd, and Purvankara Projects attained the highest ranks, while Peninsula Land and Mahindra Lifespace Developers shared the 15th position.

f) As per Composite Score Ranking, Shova Developers ranked first, followed by Ansal Properties and Nitesh Estates Ltd, with Omaxe Ltd in the lowest position (14th) in Table-5

Suggestions and Conclusion

The study highlights the significant role of leverage in determining profitability and financial performance among Indian real estate companies. A positive moderate correlation was observed between Financial Leverage (FLEV) and Return on Total Assets (ROTA, 0.43) as well as Return on Capital Employed (ROCE, 0.41), indicating that firms with higher profitability often adopt greater leverage. Similarly, a positive correlation between Debt-to-Equity Ratio (DER) and profitability metrics, such as ROTA (0.46) and ROCE (0.50), underscores the effective use of debt capital in enhancing returns. Shova Developers consistently performed well, ranking highest in leverage based on mean values and composite scores, while Jaiprakash Associates Ltd ranked lowest. According to the coefficient of variation, Unitech, DLF Ltd, and Purvankara Projects achieved top positions, with Peninsula Land and Mahindra Lifespace Developers tied at 15th. These findings reveal the critical impact of capital structure decisions on financial outcomes in the real estate sector.

The study emphasizes the need for Indian real estate companies to optimize their capital structure by effectively balancing leverage and equity to enhance profitability and financial performance. Companies should focus on leveraging debt strategically to boost returns while managing risks associated with high debt levels. Additionally, companies with lower rankings should analyze practices of top-performing companies like Shova Developers to improve their financial strategies and align with industry best practices for sustained growth.

Implications of the Study

The study reveals a positive moderate correlation between Financial Leverage (FLEV) and profitability metrics like Return on Total Assets (ROTA) and Return on Capital Employed (ROCE) for Indian real estate companies, indicating that higher leverage enhances returns. Higher Debt-to-Equity Ratio (DER) also improves ROTA and ROCE. Shova Developers ranked highest in leverage, while Omaxe Ltd was the lowest overall. Companies like Unitech and DLF Ltd demonstrated the most stability, highlighting strategic leverage effectiveness across the sector.

Limitations of the Study

1. The study focuses exclusively on the real estate sector, one of the 18 sectors listed under NSE and BSE.
2. It is based solely on secondary data from the authentic Money control website.
3. No primary data were collected from brokers, traders, or customers to assess opinions on liquidity management and other aspects.
4. The analysis emphasizes leverage and profitability as financial performance indicators, excluding others.
5. Only eight years of financial data from the annual reports of real estate companies were used.

Scope of Future Research

Future research can expand beyond the real estate sector to include other industries listed under NSE and BSE for a broader perspective on financial performance. Incorporating primary data from brokers, traders, and customers can provide insights into market opinions on liquidity and leverage management. Additionally, exploring other financial performance indicators, such as cash flow analysis or market valuation metrics, could enrich the analysis. Longer timeframes and cross-country comparisons may also enhance understanding of leverage's impact on profitability.

References

Ahmed, R., & Bhuyan, R. (2020). Capital structure and firm performance in Australian service sector firms: A panel data analysis. *Journal of Risk and Financial Management*, *13*(9), 214.

Anser, R., & Malik, Q. A. (2013). Cash conversion cycle and firms' profitability–A study of listed manufacturing companies of Pakistan. *IOSR Journal of Business and Management*, *8*(2), 83-87.

Babalola, Y. A. (2013). The effect of firm size on firms profitability in Nigeria. *Journal of economics and sustainable development*, *4*(5), 90-94.

Budhathoki, et al., (2020). The Effect of Liquidity, Leverage and Bank's Size on Bank's Profitability of Indonesian Listed Bank. *Jurnal Manajemen (Edisi Elektronik)*, *12*(2), 188-201.

Chisti, K. A., Ali, K., & Sangmi, M. I. D. (2013). Impact of capital structure on profitability of listed companies (evidence from India). *The USV Annals of Economics and Public Administration*, *13*(1 (17)), 183-191.

Dong, H. P., & Su, J. T. (2010). The relationship between working capital management and profitability: a Vietnam case. *International research journal of finance and economics*, *49*(1), 59-67.

Ekadjaja, M., Ekadjaja, A., & Siswanto, H. P. (2019, June). Factors Affecting the Use of Leverage Among Manufacturing Firms in Indonesia. In *8th International Conference of Entrepreneurship and Business Management Untar (ICEBM 2019)* (pp. 296-300). Atlantis Press.

Ghosh, S.K. & Maji, S.G.(2006). Impact of Operating Leverage on Profitability: An Empirical Study on Selected Indian Industries. *The Management Accountant*, *41* (8), 660- 667.

Goyal, A. M. (2013). Impact of capital structure on performance of listed public sector banks in India. *International journal of business and management invention*, *2*(10), 35-43.

Hussain, T. (2015). Does Capital Structure Affect Profitability of Firms?(Evidence from Firms Listed at KSE 100 Index). *Research Journal of Finance and Accounting*, *6*(5), 116-124.

Kalyani, S., & Mathur, N. (2017). Impact of capital structure on profitability: With reference to select companies from oil and natural gas industry of India. *Inspira-J. Mod. Manag. Entrep*, *7*, 129-137.

Mahmood, F., Han, D., Ali, N., Mubeen, R., & Shahzad, U. (2019). Moderating effects of firm size and leverage on the working capital finance–profitability relationship: evidence from China. *Sustainability*, *11*(7), 2029.

Masdupi, E., Tasman, A., & Davista, A. (2018, July). The influence of liquidity, leverage and profitability on financial distress of listed manufacturing companies in Indonesia. In *First Padang International Conference On Economics Education, Economics, Business and Management, Accounting and Entrepreneurship (PICEEBA 2018)* (pp. 389-394). Atlantis Press.

Mily Williams, (2014). A Study on Short-Term And Long-Term Solvency Of Nestle Pvt Ltd., indian journal of applied research, pp-109-111

Niresh, A., & Thirunavukkarasu, V. (2014). Firm size and profitability: A study of listed manufacturing firms in Sri Lanka. *International journal of business and management*, *9*(4).

Nugraha, N. M., Sulastri, L., Nugraha, D., Puspitasari, D., & Putra, R. (2020). Effect of leverage and liquidity on financial performance of companies in the property and real estate sub sector in Indonesia. *PalArch's Journal of Archaeology of Egypt/Egyptology*, *17*(10), 3675-3688.

