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Mrs. Savitha Kulkarni
Managing Editor

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Exploring the Role of Green HR Practices in Promoting Organizational Sustainability

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Abstract

This research paper explores the role of Green HR practices in contributing to sustainable development in organizations. In an era where sustainable development is at the forefront of many organizations, green HRM practices become essential for fueling efforts towards long-term ecological and economic objectives. The findings of this study articulate three significant drivers that compel organisations to move towards the Green HRM, namely, regulatory compliance, corporate social responsibility, and pressure from stakeholders. Hence, this paper also discusses the hurdles organizations encounter implementing these practices, which include resistance to change, unawareness with regards to the practices and lack of resources. Through analysing multiple case studies and relevant literature, this study shows the performance results of effective Green HR practices based on their positive outcomes such as employee engagement, reputation of the organization, and its sustainability performance. This study highlights how tailored HR practices integrating sustainability objectives can improve employee engagement, thus leading to increased productivity and overall well-being on both organizational and community levels. Conducting a systematic review of secondary data using the PRISMA tool, this paper adds to the burgeoning HR management and sustainability literature, with implications for both practice and research. It highlights the importance of promoting sustainability in organizations and argues the case for implementing Green HR practices as an essential part of modern-day Business Strategy. This exploration leads to the proposed framework, which it brings out the light on how these Green HR practices act as a catalyst for organizational sustainability and sets the path for future studies and practice in this domain.

Key Words: *Green Human Resource Practices, Organizational Sustainability, Performance Outcomes, Challenges, Drivers*

Introduction

Green Human Resource Management is a framework that incorporates concepts of environmental sustainability into various HR activities. Green HRM aims to attain a positive environmental impact while also developing a sustainable work environment. The evolution of Human Resource (HR) practices over the decades has undergone substantial transformations especially as organizations are becoming more aware of sustainability. Traditionally, HR was concerned with administrative tasks and managing employees. But in recent years, with the growing recognition of climate change and other environmental challenges, HR professionals have been called upon to play a more strategic role in fostering sustainability within their organisations. Green Human Resource Management (GHRM) was first conceptualized in the early 1990s together with the emergence of initiatives oriented on environmental awareness and corporate social responsibility (CSR) (Douglas W.S. Renwick, 2013).

Sustainability is one of the most pressing issues facing businesses in the 21st century, and businesses must grapple with pooling regulatory forces, consumer demands for sustainability, and the competitive advantages of placing sustainability at the center of decision-making. Sustainability is seen as an essential ingredient capable of generating a sustainable competitive advantage, which is reflected in superior financial and business performance. (G. Cachón-Rodríguez, 2021). It is now expected that organizations will embed environmental concerns into their daily operations as such HR departments are adopting practices that benefit employee well-being while reducing ecological footprints (Santos, 2008). Thus, the question remains whether we should focus on GHRM implementation or whether there is still a need to improve it (Komang Oka Permadi, 2024). Nevertheless, it is not without its challenges in implementing these best practices. Resistance to change, lack of resources, and insufficient training are common obstacles for organizations (Ababneh, 2021).

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As environmental and sustainability issues attract more attention, many companies practice Green HRM more and more by social demand and increasingly stringent legislation (Alghamdi, 2021). Green HRM is the underlying force in promoting more environmentally friendly and responsible behaviours among employees (Aulia, 2023).

Green HRM not only ensures compliance with environmental standards but also creates a culture in which employees are encouraged to act environmentally friendly. With green HRM practices, organizations can bring sustainability ideals into the work setting, and also motivate employees to get involved in environment protection initiatives that encourage better employee performance (Julie Haddock-Millar, 2015). Employee performance is among the top priorities for businesses and organizations to achieve their operational goals; marked especially for those who have green practices as one of their operational goals. Corporate culture and managerial support play large roles in employee performance today (Hussain Hakro, 2023). When people feel supported and valued at work, they tend to do their jobs better, helping the organization achieve its objectives. According to (Alghamdi, 2021), design of effective employee performance in profit sustainable context is a function of productivity and the individual employee contribution of every employee towards the organization sustainable environmental goals. Encouraging green behaviours among their employees can aid businesses in achieving sustainability goals and improve their market position (Khan, 2022).

Literature review

Table 1 : Literature Review

Author Name and Year	Paper Title	Key Issues Addressed
Dumont et al. (2017)	The role of green human resource management in promoting sustainability.	Examines the impact of GHRM on organizational sustainability and employee engagement.
Renwick et al. (2013)	Green Human Resource Management: A Review and Research Agenda.	Reviews the literature on GHRM and identifies research gaps and future directions.
Jabbour & Santos (2008)	The importance of human resource management in the adoption of green practices.	Discusses the role of HRM in facilitating the adoption of sustainable practices in organizations.
Zibarras & Ballinger (2011)	HRM in the New Economy: The Role of Green HRM	Explores how GHRM practices can enhance organizational performance and sustainability.
Jackson (2012)	Toward the Sustainable Enterprise: The Role of Human Resource Management	Analyses the strategic role of HRM in achieving sustainability goals within organizations.
Gupta et al. (2019)	Green HRM: A Review of the Literature and Future Directions	Provides a comprehensive review of GHRM literature and suggests future research avenues.
Ahmad et al. (2020)	Green HRM Practices and Organizational Performance: A Study of the Malaysian Context	Investigates the relationship between GHRM practices and organizational performance in Malaysia.
Ali et al. (2021)	The Impact of Green HRM on Employee Engagement and Organizational Commitment	Examines how GHRM influences employee engagement and commitment to sustainable practices.
Lee et al. (2020)	The Role of Green HRM in Enhancing Organizational Performance	Discusses the mechanisms through which GHRM contributes to improved organizational performance.
Iqbal et al. (2021)	Green HRM and Employee Performance: A Mediating Role of Employee Engagement	Investigates the mediating effect of employee engagement on the relationship between GHRM and performance.

Singh et al. (2022)	Green HRM Practices and Their Impact on Organizational Sustainability	Explores the relationship between GHRM practices and overall sustainability outcomes in organizations.
Madsen & Ulhøi (2019)	Green Human Resource Management: Theoretical Perspectives and Practical Implications	Discusses theoretical perspectives on GHRM and its practical implications for organizations.
Ong et al. (2020)	The Role of HRM in Corporate Sustainability: A Systematic Review	Conducts a systematic review of the role of HRM in corporate sustainability initiatives.
Govindarajulu & Daily (2004)	Motivating Employees for Environmental Improvement: A Leadership Approach	Examines leadership's role in motivating employees towards environmental sustainability through HRM practices.
Renwick et al. (2016)	The Role of Green HRM in Sustainable Business Practices	Discusses how GHRM can support sustainable business practices and enhance competitive advantage.
Chen et al. (2021)	How Green HRM Influences Organizational Citizenship Behaviour	Investigates the influence of GHRM on employees' organizational citizenship behaviour.
Kramar (2014)	Beyond Strategic Human Resource Management: The Importance of Green HRM	Explores the importance of integrating GHRM into strategic HRM frameworks for sustainability.
Saeed et al. (2020)	Green HRM and Organizational Performance: A Study of the Impact of Green Practices	Analyses the impact of implementing GHRM practices on organizational performance metrics.
Arulrajah et al. (2015)	Green HRM: A Review of the Literature and Implications for Future Research	Reviews existing literature on GHRM and its implications for future research directions.
Bhatia et al. (2021)	Green HRM Practices and Organizational Commitment: A Study of Indian Firms	Examines the relationship between GHRM practices and organizational commitment in the Indian context.
Jabbour et al. (2013)	Green Human Resource Management: A Review of the Literature	Provides a comprehensive review of GHRM literature and its implications for organizational sustainability.
Paille et al. (2014)	The Role of HRM in Promoting Sustainable Development: A Review	Discusses HRM's role in promoting sustainable development through effective GHRM practices.
Yusoff et al. (2021)	The Impact of Green HRM on Employee Performance: Evidence from Malaysia	Investigates the impact of GHRM on employee performance in Malaysian organizations.
Zaid et al. (2022)	Green HRM and Employee Turnover Intention: The Mediating Role of Job Satisfaction	Explores the mediating role of job satisfaction in the relationship between GHRM and employee turnover.
Boiral & Paillé (2012)	Organizational Learning and Environmental Practices: The Role of HRM	Examines the role of HRM in facilitating organizational learning related to environmental practices.
Rani et al. (2023)	Green HRM Practices: A Catalyst for Sustainable Development	Analyses the role of GHRM practices as catalysts for achieving sustainable development goals.
Kaur et al. (2023)	Green HRM and its Impact on Employee Well-Being: A Study of Indian SMEs	Investigates the impact of GHRM practices on employee well-being in small and medium enterprises in India.

Theoretical Background of the Study

This study is based on a theoretical framework which contemplates with several theories to explain the connections between the practices of Green Human Resource Management (GHRM) and organizational sustainability. These theories help us understand how sustainable practices are driven within the organizations by Human Resource department.

Resource-Based View (RBV): RBV assumed that the effective use of resources including human capital can provide organizations with competitive advantage. From the GHRM point of view, based on this theory, organizations can improve their overall performance by capitalizing on their human resources to adopt sustainable practices (Barney, 1991). The transformative potential of GHRM lies in the fact that organizations create unique capabilities through fostering a culture of sustainability (Jabbour, 2008).

Stakeholder Theory: This is because the theory encourages consideration of the interests of many stakeholders such as the employees and customers and the community.

GHRM is consistent with stakeholder theory since it focuses on the significance of driving environmental sustainability along with ethical behaviours which these days individuals are more inclined towards and key focus point/responsibility rather than just profit making (Freeman, 1984). GHRM operations is more likely to make stakeholders involved in sustainability programs of the organizations and increase stakeholder satisfaction and loyalty (Douglas W.S. Renwick and Tom Redman, 2012).

Social Exchange Theory: This theory argues that social relevant behaviour is an exchange process aiming to maximize the outcome and minimize the costs. Green human resource management measures such as GHRM are categorized into two types, however, this fact still holds that when an organization introduces any green practices, it conveys to its employees that sustainability is an important part of their contribution. This may enhance employee engagement, motivation and commitment to the organization sustainability goals (Mitchell, 2005). Through building a favourable exchange relationship, GHRM can promote organisational citizenship behaviours regarding environmental practices.

Institutional Theory: Comparative advantage results from positionality, cultural context and institutional theory (understandings of organizations that infiltrate society) as institutions set the boundaries of acceptable behavior. Organizations may implement sustainable practices through regulatory pressures, industry standards, or societal expectations in the context of GHRM (Paul J. DiMaggio, 2000). The institutional theory emphasizes how such pressures lead to the adoption of GHRM practices as organizations strive to comply with the prevailing sustainability norms as a means of improving their legitimacy and reputation.

Theory of Planned Behaviour (TPB): One of the main concepts of TPB is that people's engagement in certain behaviours is directed by intentions, which can be predicted by their attitudes, subjective norms, and perceived behavioural control (Ajzen, 1991). This theory is relevant in GHRM as it helps you understand how an employee's attitude towards sustainability and perception of organizational support for sustainable practices can influence his/her engagement in green behaviours. GHRM is promoting attitudes and behaviours conducive to sustainability within organizations, helping employees to practice sustainable behaviours through organizational support.

Gap of The Study: Even though there is a significant and growing body of literature examining Green Human Resource Management (GHRM), and its influence on organizational sustainability, many important gaps remain. While there are qualitative and anecdotal studies on GHRM practices, there is a lack of empirical studies quantifying the impact of GHRM practices on organizational performance. Furthermore, previous studies have mainly been carried out in developed countries, which does not give a significant understanding of the GHRM concept in developing countries or specific industries. In particular, the mediating effects of employee engagement and organizational culture on the relationship between GHRM and employee behaviour and outcomes have not received adequate attention. In addition, existing research is predominantly developed in isolation within specific theoretical lenses, and toward understanding longitudinal effects of GHRM, most studies are cross-sectional in design. Last but not least, employees are often neglected stakeholders regarding their perceptions and engagement of GHRM interventions, which are important for measuring their effectiveness. The purpose of this study is to fill these gaps, both theoretically, by adding to the GHRM body of literature and practically, by providing implications for organizations wishing to improve their sustainability activities.

Objectives

1. To Empirically Analyse the Impact of GHRM Practices
2. To Explore Context-Specific GHRM Implementation
3. To Examine the Mediating Roles of Employee Engagement and Organizational Culture

Research Methodology

This study will adopt a qualitative approach on the secondary method to study the influence of GHRM practices on organizational sustainability. Using the PRISMA tool for a systematic review of secondary data, a detailed literature review will be gathered from academic journals, books and credible online databases to determine any existing research, theories and empirical studies related to GHRM. This will be complemented with secondary data through reviews of various case studies of organisations which have successfully implemented GHRM practices and sustainability disclosures. The data collected will be thematically analysed for common themes and patterns, then subject to comparative analysis to understand differences and similarities between contexts. Results will be summarized to make conclusions regarding the impact of GHRM practices on organizational sustainability, and investigate the mediating effect powered by employee engagement and organizational culture. Finally, our estimated associations could be confounded by issues of secondary data and differences in data quality. Ethics guide this process by ensuring proper citation, and adherence to put academic integrity in focus. Through use of this method, the study aspires to deliver insightful contributions regarding the role of GHRM in developing sustainability, supporting previously identified gaps in the literature.

Conceptual Model for GHRM Practices in Promoting Organizational Sustainability

Fig 1: GHRMP (Authors Compilation)

An integrated conceptual model this is, showing the holistic relationships among the components (i.e. Green Human Resource Management practices, employee engagement, organizational culture, and consequently organizational sustainability). It additionally showcases mediating elements that modify the interrelationships between these relationships.

GHRM Practices: The base layer of the model, illustrating the different types of practices organizations adopt to move towards sustainability. These practices include recruitment, training, performance management and employee involvement in sustainability initiatives.

Employee Engagement: Research proves that GHRM practices boost employees' engagement. Engaged employees are more likely to get involved in sustainability initiatives, resulting in improved outcomes for the organization.

Organizational Culture: GHRM practices cultivate a sustainability-oriented culture. Having a positive organizational culture will enable employees to align their behaviors as per their sustainability goals which helps the enterprise to create a suitable environment for GHRM initiatives.

Organizational Performance: Employee engagement and culture drive higher organizational performance. The node conveys the essentials of performance offering through GHRM effectiveness as Sustainable objectives requires high productivity and efficiency.

Organizational Sustainability: The long-term results of the implementation of successful GHRM practices, the powerful commitment to employees, and a positive organizational culture are improved organizational sustainability. This includes elements of sustainability, social and economic sustainability to ensure that organizations are able to sustain themselves in the long-term.

Contextual Factors: The context, including industry characteristics, regulatory environment, and cultural aspects, shape the deployment and impact of GHRM practices. These elements establish a feedback loop, which can influence both the GHRM practices and organizational sustainability.

Mediating Factors: It presents a content model with theoretical perspectives consisting of three mediating factors in relationship of GHRM practice to employee engagement, employee engagement to organizational culture and organizational culture to sustainability:

Employee Perceptions: Positive GHRM Perceptions and Performance Outcomes: Positive GHRM perceptions can foster employee engagement and commitment resulting in improved performance and sustainability outcomes.

Organizational Commitment: Additionally, employees with high levels of organizational commitment can act as mediators in the engagement-performance relationship, thereby amplifying the positive effect of GHRM Practices.

Long-term Engagement: Continuous improvement in organizational performance and sustainability as a result of sustained engagement over time reinforces the importance of longterm strategies in GHRM.

Key Drivers in Green HR Practices on Organizational Sustainability

Fig 2: Key Drivers in GHRP (Authors Compilation)

Leadership Commitment: Green initiatives must be driven by strong commitment from leadership. They inculcate the vision and tone for sustainability within the organization and inspire employees to work towards organizational sustainability goals (Jackson et al., 2011).

Employee Involvement: Corporate sustainability programs that are inclusive of employees can in still commitment and participation in sustainability outcomes. Employees who feel engaged are more likely to contribute to green initiatives (Renwick et al., 2013).

Training and Development: Providing training and development opportunities enables employees gain knowledge and skills to incorporate sustainability practices in their work. Investing in human capital is key to developing that green culture (Jabbour & Santos, 2008).

Performance Management: Integrating sustainability into performance management systems Sustainability has to be a part of performance management systems so that employees are incentivized and held accountable for their contributions toward sustainability goals. Such consistency highlights the relevance of green practices (Daily & Huang, 2001).

Stakeholder Engagement: Sustainability cannot be achieved by organizations in isolation; hence, organizations receive stakeholder input, such as from customers, suppliers, and the community, to understand expectations and strengthen sustainability efforts. Stakeholder feedback can spark creativity in green initiatives (Freeman, 1984).

Regulatory Compliance: One of the primary motivators of Green HR practices is complying with environmental regulations. Legal compliance is mandatory for organizations to prevent penalties and promote sustainability (Aguilera et al., 2007).

Corporate Social Responsibility: An organization's commitment to corporate social responsibility (CSR) is a mark of maintaining ethical practices, including eco-friendliness. CSR activities usually run parallel to Green HR practices and mitigate the sustainability (Porter & Kramer, 2006).

Enhanced Organizational Culture: Each driver plays a role in establishing a stronger organisational culture focused on sustainability. A supportive culture leads to a desire to implement green practices among employees and the environment agenda office.

Organizational Sustainability: These key drivers lead to the ultimate impact of stronger organizational sustainability through effective Green HR practices. These include sustainable environmental, social, and economic practices, which ensure that the organization functions responsibly and ethically over the long-term.

Challenges in Green HR Practices in Promoting Organizational Sustainability

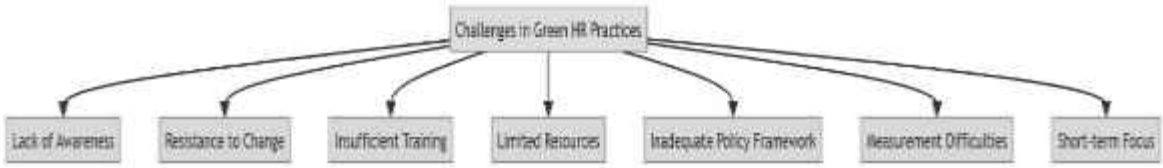

Fig 3: Challenges in GHRP (Authors Compilation)

Lack of Awareness: There might be fewer climate change awareness Green HR practices in the workplace. So little awareness may result in inadequate engagement in sustainability efforts.

Resistance to Change: There may be resistance to change associated with new green initiatives from employees as they may be fearful of the unknown or uncomfortable with changing the way they do things. This can delay the change that needs to happen.

Insufficient Training: With insufficient programs for training, employees might not have the ability and the expertise to become a sustainability deliverer. Such a gap may result in poor implementation of green initiatives.

Limited Resources: Organizational constraints such as financial, human, or technological resources, as well as the implementation of Green HR practices Ed: Challenges and Opportunities in implementing sustainability Initiatives — Poor Resourcing

Inadequate Policy Framework: Without clear policies and guidelines about sustainability, the implementation of Green HR practices can be inconsistent and create confusion. Silos could emerge from a weak framework.

Measurement Difficulties: It is difficult to measure the potency of Green HR practices and study its outturn on sustainability. The reality is that without the proper metrics, organizations will have a difficult time measuring progress or seeing data that allows them to make informed decisions.

Short-term Focus: It shows how the lack of long-term orientation in organizations leads to preferring short-term financial gains over sustainability goals. In such situations, the need of the hour is to practice Green HR practices that are a long-term approach that can be ignored.