Rakesh ,K & Neethu,M (2012), A Study on the Factors Influencing the Leverage Of Indian Companies, Journal of Commerce & Accounting Research, Volume 2 Issue 1

Singh, B., & Singh, M. (2016). Impact of Capital structure on firm's profitability: A Study of selected listed Cement Companies in India. *Pacific business review international*, *8*(7), 46-54.

Velnampy, T. D., & Niresh, J. A. (2012). The relationship between capital structure and profitability.

Vijayakumar, A. (2011). Cash Conversion Cycle and Corporate Profitability–An Empirical Enquiry in Indian Automobile Firms. *International Journal of Research in Commerce, IT & Management*, *1*(2), 84-91.

Vural, G., Sökmen, A. G., & Çetenak, E. H. (2012). Affects of working capital management on firm's performance: Evidence from Turkey. *International Journal of Economics and Financial Issues*, *2*(4), 488-495.

Wanguu, K. C., & Kipkirui, S. E. (2015). The effect of working capital management on profitability of cement manufacturing companies in Kenya. *IOSR Journal of Economics and Finance*, *6*(6), 53-61.

Exploring Differences in Electric Vehicle Perceptions: Owners vs Prospects

Ashif Ansari
Research Scholar, Department of Business Administration, Assam University, Silchar
Deepjyoti Choudhury
Assistant Professor, Department of Business Administration, Assam University, Silchar
Tarek Aziz
Ex Student, Department of Business Administration, Assam University, Silchar

Abstract

This study looks into the perceptions of electric vehicles (EVs) among current owners and potential buyer. A subject that is becoming more and more important as the globe moves towards environmentally friendly transportation options. This research explores a significant gap to understand the differences in attitudes between two groups i.e. owners and prospects (non-EV Owners), where EV adoption remains limited despite growing interest. This problem exists due to various reasons, which includes concerns over cost, infrastructure, and differing priorities between owners and prospects regarding environmental benefits and practicality. To address these questions, a descriptive quantitative approach was used, surveys to gather data on perceptions relating to ecological benefits, cost savings, and perceived risks linked with EVs. The study was conducted in Nagaon town in Assam and the findings reveal that current owners acknowledge the environmental advantages of EVs, they express concerns about cost and charging infrastructure. Whereas potential buyers exhibit a more optimistic view towards economic and ecological aspects. Remarkably, both groups share a strong ecological consciousness, indicating a common ground. This study has major implications, as it provides vital insights for policymakers and manufacturers to design personalized initiatives that meet the specific issues of both owners and prospects, thereby supporting wider acceptance of EVs in the region.

Keywords: *Electric Vehicle, Purchase intention, consumer perception, Prospects (non-EV owners)*

Introduction

Electric motors and rechargeable batteries power electric vehicles (EVs), which are now viewed as a clean substitute for cars that run on petrol (Haustein& Jensen, 2018; Egbue & Long, 2012). This study examines EV adoption, focusing on the perceptions of current owners and potential buyers. EV adoption is hampered by a number of factors, like range anxiety, price, and charging infrastructure, which have been well-documented in this study (Simsekoglu & Nayum, 2019; Globisch, Plötz, Dütschke, &Wietschel, 2019). However, deeper exploration of early adopters' demographics, travel patterns, and decision-making processes is needed to understand better the factors motivating adoption (Plötz, Schneider, Globisch, &Dütschke, 2014). This study aims to determine the causes driving adoption and offer insightful information to stakeholders and policymakers by examining the viewpoints of current EV owners and prospective customers in Nagaon (Tu & Yang, 2019).

Electric motor stakeholders were established in the 1800s, marking the beginning of the history of electric vehicles (EVs)(Gibson, 1979). Despite their initial appeal, EVs were soon marginalized by the mass manufacturing of gasoline-powered vehicles, including the Ford Model T, and the shortcomings of early batteries (Ghasri, Ardeshiri, & Rashidi, 2019). However, electric technology remained important in trains and industrial vehicles. Electric vehicles (EVs)gained popularity during late 20th century. As environmental concerns grew and battery technology improved, marking a crucial turning point in EV history with vehicles like the GM EV1 (Berliner, Hardman, & Tal, 2019). Today, EVs are experiencing a global revival, with governments promoting their adoption, and the number of hybrids and battery electric vehicles steadily increasing (Li, Long, Chen, &Geng, 2017; Sovacool, Abrahamse, Zhang, & Ren, 2019).

The fast-growing electric vehicle (EV) industry in India, fuelled by environmental concerns and government programs like the National Electric Mobility Mission Plan (NEMMP) 2020(Goel, Sharma, & Rathore, 2021). Despite a historical decline in electric transportation, EV adoption in India is now surging, thanks to growing consumer awareness, government support, and investments in charging infrastructure (Adnan, Nordin, Rahman, Vasant, & Noor, 2017). India's EV industry seems to have a promising future, with continuous innovations and incentives aligning to promote sustainable transportation (Asadi et al., 2021).

EVs offer numerous advantages, including lower maintenance costs, improved air quality, enhanced safety features, and a reduced environmental footprint (Egbue& Long, 2012; Simsekoglu &Nayum, 2019). Despite

greater upfront expenses, long-term savings in fuel and upkeep make them a economical alternative for many people (Rezvani, Jansson, &Bodin, 2015; Tu & Yang, 2019).

Research Focus: Understanding Perception

Perception, derived from the Latin "gathering," isn't just passively receiving sensory information (Goldstein, 2014; Rock, 1983). It's the complex process of interpreting and organizing stimuli from the eyes, nose, ears, and more to create our understanding of the world. Light, odour molecules, and pressure waves trigger these senses, but perception goes deeper. Philosophically, perception raises questions about reality and knowledge. Epistemology asks if a physical world exists independent of human experience and how we can be sure of its properties through our senses (Gibson, 1979; Gregory, 1970). While psychology focuses on empirically verifiable problems, these philosophical debates continue, especially regarding the innate versus learned aspects of perception (Koffka, 1935).

Identifying Differences in Perception

Perception differences arise from various factors, including sensory capacity, prior experiences, cultural backgrounds, cognitive styles, and emotional conditions (Wong & Nisbett, 2010; Cross & Harrison, 2018). Researchers use psychophysical methods to measure the relationship between stimuli and perception, allowing comparison of perceptual thresholds and sensitivities among individuals (Stevens, 1975). Neuroimaging techniques like fMRI (functional MRI) and EEG reveal how different brains process the same stimuli, highlighting the neurological basis for perceptual differences (Spence & Gallace, 2011). Cross-cultural studies show how cultural context influences the perception of objects (Goldstein, 2014). These variations can be seen in aspects like colour perception and susceptibility to visual illusions (Wong & Nisbett, 2010). Surveys and questionnaires are used to collect subjective experiences, whereas controlled studies assist separate variables that influence perception (Miller, 1956). Using these tools, researchers may systematically discover and analyse the various ways perception changes between individuals, expanding our understanding of human sensory processing and cognitive diversity (Blumberg, Cooper, & Schindler, 2014).

Literature Review

Table 1: Review Matrix

Sl. No	Author	Area of the study	Methodology used	Findings	Country of study
1.	Ziefle et al. (2014)	Examining how people feel about electric vehicles (EVs), covering the perceived benefits and drawbacks of each.	survey methodology	The study most likely discovered that people see environmental benefits as a plus for electric vehicles, but they are worried regarding battery range and faith in the technology act as drawback.	Germany
2.	Haustein and Jensen's (2018)	Comparing the attitudes and actions of drivers of conventional cars and EVs in order to examine the factors that manipulate the acceptance of EVs.	comparative study	EV adopters are often male, educated, wealthy, and own multiple cars. They have fewer EV barriers, positive attitudes, and social norms, suggesting these factors influence EV adoption.	Denmark and Sweden
3.	Egbue and Long (2012)	Examining the barrier that stand in the way of widespread EV adoption, with a particular emphasis	mixed-methods approach	Found that the main obstacles to EV acceptance are high procure in price, limited in range, and lack of charging facilities. They	United States

		on consumer attitudes and perceptions.		also found that customers are anxious about the performance and reliability of EVs.	
4.	Ghasri, Ardeshiri, and Rashidi (2019)	Examining how people perceive electric vehicles (EVs) and how these perceptions influence their decision-making as consumers.	survey-based methodology	Found that women in New South Wales, Australia, have a high chance to approve EVs than men, despite men's higher interest in EVs. Women perceive EVs as better designed, safer, and more environmentally friendly.	New South Wales, Australia.
5.	Plötz, Schneider, Globisch, and Dütschke (2014)	Determining the traits and driving forces of Germany's early EV adopters.	quantitative approach	It was revealed that early EV adopter Germans are often middle-age mans who are technical professionals living in rural or suburban multiple people houses. Owning big numbers of vehicles, and are more prone to profit from the economical benefits of EVs, and are willingness to pay expensive for them.	Germany
6.	Li, Long, Chen, and Geng (2017)	Investigating the elements that influence customer decisions to procure Battery Electric Vehicles (BEVs).	comprehensive literature review	Found that people's choice to procure electric vehicles (EVs) are subjected to demographics, charging infrastructure, government policies, environmental attitudes, perceived risks, and purchase motivation.	China
7.	Cocron et al. (2011)	Utilising the MINI E field experiment in Berlin as a case study to assess electric cars (EVs) from the viewpoint of the user.	both qualitative and quantitative methods	Electric vehicles can meet most daily needs with a particular range. Participants of this study have a positive attitude towards EVs, and ecological considerations like CO2 emissions plays considerable role in evaluation.	Berlin, Germany
8.	Tu and Yang (2019)	Analyzing the main determinants that affect consumers' choices to buy electric cars (EVs).	survey-based approach	Aspects that play role in the purchase decision of EVs are Environmental awareness, perceived economic benefits, charging infrastructure, and social influence.	Taiwan

				They also noted that women tend to purchase EVs more than man	
9.	Chu, Im, Song, and Park (2019)	Comparing Chinese and Korean early adopters of electric cars (EVs) in order to comprehend the behavioral and psychological aspects that affect their uptake and satisfaction.	comparative survey methodology	Chinese EV adopters value environmental benefits, while Korean adopters prioritize cost. Both groups are satisfied with EVs, but range and charging are concerns. Governments should reduce costs and improve convenience to promote EV adoption in both countries.	China and Korea
10.	Morton, Anable, and Nelson (2016)	Examining how people's willingness to try new things influences their preferences for electric vehicles (EVs).	survey-based approach	It was discovered that people's desire to try new things has a substantial influence on their choices for electric cars (EVs). They also discovered that customers are more willing to choose EV if they believe it performs well and satisfies their requirements	United Kingdom
11.	Berliner, Hardman, and Tal (2019)	Examining the opinions and purchasing intentions of California's early adopters of electric vehicles (EVs) to better understand their prospective interest in and adoption of self-driving cars.	qualitative approach	However, many early EV adopters have only a basic understanding of automated vehicles and are not necessarily interested in acquiring one. Younger male with high education and higher education level in California are more likely to choose EVs. They are also more focused on technology and innovation.	California, United States
12.	Simsekoglu and Nayum (2019)	Identifying the aspects that influence conventional car drivers' intentions to procure a battery electric vehicle (BEV).	survey-based methodology	Study found that environmental benefits, cost savings, social pressure, and self-confidence drive higher EV purchase intentions.	Norway
13.	Globisch, Plötz, Dütschke, and	Examining the factors that influence electric vehicle (EV)	empirical research methods	The study suggests prioritizing fast-charging stations over widespread coverage, as most	Germany