Impact on Organizational Sustainability:

The challenges in the diagram above can play a substantial role in preventing an organization from reaching its sustainability goals:

- **Engagement and Participation**: There may also be barriers to participation at the employee level, with initiatives being meaningful only to a few.
- **Skill Gaps**: Limited training restricts employees from applying green practices, leading to ineffective implementation and lost potential for enhancement.
- **Resource Allocation**: Limited resources means less ability to invest in necessary initiatives, so sustainability programs can become inadequate.
- **Policy Clarity**: The absence of comprehensive policy frameworks can lead to practices that do not align, rendering organizational endeavors toward sustainability incoherent.
- **Progress Assessment**: Measurement challenges prevent organizations from assessing the success of their initiatives, which can stall progress and contribute to disillusionment with sustainability initiatives.
- **Long-term Vision**: The lack of commitment to a sustainable practice due to this short term focus threatens the organizations long term survival and reputation.

Strategies to Overcome Challenges in Green HR Practices: To promote organizational sustainability through Green HR practices, organizations can adopt several methods to minimize the barriers that have been identified in the former diagram. Each challenge comes with actionable solutions:

Education and Communication: Create campaigns that raise awareness on the importance of sustainability and Green HR practices. Educate your employees on similar initiatives and their benefits and goals by hosting workshops, seminars and through internal communications Foster Executive Support: Engage executives to take up the cause of sustainability, signalling seriousness and embedding awareness into the organizational culture.

Change Management Programs: Conduct well-structured change management programs with active employee involvement. Tackle concerns and suggestions using feedback channels. Encouraging Participation: By offering incentives to employees who engage in sustainability programs, you create a positive reinforcement loop and drive acceptance to change.

Comprehensive Training Programs: Enhance employee capabilities for Green HR implementation through targeted training programs Add examples and want training in it. Offer Continuous Learning Opportunities: Organize workshops, online courses, and other forms of training to help employees stay updated on sustainability best practices.

Resource Allocation: Among each of the above: make budgets for sustainability initiatives a priority. Instead, consider diverting current resources to invest in green programs. This may include, as examples, partnerships and collaborations with organizations, NGOs or academic institutions to share resources, knowledge and best practices in sustainability.

Policy Development: Create policies and guidelines that define the organization's commitment to sustainability. Ensure that everyone in your organization understands these policies. Regular Review and Updates: There should be periodic reviews and updates of the policies to ensure they align with the changing sustainability goals and practices used, keeping the policies relevant and effective.

Develop Clear Metrics: The proposed Green HR model should help develop metrics that are specific and measurable to verify how effective Green HR practices are. Implement KPIs related to sustainability objectives. Collaboration Tools: Facilitate communication and collaboration among teams, stakeholders, and partners involved in sustainability initiatives, ensuring everyone is aligned and working towards common goals.

Long-term Vision and Goals: Organization to think beyond short-term goals and more toward long-term sustainability goals. Craft a list of actionable sustainability objectives with corresponding timelines in a strategic plan. Embed Sustainability in Business Strategy: Embed sustainability considerations into the overall business strategy and ensure all stakeholders contribute to it.

Findings

Table 2: Findings

Key Findings	Description
Importance of Leadership Commitment	Strong leadership commitment is crucial for motivating employees and setting a vision for sustainability.
Employee Engagement is Critical	High levels of employee involvement lead to better outcomes in sustainability initiatives.
Training Enhances Effectiveness	Comprehensive training equips employees with the skills needed for effective Green HR practices.
Resource Allocation Matters	Adequate resources are necessary for successful implementation of Green HR practices.
Clear Policies Drive Consistency	Well-defined policies create consistency in executing sustainability initiatives.
Measurement is Key to Improvement	Specific metrics and data systems enable assessment and continuous improvement of sustainability efforts.
Long-term Focus is Essential	Integrating sustainability into business strategy ensures meaningful long-term progress.
Overcoming Resistance to Change	Effective change management strategies can mitigate resistance and foster acceptance among employees.
Collaborative Approaches Enhance Success	Partnerships with external stakeholders provide valuable resources and expertise for Green HR practices.
Impact on Organizational Performance	Successful Green HR practices improve employee morale, enhance brand reputation, and lead to better financial outcomes.

Conclusions

The focus of this research paper has been on the complex and critical intersection of Green Human Resource (HR) practices and organizational sustainability and the myriad challenges and strategies involved in the transition towards effective implementation of these practices. The results highlight that effective Green HR practices are not an additional piece, rather they form an essential aspect of an organization's total sustainability approach. In summary, it is clear from the highlights that key factors such as commitment from top management, involving employees, and thorough training programs play a pivotal role in creating a sustainability culture. Moreover, the need for focused policies and resource allocation is needed to successively manage Green HR practices. Measuring and monitoring these practices is essential for continuous improvement, and a long-term focus allows for potential meaningful sustainability benefits.

So, to achieve buy in from everyone in the organization, it is important to overcome the resistance to change that always comes with the need to get up and move through effective change management strategies. External engagement and collaborative practices partner with stakeholders to enhance sustainability and community outcomes even more. This research provides considerable insight into the gaps currently holding organizations back and those that act early and proactively on such challenges will be better equipped to take appropriate steps and instigate truly Green HR themselves. Not only does this make an organization more sustainable, but it also improves performance as well as employee morale and the reputation of the brand. Further studies is required within the context of Green HR practices evolving in light of generations, technology and global sustainability trends. Such an approach allows organizations to stay ahead of the curve in sustainable development, while also contributing to wider societal goals related to environmental stewardship and social responsibility.

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The Recovery of NPAs by the Scheduled Commercial Banks in India: An Empirical Study

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Abstract

The lifeblood of economic activity is finance. Several problems beset the Indian financial system, one of the most significant being the huge volume of non-performing assets on banks' balance sheets. For banks to function properly in the economy, they need to maintain low levels of non-performing assets (NPAs). The most adverse impact on a bank's financial health is non-performing assets (NPAs). Credit advances are crucial for funding productive goals. Credit Risk, on the other hand, is associated with bank retail products and derives from the borrower's failure to repay. The credit cycle is disrupted, and the fund is frozen. As a result, these loan losses have a significant impact on the bank's profits. While it is impossible to eliminate such losses, banks can always strive to minimize them through various recovery mechanisms.

This document analyses the recovery mechanism of NPA with four important wings. In other words, it covers several years from 2012 to 2222, 2021, through Lok Adalat, DRTS, SARFASEI, instance code, bankruptcy, and NPA effects. This study is based on the secondary data collected from the preservation of RBI data. The survey revealed that the recovery mechanism of the overall banking sector is very weak. Among the four sectors, the recovery of IBC has been better than the other three.

Keywords: GNPA, NPA, Lok Adalat, DRT, SARFASEI, IBC, Recovery Channels

Introduction

Banks are the backbone of a sound financial system, as they play an important role in the growth and development of a country by providing loans to various sectors of the economy. For a developing country like India to grow sustainably, its banking sector must be healthy enough to meet the capital requirements of various sectors. But in recent years, a large quantity of non-working assets has had a significant impact on the income of banks, as they should make arrangements on NPA. Consequently, banks must accept effective resolution methods to restore a large number of NPAs to improve their financial indicators. The NPA business custody in the civil courts to obtain the authorized and restored debt authorization requires time, and until then, the banks must suspend such an account. Non-performing assets are loans/advances on which banks do not earn interest. NPAs are classified into gross NPAs (GNPAs) and net NPAs (NNPAs). GNPA is the main contribution of NPA and funding interest loans. The ratio is GNPA / Raw Advances. Gross advances are all outstanding loans and advances, including advances for which refinancing has been received but excluding rediscounted bills and advances written off at the head office level. On the other hand, NNPA are the actual NPAs arising after deducting GNPA deductions. Where deductions include provisions made against NPA accounts, deposit insurance company/export credit guarantee company receivables received and held pending settlement, progress payments received and held in doubtful/other account, balance in miscellaneous expense account against NPA accounts, floating reserves, provisions instead of reduction in fair value of restructured accounts classified as NPA and standard assets. All scheduled commercial banks recover their NPAs through the recovery channels viz., Debt Recovery Tribunal, Lok Adalat, SARFAESI Act 2002 & Insolvency & Bankruptcy Code these recovery channels were backed up with legal enactments and protecting the interest of both Creditors and Debtors. The Indian government set up a committee under the chairmanship of Shri. Tiwari in 1981 to look into the legal difficulties faced by banks and financial institutions in recovering loans and recommended setting up of special tribunals for speedy recovery of debts. Also, the Narasimham Committee (1991) advocated the formation of Special Tribunals for the fast recovery of loans. As a result of these recommendations, the RDDBFI Act, 1993 came into force on June 24, 1993, which was passed in parliament on August 27, 1993. As a result, Debt Recovery Tribunals (DRTs) and Debt Recovery Appellate Tribunals (DRATs) were constituted under the RDDBFI Act, 1993, with the specific objective of "speedy adjudication and recovery of debts owed to banks and financial institutions" under the powers conferred by the Act. These tribunals deal with cases in which the amount of debt owed to a bank/financial institution or a consortium of banks/financial institutions is more than Rs 1 lakh and less than Rs 1 million. The Legal Services Authorities Act of 1987 established Lok Adalats. All SCBs and FIs can use it

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as a platform to settle their debts through arbitration, conciliation, mediation, compromise, or a friendly or negotiated agreement. These dispute resolution measures are provided for in Article 89 of the Code of Civil Procedure (Report). This forum is primarily used by banks and financial institutions to recover small outstanding debts as it does not charge any fees for new cases or disputes. On June 21, 2002, the SARFAESI Act became operative, and on August 22, 2002, it was re-promulgated. A securitization company (SC) or reconstruction company (RC) operates under the SARFAESI Act, 2002, carrying out the asset reconstruction or securitization activities specified in Section 10 of this Act (RBI, 2003). Before engaging in the securitization and reconstruction of financial assets (FAs), each SC/RC is required to register with the RBI (The Securitization and Reconstruction, 2016). The Narasimham and Andhyarujina Committees' recommendations led to this act.

Review of Literature

NPAs pose a serious threat to the banking sector, and therefore, it is always an issue of concern for banks and policymakers. There are numerous studies on NPAs that highlighted the factors responsible for NPAs, identified its impact on bank operations, and discussed legal and non-legal mechanisms for its recovery. A few important studies on resolution techniques of NPAs are mentioned as follows: **Khedekar Pooja S(2012)** deals with understanding the concept of NPA, the causes, and an overview of different sectors in India. **Vadivalagan G., and Selvarajan B**, (**2013)** attempted to focus mainly on the impact of NPAs, suggestions to reduce the NPAs, and observing the scenario of nonperforming assets at the global level and at the national level. The data on NPAs in Indian scheduled commercial banks have been collected for analysis. The results are derived from the statistical analysis, and accordingly, suitable suggestions were given to contain the NPAs. **Helge Eknath J, Padhye Pradip (2016)** focused on the problem of non-performing assets of banks in India, as the NPAs reflect the performance of banks. The study does a comparative analysis between the NPAs of Public Sector Banks v/s Private Sector Banks and asserts that the Public sector banks have shown very good results in financial transactions compared to private sector banks. The only problem that the public sector banks were facing was the increasing number of non-performing assets. Non-performing assets of public sector banks had regularly increased year on year. Conversely, non-performing loans from private sector banks had regularly declined annually, except for a few years. Overall, the decrease in non-performing loans indicated that banks have strengthened their credit evaluation processes over the years, and the increase in the number of non-performing loans indicated the need to make provisions that weaken the banks' overall profitability. The report states that the magnitude of NPA in public sector banks is comparatively higher than in private sector banks. **Prasad E, Hari Prasad, G. V. Bhavani** (2017) intended to study the performance of the public sector in India with reference to their NPAs as the Banking sector is the backbone of the nation's economy**. Shaban Majid.,** (2018) investigated non-performing assets and their impact on the profitability of commercial banks, namely, Indian public sector banks, private sector banks, and foreign-owned commercial banks in India. The data was collected from RBI database for eleven years from 1st April 2006 to 31st March 2017. Regression analysis has been used in the study where return on assets and return on equity have been used as proxy variables for profitability of the banks while Gross NPA to Gross advances ratio and Net NPA to Net advances ratio has been used as independent variables to denote the non-performing assets of the banks. It was found that non-performing loans have a negative impact on bank profitability. Furthermore, the findings show that the profitability of foreign banks is least affected by non-performing loans as compared to public and private banks. **Sarbabidya Monisankar, Sultana Mafruza, (2019)** understand the concept of NPA and tried to analyse the trend. In this study, they attempted to find a significant difference between the total NPA (GNPA) and the pure NPA (NNPA) among various banks, such as the private sector, public sector, and foreign banks. In their 2019 study, "The Impact of Credit Risk Management on Profitability of Public Sector Commercial Banks in India," **Ali Liaqat and Dhiman Sonia (2019**) attempted to investigate an empirical relationship between credit risk management and banks' financial performance. For the years 2010–2017, an effort has been made to determine the statistical influence of credit risk management indicators on the profitability of public sector commercial banks. The top 10 public sector commercial banks chosen based on total assets were the subjects of the study. Panel regression was applied for data analysis. In the panel model equation, credit risk management was considered as an independent variable measured by non-performing loan ratio (NPLR), loan loss provision ratio (LLPR), capital adequacy ratio (CAR), asset quality ratio (AQ), management (M), earnings (E) and liquidity (L) while bank profitability was considered as a dependent variable measured by return on assets (ROA). The results of this survey indicate that credit risk management indicators have a significant impact on the financial performance of selected public sector banks in India. The empirical findings indicated that ROA (profitability) was positively related to CAR, management quality, and earnings ability, whereas it was found to be negatively related to AQ and liquidity.

Alamelumangai and B. Sudha (2019) sought to evaluate how effective these channels are in decreasing NPAs. The efficiency of the recovery channels was evaluated based on the volume of NPAs recovered over the 13 years from 2005 to 2017. To comprehend the notable variation in the trend of NPA recovery across the current channels, a statistical test known as Analysis of Variance (ANOVA) was employed.

Soni Kanika Tiwari and Chandan Kumar (2020), sought to investigate the current challenges facing the Indian banking sector, particularly focusing on the escalating issue of non-performing assets in Indian banks. In this case, the net profit ratio was considered a dependent variable that reflects the banks' profitability. Three independent factors were taken into consideration, representing different factors affecting the financial performance of banks. Specifically, Net NPA Ratio, Current Ratio, and Capital Adequacy Ratio.

Ten Indian banks were considered as a sample, specifically, the top five public sector banks and top five private sector banks by total assets. Financial data was collected for a period of three years, from 2016 to 2018. The applied statistical test was correlation and regression. In addition, a graphic analysis of the bank, which was taken in the form of a sample size, was implemented. The result indicates that it is a general literature, which is an NPA, a pure coefficient, a significant negative connection, the validity of capital, and a significant positive connection. The analysis also shows the financial indicators of each bank and provides useful information on the general conditions of India's private banks and public banks.

Dr. Nihat Fatima et. al. (2020) investigated various parameters of non-performing loans of scheduled commercial banks (SCBs) and also studied the effectiveness of three major recovery channels for legitimate non-performing loans: Lok Adalats, SARFAESI, and DRTs. In this study, ANOVA and the Kruskal-Wallis test were used to analyze the differences between the recovery channels. The analysis revealed that there is a significant difference in NPA recovery rates between these channels. The author found that there has been a significant increase in NPA ratios during 2007 to 2018 and concluded that SARFAESI is the most effective recovery channel as its procedure is not lengthy, plus it empowers secured creditors to recover their debts without the intervention of the court.

Gaur Dolly and Mohapatra Deepti Ranjan, (2021) sought to study the relationship between non-performing assets and profitability in the Indian banking sector to determine the severity of the impact of non-performing assets on the profitability of banks. In addition, other bank-specific, sector-specific, and macroeconomic factors affecting bank profits were considered. A balanced panel dataset consisting of 37 scheduled commercial banks in India spanning a period of 14 years (2005-2018) was used to carry out the required analysis. The results were obtained using fixed-effects and random-effects panel regression models. Due to the presence of heteroscedasticity, the results of the robust standard error were presented.

A highly negative correlation exists between NPA and the two profitability measures: return on assets (ROA) and return on equity (ROE). The results of this study have established NPA as the major detractor of the banking industry's profits because NPA carries the most negative regression coefficient, which is highly significant. This means that a deterioration in credit quality will make it harder for banks to operate, leading to their failure.

Mitra Samuel S, et. al.. (2021) attempted to make a side-by-side comparison between the two categories of banks for assessment of relation of NPAs and profitability. For this purpose, the top ten commercial banks, five from each sector, in terms of revenue generation have been selected during the period 2008-09 and 2017-18. The findings reveal a negative linkage between provision for NPA to interest income and profitability (ROA) in the case of both categories of banks. The study also found a positive association between NPA recovery and profitability in the case of public sector banks.

Rational of the Study

Assets, including leased assets, become non-performing when they stop generating income for the bank. A 'non-performing asset' (NPA) is defined as a line of credit on which interest and/or principal payments have remained 'overdue' for a specified period. Currently, it is 90 days from the loan approval date. We all know that bad loans stop generating revenue, require provisions, increase borrowing costs, affect employee morale, and dissipate capital. In this context, NPA recovery plays a vital role in sustaining the banking industry. Recovery mechanism is the process of planning, testing, and implementing recovery procedures and standards required to restore financial assets in the event of a firm's failure. The central government and the Reserve Bank of India have taken steps to create a legal and regulatory framework to manage and reduce bad loans, and therefore, studies are being conducted to examine the effectiveness of various recovery channels used by SCBs.

Statement of Problem

The recovery of bank debt was a serious problem. Because a large amount of public funds was frozen for the default borrower. The accumulation of bad assets (NPA) and the decrease in NPA recovery will reduce the recycling of money that directly affects bank loans. Potential non-performing assets (NPAs) have made banks increasingly reluctant to lend to large projects. The interest of both debtors and creditors is protected by utilising debt recovery channels such as Debt

Recovery Tribunals, Lok Adalats, Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interests (SARFAESI) Act 2002 through planned advertisement of recovery of bad debts by the creditors. The implementation of the Insolvency and Bankruptcy Code, 2016 (IBC) has also paved the way for the speedy recovery of corporate debts.

Objectives of the Study

- To ascertain the level of NPAs of Scheduled Commercial Banks in India
- To evaluate the level of NPAs in different categories of Banks like Public Sector, Private Sector, Foreign Banks, & Small Finance banks
- To evaluate the recovery of NPAs through various channels
- To examine the effectiveness of existing channels of recovery of bank loans

Scope of the Study

The study focuses on the non-performing loans of SCBs in India and the role played by various recovery mechanisms adopted by SCBs between 2012-2013 and 2021-2022.

Research Methodology

The study analysed the effectiveness of Lok Adalat, DRT, SARFAESI Act, and IBC 2016 for a period of 10 years, from 2013 to 2022. The study is based on secondary data on the recovery of bad loans through various recovery channels of Indian banks from the RBI release. Percentage analysis, trend analysis, ratios, and averages are statistical tools used to analyze data and draw meaningful conclusions.

Research Area

The area of this research is limited to the performance of four recovery mechanisms available to the SCBs. So, the descriptive & exploratory research design is used.

Data Collection

Data for the present study is gathered mainly from secondary sources like Books, Reports, Articles, Journals, Websites, Blogs, previously submitted research theses & papers published in the same field.

Data Analysis

An analysis of the NPAs & recovery of NPAs by All Scheduled Commercial Banks through four recovery channels viz., Lok Adalats, Debt Recovery Tribunals, SARFAESI Act 2002 & IBC 2016 is presented below.