	Wietschel (2019)	owners' choices for public charging infrastructure.		German drivers value speed over charging density.	
14.	Wu, Liao, and Wang (2020)	Analyzing the opinions of Chinese consumers towards ACEVs (autonomous, connected, and electric cars).	survey methodology	Chinese consumers favor ACEVs for environmental benefits and convenience, but safety, liability, and charging concerns hinder adoption.	China
15.	Asadi et al.(2021)	Investigating the elements that affect Malaysian customers' plans to purchase electric cars (EVs).	survey-based approach	Perceived value, social influence, and environmental factor strongly manipulate Malaysian consumers' intention to purchase EV	Malaysia
16.	She, Sun, Ma, and Xie (2017)	Investigating the obstacles preventing the wide spread adoption of battery EV (BEVs) in Tianjin, China, based on public perception.	survey-based approach	High price, limited range, charging infrastructure, and battery concerns are key EV adoption barriers in Tianjin, China.	Tianjin, China.
17.	Febransyah (2021)	Analyzing the elements that affect Indonesian buyers' decisions to buy battery electric cars (BEVs).	survey-based approach	It was found by Febransyah (2021) that perceived utility, emotion, cost of ownership, and automotive identity all affect Indonesian customers' intentions to purchase electric vehicles (EVs). Rich, educated consumers have a mild preference for EVs, and their intentions are influenced by emotion, functionality, car identity, and ownership cost.	Indonesia
18	White and Sintov (2017)	Examining how environmental and social innovator symbolism influences people's intentions to adopt (EVs).	survey-based approach	Found that people see electric vehicles (EVs) as symbols of being an environmentalist and a social innovator. This view substantially influences their inclination to acquire an EV, much more so than other considerations like price or performance.	United States
19.	Nayum, Klöckner, and	Comparing the personality traits and attitudes of	comparative study	Found that EV buyers are not likely to be female, younger, have	Trondheim, Norway

	Mehmetoglu (2016)	people who buy traditional cars and those who buy battery electric cars.		high incomes and education level, and live in urban areas. They are also more conscious about ecological issues and have a stronger sense of social responsibility.	
20.	Bunce, Harris, and Burgess (2014)	Examining the experiences and perceptions of (EV) drivers in the UK, focusing on their charging habits and overall satisfaction.	qualitative research methods	Found that UK EV drivers are satisfied with their range, charging infrastructure, and driving experience. They also discovered that government rules and incentives had a substantial impact on their decision to use EVs. However, the hefty initial price of EVs remains a deterrent to many potential customers.	United Kingdom.
21.	Rezvani, Jansson, and Bodin (2015)	Reviewing the progress made in understanding consumer adoption of electric vehicles (EVs) and identifying areas for future research.	comprehensive review	Environmental concerns, performance, and financial benefits drive Indian EV adoption, but cost and infrastructure remain barriers.	Umeå, Sweden
22.	Junquera, Moreno, and Álvarez (2016)	Analyzing how Spanish customers view electric vehicles (EVs) and their plans to buy one, with a particular emphasis on worries regarding vehicle confidence and technological constraints.	survey-based approach	Spanish consumers are interested in the ecological gains of EVs and are willing to explore owning one if technology advances and charging infrastructure becomes more available. The study discovered that they are concerned about the technical features of EVs, such as life of battery, charging speed, and range.	Spain
23.	Sovacool, Abrahamse, Zhang, and Ren (2019)	Analyzing the driving forces behind prospective EV buyers in China to ascertain whether the enjoyment or financial gains of EV ownership are their top priorities.	survey-based approach	Chinese consumers prioritize EVs' environmental benefits and safety, but high costs and limited charging infrastructure hinder adoption.	China
24.	Adnan, Nordin, Rahman,	Examining the theoretical frameworks	comprehensive literature review	Key factors for EV adoption include environmental benefits,	Perak, Malaysia

	Vasant, and Noor (2017)	currently in use to comprehend how consumers adopt electric cars (EVs).		cost savings, and technology, but barriers like range anxiety and price persist.	
25	Krishna (2021)	Identifying the hurdles to the broad use of EVs through the use of thematic analysis.	thematic analysis	The study discovered that government subsidies and incentives are vital for increasing EV adoption. He also discovered that the most significant impediments to EV adoption in India consist of high prices, limited range, a lack of infrastructure for charging, and doubts about battery life and safety.	Pune, Maharashtra, India
26	Goel, Sharma, & Rathore. (2021).	Investigating the potential advantages and tactics for vehicle-to-grid (V2G) integration, as well as the barriers and difficulties impeding the uptake of electric cars (EVs) in India.	Systematic literature review	Cost, range, infrastructure, and awareness, with government incentives crucially hinder EV adoption in India.	Bhubaneswar, India
27	Singh, Singh, & Vaibhav. (2021).	Examining the trends, development, and government policies related to EVs in India.	Systematic literature review	The Indian EV market is growing due to government support, but high costs and infrastructure issues hinder adoption.	Himachal Pradesh, India

Table 2: Factors Affecting Consumer Perception Related to Electric Vehicle

Sl. No.	Factors Identified	Author (Year)
1	Perceived monitory benefit	Ziefle et al. (2014); Ghasri, Ardeshiri, and Rashidi (2019); Singh, Singh, & Vaibhav. (2021).
2	Perceived environmental benefit	Ziefle et al. (2014); White and Sintov (2017); Singh, Singh, & Vaibhav. (2021).

3	Perceived symbol of EVs	White and Sintov (2017); Berliner, Hardman, and Tal (2019).
4	Perceived risk	Egbue and Long (2012); She, Sun, Ma, and Xie (2017); Krishna (2021); Goel, Sharma, & Rathore. (2021).
5	Perceived cost of Ev's	Tu and Yang (2019); Rezvani, Jansson, and Bodin (2015); Goel, Sharma, & Rathore. (2021).
6	Personal Innovativeness	Morton, Anable, and Nelson (2016); Junquera, Moreno, and Álvarez (2016).
7	Environmental concern	Ziefle et al. (2014); White and Sintov (2017); Singh, Singh, & Vaibhav. (2021).
8	EV purchase intention	Simsekoglu and Nayum (2019); Febransyah (2021); Adnan, Nordin, Rahman, Vasant, and Noor (2017)

Findings summarized from Literature Review

The choice of electric cars (EVs) depends on a numerous reason, which includes cost, the environment, how they feel about EVs, and their willingness to try new products. Consumers are frequently drawn to the cheaper fuel and maintenance expenses associated with EVs, especially when government incentives are provided to augment the financial benefits (Sovacool, Abrahamse, Zhang, & Ren, 2019; Goel, Sharma, & Rathore, 2021). In regions like China, India, and California, long-term financial savings are a key motivator for potential buyers (Morton, Anable, & Nelson, 2016). People choose electric cars (EVs) because they are better for the environment. They help reduce greenhouse gases and our reliance on fossil fuels. Early adopters in places like Germany and California often say that caring about the environment was a big reason for buying an EV. (Egbue & Long, 2012; Globisch, Plötz, Dütschke, &Wietschel, 2019). The symbolic value of EVs, representing modernity and environmental responsibility, further enhances their appeal. Studies in the UK, China, and Korea reveal that EV owners often associate their vehicles with sustainability and cutting-edge technology, adding to their social prestige (White & Sintov, 2017; Simsekoglu & Nayum, 2019). People are still hesitant to purchase EVs due to issues about their range, Charging station availability and hefty initial cost (Rezvani, Jansson, &Bodin, 2015). These worries are particularly prominent among non-adopters, according to studies from Tianjin and Indonesia (Singh, Singh, & Vaibhav, 2021). People that are open to new experiences are more likely to accept electric vehicles (EVs), particularly in Germany, China, and Korea. This is a key consideration when considering whether to buy an EV (Tu & Yang, 2019). Cost remains a continuing barrier, with many consumers considering EVs as prohibitively expensive in comparison to conventional vehicles, despite the long-term benefits that some early adopters recognize (Globisch, Plötz, Dütschke & Wietschel, 2019). While these motivations motivate early adopters, growing EV adoption needs resolving cost and infrastructure problems while promoting EVs' environmental and symbolic benefits (Rezvani, Jansson, &Bodin, 2015; Globisch, Plötz, Dütschke, & Wietschel, 2019). People's decision to purchase electric vehicles (EVs) is subjected by an array of factors, including their perceptions of the benefits, hazards, and prices, their desire to try new things, and their level of environmental concern.

Research Gap

While multiple studies investigate a variety of aspects of EV adoption, such as customer choice, attitudes, impediments, and motives, none of them directly address the subtle differences in perception between these two distinct categories in the perspective of EV adoption (Haustein& Jensen, 2018). According to previous studies, there is a significant gap in studies primarily focused on determining variations in perceptions of electric vehicles (EVs) among owners and prospects (Ghasri, Ardeshiri, & Rashidi, 2019). Existing studies primarily examine factors influencing EV adoption from a broad perspective, encompassing both owners and potential users (Cocron et al., 2011). They analyse attitudes, intentions, preferences, and barriers towards EVs without distinguishing between those who actively operate the vehicles and those who may be prospects or potential future drivers (Morton, Anable, & Nelson, 2016). Currently, significant attention is being paid to electric vehicles as sustainable transportation resolution, but major barriers to their wider acceptance remain (Rezvani, Jansson, &Bodin, 2015). Previous study identifies a number of factors that influence customer attitudes towards electric vehicles, including environmental concerns, pricing, driving range, infrastructure for charging, as well as technological features (Li, Long, Chen, &Geng, 2017). However, most studies have focused on drivers'

perspectives, neglecting possible differences between current owners and potential buyers (Plötz, Schneider, Globisch, & Dütschke, 2014). Understanding these differences is crucial, as acceptance and adoption of EVs depend heavily on potential buyers (Egbue & Long, 2012). The motive of this study is to study about the attitudes of present EV owners and future purchasers in Nagaon town in Assam towards electric vehicles. By comparing their perspectives and attitudes, we want to acquire a comprehensive knowledge of what promotes EV adoption in both categories. This information will assist in developing tactics that address each person's unique requirements and desires of both owners and prospective customers, encouraging more people to use electric vehicles in the region (Sovacool, Abrahamse, Zhang, & Ren, 2019).

Objectives of the Study

1. To identify owners' perceptions on electric vehicles in study area.
2. To identify prospects (non- EV owners) perception of electric vehicles in study area.
3. To identify any difference in perceptions of electric vehicles among owners and prospects in Nagaon town.

Hypothesis of the study

Hypothesis Ho: The Perception mean value on Electrical Vehicles for Owners and prospects are significantly not different.

Research Methodology

This study employs a descriptive quantitative research approach, collecting numerical data and using statistical analysis for interpretation. This method is ideal for studies aiming to measure relationships, behaviours, or attitudes within a target population. Nestled in Assam's northeast, Nagaon town thrives on the banks of the Kalong River. Surrounded by the Brahmaputra Valley's rich farmlands, it's roughly 200 kilometers east of Assam's capital, Guwahati. The study focused on Nagaon residents, and the estimated population of Nagaon town in 2024 is 165,000. Sample sizes are critical for representing segments of a population in surveys or studies. To compute the sample size, set the margin of error (ε), which is the greatest permissible discrepancy between the sample estimate and the true population value. To estimate the fraction of prospects/owners in Nagaon town, use the confidence interval equation with the margin of error set to 50% and solve for the sample size. For example, Given a population proportion of 0.5 and a finite population size of 165,000 (2024 estimate), the required sample size can be easily calculated.

Yemen's formula for sample size when population is finite is used for the calculation of sample size. The population size of Nagaon town is = 165,000

$$n = \frac{N}{1 + N(e)^2}$$

Here, n= size of sample, N= size of population, e= precision level or sampling error is 10% i.e 0.1 since confidence level is 90%.

Thus, N=165,000 = 165,000 /(1 + 165,000 *0.05 *0.05) = 399.30 = 400

Thus, the calculated sample size for the study is 400.

Convenience sampling is a method of choosing participants for a study based on who is easiest to reach. This is a type of non-probability sampling, meaning participants are not selected randomly. It is also known as grab sampling, incidental sampling, or opportunity sampling. This strategy was utilised to collect data for the investigation. The questionnaire has been adopted from (Xiuhong He, Wenjie Zhan, Yingying Hu, 2018). Primary data for this study was gathered through survey method. The research tool was an online questionnaire created with Google Forms. These questions were developed using numerous elements and characteristics relevant to the investigation. To assess the level of agreement, 24 items (statements) from literature review were used. Each of these assertions was assessed on a 5-point Likert scale. The study period was from April to June, 2024. The main approaches to data analysis involve techniques that help the researcher understand the pattern, trend, and relationship between data. A number of data analysis techniques were used in this study like tabular analysis, Excel and SPSS to effectively interpret and present the findings.

Data Analysis and Interpretation

Unveiling meaning from data is crucial. Researchers across fields analyze raw data to identify patterns and trends. This allows them to interpret findings within context and draw valuable insights. Tools like Excel and SPSS help analyze survey responses, empowering academics, businesses, and healthcare professionals to make data-driven decisions and solve problems in today's data-rich world.