Non-performing assets in India 2022 data

Because of different government activities, the Gross Non-Performing Assets (GNPAs) of banks have diminished by Rs 48,138 crore to Rs 7.44 lakh crore as of March 31, 2022, whereas the Net Non-Performing Assets (NNPs) have reduced by Rs. 228895 Crores to Rs. 2.04 lakh crores. Towards the end of March 2022, Scheduled Commercial Banks (SCBs) had GNPAs adding up to Rs 7.44 lakh crore on their asset reports. SCBS's total NPA decreased from 7,91,791 Krone of 31.3.2017 to 31.3.2022 to 7,43,653 rupees, but NPA had decreased from RS. 4,33,121 rupees to rupees. 2,04,226 crores.

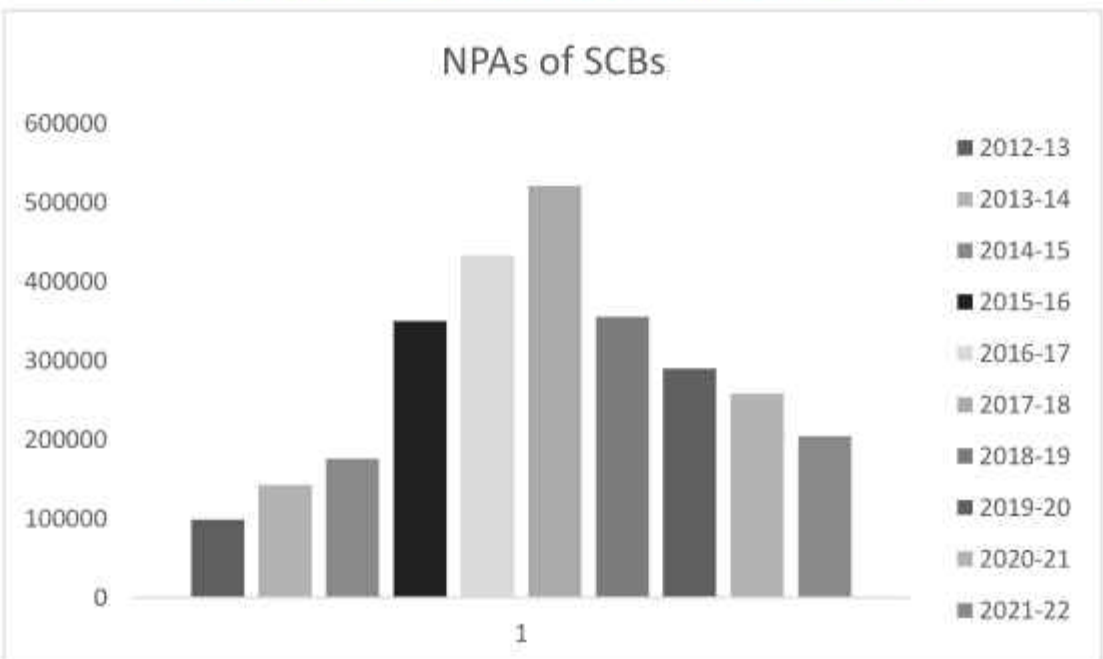
Table 1: GNPA & NPA details of all Scheduled Commercial Banks

(Rs. Crores)

All Schedules Commercial Banks						
Year	Advances		Non-Performing Assets			
			Gross		Net	
	Gross	Net	Amount	As % of Gross Advances	Amount	As % of Net Advances
2012-13	5988277	5879773	194053	3.2	98693	1.7
2013-14	6875748	6735213	263362	3.8	142421	2.1
2014-15	7559760	7388160	323335	4.3	175841	2.4
2015-16	8173121	7896467	611947	7.5	349814	4.4
2016-17	8492565	8116109	791791	9.3	433121	5.3
2017-18	9266210	8745997	1039679	11.2	520838	6
2018-19	10294463	9676183	936474	9.1	355068	3.7
2019-20	10918918	10301897	899803	8.2	289370	2.8
2020-21	11399608	10820208	837771	7.3	258228	2.4
2021-22	12821603	12013294	743653	5.8	204226	1.7

Source: Annual Reports of RBI from 2012 to 2022

Graph 1: NPAs of Scheduled Commercial Banks



Inference

The NPAs of the SCBs were Rs. 98693 crores in the year 2012-12 were increased to Rs. 520838 crores in the year 2017-18 & decreased to Rs. 204226 crores in the year 2021-22. The percentage of NPAs to the net advances was 1.7% which was increased to 6% in the year 2017-18 & decreased to 1.7% in the year 2021-22.

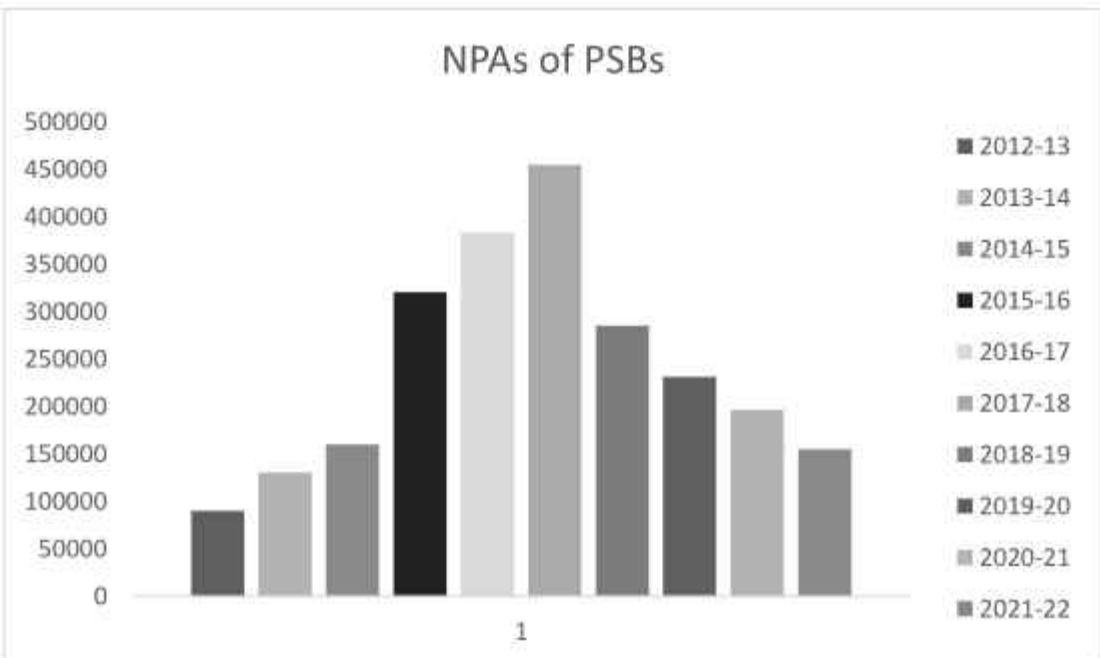
Table 2: GNPA & NPA details of all Public Sector Banks

(Rs. Crores)

Public Sector Banks						
Year	Advances		Non-Performing Assets			
			Gross		Net	
	Gross	Net	Amount	As % of Gross Advances	Amount	As % of Net Advances
2012-13	4560169	4472845	165006	3.6	90037	2
2013-14	5215920	5101137	227264	4.4	130394	2.6
2014-15	5615793	5476250	278468	5	159951	2.9
2015-16	5823907	5593577	539956	9.3	320376	5.7
2016-17	5874849	5557232	684732	11.7	383089	6.9
2017-18	6141698	5697350	895601	14.6	454473	8
2018-19	6382461	5892667	739541	11.6	285122	4.8
2019-20	6615112	6158112	678317	10.3	230918	3.7
2020-21	6770363	6348758	616616	9.1	196451	3.1
2021-22	7427041	7033864	542174	7.3	154745	2.2

Source: Annual Reports of RBI from 2012 to 2022

Graph 2: NPAs of Public Sector Banks



Inference

The public sector banks NPAs were Rs.90037 crores in the year 2012-13, which increased to Rs. 454473 crores in the year2017-18 & decreased to Rs. 154745 crores in the year 2021-22. The percentage of NPAs to Net advances was 2% in the year 2012-13 which increased up to 8% in the year 2017-18 & decreased to 2.2% in the year 2021-22.

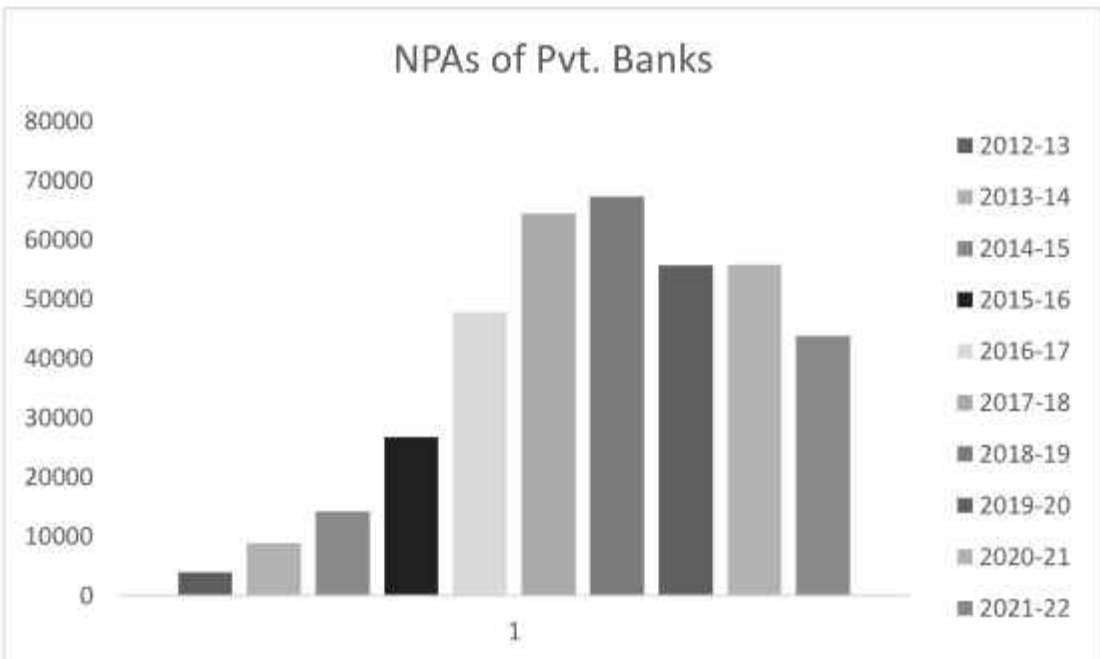
Table 3: GNPA & NPA details of Private Sector Banks

(Rs. Crores)

Private Sector Banks						
Year	Advances		Non-Performing Assets			
			Gross		Net	
	Gross	Net	Amount	As % of Gross Advances	Amount	As % of Net Advances
2012-13	886023	873252	15800	1.8	3900	0.4
2013-14	1360253	1342935	24542	1.8	8862	0.7
2014-15	1607329	1584312	34106	2.1	14128	0.9
2015-16	1972608	1939339	56186	2.8	26677	1.4
2016-17	2266721	2219475	93209	4.1	47780	2.2
2017-18	2725891	2662753	129335	4.7	64380	2.4
2018-19	3442347	3327328	183604	5.3	67309	2
2019-20	3776231	3625154	209568	5.5	55683	1.5
2020-21	4097040	3939292	200141	4.9	55809	1.4
2021-22	4757421	4373300	180782	3.8	43733	1

Source: Annual Reports of RBI from 2012 to 2022

Graph 3: NPAs of Private Sector Banks



Inference

The NPAs of the private sector banks were Rs.3900 crores which went up to Rs.67309 crores in the year 2018-19 & decreased to Rs. 43733 crores in the year 2021-22. The percentage of NPAs to the net advances was 0.4% in the year 2012-13 which increased up to 2.4% in the year 2017-18 & came down to 1% in the year 2021-22

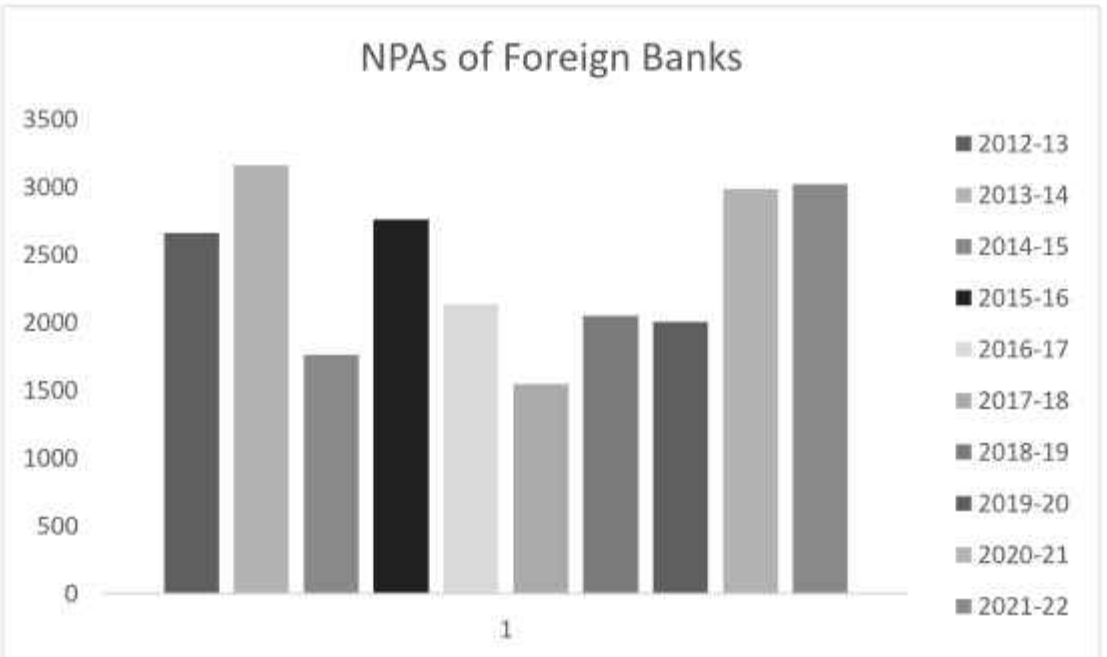
Table 4: GNPA & NPA details of Foreign Banks in India

(Rs. Crores)

Year	Foreign Banks					
	Advances		Non-Performing Assets			
			Gross		Net	
	Gross	Net	Amount	As % of Gross Advances	Amount	As % of Net Advances
2012-13	268966	263680	7977	3	2663	1
2013-14	299575	291142	11565	3.9	3160	1.1
2014-15	336638	327599	10761	3.2	1762	0.5
2015-16	376607	363551	15805	4.2	2762	0.8
2016-17	343822	332335	13629	4	2137	0.6
2017-18	363305	351016	13849	3.8	1548	0.4
2018-19	406881	396726	12242	3	2051	0.5
2019-20	436066	428076	10208	2.3	2005	0.5
2020-21	420617	423546	15044	3.6	2987	0.7
2021-22	475379	503833	13786	2.9	3023	0.6

Source: Annual Reports of RBI from 2012 to 2022

Graph 4: NPAs of Foreign Banks in India



Inference

The NPAs of foreign banks were Rs. 2663 crores in the year 2012-13 which went up to Rs.2762 crores in the year 2015-16 & were Rs.3023 crores in the year 2021-22. The percentage of NPAs to the net advances was 1% in the year 2012-13 which decreased to 0.4 in the year 2017-18 & was 0.6% in the year 2021-22

Table 5: GNPA & NPA details of Small Finance Banks*

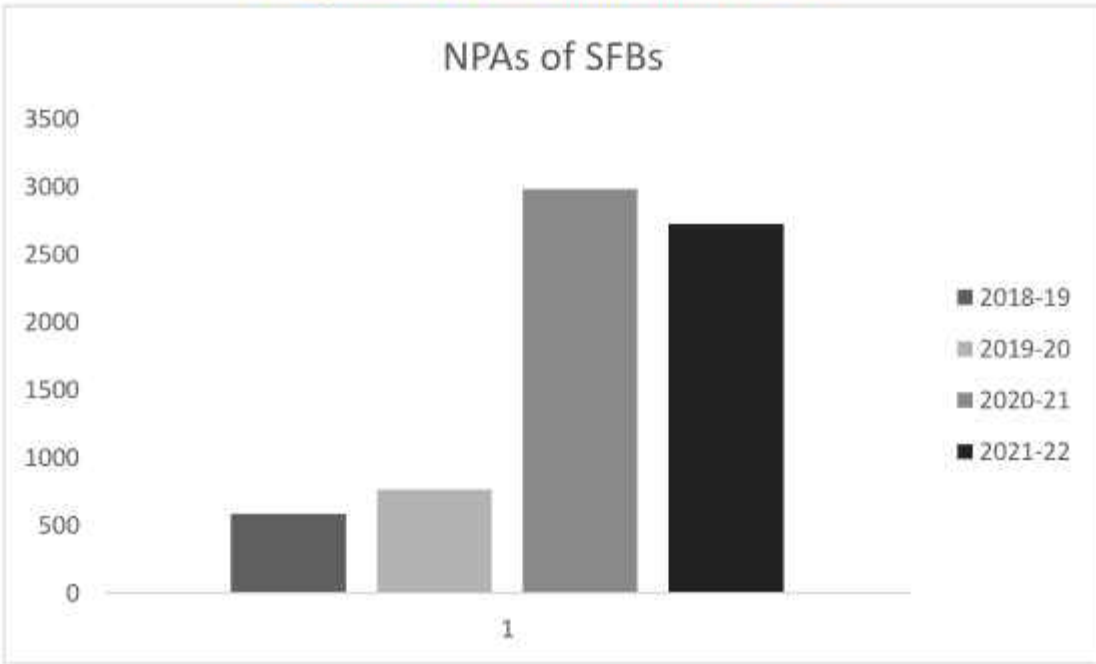
(Rs. Crores)

Small Finance Banks						
Year	Advances		Non-Performing Assets			
			Gross		Net	
	Gross	Net	Amount	As % of Gross Advances	Amount	As % of Net Advances
2018-19	62775	59461	1087	1.7	586	1
2019-20	91509	60554	1709	1.9	765	0.8
2020-21	111589	108613	5971	5.4	2981	2.7
2021-22	141041	136250	6911	4.9	2725	2

Source: Annual Reports of RBI from 2012 to 2022

*The Reserve Bank had issued the Guidelines for Licensing of "Small Finance Banks" in the Private Sector on November 27, 2014. In February 2015, RBI released the list of entities which had applied for a small finance bank license. Capital Small Finance Bank was the first small finance bank to begin operations, opening with 47 branches on 24 April 2016. So the data is available from the year 2018 onwards.

Graph 5: NPAs of Small Finance Bank



Inference

The NPAs of Small Finance Banks were Rs.586 crores in the year 2018-19 which increased to Rs. 2981 in the year 2020-21 & were Rs. 2725 crores in the year 2021-22. The percentage of NPAs to the net advances was 1% in the year 2018-19 which increased to 2.7% in the year 2020-21 & was 2% in the year 2021-22

Recovery Mechanisms

The recovery mechanism refers to the procedures and processes necessary for reclaiming financial assets when a borrower defaults. An NPA, as previously mentioned, is an asset that no longer produces income and returns; if not

handled appropriately and swiftly, it can harm the bank. Thus, the recovery of NPAs is crucial for the stability of the banking sector. In India, recovery is conducted through the following channels.

Lok Adalat

According to the Legal Services Authorities Act of 1987, Lok Adalat serves as a forum where cases that are pending in court or at the pre-litigation stage are resolved. Lok Adalat has proven to be an effective means for settling debt related to loans. The Indian Banks Association (IBA) provides guidelines to its members for addressing issues with Lok Adalats to ensure quick resolutions. Lok Adalats can manage debt amounts up to Rs.10 lakhs, as well as larger sums categorized as dubious or in loss. Both suit-filed and non-suit-filed accounts can be addressed by Lok Adalats. They operate at various times throughout the year. State, High Court, District, and Taluk levels are all conducted at the same time and in the same order as shown below:

- At least once a month, Mega Lok Adalats are held at District Court Centers.
- Weekly Lok Adalats at all Court Centres regularly every week.
- National Lok Adalat: This is held bi-monthly, generally on the second Saturday of each month or on any other day as specified by the National Legal Services Authority (NALSA).

The Banks and Financial Institutions Debt Recovery Act of 1993

The Narasimhan Committee endorsed the Tiwari Committee Report in 1991. Following the recommendations of the Narasimhan Committee, the government implemented the innovative Recovery of Debts to Banks and Financial Institutions Act in 1993, commonly referred to as the RDB Act. This legislation defined the responsibilities of the Debt Recovery Tribunal. It's important to note that the Tribunal was established by an Act of Parliament, which was empowered to do so under Article 247 of the Indian Constitution.

The RDB Act altered the management of asset-recovery cases in India, although it has faced scrutiny on multiple occasions. In 1995, the Delhi High Court successfully contested the constitutionality of the DRT, determining that the Tribunal could not operate effectively due to the absence of a system for submitting counterclaims. Following this, the RDB Act underwent revisions, and the Supreme Court confirmed the validity of the amended legislation. Currently, borrowers are empowered to file "counterclaims" as stipulated in section 19 of the RDB Act.

Debt Recovery Tribunal

In 1993, the Recovery of Debts Due to Banks and Financial Institutions Act led to the formation of the Debt Recovery Tribunal. This tribunal was set up to expedite the resolution of outstanding cases and the enforcement of judgments. Legal actions by banks against borrowers who default on their loans are handled by these tribunals, which are regarded as quasi-judicial entities. Chapter III of the Act outlines the scope, powers, and authority assigned to these tribunals and how they should be implemented. Additionally, the limitations specified in the Limitations Act will also apply to the Debt Recovery Tribunal.

Under Section 18 of the Act, only the High Courts and the Supreme Court (which exercises jurisdiction under Articles 226 and 227 of the Constitution of India) have jurisdiction to hear cases relating to the recovery of debts against banks and financial institutions. On the other hand, the Tribunals can only hear cases worth Rs 1 million and above. The Debt Recovery Tribunal can also hear appeals against secured creditor suits filed under the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interests Act (SARFAESI).

Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, 2002

The SARFAESI Act has had a major impact on the debt recovery quandary in the country. The most significant change brought about by SARFAESI is that banks can now take over the ownership of loan accounts after they have been classified and verified as non-performing assets (under Section 13.4 of SARFAESI) without going through any examination or lengthy litigation process. A secured creditor can sell or lease the assets held as collateral or appoint a receiver to manage the assets in case they are marked as non-performing assets under the SARFAESI Act. With the assistance of the Chief Magistrate, the bank can retain the asset for 60 days after serving notice to the defaulter.

If a credit account is delegated a nonperforming resource (NPA) under the SARFAESI, the bank\'s approved authority can start the interaction. Despite the fact that the borrower has consented to pay the late sum, the bank has the privilege to look for reimbursement of the whole advance sum in addition to revenue. Perhaps, instead of settling the case, the bank will demand that the remaining balance be paid in full and that the bank advance be repaid on demand. However, if the borrower pays the arrears, nothing is preventing the bank from stopping the proceedings and continuing with the advance documents. All registered commercial banks are subject to the SARFAESI Act. If a secured creditor is unable to recover the full amount due by selling the secured assets, he can approach the Debt Recovery Tribunal.

Insolvency and Bankruptcy Code 2016

The Insolvency and Bankruptcy Code, 2016 (IBC) enacted on May 28, 2016, against the backdrop of mounting non-performing loans, to establish a consolidated framework for insolvency resolution of corporations, partnership firms, and individuals in a time-bound manner, seeks to tackle the non-performing asset (NPA) problem in two ways. Firstly, behavioural change on the part of the debtors to ensure sound business decision-making and prevent business failures is encouraged. Second, it provides a process through which financially distressed companies undergo a rehabilitation process and get back on their feet. According to the IBC, the Indian insolvency regime has shifted from "debtor-owner control" to "creditor control". The creditor-in-control model hands control of the debtor to its creditors and relies upon the managerial skills of a newly appointed management to take over an ailing company and ensure business continuance. It provides for a time-bound process to resolve insolvency. When a loan default occurs, the creditor has to take control of the debtor's assets and take a decision to resolve the insolvency. Under the IBC, debtors and creditors can initiate recovery proceedings against each other. Under the IBC, a company has to complete the entire insolvency process within 180 days. The deadline can be extended if creditors do not object to the extension. For small companies, including startups with an annual turnover of Rs 1 crore, all bankruptcy proceedings have to be completed within 90 days, and the period can be extended by 45 days. If the debt resolution does not happen, the company goes into liquidation. The IBC was designed to address the problem of bad loans that was plaguing the banking system. The IBC process has transformed the relationship between debtors and creditors. Several major cases have been resolved in two years, while others are at advanced resolution stages. The IBC has reformed the landscape of Indian law on insolvency to a large extent. This has encouraged disciplined borrowing among companies as promoters fear losing control of their businesses in the event of default. Notably, as many as 18,629 applications requiring over Rs 529 billion in funding were resolved before being accepted. Following the implementation of the IBC, India's insolvency resolution ranking improved from 136th in 2017 to 52nd in 2020, according to a World Bank report.

Table 6: NPA recovery by SCBs

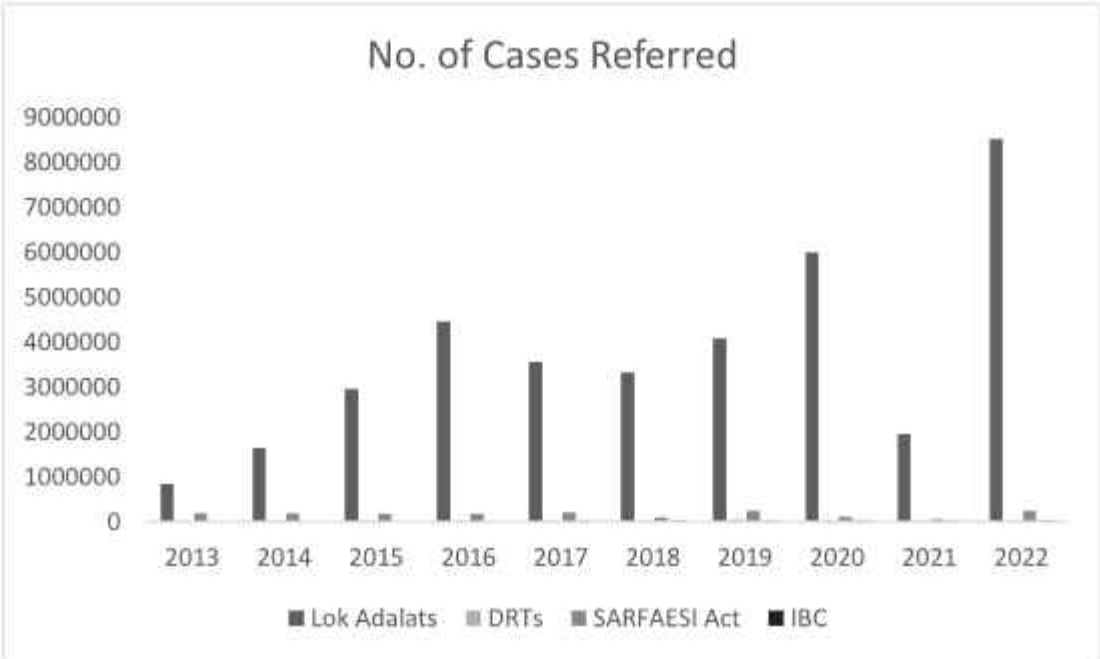
Amount in Rs. Billion

Year	Particulars	Recovery Channel				Total
		Lok Adalats	DRTs	SARFAESI Act	IBC	
2012-13	No. of Cases Referred	840961	13408	190537	----	1044636
	Amount Involved	66	310	681	----	1058
	Amount Recovered	4	44	185	----	232
	% of Amount Recovered	6.1	14.1	27.1	----	21.9
2013-14	No. of Cases Referred	1636957	28258	194707	----	1859922
	Amount Involved	232	553	946	----	1731
	Amount Recovered	14	53	244	----	311
	% of Amount Recovered	6.2	9.5	25.8	----	18
2014-15	No. of Cases Referred	2958313	22004	175355	----	3155672
	Amount Involved	309.79	603.71	1567.78	----	2481.28
	Amount Recovered	9.84	42.08	256	----	307.92
	% of Amount Recovered	3.2	7.0	16.3	----	12.4

2015-16	No. of Cases Referred	4456634	24537	173582	----	4654753
	Amount Involved	720.33	693.41	801	----	2214.74
	Amount Recovered	32.24	63.65	131.79	----	227.68
	% of Amount Recovered	4.5	9.2	16.5	----	10.3
2016-17	No. of Cases Referred	3555678	32418	199352	37	3787485
	Amount Involved	361	1008	1414	----	2783
	Amount Recovered	23	103	259	----	385
	% of Amount Recovered	6.3	10.2	18.3	----	13.8
2017-18	No. of Cases Referred	3317897	29345	91330	704	3439276
	Amount Involved	457	1331	819	99	2706
	Amount Recovered	18	72	264	49	403
	% of Amount Recovered	3.9	5.4	32.2	49.5	14.9
2018-19	No. of Cases Referred	4080947	52175	248312	1135	4382569
	Amount Involved	535	3065	2891	1666	8157
	Amount Recovered	28	106	419	708	1261
	% of Amount Recovered	5.2	3.5	14.5	42.5	15.5
2019-20	No. of Cases Referred	5986790	33139	105523	1986	6127438
	Amount Involved	678	205	1965.82	2249.35	5098.17
	Amount Recovered	42.11	99.86	342.83	1041.17	1525.97
	% of Amount Recovered	6.2	48.7	17.4	46.3	29.9
2020-21	No. of Cases Referred	1949249	28182	57331	536	2035198
	Amount Involved	280.84	2253.61	675.1	1353.19	4562.74
	Amount Recovered	11.19	81.13	276.86	273.11	642.29
	% of Amount Recovered	4.0	3.6	41.0	20.2	14.1
2021-22	No. of Cases Referred	8506648	29487	249475	885	8786495
	Amount Involved	1190	471.65	1216.42	1992.5	4870.57
	Amount Recovered	27.77	121.14	273.49	474.21	896.61
	% of Amount Recovered	2.3	25.7	22.5	23.8	18.4
Total Cases Referred		37290074	292953	1685504	5283	39273444
Total Amount Involved		4829.96	10494.4	12977.12	7360.04	35662.5
Total Amount Recovered		210.15	785.86	2651.97	2545.49	6192.47
% of Amount Recovered		4.4	7.5	20.4	34.6	17.4

Source: Annual Reports of RBI from 2012 to 2022

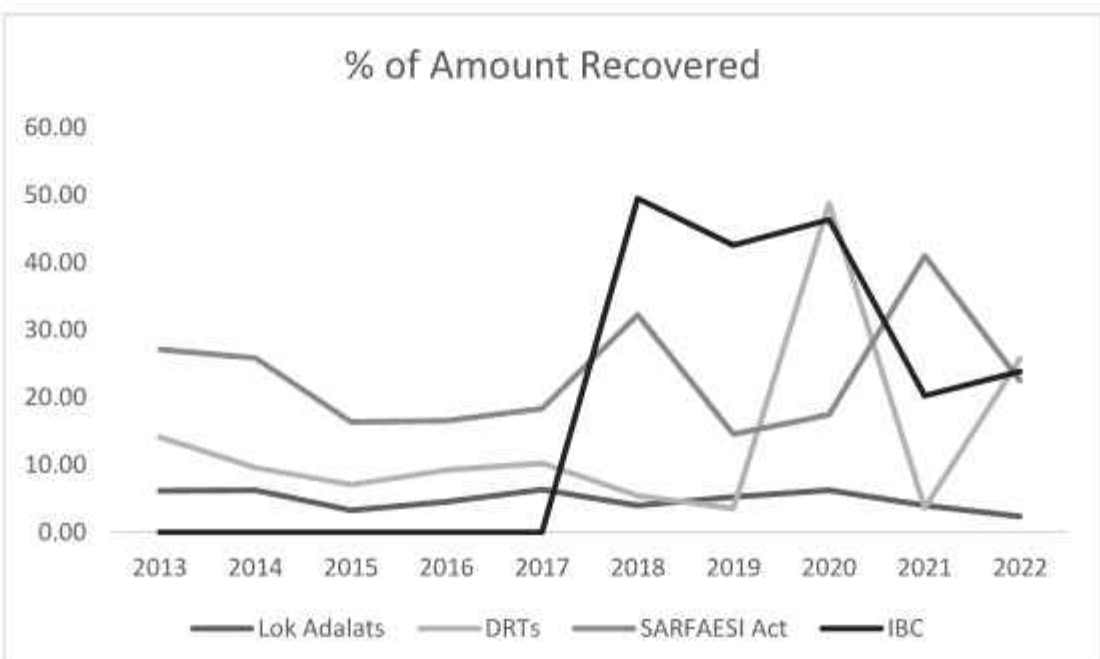
Graph 6: Number of Cases referred to recovery channels



Inference

The total number of cases referred to Lok Adalat were 37290074, DRTs 292953, SARFAESI Act 1685504 & IBC 5283 till 2022

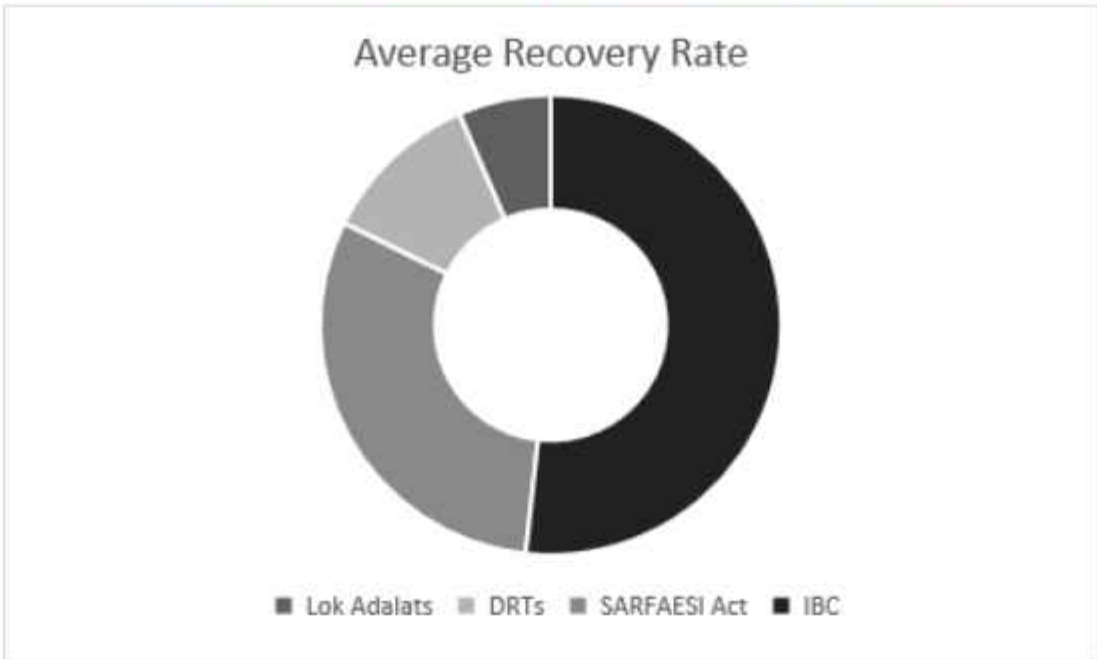
Graph 7: Percentage of Amount Recovered by using recovery channels



Inference

The recovery rate of Lok Adalat was 6.1% in the year 2012-13 which went up to 32.24% in the year 2014-15 & was 2.3% in the year 2021-22. The recovery rate of DRTs was 14.1% in the year 2012-13 which went up to 63.65 in the year 2015-16 & was 25.7% in the year 2021-22. The recovery rate of SARFESAI Act was 27.1 in the year 2012-13 which went up to 32.2% in the year 2017-18 & was 22.5% in the year 2021-22. The recovery rate of IBC was 49.5% in the year 2017-18 & was 34.6% in the year 2021-22.

Graph 8: Average recovery rate of recovery channels



Inference

The average percentage amount of NPAs recovered by Lok Adalat 4.4, DRTs 7.5, SARFAESI Act 20.4 and IBC 34.6 till 2022

Outcomes of IBC since 2016

Table 7: Status of Liquidation Processes as on September 30, 2022

Ongoing	1378
> Two years	685
> One year ≤ Two years	325
> 270 days ≤ 1 year	109
> 180 days ≤ 270 days	81
> 90 days ≤ 180 days	96
≤ 90 days	82

Source: The quarterly newsletter of IBBI July-Sept. 2022

Graph 9: Status of Liquidation Processes as on September 30, 2022

Inference

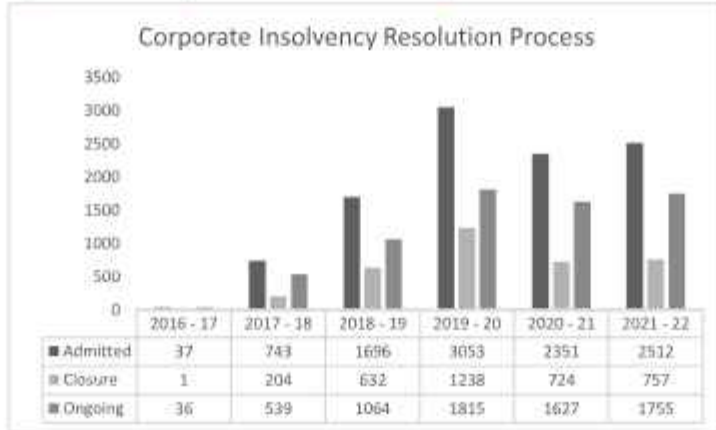
Out of 1378 ongoing liquidation processes 50% of cases have taken more than 2 years' time to resolve, 23% of taken more than one year, 8% have taken more than 270 days, 6% have taken more than 180 days, 7% have taken more than 90 days while 6% have resolved in less than 90 days

Table 8: Corporate Insolvency Resolution Process

Year	Beginning of the Period	Admitted	Closure by				End of the Period
			Appeal/ Review/ Settled	Withdrawal under Section 12A	Approval of Resolution Plan	Commence-ment of Liquidation	
2016 - 17	0	37	1	0	0	0	36
2017 - 18	36	707	94	0	19	91	539
2018 - 19	539	1157	153	97	77	305	1064
2019 - 20	1064	1989	344	217	136	541	1815
2020 - 21	1815	536	91	162	121	350	1627
2021 - 22	1627	885	103	171	143	340	1755
Total	**NA**	**5311**	**786**	**647**	**496**	**1627**	**1755**

Source: The quarterly newsletter of IBBI July-Sept. 2022

Graph 10: Corporate Insolvency Resolution Process



Inference

Out of 5311 cases admitted with the IBBI from the year 2016-17 to 2021-22 a total of 3556 cases have been resolved by the IBC with a success rate of 66.95%.