Table 3: Gender Distribution of the respondents

Gender	Frequency	Percent	Valid Percent
Male	185	46.25	46.25
Female	215	53.75	53.75
Total	400	100	100

Source: Primary Data

Table 3 illustrates the gender breakdown of the survey participants. 46% of Nagaon town's responders were male, while nearly 54% were female.

Table 4: Age Group Distribution of the Respondents

Age Group	Frequency	Percent	Valid Percent
18-25	251	62.75	62.75
26-35	139	34.75	34.75
36-50	10	02.5	02.5
Total	400	100	100

Source: Primary Data

Table 4 show the age group sharing of the people who responded. Here62.75% of the respondents are in the 18-25 age groups, 34.75% respondents are of 26-35 years of age, and 2.5% of respondents fall under the 36-50 age groups.

Table 5: Distribution of people who have driven EVs and EV Prospects

	Frequency	Percent	Suitable Percent
Owners	102	25.5	25.5
Prospects	298	74.5	74.5
Total	400	100	100

Source: Primary Data

Table 5 shows the distribution of the respondents who have experienced driving EVs and respondents who are a prospect to EVs. In this survey 74.5% of the respondents are a prospect to EVs and 25.5% respondents are EV owners.

Reliability of Instrument

Imagine a measuring tape that stretches or shrinks with each use. In research, reliability is like a trustworthy measuring tool – it ensures a survey or scale consistently captures the concept it's designed to measure. Internal consistency is a key aspect of reliability. It means the different questions within a scale all assess the same underlying concept in a similar way. Think of it like multiple measuring tapes all agreeing on the same length.

Cronbach's alpha is a popular way to measure how reliable a set of questions is. It gives a score from 0 to 1, with higher scores meaning the questions are more consistent. Usually, a Cronbach's alpha above 0.7 is considered good, showing that the questions are measuring the same thing reliably.

Table 6. Reliability Test using Cronbach's Alpha

Reliability Statistics			
Cronbach's Alpha	N of Items		
.788	24		
Item Statistics			
	Mean	Std. Deviation	N
VAR00001	4.18	1.016	400
VAR00002	3.42	.939	400
VAR00003	3.27	1.097	400
VAR00004	3.69	1.096	400

VAR00005	3.78	.937	400
VAR00006	3.86	.887	400
VAR00007	4.09	.895	400
VAR00008	3.71	.951	400
VAR00009	2.88	.960	400
VAR00010	3.22	.965	400
VAR00011	2.74	1.037	400
VAR00012	3.74	1.037	400
VAR00013	3.36	.849	400
VAR00014	3.35	.894	400
VAR00015	2.94	1.014	400
VAR00016	2.97	.920	400
VAR00017	3.18	1.003	400
VAR00018	3.51	.901	400
VAR00019	3.49	.958	400
VAR00020	3.08	.955	400
VAR00021	2.89	.975	400
VAR00022	4.28	1.003	400
VAR00023	4.40	.844	400
VAR00024	4.56	.695	400

Cronbach's Alpha score is 0.788 for 24 items, each with 400 items, which exceeds the 0.7 standard, indicating that measurements made in a single session are both representative and stable over time. This shows that the samples utilised in the study are extremely dependable, which reflects the measurement instrument's reliability. Furthermore, it indicates a high level of internal uniformity for the given sample.

Analysis and Interpretation of Objectives:

Objective 1: To identify owners' perceptions on electric vehicles in Nagaon.

Table 7: Perception of owners towards EVs

Perception Mean Value	EV owners
Perceived Monetary benefits of EVs	3.03
Perceived Environment benefits of EVs	3.98
Perceived Symbol of EVs	2.66
Perceived Risk of EVs	2.81
Perceived Fee of EVs	2.59
Personal Innovativeness	2.98
General Environmental Concerns	3.89
EV Purchase Intention	3.15

This study on electric vehicle owners in Nagaon town provides valuable insights into their perceptions on electric vehicles (EVs). On its financial front, drivers perceive moderate monetary benefits, with a mean score of 3.03, suggesting a neutral to slightly positive view of EVs' cost-saving potential. Environmental benefits, however, resonate more strongly among drivers, reflected by a higher mean score of 3.98, indicating that many agree EVs offer significant environmental advantages. Interestingly, EVs are not strongly associated with social prestige or status symbols, as the mean score for this factor is relatively low at 2.66.

When it comes to perceived risk, drivers are cautious, but not unreasonably so, with a slightly negative mean score of 2.81. Similarly, the perceived cost of EVs remains a concern, as seen by a mean score of 2.59, indicating that affordability remains a top priority for many owners. Despite these worries, drivers show moderate personal innovativeness, rating 2.98, indicating a balanced willingness to adopt new technology such as EVs. Environmental concerns are a particularly strong incentive for EV ownership in Nagaon, with a mean score of 3.89, indicating that many drivers prioritize environmental considerations when making decisions. In terms of purchase intentions, the mean score of 3.15 suggests a fairly positive preference for purchasing EVs, however factors such as perceived risks, costs, and individual openness to innovation continue to influence these decisions. Overall, EV owners in Nagaon town display a mix of neutral to positive perceptions of EVs.

Objective 2: To identify prospects' perception of electric vehicles in Nagaon town.

Table 8. Perception of Prospects /Non-Owners towards EVs

Perception Mean Value	EV Non-Drivers/Prospects
Perceived Monetary benefits of EVs	3.53
Perceived Environment benefits of EVs	3.77
Perceived Symbol of EVs	3.06
Perceived Risk of EVs	3.15
Perceived Fee of EVs	3.23
Personal Innovativeness	3.18
General Environmental Concerns	4.30
EV Purchase Intention	3.33

The study also examined how potential EV buyers (prospects) in Nagaon town view electric vehicles, revealing interesting contrasts with current owners. Prospects perceive significant financial benefits from EVs, with a mean score of 3.53, indicating stronger attraction to cost savings than current owners. They also view environmental benefits positively, scoring 3.77, highlighting their strong environmental consciousness and its positive influence on their EV perceptions. Unlike owners, prospects see EVs as strong status symbols, as their mean score is3.06 is higher than that of owners.

Prospects are less risk-averse than owners, with a neutral-positive perception of EV risks (mean score: 3.15), and they also view EV costs more favorably, with a mean score of 3.23, indicating that cost is less of a concern for them however on a higher side. Their openness to new technology is moderate, scoring 3.18, and their environmental concerns are even stronger than owners', reflected by a high mean score of 4.30. This suggests that environmental priorities heavily influence their positive outlook on EVs.