Findings

The percentage of NPAs with that of Net advances of all SCBs ranges between 6% to 1.7%, whereas of Public Sector Banks rages from 8% to 2%, in case of private sector banks it ranges from 2.4% to 0.4%, The NPAs of Foreign Banks ranges from 1.1% to 0.4% & that of Small Finance Banks it ranges from 2.7% to 0.8%

A total 39272444 number of cases referred to the four recovery channels for the recovery of the NPAs involving an amount of Rs. 35662.5 crores till 2021-22 out of which an amount of Rs. 6192.47 crores were recovered. The average rate of recovery of the four channels was 17.4%.

The most number of cases were covered under Lok Adalats followed by SARFASEI Act, DRTs & IBC respectively

The recovery rate of Lok Adalat ranges from 2.3% to 6.3%, whereas that of DRTS ranges from 3.5% to 48.7, the rate of SARFASEI Act ranges between 14.5% to 41% & that of IBC is between 20.2% to 49.5% 87% of cases referred to IBC have taken more than 180 days to resolve

The success rate of IBC in resolving the insolvency process is 66.95%

Conclusion

The study found that though the maximum number of cases referred to Lok Adalats but IBC is the most efficient channel in recovering NPAs as the total number of cases filled for Corporate Insolvency Resolution Process under IBC as on 2021-22 were 5311 out of which 786 were either settled or under review process, 647 cases were withdrawn under section 12A, 496 cases were approved for resolution plan, 1627 cases where commencement of liquidation began & 1755 cases were outstanding. This shows the success rate of IBC as 66.96% of cases filed under IBC were resolved in six years recovering an amount of Rs. 2545.49 billion out of total amount of Rs. 7360.04 billion with a recovery rate of 34.6% whereas the Lok Adalats helped recover an amount of Rs. 210.15 billion out of total amount of Rs. 4829.96 billion with a recovery rate of 4.4%. The reason for recovering the best level in IBC is to provide the ability for creditors to recover debt without the intervention of justice. However, the time required to resolve the case is more, and it takes an average of 180 days to solve the case, so IBC can take a long time to achieve results. The regulators have to create a mechanism by which the duration of settlement shall come down to 90 days as agreed upon while implementing the IBC 2016.

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Evaluating Green Marketing Strategies' Influence on Consumer Adoption of Electric Vehicles

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** S.C. Patil

Abstract

This study evaluates the impact of green marketing strategies on consumer adoption of electric vehicles (EVs), focusing particularly on eco-labeling and sustainability-focused advertisements. The research investigates how these marketing strategies affect consumers' purchase intent for EVs and examines the role of consumer environmental awareness as a mediator in this relationship. Data were collected from a sample of 385 respondents across Karnataka, using surveys and statistical tools like correlation analysis, multiple linear regression, independent t-tests, and mediation analysis. Findings: Results show a high positive correlation between green marketing strategies and purchase intent for EVs, which signifies that as the consumers are exposed to eco-labeling and sustainability-focused advertisements, their intention to adopt EVs increases. Furthermore, environmental awareness was found to significantly mediate the relationship between green marketing and EV adoption with ($\beta = 0.45$, $p < 0.01$) and ($\beta = 0.25$, $p < 0.01$), highlighting the importance of consumer education in driving sustainable behavior. The study concludes that businesses and policymakers can leverage green marketing strategies to boost the adoption of electric vehicles, contributing to environmental sustainability goals. These insights offer practical implications for enhancing marketing efforts and supporting policy initiatives aimed at promoting sustainable transportation.

Keywords: Green Marketing, Electric Vehicles, Purchase Intent, Environmental Awareness, Sustainability.

Introduction

With the world moving increasingly towards acquiring a higher concern over environmental degradation, resource depletion, and climate change, sustainability has fast taken center stage in policymaking, corporate strategy, and consumer behavior. Transportation, being one of the major contributors to greenhouse gas emissions, has emerged as a leading sector for intervention, and the growing trend in this context is the adoption of cleaner, greener alternatives in the form of electric vehicles (EVs). The proliferation of EVs is a transformative shift in the automotive industry and a decisive step toward mitigating environmental damage. However, the widespread adoption of EVs depends not only on technological advancements but also on the effective communication and promotion of their benefits through innovative marketing approaches. Green marketing has the strategic imperative of aligning marketing strategy with environmental goals, thus being crucial in building awareness among consumers and changing purchasing behaviors, leading eventually to the embracing of green products such as electric vehicles. As a concept, green marketing represents the promotion of products and practices that reduce harm to the environment while emphasizing ecological benefits (Smith et al., 2020). This strategy, the use of aspects such as emissions cutbacks, improved mileage, and other long-term costs will resonate in the ears of environmentally conscious buyers. Nonetheless, green marketing techniques rely on such techniques addressing distinctive concerns, preferences, and perceptions that exist between green consumers and targeted potential buyers for Electric Vehicles. For example, some customers may value greenness and eco-friendliness, but for others, issues such as cost, recharging stations, and performance are more critical (Johnson & Lee, 2019). This calls for green marketing to consider such diverse issues so that appealing stories can be made to connect with various customer segments.

There are several factors influencing the uptake of EVs. These factors range from environmental concerns to economic motivators, social influences, and technological factors (Chen et al., 2021). Among them, green marketing is an essential mediator between the perceptions of consumers and the broader environmental objectives connected to EV adoption. Green marketing campaigns, in general, tend to build perceived value through the positioning of EVs with global sustainability trends, health advantages, and economic benefits over time (Thompson & Carter, 2018). In addition, such campaigns often use eco-labeling, sustainability certifications, and endorsements from respected organizations to create trust and credibility among consumers (Garcia et al., 2020). Even though it has the potential, the impact of green

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marketing on the adoption of EVs is not uniform across all markets and demographics. In developed economies, where awareness regarding the environment is relatively more substantial, green marketing strategies have successfully delivered impressive returns through instilled social responsibility and pro-environmental consumer behaviors (Parker & Adams, 2022). Conversely, in developing countries, affordability and infrastructure issues typically are given priority over the environment; in such regions, the outcome of green marketing efforts is somewhat subjective and contingent on the scenario at hand (Sharma et al., 2021). For instance, in India, a country which has a growing middle class and ever-increasing automobile ownership, marketing campaigns for electric vehicles need to address concerns that relate to availability of charging stations, battery longevity, and purchase price while promoting the fact that they are contributing to reducing air pollution and energy independence (Kumar & Singh, 2023). The development of green marketing strategies has been very closely related to the advancement of digital technology, which has expanded the reach and effectiveness of sustainability messaging. Social media, online advertising, and data analytics have allowed marketers to tailor their campaigns to specific audience segments, thereby enhancing their relevance and impact (Wilson et al., 2019). For example, targeted ads touting the environmental savings of EVs combined with a few satisfied customer testimonials have become an effective method of building trust among consumers, countering naysayers and critics (Anderson et al., 2020). Gamification is another technique; for example, the carbon footprint apps that track consumers' carbon footprints and the rewards for practicing eco-friendly habits further encourage a tech-savvy consumer to practice eco-friendlier habits (Brown & Taylor, 2021).

However, the success of green marketing strategies is also dependent on overcoming several barriers to EV adoption. Range anxiety, or the fear of running out of battery power before reaching a charging station, remains a significant deterrent for many potential buyers (Davis & Moore, 2022). Similarly, misconceptions about the cost-effectiveness and performance of EVs, often fueled by inadequate consumer education, can undermine the efficacy of green marketing efforts (Phillips et al., 2023). It requires addressing these concerns with a holistic approach that focuses on effective messaging coupled with tangible improvements in EV technology and infrastructure. For instance, partnerships between automobile companies, governments, and energy companies can increase the visibility and availability of charging networks, thus furthering the value propositions advertised in green marketing campaigns (Nguyen & Patel, 2020).

Secondly, the legitimacy of green marketing strategies is fundamentally linked to the authenticity and transparency of the claims made by marketers. There are cases where greenwashing has led to erosion of consumer confidence, which then calls for regulation and more stringent accountability, according to Clarkson et al. (2021). To overcome this, companies have to be sustainable in their practice, and integrate eco-friendly values into all activities within the supply chain while providing clear information about these efforts to stakeholders, according to Evans & Richards (2023). For instance, car manufacturers can use life-cycle assessments and third-party certifications to support their assertions about the environmental advantages of EVs, which would increase consumer trust and loyalty. The interaction between green marketing and consumer acceptance of EVs also mirrors more general social forces and cultural currents. In countries where environmental awareness is deeply rooted, such as Scandinavia, green marketing strategies often strike a chord with consumers, resulting in greater adoption of EVs (Larsen et al., 2019). However, in areas where environmental awareness is still growing, green marketing campaigns may have to be based on more pragmatic and economic incentives to spur behavioral change (Mishra et al., 2021). Moreover, the influence of social influence and peer pressure on consumer choice cannot be denied because most of the time, people are inclined to follow a choice made by their social circles (Robinson & Hayes, 2022).

Behavioral insights can, therefore, be incorporated into green marketing plans for potential gains in their implementation. Research in behavioral economics has shown that framing environmental benefits in terms of personal gains, such as health improvements or cost savings, increases consumer engagement dramatically (Stewart & Bennett, 2020). Similarly, the use of social norm messaging, which focuses on the prevalence of peers' eco-friendly behaviors, encourages pro-environmental actions (Campbell et al., 2021). By incorporating these insights into their campaigns, marketers can create more persuasive narratives that resonate with consumers on both emotional and rational levels.

Beyond influencing consumer behavior, green marketing strategies can also drive systemic changes in the automotive industry and beyond. The increasing demand for EVs is partly due to efficient green marketing by companies, such as those using longer-lasting batteries, faster charging technology, and better-priced models offered by carmakers, which continue to invest in researching and developing better products (Zhang et al., 2022). Moreover, the growth of EVs has spurred the development of renewable energy infrastructure as governments and private entities strive to support the shift toward sustainable transportation (Hansen & Lopez, 2023). These developments underscore the transformative potential of green marketing as a catalyst for environmental and economic progress. As the move toward sustainable transport around the globe accelerates, it is of extreme importance to weigh the green marketing strategies and influence they have over the adoption by consumers of Electric Vehicles. Studying their efficacies across context and demographics, researchers find best practices in their areas and discover barriers towards them, helping in suggesting proper

interventions for facilitating faster adoption rates of Electric Vehicles (Peterson et al., 2022). Such assessments may also be instrumental in informing the development of policies and programs that respond to consumer wants and market realities, thus shaping a more accessible and sustainable future.

Overall, Green marketing is, therefore, one of the greatest tools for fostering environmental sustainability as well as spurring the promotion of EVs. Success will depend on the fine understanding of consumer behavior, a commitment to authenticity and transparency, and a willingness to address the practical challenges associated with EV adoption. As societies continue to grapple with the environmental and economic implications of climate change, the insights derived from this study will contribute to the development of more effective strategies for advancing sustainable transportation and achieving global sustainability goals.

Significance of the Study

Evaluating Green Marketing Strategies' Influence on Consumer Adoption of Electric Vehicles (EVs)" is relevant for its inquiry into the complexities involved in how sustainability in the environment, consumers, and creative marketing strategies have interactions. Such a study goes towards addressing multifaceted topics in environmentalism, business policy, technology assimilation, and the social outcomes it generates as it advances on theoretical and applied grounds. Electric vehicles have become a revolutionary answer to the global challenge of reducing greenhouse gas emissions and mitigating climate change (Smith et al., 2020). Despite the great technological advancements in EVs and growing awareness of their environmental benefits, adoption rates are still uneven across different regions. Understanding the role of green marketing strategies in influencing consumer behavior is critical for bridging this gap (Johnson & Lee, 2019). The study, by examining how marketing strategies emphasizing sustainability resonate with consumers, offers insights into overcoming barriers to EV adoption and driving long-term environmental benefits. This research also puts forth environmental concerns on the need to accelerate the transition towards low-carbon transportation alternatives. The transportation sector constitutes nearly 25% of global emissions emanating from energy-related CO2 emissions (Chen et al., 2021). The paper reveals the ways in which sound green marketing strategies can magnify adoption rates of EVs and contributes to the work around the world toward net-zero emissions and working toward establishing sustainable urban mobility systems.

On a corporate level, the findings are invaluable to automotive manufacturers and marketers. Green marketing, when done authentically, can strengthen brand equity, build consumer trust, and foster loyalty (Thompson & Carter, 2018). The study explores how companies can leverage eco-labeling, sustainability narratives, and digital campaigns to establish a competitive edge in the EV market. It also explores how green marketing strategies can reduce skepticism and alleviate the concerns of consumers, such as range anxiety and high upfront costs, thereby increasing purchase intent (Garcia et al., 2020). The economic implications of this study are equally important. The EV market is expected to explode with the increasing government incentives and consumer demand (Sharma et al., 2021). It would allow businesses to design targeted strategies for maximum market penetration and profitability based on understanding the nuances of consumer behavior that green marketing may influence. The research also investigates how government policies, such as tax benefits and subsidies, can synergize with marketing initiatives for the widespread adoption of EVs (Kumar & Singh, 2023).

The second critical contribution lies in the societal relevance of the study. The shift toward sustainable transportation involves addressing deeply ingrained consumer habits and perceptions. This research emphasizes the importance of consumer education and awareness, particularly through green marketing campaigns, to dispel myths about EVs and foster informed decision-making (Wilson et al., 2019). This analyzes the role of testimonials, endorsements, and community-driven initiatives in building trust and overcoming resistance to change as a roadmap for future marketing strategies (Anderson et al., 2020).

The academic significance of this study lies in its contribution to the growing body of knowledge on green marketing and consumer behavior. Previous studies have explored individual aspects of EV adoption, but this research takes a holistic approach by integrating psychological, economic, and environmental perspectives (Brown & Taylor, 2021). It also extends the theoretical frameworks of consumer behavior by examining the moderating effects of cultural and demographic factors on the effectiveness of green marketing strategies. Furthermore, this study addresses critical issues, such as greenwashing and its potential to undermine consumer trust (Clarkson et al., 2021). Emphasizing the need for authenticity and transparency in green marketing practices contributes to establishing ethical standards in the industry. The findings encourage companies to adopt genuine sustainability practices rather than superficial branding efforts, ensuring long-term credibility and consumer engagement (Evans & Richards, 2023).

From a policy standpoint, this study underlines the importance of collective efforts among governments, businesses, and consumers toward sustainable transportation. Based on this understanding, it reveals the best marketing strategies in

support of policy frameworks that will assist stakeholders to increase public-private partnership and promoting incentives for sustainability practices (Phillips et al., 2023). Besides, the research provides answers to how the digitalization of marketing affects practices. Increasing the influence of social media and online platforms makes green marketing another dimension. Thus, this paper studies how these digital tools--advertising in targeting, gamification, and influencer campaign--can leverage sustainability messages through increasing reach and impact, mainly to younger consumers (Parker & Adams, 2022). In a broader perspective, the study supports the United Nations Sustainable Development Goals, particularly those in Goal 11, Sustainable Cities and Communities, and Goal 13, Climate Action. This way, the findings can feed into creating greener urban environments and mitigating the effects of climate change as a byproduct of successfully promoting the consumption of EVs through marketing. Then again, it speaks volumes about the impact of consumer behavior towards achieving these goals through better directions interlaced with individual actions, in pursuit of sustainable goals globally (Davis & Moore, 2022).

The implications for consumer psychology are immense. By knowing how emotional, cognitive, and social factors determine consumer responses to green marketing strategies, businesses can design campaigns that resonate with target audiences on deep levels (Chen et al., 2021). This research looks at the role of social norms, peer influence, and altruistic motivations in consumer preferences and their psychological drivers to adopt EVs (Garcia et al., 2020). The study lays the groundwork for future research. It identifies gaps in present marketing strategies and consumer patterns of adoption to develop innovative ways for the promotion of sustainable products. Multidisciplinary perspectives include behavioral economics, environmental science, and digital marketing, ensuring that the subject matter is comprehensively understood (Brown et al., 2021).

Lastly, the practical significance of this study reaches out to a wide variety of stakeholders such as policymakers, businesses, environmental activists, and consumers. By bridging the gap between academic research and real-world applications, it provides a robust framework for designing, implementing, and evaluating green marketing strategies that drive sustainable consumption (Clarkson et al., 2021). Accordingly, the significance of this study is multifaceted, addressing critical issues at the intersection of environmental sustainability, consumer behavior, and marketing innovation. Its contributions span environmental, economic, societal, academic, and policy domains, offering valuable insights for promoting the adoption of electric vehicles and advancing global sustainability goals.

Hypothesis of the study

H1: Green marketing strategies, such as eco-labelling and sustainability-focused advertisements, have a significant positive influence on consumers' purchase intent for electric vehicles.

H2: Consumer environmental awareness significantly mediates the relationship between green marketing strategies and electric vehicle adoption.

Methods and Approach

The research methodology for the study titled "Evaluating Green Marketing Strategies' Influence on Consumer Adoption of Electric Vehicles" adopts a quantitative research design to analyse the influence of green marketing strategies on consumer behavior, specifically regarding their intent to adopt electric vehicles (EVs). The survey-based approach is used to collect primary data from consumers across the Karnataka state, which will ensure adequate geographic representation from urban, semi-urban, and rural regions. Stratified random sampling will be used in participant selection to ensure proper proportional representation across the demographic groups: age, income, education level, and geographic location. The sample size will comprise 385 respondents (W.C.H., Y.W.H., & M.R.M.A. 2023; Saragih, A.H., Siallagan, I.P., & Napitupulu, S.M. 2024). selected for statistical validity and a solid analysis. The data will be collected through a structured questionnaire, capturing consumer perceptions on green marketing strategies, environmental awareness, and factors that may influence EV adoption. Descriptive statistics will be applied to summarize the data. In this study, regression analysis will be applied in testing the first hypothesis of how green marketing impacts purchase intent. Furthermore, mediation analysis will be applied in ascertaining the role played by environmental awareness between green marketing and EV adoption. Statistical tools like SPSS will be applied to analyze the data. This methodology ensures that the objectives of the study are met while providing actionable insights into the effectiveness of green marketing in promoting sustainable consumer behavior.

Findings and Interpretations

Table 1: Demographic Information of the Respondents

Demographic Variable	Category	Number of Respondents (N=385)	Percentage (%)
Age	18-25 years	70	18.18%
	26-35 years	95	24.68%
	36-45 years	90	23.38%
	46-55 years	75	19.48%
	56 and above	55	14.29%
Gender	Male	210	54.55%
	Female	175	45.45%
Education Level	High School/Undergraduate	105	27.27%
	Graduate	120	31.17%
	Post-Graduate/Doctorate	160	41.56%
Income Level	Below ₹3,00,000 pa	115	29.87%
	₹3,00,000 - ₹6,00,000 pa	125	32.47%
	₹6,00,000 - ₹10,00,000 pa	95	24.68%
	Above ₹10,00,000 pa	50	12.99%
Geographic Location	Urban (Metropolitan Cities)	150	38.96%
	Semi-Urban (Tier 2 Cities)	125	32.47%
	Rural (Tier 3 Cities/Villages)	110	28.57%

Source: Data Collection

Table.1 highlights the Demographic information from the 385 respondents will be very enlightening, covering age, gender, educational level, income, and geographic location. The age distribution indicates that a large proportion of the respondents are aged between 26 and 45 years- typical ages that might be more on the cutting edge concerning technology and interest in sustainable products such as electric vehicles. The gender distribution reflects somewhat an equal input from the male and female respondents, including representation of both views. The educational level, meanwhile, shows that many respondents had a graduate and post-graduate degree; thus, the sample is well-educated and, perhaps, more aware of green marketing and EV adoption. Income distribution indicates that a majority of the respondents are in the income range of ₹3,00,000 to ₹6,00,000; this is relevant because this income group is more likely to be interested in the purchase of electric vehicles. The geographic division would ensure that different regions in Karnataka, such as urban, semi-urban, and rural areas, are covered, making the results generalizable across different population segments.

Table 2: Reliability Test

Construct	Variable (Item)	Number of Items	Item-Total Correlation	Cronbach's Alpha if Item Deleted	Alpha Value
Green Marketing Strategies	1. Eco-labeling awareness (e.g., "I recognize eco-labels on products.")	5	0.65	0.84	0.87
	2. Impact of advertisements (e.g., "Green advertising influences my decision to buy EVs.")	6	0.72	0.85	

	3. Perception of sustainability (e.g., "I believe sustainability claims influence my purchase behavior.")	4	0.78	0.83	
Consumer Adoption of Electric Vehicles	4. Purchase intent (e.g., "I plan to buy an electric vehicle in the next 1-2 years.")	5	0.8	0.79	0.86
	5. Willingness to pay more for EVs (e.g., "I am willing to pay a premium for an electric vehicle.")	4	0.75	0.8	
	6. Perceived usefulness (e.g., "I believe electric vehicles are more beneficial for the environment.")	5	0.7	0.82	

Source: Literature Review and Analysis

The Cronbach's Alpha analysis in the table.2 shows the reliability of the scales used to measure green marketing strategies and consumer adoption of electric vehicles. Since Cronbach's Alpha values are above 0.7 for all constructs, the internal consistency of the scales is good, meaning that the items within each construct are reliable and contribute positively to the measurement of their respective variables. The analysis also reveals that individual items, such as eco-labeling awareness and perceived usefulness of EVs, have a strong correlation with the total score, indicating that these items are effective in capturing consumer perceptions related to green marketing and EV adoption. The high Cronbach's Alpha values validate the robustness of the survey instrument, ensuring that the findings derived from this data will be trustworthy.

Table 3: Correlation analysis (Green Marketing strategies and Purchase Intent for EVs)

Variable 1	Variable 2	Correlation Coefficient (r)	p-value	Interpretation
Eco-labeling	**Purchase Intent for EVs**	r = 0.82	p-value < 0.01	A strong positive correlation (r = 0.82) indicates that as eco-labeling increases, purchase intent for EVs also increases.
Sustainability-focused Advertisements	**Purchase Intent for EVs**	r = 0.75	p-value < 0.01	A moderate positive correlation (r = 0.75) shows that as sustainability-focused advertisements increase, purchase intent for EVs increases.
Overall Green Marketing Strategy	**Purchase Intent for EVs**	r = 0.78**	p-value < 0.01	A strong positive correlation (r = 0.78) supports the hypothesis that green marketing strategies significantly influence purchase intent for electric vehicles.

Table 3 reveals that, there are significant positive correlations between green marketing strategies and the purchase intent of electric vehicles. For instance, the correlation between eco-labelling and the purchase intent for electric vehicles presents a high and positive value of r = 0.82 (p-value < 0.01). This suggests that with increased usage of eco-labeling, there is an increased purchase intent of electric vehicles with significant positivity. Likewise, the correlation between the presence of sustainability-focused advertisements and purchase intent for electric vehicles is positive with a moderate r = 0.75, p-value < 0.01, which implies that a higher increase in sustainability-focused advertisements has resulted in a marked increase in purchase intent for electric vehicles. In general, the overall relationship between green marketing strategies and intent to purchase an EV is r = 0.78, p-value < 0.01. In this regard, the hypothesis for green marketing strategies influencing consumers' intentions to buy electric vehicles is upheld. These findings collectively suggest that eco-labeling, sustainability-oriented advertisements, and green marketing strategies in general have a high capability of driving the interest of customers in electric vehicles.

Table 4: Multiple Linear Regression Analysis (Assess the impact of green marketing strategies on purchase intent for electric vehicles (EVs)

Variable	Standardized Coefficient (β)	t-value	p-value	Interpretation
Eco-labeling	0.3	5.21	< 0.01	A significant positive relationship (β = 0.30) indicates that eco-labeling has a positive impact on purchase intent for EVs.
Sustainability-focused Advertisements	0.25	4.12	< 0.01	A significant positive relationship (β = 0.25) shows that sustainability-focused advertisements positively influence purchase intent.
Environmental Awareness	0.18	3.04	< 0.01	A significant positive relationship (β = 0.18) demonstrates that higher environmental awareness enhances purchase intent for EVs.
Income Level (Control Variable)	0.1	1.92	0.06	A moderate positive relationship (β = 0.10), but marginally non-significant, suggesting that income level has a small influence on purchase intent.
Overall Green Marketing Strategy	0.55	7.48	< 0.05	A significant positive relationship (β = 0.55) confirms that the overall green marketing strategy significantly impacts purchase intent for electric vehicles.

The multiple linear regression analysis in the table-4 on the effect of green marketing strategies on purchase intent for electric vehicles reveals several significant findings. First, eco-labeling has a positive relationship with purchase intent for electric vehicles with a standardized coefficient (β) of 0.30 and a t-value of 5.21 (p-value < 0.01). This indicates that as the presence of eco-labeling increases, consumers' intent to purchase electric vehicles also increases. Likewise, sustainability-conscious advertisements have a positive relationship: β = 0.25, t = 4.12, and p-value < 0.01. That means that sustainability-oriented advertisements positively relate to consumers' intent to purchase electric vehicles. The effect of environmental awareness is also significant as β = 0.18, t = 3.04, and p-value < 0.01. In other words, the more environmental consumer knowledge, the greater the intent to buy electric cars. Although income level has a positive relationship with purchase intent (β = 0.10), the effect is marginally non-significant (p-value = 0.06), which means that income has a smaller influence on purchase intent than the other factors. Finally, the overall green marketing strategy has the strongest positive impact, with a significant β of 0.55 and a t-value of 7.48 (p-value < 0.05), confirming that comprehensive green marketing strategies significantly drive consumers' intent to adopt electric vehicles.

Table 5: Independent t-test Analysis (Compare the purchase intent between respondents who have been exposed to green marketing and those who haven't)

Group	Mean Purchase Intent Score	Standard Deviation	t-value	Degrees of Freedom (df)	p-value	Interpretation
Exposed to Green Marketing	4.45	0.76	t = 3.45	383	p-value < 0.01	The exposed group shows a higher purchase intent (Mean = 4.45) with a significant t-value of 3.45 and p-value < 0.01, indicating a strong difference in purchase intent compared to the non-exposed group.
Not Exposed to Green Marketing	3.89	0.82				The non-exposed group has a lower purchase intent (Mean = 3.89), suggesting that exposure to green marketing significantly influences purchase intent for EVs.

Table 5 provides an Independent t-test Analysis (Table 5): This analysis compares the purchase intent of respondents exposed versus not exposed to green marketing. The mean purchase intent score for those exposed was 4.45 with a standard deviation of 0.76, compared to a mean score of 3.89 with a standard deviation of 0.82 for those who were not exposed. The t-value for the comparison is 3.45 with 383 degrees of freedom, and the p-value is less than 0.01, which is statistically significant. The result is, therefore, significant, showing that exposure to green marketing results in a higher purchase intent of electric vehicles as compared to those who have not been exposed. This makes the exposed group differ clearly on purchase intent, thus indicating that green marketing influences the consumer's intentions to purchase EVs.

Table 6: Mediation Analysis (Regress Mediator [Environmental Awareness) on Independent Variable (Green Marketing Strategies)

Independent Variable	Mediator	Coefficient (β)	Standard Error (SE)	t-value	p-value
Green Marketing Strategies	Environmental Awareness	0.45	0.08	5.63	< 0.01
Green Marketing Strategies	Electric Vehicle Adoption	0.60	0.09	6.67	< 0.01

Table 6 sheds light on the Mediation analysis that will be done on the role of environmental awareness as a mediator between green marketing strategies and electric vehicle adoption. In Table 6, the regression analysis is shown, and it can be seen that green marketing strategies have a positive and significant effect on environmental awareness, $\beta = 0.45$, p-value < 0.01. Secondly, the regression analysis found direct influence of green marketing strategies on electric vehicle adoption: $\beta = 0.60$ and t-value equal to 6.67.

Table 7: Dependent Variable (Electric Vehicle Adoption) on Both Independent Variable (Green Marketing Strategies) and Mediator (Environmental Awareness)

Independent Variable	Mediator	Dependent Variable	Coefficient (β)	Standard Error (SE)	t-value	p-value
Green Marketing Strategies	Environmental Awareness	Electric Vehicle Adoption	0.45	0.09	5	< 0.01
Environmental Awareness		Electric Vehicle Adoption	0.25	0.07	3.57	< 0.01

Results, as presented in Table 7, show that in the mediation model, in which environmental awareness intervenes, the relationship between green marketing strategies and electric vehicle adoption remains significant, with a β of 0.45 and a p-value less than 0.01; however, it also states that environmental awareness affects electric vehicle adoption significantly ($\beta = 0.25$, p-value less than 0.01). This confirms that environmental awareness partially mediates the relationship between green marketing strategies and electric vehicle adoption, because both direct and indirect effects are significant.

Discussion

Conducting the analysis results in strong proof for both hypotheses since it confirms to a great degree that green marketing strategies do work in affecting customer decisions about electric vehicles. For hypothesis one, claiming that green marketing strategies, ranging from eco-labeling to an advertisement focused on issues of sustainability influence consumers' willingness to buy electrical vehicles, these two marketing strategies indicated a strong relationship with purchase intentions. The correlation coefficients, especially for eco-labeling ($r = 0.82$) and sustainability-focused advertisements ($r = 0.75$), indicate that as these green marketing strategies increase, so does the intent to purchase

electric vehicles. In addition, the multiple linear regression analysis results show that eco-labeling, sustainability-focused advertisements, and overall green marketing strategies all significantly contribute to the increased purchase intent for EVs, further reinforcing the positive relationship between green marketing and consumer behavior. These findings decisively support the first hypothesis, confirming that green marketing strategies have a notable impact on consumers' intentions to adopt electric vehicles.

The second hypothesis focuses on testing the idea of whether consumer environmental awareness mediates the relationship between green marketing strategies and electric vehicle adoption. Results indicate the existence of good evidence on the same for this hypothesis also. Mediation analysis indicates the positive impact that the green marketing strategy has on consumer environmental awareness. Again, there are significant coefficients for both direct and indirect pathways with environmental awareness turning out to be an important mediating variable for the given relationship. This piece of evidence vindicates the hypothesis that consumer environmental awareness both influences their reaction to green marketing and will play a critical role in driving their adoption of electric vehicles. Both hypotheses are thereby accepted, validating the critical role of green marketing strategies and environmental awareness as determinants of consumer behavior towards sustainable transportation.

Conclusion

This research would highlight the effects that green marketing would have on people's buying behaviour in adopting electricity-driven vehicles; indeed, existing studies indicate green marketing strategies- such as a practice called eco-branding and campaigns targeting consumers regarding the sustainability factors- have impacted consumer intent when buying electricity-driving cars. The findings highlight that as consumers are exposed to marketing efforts promoting sustainability, they develop a stronger intention to adopt electric vehicles, aligning with the growing global trend toward environmentally responsible choices. Furthermore, the study reveals that consumer environmental awareness plays a crucial mediating role in this relationship. Environmental awareness fosters greater demand on green marketing campaigns; electric vehicle customers thus gain higher responses on interest as regards to a possible purchase of electric vehicles. Thereby, it suggests educating customers of the need for and means to bring positive changes regarding the environment with an advocacy role marketing performs. This, therefore, underscores the importance of businesses and policymakers to include green marketing strategies that not only increase awareness but also deepen the understanding of the environmental benefits associated with the adoption of electric vehicles. Finally, the study contributes to the wider debate on sustainability and provides practical insights into improving the effectiveness of green marketing in facilitating the transition toward a more sustainable transportation system.

Practical Implication of the Study

This study's practical implications are crucial for businesses and policymakers in developing a framework for promoting the use of electric vehicles (EVs) and increasing environmental sustainability. The study provides evidence that green marketing strategies, including eco-labeling and advertisements centered on sustainability, can indeed sway consumers' intent to buy. These strategies would enable businesses to connect with sustainable products more significantly to consumers; therefore, using EVs is highlighted for achieving more customers who can be interested in the environmental merits. Companies have been able to not only enrich brand image by stressing eco-friendly practices but also to achieve goals for the environment. The empirical evidence further found that consumer environmental awareness is a prime mediator of green marketing and the adoption of an electric vehicle. Therefore, businesses and marketers should focus on initiatives that educate consumers about environmental issues because an informed customer is more likely to make environmentally conscious purchasing decisions. On the policy front, this research suggests that governments and regulatory bodies should support green marketing initiatives, incentivize sustainable product labeling, and promote consumer awareness programs to drive the transition to electric vehicles. Public-private collaborations may further enhance consumer confidence in EVs by making more information about the environmental and economic benefits of electric mobility visible and reliable. Overall, the findings underscore the potential of green marketing in shaping consumer behavior towards sustainable choices, offering a roadmap for businesses and policymakers to contribute to a greener, more sustainable future.

Limitation of the Study

Despite the valuable insights provided by this study, several limitations should be acknowledged. First, the study relies on self-reported data, which may be subject to biases such as social desirability or recall bias, affecting the accuracy of the

responses. Additionally, the research focuses primarily on consumers' attitudes and intentions without measuring actual behavioral outcomes, which could vary in real-world contexts. This research scope is further limited to the specific geographical area of Karnataka and might not encompass the diversity of consumer behaviors across other regions or countries with diverse environmental and economic conditions. Besides, although green marketing strategies and environmental awareness are vital factors, the study does not consider variables like price sensitivity, government incentives, or the availability of infrastructure, which can also be pivotal in adopting EVs. Lastly, the sample size, though robust, may still not represent all segments of the population, limiting generalizability.

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Study on Profitability of Manufacturing Industries

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Abstract

Few lines on manufacturing industry

India's manufacturing sector is a key driver of economic growth, contributing significantly to GDP and employment. Major industries include textiles, automobiles, pharmaceuticals, and electronics. The "Make in India" initiative has boosted domestic production and foreign investments. With a growing skilled workforce and robust infrastructure, India is emerging as a global manufacturing hub.

By examining financial performance indicators like return on equity (ROE), net profit margin, and capital structure, this study explores the variables impacting profitability in the Indian manufacturing sector. The study looks at connections between important financial variables, such as capital expenditure (CAPEX), earnings per share (EPS), operating profit margin, and total liabilities, using data from five publicly traded corporations during ten years (2014–2023). The results show that while EPS and operating profit margin show favourable correlations with ROE, CAPEX, COGS, and liabilities have a negative impact. In order to increase profitability and guarantee long-term sustainability in the manufacturing sector, the study emphasizes the significance of effective resource allocation, debt management, and revenue diversification.

Keywords: Manufacturing sector, Return On Equity (ROE), net profit margin, and capital structure, profitability

Introduction of the topic

Every trade focuses on long-term maintainability, and one of the main factors influencing this supportability over time is benefit. Ensuring consistent benefits might be a simple task for companies or business visionaries. Businesses periodically evaluate their methods and exercises to increase productivity to achieve this. As a result, predicting future benefits from previous performance becomes fundamental.

Various metrics, including return on resources, return on capital used, return on net worth, cash return on capital contributed, net benefit edge, and net benefit edge, can be used to quantify benefit. At that time, the relative execution of the commerce is surveyed by comparing these productivity indicators to specific benchmarks.

Understanding the factors that set their productivity apart from others in the sector is essential for companies and businesspeople. However, for more diversified organizations, it becomes crucial to study the factors that lead to differences in productivity among different types of businesses. Examining these differences using individual companies' budgeting data might be difficult and time-consuming.

Relying on the aggregate or typical financial data of businesses within a specific industry can help mitigate this complexity because it speaks to the businesses that can be categorized as tall entertainers or moo entertainers by using these comparisons. Businesses must understand how additional budgeting execution metrics affect benefit in addition to benefit measurement.

Understanding the factors that set their productivity apart from others in the sector is essential for companies and businesspeople. However, for organizations that are more diversified, it becomes crucial to study the factors that lead to differences in productivity among different types of businesses. It might be difficult and time-consuming to examine these differences using individual companies' budgeting data.

Relying on the aggregate or typical financial data of businesses within a specific industry can help to mitigate this complexity because it speaks to the typical traits of companies operating in that sector. In this context, the program looks into the elements that provide one fabrication company an advantage over another.

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Literature Review

A lot of research has been done on evaluating the financial performance of manufacturing companies both domestically and abroad. The determinants of profitability have been the subject of numerous studies that have looked at the ways in which different financial variables affect profitability. Few studies have focused on companies inside a particular industry in India; most have examined manufacturing enterprises across many industries.

Kant, M. C. T. (2018)

The purpose of this study is to assess the factors influencing the productivity of manufacturing companies listed on the New York Stock Exchange. Firm estimate, increased inquiry and advancement, development rate, efficiency, age, net resource turnover, usage proportion, and current proportion are among the elements that are being evaluated. Benefit is then the subordinate variable. Data on 250 American fabrication companies was gathered from the ORBIS database between 2012 and 2017. The results indicate a positive correlation between the subordinate variable, benefit, and speculation in research and improvement, development rate, worker efficiency, usage proportion, and current proportion. There was no objectively significant correlation between age and benefit and the independent factors firm assessed. This leads to the conclusion that productivity and net resource turnover are negatively correlated.

Saleem, S., & Shafi, M. K. (October 2023)

This study evaluates the factors influencing productivity differences among various Indian fabrication companies. The study uses total budgetary justifications from 52 manufacturing companies, obtained from the CMIE Industry Viewpoint database, spanning the years 2016–17 to 2018–19. The companies were divided into three productivity groups: tall, medium, and mo. The researcher used multi-nominal computed analysis to determine that turnover and dissolvability metrics (such as interest cover, obligation benefit scope, and debt equity percentage) are essential for differentiating between these benefit levels. Numerous relapse investigations supported these findings, confirming that dissolvability measures significantly impact industrial benefits. The study emphasizes how important it is to comprehend how different budgetary execution metrics affect overall benefits in manufacturing segments. Although productivity analysis has been identified as a useful tactic, it is still a poorly studied area. This study expands on the limited research on benefit analysis by using focus interviews to examine the situations in which productivity analysis is or is not planned, as well as the reasons behind various types of benefit analysis. Are they organized, and how are they applied while making decisions?

Brierley, J.A. (2016)

A few eminent studies show that working units get ready profitability analysis when there's an intrigued in planning it and the assets exist to prepare it. Working units get ready both item productivity investigation (PPA) and client productivity investigation (CPA) to help with expanding benefits through overseeing low-profit or loss-making clients. The point is to distinguish those items that contribute to the moo benefit or bad benefit of a client. In those working units planning as it were PPA, its work is to identify low benefit or unrewarding items. This data is used to help in deciding what action ought to be taken to extend the benefits of those items. In differentiation, client-centered working units deliver as it were a CPA. Catchphrases:

productivity examination; item productivity examination; client benefit examination; consideration coordinating data; coordinated utilization of benefit examination in decision-making.