Moreover, prospects show a notably stronger intent to purchase EVs, with a mean score of 3.33, indicating clear interest in acquiring them. Overall, prospects in Nagaon town have more favorable perceptions of EVs than current owners. Financial advantages, lower concerns about risks and costs, and strong environmental awareness shape their positive outlook. Understanding these differences allows for more tailored strategies to promote EV adoption, addressing the specific concerns and motivations of each group.

Objective 3: To identify any difference in perceptions of electric vehicles among owners and prospects in Nagaon town.

Hypothesis Ho: The Perception mean value on Electrical Vehicles for Owners and Non-Owners are not significantly different.

Table 9. Perception of Owners and Prospects /Non-Owners towards EVs

Perception Mean Value	**EV Non-Drivers/Prospects**	**EV owners**
Perceived Monetary benefits of EVs	3.03	3.53
Perceived Environment benefits of EVs	3.98	3.77
Perceived Symbol of EVs	2.66	3.06
Perceived Risk of EVs	2.81	3.15
Perceived Fee of EVs	2.59	3.23
Personal Innovativeness	2.98	3.18

General Environmental Concerns	3.89	4.30
EV Purchase Intention	3.15	3.33

To identify whether there is difference in perception on electrical vehicles between owners and non-drivers, t test for difference of means is conducted using Excel.

Table 10: Levene's test for equality of variances

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
V3	Equal variances assumed	.002	.844	1.609	14	.121	.275
	Equal variances not assumed			1.700	12.554	.153	.275

The study uses statistical tests to assess owner and prospect views of electric vehicles (EVs). Levene's test for variance equality is an important evaluation. This test determines whether the variances (spreads) of data between two groups (owners and prospects in this case) are statistically equal. A high p-value (greater than 0.05) implies the variances are probably similar.

In this study, Levene's test results in a p-value of 0.844, which is greater than 0.05. Suggests that the variances in perception scores between owners and prospects are likely similar.

Moving on to the t-test: Given the likely equal variances, we can proceed with a t-test assuming equal variances. This test helps determine if the means (averages) of perception scores between the two groups are statistically different. A high p-value (greater than 0.05) in the t-test suggests the means are likely not statistically different.

The t-test for mean differences resulted in a p-value of 0.121, again greater than 0.05. This suggests that the average perception scores between owners and prospects regarding electric vehicles are likely not significantly different.

We accept the null hypothesis based on the p-values obtained from both Levene's test and the t-test. Which means here is no statistically significant evidence to support the argument that owners and prospects have fundamentally different attitudes of electric vehicles. While the survey found fascinating statistical trends in their specific viewpoints, their overall attitudes towards EVs appear to be comparable.

Recommendations

This paper proposes realistic strategies for boosting electric cars (EVs) in Nagaon. These recommendations are beneficial to politicians and marketers. First, customized communication should be used to address the specific issues of both current EV owners and prospective buyers. For all groups, emphasizing the environmental benefits of EVs is critical because they are a big incentive. To alleviate cost concerns, particularly among current owners who regard cost as a barrier, financial incentives such as subsidies or purchasing incentives should be adopted to make electric vehicles more affordable.

Efforts should also be made to show up the perceived risks of EVs by providing instructional programs on safety, maintenance, and reliability, hence increasing confidence in the technology. Furthermore, promoting innovation by presenting the most recent EV improvements can entice both drivers and prospects by demonstrating EVs' comfort and efficiency. Given both groups' great environmental consciousness, harnessing this element has the potential to boost adoption even further.

Tailored marketing activities are required, with a focus on financial savings for prospective buyers and environmental benefits for present owners. Investment in EV infrastructure, like as charging stations, should be prioritized to benefit both current and prospective consumers. Collaboration among government agencies, private enterprises, and community organizations is critical for developing comprehensive plans to increase EV adoption in the region. By implementing these recommendations, Nagaon can make the shift to sustainable transportation more seamless.

Conclusion

This study investigates how electric vehicle (EV) owners and prospective customers in Nagaon town perceive EVs, with the goal of discovering any major disparities between their perspectives. Nagaon EV owners hold mixed feelings, acknowledging cost savings and environmental benefits while being apprehensive about hazards and high expenses. Their openness to new technology, motivated by environmental concerns, leads to a tepid interest in EV adoption. Prospects, on the other hand, are more enthusiastic, citing higher financial savings, prioritizing environmental benefits, and expressing fewer concerns about risks and expenses. Their increased interest in acquiring EVs indicates the necessity for specific efforts that appeal to both demographics.

Despite analyzing differences, the study discovered no significant differences between how current EV owners and future customers in Nagaon town perceive electric vehicles (EVs). Both groups had comparable perspectives on the merits and drawbacks of EVs, with environmental benefits being a major motivator and status symbolism playing a minor role.

The report emphasizes the significance of resolving economic, risk, and environmental issues to increase electric vehicle (EV) acceptance. However, this study's focus on Nagaon limits its relevance to other places. Additionally, relying on self-reported data may induce bias. Overall, the study provides policymakers and industry leaders with useful insights into promoting EV adoption by addressing significant concerns and emphasizing the benefits that are most appealing to present and potential EV users.

References

Adnan, N., Nordin, S. M., Rahman, I., Vasant, P. M., & Noor, A. (2017). A comprehensive review on theoretical framework-based electric vehicle consumer adoption research. *International Journal of Energy Research*, *41*(3), 317-335.

Asadi, S., Nilashi, M., Samad, S., Abdullah, R., Mahmoud, M., Alkinani, M. H., &Yadegaridehkordi, E. (2021). Factors impacting consumers' intention toward adoption of electric vehicles in Malaysia. *Journal of Cleaner Production*, *282*, 124474.

Berliner, R. M., Hardman, S., & Tal, G. (2019). Uncovering early adopter's perceptions and purchase intentions of automated vehicles: Insights from early adopters of electric vehicles in California. *Transportation research part F: traffic psychology and behaviour*, *60*, 712-722.

Blumberg, B., Cooper, D.R. and Schindler, P.S. (2014) *Business Research Methods*. 4th edn. Berkshire: McGraw-Hill Education.

Bunce, L., Harris, M., & Burgess, M. (2014). Charge up then charge out? Drivers' perceptions and experiences of electric vehicles in the UK. *Transportation Research Part A: Policy and Practice*, *59*, 278-287.