Agarwal, R. N. (1991)

The inquiry about productivity and development within the Indian vehicle fabricating industry since 1975 analyzes a few key perspectives. 1. The study evaluates the impact of arrangement modifications from 1981 to 1982 on productivity and development and determines whether businesses have had super typical gains since the removal of cost restraints in 1975. The study, which uses Tobin's q as a measure of productivity, finds no evidence of extraordinary benefits, instead attributing them to factors including business age, vertical integration, expansion, and changes in industry approaches. Broadening, industry arrangement, net held advantages, and capacity growth all affect how businesses develop. The analysis also emphasizes differences in performance between the automobile and non-automotive sectors, as well as differences within these sectors, reflecting the industry's development and the effects of financial liberalization and governmental policies, omitting progress.

1. Revathy, S., & Santhi, V.

The study divides manufacturing firms into two time periods (before and post-merger) and three stages (spearheading, development, and union). Using a sample of 70 businesses selected through a multi-phase inspection process, the study discovers a significant inverse association between productivity and the debt-to-equity ratio. In particular, it reveals that an increase in the debt-to-equity ratio has the opposite effect on the profits of manufacturing firms listed on the Bombay Stock Exchange in India. Steady with other considerations, the discoveries demonstrate that obligation proportions harm

productivity, adjusting with the expectations of the Pecking-Order Theory[1][3][4]. The ponder moreover highlights that firm-specific variables such as measure, liquidity, and tangibility can impact this relationship, although the essential effect is credited to the capital structure choices made by the companies. This inquiry underscores the significance of ideal capital structure in upgrading the benefit of fabricating firms in India.

Karak, A., & Basu, D. (22 February 2019)

This article starts with a study of the well-known claim by Besley and Burgess concerning the negative effect of work direction on organized segment fabricating execution in India. Within the moment portion of the article, the creators utilize a state-level board information set for the period 1969–2005 to examine the relative significance of benefit (rate of benefit as a rate of the overall substitution fetched of capital stock) and mechanical debate (man-days misplaced to all mechanical debate as a rate of add up to laborers utilized) to clarify cross-state varieties of fabricating execution in India's organized segment. Utilizing three distinctive measures of fabricating execution — net esteem included, speculation and business — they discover that benefit is more critical than mechanical debate in clarifying the variety of fabricating division execution over Indian states. The discoveries displayed here therefore address the uncritical acknowledgment of Besley and Burgess's comes about within the writing on work control.

Panda, A. K., & Nanda, S. (26 January 2018)

This paper looks at the relationship between working capital financing (WCF) and firm benefit in six key fabricating segments of the Indian economy. The consideration, crossing from 2000 to 2016, includes a test of 1,211 firms and utilizes a two-step generalized strategy of minutes (GMM) estimator to analyze the non-linear relationship between WCF and productivity.

The discoveries uncover a sector-specific effect: an arched relationship between WCF and benefit within the chemical, development, and shopper merchandise divisions, demonstrating that these firms can fund a bigger parcel of their working capital through short-term obligations without adversely influencing profitability. In differentiation, firms within the apparatus, metal, and material businesses show a concave relationship, recommending that whereas introductory increments in short-term obligation financing can improve productivity, advance increments may have negative impacts.

Also, the ponder appears that firms with tall money related adaptability and tall price-cost edges can increment productivity by financing a bigger parcel of their working capital necessities through short-term obligations, in spite of the fact that this approach carries dangers. The comes about highlight the significance of sector-specific and firm-specific variables in deciding the ideal working capital financing procedure to maximize benefit.

Majumdar, S. K., & Bhattacharjee, A. (22 Aug 2013)

The affect of spinouts on parent companies and their execution is multifaceted. Spinouts, established by previous workers of officeholder firms, can beat other unused wanders due to the exchange of information and systems from the parent company, but they frequently confront competition from the parent firm itself.

Spinouts can upgrade parent firm execution by expanding corporate coherence, either by refocusing assets on center competencies or settling top-level clashes. This permits the parent company to center on its center operations without the redirection of assets to fragments with diverse needs, possibly driving to made strides development and development.

In any case, the method of making a spinout can be exorbitant and diverting for the parent company, and there's no ensure that the spun-out division will be productive on its claim. In spite of these challenges, spinoffs can open esteem for both the parent and the unused substance, permitting the spun-out division to raise its claim capital and work autonomously. Verifiably, spinoffs have for the most part performed well over time, with both the parent company and the backup regularly outflanking the showcase within the a long time taking after the spinoff.

Supran, K., & Das, D. (13 April 2016)

Employing a state-industry board information set of 55 businesses for 19 major Indian states over the period 1983–84 to 2007–08, we examine the contemporaneous and long-run impacts of the rate of benefit and its components—profit share, capacity utilization rate, and capacity- capital ratio—on venture utilizing direct energetic board information models. Our comes about appearing that:

the rate of benefit has both brief and long-run positive impacts on speculation; (b) the benefit share and capacity-capital proportion have primarily long-run positive impacts, but the capacity utilization rate encompasses a more complex design of effect on venture.

Sharma, S.K. (October 12, 2015)

The ponder measures the determinants and measurements of efficiency and developments utilizing board information of diverse mechanical bunches at the smaller scale level for the fabricating division of one of the creating states of the Indian

economy. The ponder could be a novel attempt to apply the Malmquist efficiency list in conjunction with its components. Moreover, endeavours have been made to recognize a few macroeconomic and infrastructural variables and their affiliation with the level of efficiency. The consideration is more likely to be free from any sort of mutilations as the show endeavor concentrates on industry-level examination which appreciates different common highlights and constitutes a homogeneous test due to their operations in comparable financial situations and subject to the same administrative administration. Profitability-productivity association confirms the gigantic potential for chosen categories. The ponder demonstrates that there's not as it were a have to fortify the level of developments and ideal utilization of assets but moreover, a basic commitment to adjust and harmonize both viewpoints.

Objectives of the study

- Analyze productivity metrics to evaluate important benefit metrics, including net benefit edge, return on resources, and return on capital used, to determine how they affect trade maintainability.
- Compare Industry Execution: Using budgetary execution comparisons, identify the factors differentiating high- and low-performing companies within the fabricating industry.
- Examine the Enhancement Effect: To investigate how expanding across industries affects benefits and to understand the difficulties in comparing these differences using financial data.
- Use Amassed Information: To look into the use of accumulated financial data to rearrange the ideas regarding benefit types and ensuring an agent assessment of regular companies within a sector.

Research Methodology

Research is a systematic, scientific study. It means an intensive and powerful search for knowledge and understanding of social and physical phenomena. It is a method for scientifically discoursing of value. Methodology means a set of methods used to study the problem.

Meaning of Research

Research means an intensive, powerful search to discover true values in scientific ways. It is not merely the accumulation and communication of generalizations as a basis for action and foresight.

Research Design

- Descriptive research is used because the data is collected, processed, and presented as a project
- The goal of this research is to learn about an industry's profitability
- The research will look into how the industries manage their profitability
- The data is collected from screener, a leading database for financial data. The study considerers 05 companies which are listed in BSE from the Indian manufacturing industry sector. There are totally 50 observations i.e. (05 companies * 10 years data). The data of 10 years i.e. 2014 to 2023, both inclusive is considered for the analysis. The missing data is excluded for analysis.

  The research will last eight weeks

Secondary data

Secondary data is the data already collected by someone else and which is used for our study purpose. It is the data, which gives relevant information in the different fields, wherever we want. Secondary data is collected through the manual, internet Correlation

Table1: Correlation Analysis

	LOG ROE	LOG CAPEX	LOG COGS	LOG EBITDA	LOG EPS	LOG NET PROFIT MARGIN	LOG OPERA-TING PROFIT MARGIN	LOG P/E RATIO	LOG REVENUE	LOG SHARE-HOLDER EQUITY	LOG TOTAL ASSETS	LOG TOTAL LIABI-LITIES	LOG GROSS PROFIT MARGIN
LOG ROE	1.00												
LOG CAPEX	-0.29	1.00											
LOG COGS	-0.20	0.82	1.00										
LOG EBITDA	-0.09	0.30	0.58	1.00									
LOG EPS	0.45	-0.13	0.11	0.57	1.00								
LOG NET PROFIT MARGIN	-0.23	-0.30	-0.22	0.29	0.06	1.00							
LOG OPERATING PROFIT MARGIN	0.25	- 0.17	- 0.16	0.49	0.64	0.45	1.00						
LOG P/E RATIO	0.36	0.06	0.10	- 0.08	0.38	- 0.21	0.03	1.00					
LOG REVENUE	- 0.17	0.86	0.95	0.47	0.07	- 0.37	- 0.26	0.15	1.00				
LOG SHAREHOLDER EQUITY	- 0.12	0.35	0.73	0.77	0.38	0.00	0.09	- 0.05	0.64	1.00			
LOG TOTAL ASSETS	- 0.34	0.89	0.81	0.16	- 0.38	-0.37	-0.48	-0.01	0.87	0.34	1.00		
LOG TOTAL LIABILITIES	- 0.29	0.56	0.85	0.74	0.20	0.07	0.05	-0.11	0.76	0.90	0.56	1.00	
LOG GROSS PROFIT MARGIN	0.09	-0.51	-0.52	-0.57	-0.26	-0.14	-0.44	0.10	-0.38	-0.49	-0.25	0.07	1.00

Table 1, refers to the correlation existing between the various variables chosen from study.

Table 2: Hypothesis

Hypothesis	t-statistic	Probability	Decision
There is no correlation between ROE and Capex.	-0.757062	0.4574	Reject
There is no correlation between ROE and COGS	0.513853	0.6127	Reject
There is no correlation between ROE and EBITDA	-0.811925	0.4259	Accept
There is a correlation between ROE and EPS	1.529047	0.1412	Reject
There is no correlation between ROE and net profit margin	0.180412	0.8586	Reject
There is a correlation between ROE operating profit margin	2.067217	0.0513	Reject
There is a correlation between ROE and P/E ratio	0.921047	0.3675	Reject
There is no correlation between ROE and revenue	0.502368	0.6206	Accept
There is no correlation between ROE and shareholder equity	0.899293	0.3787	Accept
There is no correlation between ROE total assets	0.919074	0.3685	Reject
There is no correlation between ROE and total liabilities	-3.008413	0.0067	Reject
There is a correlation between ROE and gross profit margin	0.701677	0.4906	Accept

Findings

Correlation Study

- Negative Correlations: CAPEX, COGS, EBITDA, revenue, shareholder equity, and total liabilities are among the factors that have a negative association with ROE.
- Positive relationships: The operating profit margin, P/E ratio, gross profit margin, and EPS all exhibit positive relationships with ROE.
- Different correlations have different magnitudes, which suggests that ROE and the other financial measures are associated to differing degrees.

Testing Hypotheses

- The hypotheses were rejected for the majority of the variables since the correlations were not statistically significant, as indicated by p-values greater than 0.05.

Notable exclusions: ROE and total liabilities have a significantly significant negative connection ($p < 0.05$).

Although the relationship between ROE and factors like sales and shareholder equity was acknowledged, its importance is still limited.

Interpretation of Regression: Important conclusions drawn from the regression coefficients:

Direct correlations, such as those between ROE and variables like operating profit margin, are shown by positive coefficients.

Inverse correlations, like those between ROE and CAPEX, are shown by negative coefficients.

Suggestions

- Capital Outlays (CAPEX): Priorities CAPEX optimization since overinvestment may harm profitability, as indicated by its negative link with ROE.
- Efficiency in Operations: Since COGS and EBITDA have negative correlations with ROE, successfully manage COGS and increase EBITDA.
- Diversification of Revenue: Improve revenue sources to counteract the shaky and unfavorable correlation with ROE.
- Measures of profitability: Priorities raising operating profit margins and EPS since they have a good correlation with ROE and may lead to improved financial results.
- Management of Liability: High liabilities should be addressed because they have a substantial negative link with ROE, which suggests that debt management needs to be improved.
- Shareholder Attention: Create plans to increase shareholder equity because it has a varied but noticeable relationship with ROE

Conclusion

The analysis of manufacturing industry profitability reveals the crucial elements impacting the long-term viability and financial stability of companies operating in this field. Profit margins, return on equity, and return on assets are important profitability metrics that offer important information about financial performance and operational effectiveness. The analysis shows that factors like market diversification, capital structure, and cost control have a big influence on profitability. Furthermore, smart investments in technology and innovation, when combined with efficient resource allocation, become essential catalysts for development and competitive advantage.

The results highlight how crucial it is to take a balanced approach to financial planning, focusing on optimizing liabilities and capital expenditures while promoting income diversification and operational effectiveness. Manufacturing companies may improve their strategic decision-making and secure long-term profitability and resilience in a market that is becoming more competitive and dynamic by utilizing these insights.

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Study of Most Effective Marketing Channels for Reaching Gen Z Consumer

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Abstract

Purpose: Understanding Generation Z's (Gen Z) consumer behavior is crucial for businesses seeking to create effective marketing strategies. This study explores the most efficient marketing channels to engage with Gen Z consumers, given their preference for digital content, social media interactions, and authenticity in brand communications.

Design and Methodology: This study employed a descriptive research design, which aimed to describe the effective channels to reach Gen Z consumers. The primary objective was to identify the most popular and influential channels among this demographic.

Results: The findings highlight Instagram and YouTube as the most preferred social media platforms, with video content being the most engaging format. Influencer marketing proves to be a significant factor, although Gen Z exhibits skepticism toward influencer endorsements, prioritizing authenticity over promotional content. Discounts and free trials serve as strong motivators for product engagement. The study provides actionable insights for businesses, suggesting that brands should prioritize interactive, visually engaging, and transparent marketing strategies. The research also emphasizes the importance of aligning marketing efforts with Gen Z's values of sustainability, diversity, and social responsibility.

Key Words: Gen Z, digital marketing, influencer marketing, social media engagement, consumer behavior, video content, brand authenticity.

Introduction

The future of marketing is being shaped by the varied and digitally native Generation Z, which was born between 1997 and 2012 (Pew Research Centre, 2020). Gen Z is a huge consumer group that businesses cannot afford to overlook, with a global population of approximately 2.5 billion people (United Nations, 2020). Understanding Gen Z consumers' choices, behaviours and values—all of which are influenced by their varied backgrounds, tech savvy and social awareness—is essential to reaching them (Forbes, 2020).

According to HuffPost (2020), Gen Z's passion of social networking, sustainability and authenticity define their purchasing habits. They are more inclined to interact with companies that value diversity, inclusion, and social responsibility (Nielsen, 2020). But Gen Z is also renowned for having a short attention span and being sceptical of conventional marketing strategies (JWT, 2020).

Despite the growing importance of Gen Z consumers, there is a lack of understanding about the most effective marketing channels to reach them. Businesses find it difficult to engage with this generation, which results in lost opportunities and lower profits. By examining the best marketing avenues for connecting with Gen Z customers, this study seeks to close this knowledge gap.

Background of the Study

Born between 1997 and 2012, Generation Z is a unique group that is shaping marketing in the future. Given that Gen Z comprises over 2.5 billion individuals globally, businesses should not ignore this customer group. The behaviour, tastes, and values of Generation Z have been significantly impacted by the quick development of technology. Being the first

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generation to have grown up in the age of the internet, social media, and smartphones, they are extremely tech-savvy, integrate technology into their daily lives, and are always online, particularly because of social media. They prefer visual stuff, particularly images or videos.

Social awareness and concern for social issues are also influencing Gen Z's purchasing behavior. Unlike previous generations, they are more influenced by peers or influencers when making decisions about what to buy, and they pay more attention to brands that prioritise environmental safety and accountability.

These people demand that brands share their beliefs and stand for societal matters,support sustainability, diversity and inclusion in consumer choices. Prefer brands with responsibility for environment and society activities. Social media has changed how Gen Z consumes information as well as interacts with brands today.

Literature Review

Social Media

Instagram: 70% of GenZ users are on Instagram, making it a key platform for reaching this demographic (Pew Research Center, 2020). Pew Research Center. (2020). Generation Z Looks a Lot Like Millennials on Key Social and Political Issues. **TikTok**: 53% of GenZ users are on TikTok, with 60% using the app daily (GlobalWebIndex, 2020). GlobalWebIndex. (2020). Gen Z: The Future of Social Media. **Snapchat**: 46% of GenZ users are on Snapchat, with 55% using the app daily (GlobalWebIndex, 2020). GlobalWebIndex. (2020). Gen Z: The Future of Social Media.

Influencer Marketing

53% of GenZ consumers trust recommendations from peers and influencers (Forbes, 2020). Forbes. (2020). How to Market to Gen Z. 60% of Gen Z consumers have purchased a product after seeing an influencer endorsement (Thomason, 2020). Thomason. (2020). The State of Influencer Marketing.

Visual Content

5% of GenZ consumers prefer images and videos over text-based content (Adobe, 2020). Adobe. (2020). Gen Z and the Future of Creativity. Short-form video content is particularly effective, with 55% of GenZ consumers watching videos daily (Global Web Index, 2020). Global Web Index. (2020). Gen Z: The Future of Social Media.

Authenticity and Transparency

67% of GenZ consumers expect brands to take a stand on social issues (HuffPost, 2020). HuffPost. (2020). Gen Z Is Changing the Way Brands Approach Marketing. 60% of GenZ consumers prioritize authenticity and transparency in brand messaging (Microsoft, 2020). Microsoft. (2020). Gen Z and the Future of Technology.

Mental Health and Wellness

60% of GenZ consumers prioritize self-care and mental wellness (American Psychological Association, 2020). American Psychological Association. (2020). Stress in America: Gen Z. Brands that promote mental health and wellness are seen as authentic and trustworthy by GenZ consumers (HuffPost, 2020). HuffPost. (2020). Gen Z Is Changing the Way Brands Approach Marketing.

Entrepreneurship and Freelancing

63% of Gen Z consumers are interested in entrepreneurship (Gallup, 2020). Gallup. (2020). Gen Z and the Future of Work. 57% of Gen Z consumers are interested in freelancing (Gallup, 2020). Gallup. (2020). Gen Z and the Future of Work.

Remote Work

62% of Gen Z consumers prefer to work remotely (Upwork, 2020). Upwork. (2020). Future of Work: Gen Z. Brands that offer remote work options are seen as attractive and flexible by GenZ consumers (Upwork, 2020). Upwork. (2020). Future of Work: Gen Z.

Gen Z consumers are a unique and diverse generation that values authenticity, transparency, and mental health and wellness. To effectively reach Gen Z consumers, marketers must prioritize social media, influencer marketing, visual content, gaming, and remote work options. By understanding Gen Z's preferences and behaviors, marketers can develop effective marketing strategies to connect with this Generation.

Statement of the Problem & Objectives of the Study

As noted by Nielsen (2020), Generation Z is marked by their extensive engagement on social media, along with a strong focus on sustainability, diversity, and inclusion when making purchasing choices. Consequently, Gen Z customers tend to favor recommendations from influencers and are significantly swayed by feedback from their peers. For example, they possess a shorter attention span compared to other generations, which is attributed to their inclination towards visual

content (Microsoft 2020). Nevertheless, amidst all these changes, there remains a gap in information. Many companies do not have a clear understanding of which channels or strategies are most effective for marketing to Generation Z. This gap in knowledge results in lost opportunities for businesses looking to engage with a crucial consumer demographic. Firms that fail to resonate with Gen Z or that do not adapt to their preferences and behaviors will likely face decreased revenue and a decline in market share.

This research will explore the most successful marketing channels for engaging Gen Z consumers in order to provide insights into how businesses can create effective marketing strategies aimed at this demographic. The aim of this research was to identify relevant social media platforms that can effectively assist businesses in engaging with Gen Z consumers. Create a framework for organizations to develop successful marketing strategies targeting Gen Z customers and determine how visual content impacts their purchasing choices. Gain insights into the values and priorities that shape Gen Z's consumption behavior. Additionally, offer suggestions on how companies can enhance their strategies to better meet the needs of Generation Z.