Chu, W., Im, M., Song, M. R., & Park, J. (2019). Psychological and behavioral factors affecting electric vehicle adoption and satisfaction: A comparative study of early adopters in China and Korea. *Transportation Research Part D: Transport and Environment*, *76*, 1-18.

Cocron, P., Bühler, F., Neumann, I., Franke, T., Krems, J. F., Schwalm, M., & Keinath, A. (2011). Methods of evaluating electric vehicles from a user's perspective–the MINI E field trial in Berlin. *IET Intelligent Transport Systems*, *5*(2), 127-133.

Cross, I., & Harrison, P. (2018). The impact of cultural context on perception and cognition. *Annual Review of Psychology*, 69, 65-89.

Egbue, O., & Long, S. (2012). Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions. *Energy policy*, *48*, 717-729.

Febransyah, A. (2021). Predicting purchase intention towards battery electric vehicles: A case of indonesian market. *World Electric Vehicle Journal*, *12*(4), 240.

Ghasri, M., Ardeshiri, A., & Rashidi, T. (2019). Perception towards electric vehicles and the impact on consumers' preference. *Transportation Research Part D: Transport and Environment*, *77*, 271-291.

Gibson, J. J. (1979). The ecological approach to visual perception. *Houghton Mifflin.*

Globisch, J., Plötz, P., Dütschke, E., &Wietschel, M. (2019). Consumer preferences for public charging infrastructure for electric vehicles. *Transport Policy*, *81*, 54-63.

Goel, Sharma, & Rathore. (2021). A review on barrier and challenges of electric vehicle in India and vehicle to grid optimisation. *Transportation engineering*, *4*, 100057.

Goldstein, E. B. (2014). Sensation and perception (9th ed.). *Cengage Learning.*

Goldstein, E. B. (2014). Sensation and perception (9th ed.). *Cengage Learning*.

Gregory, R. L. (1970). The intelligent eye. *Weidenfeld & Nicolson*.

Haustein, S., & Jensen, A. F. (2018). Factors of electric vehicle adoption: A comparison of conventional and electric car users based on an extended theory of planned behavior. *International Journal of Sustainable Transportation*, *12*(7), 484-496.

Junquera, B., Moreno, B., & Álvarez, R. (2016). Analyzing consumer attitudes towards electric vehicle purchasing intentions in Spain: Technological limitations and vehicle confidence. *Technological Forecasting and Social Change*, *109*, 6-14.

Koffka, K. (1935). Principles of Gestalt psychology. *Harcourt, Brace & World*.

Krishna, G. (2021). Understanding and identifying barriers to electric vehicle adoption through thematic analysis. *Transportation Research Interdisciplinary Perspectives*, *10*, 100364.

Li, W., Long, R., Chen, H., &Geng, J. (2017). A review of factors influencing consumer intentions to adopt battery electric vehicles. *Renewable and Sustainable Energy Reviews*, *78*, 318-328.

Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, *63*(2), 81-97.

Morton, C., Anable, J., & Nelson, J. D. (2016). Exploring consumer preferences towards electric vehicles: The influence of consumer innovativeness. *Research in transportation business & management*, *18*, 18-28.

Nayum, A., Klöckner, C. A., &Mehmetoglu, M. (2016). Comparison of socio-psychological characteristics of conventional and battery electric car buyers. *Travel Behaviour and Society*, *3*, 8-20.

Plötz, P., Schneider, U., Globisch, J., &Dütschke, E. (2014). Who will buy electric vehicles? Identifying early adopters in Germany. *Transportation Research Part A: Policy and Practice*, *67*, 96-109.

Rezvani, Z., Jansson, J., &Bodin, J. (2015). Advances in consumer electric vehicle adoption research: A review and research agenda. *Transportation research part D: transport and environment*, *34*, 122-136.

Rock, I. (1983). The logic of perception. *MIT Press*.

She, Z. Y., Sun, Q., Ma, J. J., &Xie, B. C. (2017). What are the barriers to widespread adoption of battery electric vehicles? A survey of public perception in Tianjin, China. *Transport Policy*, *56*, 29-40.

Simsekoglu, Ö., &Nayum, A. (2019). Predictors of intention to buy a battery electric vehicle among conventional car drivers. *Transportation Research Part F: Traffic Psychology and Behaviour*, *60*, 1-10.

Singh, Singh, & Vaibhav. (2021). Analysis of electric vehicle trends, development and policies in India. *Case Studies on Transport Policy*, *9*(3), 1180-1197.

Sovacool, B. K., Abrahamse, W., Zhang, L., & Ren, J. (2019). Pleasure or profit? Surveying the purchasing intentions of potential electric vehicle adopters in China. *Transportation Research Part A: Policy and Practice*, *124*, 69-81.

Spence, C., &Gallace, A. (2011). Multisensory perception: From laboratory to clinic. *Experimental Brain Research, 213(4)*, 529-541.

Stevens, S. S. (1975). Psychophysics: Introduction to its perceptual, neural, and social prospects. *Wiley*.

Tu, J. C., & Yang, C. (2019). Key factors influencing consumers' purchase of electric vehicles. *Sustainability*, *11*(14), 3863.

White, L. V., & Sintov, N. D. (2017). You are what you drive: Environmentalist and social innovator symbolism drives electric vehicle adoption intentions. *Transportation Research Part A: Policy and Practice*, *99*, 94-113.

Wong, H. S., & Nisbett, R. E. (2010). Culture and perception: Cross-cultural studies of visual perception. *Journal of Personality and Social Psychology, 99(5)*, 874-891.

Wu, J., Liao, H., & Wang, J. W. (2020). Analysis of consumer attitudes towards autonomous, connected, and electric vehicles: A survey in China. *Research in transportation economics*, *80*, 100828.

Ziefle, M., Beul-Leusmann, S., Kasugai, K., &Schwalm, M. (2014). Public perception and acceptance of electric vehicles: exploring users' perceived benefits and drawbacks. In *Design, User Experience, and Usability. User Experience Design for Everyday Life Applications and Services: Third International Conference, DUXU 2014, Held as Part of HCI International 2014, Heraklion, Crete, Greece, June 22-27, 2014, Proceedings, Part III 3* (pp. 628-639). Springer International Publishing.