Research Methodology

In order to find efficient ways to engage Gen Z customers, this study used a descriptive research design. Finding the most popular and influential channels for this age range was the primary goal. This methodology was chosen due to its descriptive nature, which allows for a thorough examination of the phenomenon under investigation (successful strategies for interacting with Gen Z customers) without changing any factors.

This design made it easier to gather information about the preferences, trends, and patterns of Gen Z customers today, which led to a more comprehensive understanding of the study problem. This kind of study design is descriptive. The goal is to provide the most efficient ways to connect with Gen Z customers. The method is cross-sectional, meaning it gathers information at one particular moment. Google Forms is used to administer an online survey as the data collection method. In terms of the sample design, the study's target demographic consists of Gen Z users who are active on social media platforms and have made an online purchase in the past 12 months.

Customers in the Sample Frame Gen Z demographic, who are between the ages of 18 and 24, use social media platforms like Instagram, Facebook, Twitter, and others, and have made online purchases within the past 12 months. Individual Gen Z customers who satisfy the sample frame requirements make up the sample unit. The study used the sample approach, combining convenience sampling with snowball sampling. To do this, an online survey will be disseminated to the target community using social media and other online forums. And according to the size calculation, a sample size of 150–200 responders will be enough given the study's restrictions.

The survey was conducted using a self-administered online questionnaire under the Survey Method. The survey will be accessible through internet discussion boards and social media sites. To collect both quantitative and qualitative data, it will include multiple-choice, Likert scale, and open-ended questions.

Google Forms will be used to administer an online survey in order to gather the core data. To reach the intended audience of Gen Z customers, the poll will be disseminated via social media sites (Instagram, TikTok, Facebook, Twitter, etc.) and pertinent online discussion boards.

Even though primary data is the major source, this study mostly draws from secondary sources. However, marketers may also use some secondary sources, such as literature reviews and other studies about successful marketing channels for Gen Z consumers. This will confirm the results of the primary approach even further. This previous knowledge is crucial since it exposes some current marketing truths.

Additionally, by combining direct research with secondary reporting, this study aims to provide a comprehensive understanding of effective advertising medium.

Limitations of the Study

It should be noted that this study has a number of limitations, such as the possibility that the 150–200 sample size is not typical of the whole Gen Z population. Because only people with internet and social media access could participate, the use of online questionnaires may have introduced self-selection bias. Only Gen Z customers were the focus of the study, therefore its findings might not apply to other areas. Self-reported data may be biased and inaccurate if it is relied upon. Additionally, the study only looked at media outlets; it ignored other variables that can affect Gen Z consumers' tastes.

Additionally, because the study was conducted over a short period of time, it might not accurately reflect how preferences or behaviors develop over time. Last but not least, the study lacked a control group, which may have offered a point of comparison.

These drawbacks show how much more research is required to confirm and build on the study's conclusions.

Data Analysis and results

A) Demographic Details

Demographic Characteristics	Measures	Frequency	Percentage
Age	12-17	69	18.6
	17-22	151	40.8
	22-27	150	40.5
Qualification	Pre-Graduate	101	27.4
	Graduate	142	38.4
	Post-Graduate	127	34.3
Occupation	Student	256	69.5
	Professional	96	25.9
	Agriculture	9	2.4
	Businessman	8	2.2

Students and young people (17–27 years old) made up 370 of the Gen Z respondents, or 83.5% of the total, as the chart below shows. The demographic profile reveals a diverse range of educational backgrounds, with 20.5% post-graduates, 46.5% graduates, and 33% pre-graduates. With 45.7% of the population being female and 54.3% being male, the gender distribution is slightly male. This demographic profile indicates that social media, influencer relationships, and internet marketing are likely to be successful in promoting goods and services that cater to the requirements, interests, and values of students. For this demographic, advertising might be a successful marketing tactic. Given Gen Z students' attention span and preferences, marketing messages should be relatable, interesting, and brief.

B) Social Media Usage

Questions	Measures	Frequency	Percentage
Which social media platforms do you use most frequently?	Instagram	324	43
	Youtube	273	36
	Facebook	95	12
	Twitter	71	9
How often do you check your social media accounts?	Less than 30 hours	91	24.6
	30 mins – 1 hour	106	28.6
	1 hour – 2 hour	122	33
	More than 2 hours	51	13.8

According to the survey, Gen Z members use social media regularly and obviously prefer websites that prioritise visual material, as can be seen in the accompanying table. Instagram (87.8%) and YouTube (73.9%) are the most popular social media platforms, followed by Facebook (25.7%) and Twitter (19.2%). This suggests that businesses targeting Generation Z should concentrate their marketing efforts on YouTube and Instagram.

Regarding the frequency of social media use, the majority of respondents (62.7%) check their accounts at least once per hour, followed by 29.7% who check every 1-2 hours and 33% who check every 30 minutes to an hour. 13.8% of users check their accounts for more than two hours every day, compared to just 24.6% who do so for less than 30 minutes. This implies that Gen Z respondents use social media regularly, providing businesses with a wealth of chances to interact with them.

C) Marketing Preferences:

Questions	Measures	Frequency	Percentage
What type of content do you engage most with?	Videos	350	54.9
	Text – Only	45	7.1
	Images	243	38.1
a) Do you prefer adds with: User Generated Content	Strongly Disagree	36	9.7
	Disagree	37	10
	Neutral	107	28.9
	Agree	112	30.3
	Strongly Agree	78	21.1
b) Celebrities or Influencers	Strongly Disagree	56	15.1
	Disagree	43	11.6
	Neutral	112	30.3
	Agree	28	7.6
	Strongly Agree	131	35.4
c) Animations/ Graphics	Strongly Disagree	45	12.2
	Disagree	46	12.4
	Neutral	97	26.2
	Agree	37	10
	Strongly Agree	145	39.2
d) Others	Strongly Disagree	50	13.5
	Disagree	36	9.7
	Neutral	98	26.5
	Agree	107	28.9
	Strongly Agree	79	21.4
Do you trust recommendations from influencers?	Yes	212	57.3
	No	158	42.7
a) What motivates you to try a product/service endorsed by influencer? - Discount	Strongly Disagree	44	11.9
	Disagree	31	8.4
	Neutral	48	13
	Agree	103	27.8
	Strongly Agree	144	38.9
b) What motivates you to try a product/service endorsed by influencer? - Free Trial	Strongly Disagree	40	10.8
	Disagree	36	9.7
	Neutral	111	30
	Agree	89	24.1
	Strongly Agree	94	25.4

According to the above table, Gen Z respondents are least interested in text-only material (7.1%) and most interested in video content (54.9%). They are attracted to advertisements with genuine people or user-generated material (30.27%), as well as endorsements from celebrities or influencers (35.41%). They are also drawn to animated or visual advertisements (39.19%). Nonetheless, they are dubious of suggestions from influencers (53.30%), and they are more inclined to buy a good or service if it comes with a discount (38.92%) or a free trial (30%). These studies provide valuable insights for businesses to effectively target and engage with Gen Z consumers through visually appealing, interactive and incentivized marketing strategies.

Findings & Suggestions

According to the study's conclusions, Instagram is the most widely used social media network among Gen Z respondents, suggesting a desire for engaging and visually appealing content. Compared to text and photos, video material creates more engagement, indicating that Gen like dynamic and interactive storytelling. Additionally, Gen Z respondents show skepticism regarding suggestions from influencers, suggesting that reliability and authenticity are important. For Gen Z respondents, authenticity is more important than discounts and free trials when it comes to considering buying goods or services recommended by influencers.

Noting the Demographic Insights 17–22 years old, which suggests an emphasis on marketing tactics targeted at young people. Furthermore, the majority of respondents are male, which raises the possibility of bias in the findings and views on occupation students. This suggests that educational institutions and youth-centric marketing are the main focus. Businesses should prioritize Instagram and video content marketing tactics and collaborate with genuine influencers who share their values, according to the study's recommendations. Prioritize emphasizing the advantages of the product or service over depending only on discounts.

Finally, create advertising specifically for male students between the ages of 17 and 22. Create real, dynamic, and captivating video content for marketers, and make use of social proof and user-generated material. Track and evaluate the return on investment from influencer marketing and modify tactics to suit changing Gen Z tastes. Future research should look at the causes of influencer mistrust as well as the preferences of Gen Z respondents who are male and female. Finally, examine how educational institutions affect the consumption patterns of Generation Z.

Conclusion

The survey offers insightful information about Gen Z's preferences for social media, how they interact with content, and how they see influencer marketing. These data can be used by companies and marketers to create focused strategies that emphasise Instagram marketing, video content, and authenticity.

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Comprehensive Valuation and Analysis of the Nifty 50 Index: Assessing Financial Health and Growth Prospects

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Abstract

This research originates from the increasing need for accurate and forward-looking valuation methods in dynamic and evolving markets like India. It focuses on the valuation of the Nifty50 Index, one of India's most prominent stock market benchmarks, using the Discounted Cash Flow (DCF) approach. By treating the index as a single entity, the valuation simplifies the analysis of its 50 constituent companies, aggregating their earnings, dividends, and buybacks to estimate the intrinsic value. The project aims to assess the financial health and future growth prospects of the Nifty50, providing actionable insights for investors and stakeholders.

The valuation employs the Base Valuation (Recent Data Approach), which integrates the latest financial and macroeconomic data to align with current market conditions. Key inputs include a risk-free rate of 6.92%, an equity risk premium of 1.43%, a 3-year average EPS CAGR of 12.47%, and a total yield of 1.44%. These inputs drive the projection of future cashflows, which are discounted using a cost of equity of 8.35% to derive the intrinsic value.

The analysis reveals an intrinsic value of 27,435, compared to the current Nifty50 level of 24,467.45, classifying the index as undervalued with a potential appreciation of 12.13%. This undervaluation is supported by robust earnings growth, stable shareholder returns, and favorable macroeconomic conditions. Sectoral diversity across Financial Services, Information Technology, and Consumer Goods further strengthens the index's growth prospects.

Scenario analysis demonstrates the sensitivity of valuations to assumptions. While the Base Valuation reflects optimism based on recent trends, a Historical Averages Valuation suggests overvaluation, emphasizing the importance of timeframe selection.

Keywords: Discounted Cash Flow Valuation, Free Cash Flow to Equity, Intrinsic Value, CAPM Model, Terminal Value, Nifty50 Index.

Introduction

The Nifty 50, introduced on April 22, 1996, is one of India's most prominent stock market indices, representing the weighted average of 50 of the largest and most liquid companies listed on the National Stock Exchange (NSE). Its inception marked a significant milestone in the evolution of India's capital markets, offering a comprehensive benchmark for gauging the performance of the nation's equity market. The base date of the Nifty 50 is November 3, 1995, with a base value set at 1,000 points, reflecting India's economic and financial development at that time. Over the years, the index has transitioned to a **free-float market capitalization methodology** in 2009, ensuring that only shares available for trading are considered in its calculation, enhancing its relevance for investors.

Historical Background and Evolution of the Nifty 50

The launch of the Nifty 50 coincided with India's economic liberalization in the early 1990s, a period marked by structural reforms aimed at integrating the Indian economy with global markets. The National Stock Exchange (NSE), established in 1992, sought to modernize the Indian financial markets, replacing traditional outcry systems with electronic trading platforms. The introduction of the Nifty 50 as NSE's flagship index addressed the need for a standardized measure to track the performance of India's largest companies across diverse sectors.

Initially, the Nifty 50 adopted a **full-market capitalization methodology**, calculating the index value based on the total market cap of constituent companies. However, in 2009, it transitioned to the **free-float methodology**, which considers only freely tradable shares, excluding promoter holdings. This change aligned the index with global standards, enhancing its reliability and accuracy as a market barometer.

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Today, the Nifty 50 covers a broad spectrum of industries, including financial services, information technology, consumer goods, pharmaceuticals, and energy. The index has become a benchmark for institutional and retail investors, reflecting over **50% of the total market capitalization** of all NSE-listed stocks.

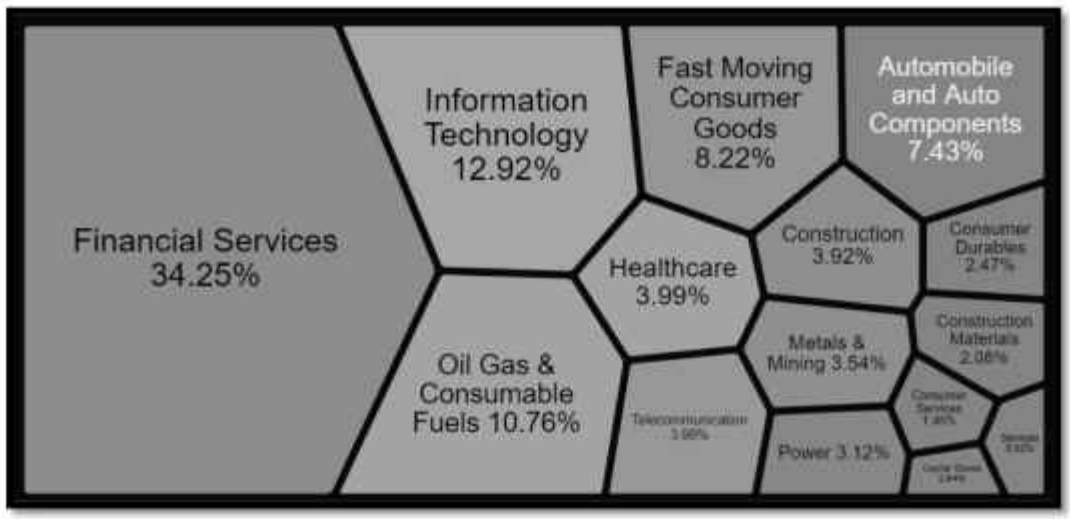

Fig. 3: Sector wise Free Float Market Capitalization in Nifty 50

The Role of Nifty 50 in the Indian Economy and Global Markets

The Nifty 50 has the dual function of measuring the Indian economic condition as well as helping the international investors to determine the trends of India's market. It is essentially an indicator of India's economic health and corporate performance and is commonly used as such globally.

As a Barometer of the Indian Economy

- The Nifty 50 provides a snapshot of India's largest companies that are instrumental to the country's economic output. Made up of sectors including financials, IT, energy and consumer goods, among others, it gives a snapshot of the overall health of the economy.
- When the economy is growing, the index usually shows strong performance while in a recession it usually underperforms hence it is a vital tool for policy makers and analysts.

Facilitating Investments and Risk Management:

- The Nifty 50 is used by mutual funds, portfolio managers and other institutional investors to compare the performance of their portfolio against a standard index. Some of the passive investment instruments like index funds and exchange traded funds (ETFs) follow it to provide diversified investment in the Indian market.
- Derivatives based on the Nifty 50 index like futures and options provide advanced tools for managing risk whereby investors can insure their portfolios or wager on the market's direction.

Global Appeal and Foreign Investments:

- As the economy of India becomes a significant force in the global market, Nifty 50 has been well received by Foreign Institutional Investors (FIIs). It is an efficient and dependable means of accessing the Indian stocks and particularly suits the needs of those who are interested in tapping into one of the most dynamic markets in the world

Context of Valuation

The valuation of the Nifty50 Index aims to provide a deeper understanding of its financial health and future growth potential. This is particularly important in a dynamic market environment characterized by global uncertainties, fluctuating interest rates, and sectoral shifts. By employing the Discounted Cash Flow (DCF) approach, the index is analyzed as a single entity, aggregating metrics such as earnings, dividends, and buybacks from its constituent companies. This approach aligns with global practices for index valuation and simplifies the process while ensuring meaningful insights.

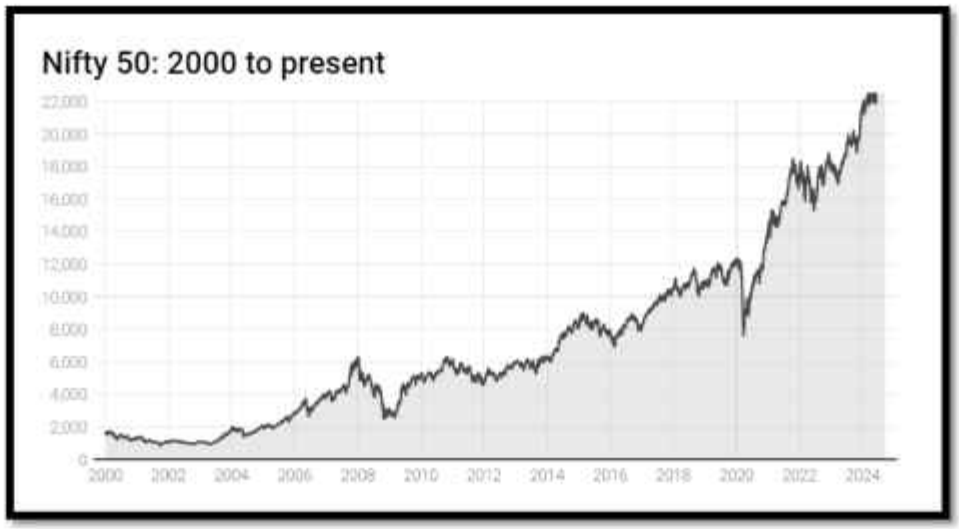

Fig. 4: Historical Performance of Nifty 50 Index (2000–2024)

The chosen valuation date is December 2024, with all data used up to this point. The focus is on estimating the Free Cash Flow to Equity (FCFE) for the index, projecting future cashflows, and discounting them to the present value to arrive at the intrinsic value. Key inputs include the risk-free rate (proxied by the 10-year Indian government bond yield), equity risk premium, and earnings growth rate based on historical trends. A constant terminal growth rate is also assumed for cashflows beyond the forecast period.

This valuation assesses whether the Nifty50 is currently overvalued, undervalued, or fairly valued by comparing its intrinsic value to its market value. It also provides a broader perspective on the sustainability of its returns, driven by macroeconomic factors and sectoral dynamics. The insights derived from this study can serve as a valuable tool for decision-making, enabling stakeholders to gauge the index's investment potential and understand its role in the evolving Indian financial landscape.

Literature Review

Oded, J., & Michel, A. (2007) examined and reconciled four common methods of valuing corporations: adjusted present value (APV), capital cash flows (CCF), cash flows to equity (CFE), and free cash flows to the firm (FCF). The authors argue that inconsistencies in valuation arise from differing assumptions about debt rebalancing policies. They demonstrate that each method can be adjusted for a firm that rebalances its debt and, when done so, all methods produce the same result. The authors conclude that, with consistent application of the debt rebalancing policy, any of the four methodologies can be used to determine a company's value accurately.

Cassia, L., Plati, A., & Vismara, S. (2007) emphasized the importance of carefully considering the length of the explicit forecast period in DCF models. The authors argue that analysts should ensure this period is long enough for a company to exhaust its competitive advantage, reaching a Steady-State where the return on capital equals its cost. They find that valuations can be overly sensitive to the perpetual growth rate used in the Terminal Value if the explicit forecast period doesn't adequately reflect this transition to Steady-State.

Steiger, F. (2010) examined the discounted cash flow (DCF) valuation method, a standard procedure in finance used to determine a company's worth by analyzing the net present value (NPV) of future free cash flows, discounted by the weighted average cost of capital (WACC). The paper explains the steps of the DCF method, using a case study of BASF to highlight the method's sensitivity to inputs like WACC and perpetual growth rate. The author concludes that while the DCF method is valuable, its accuracy depends on the validity of underlying assumptions and suggests using it with other valuation methods.

Panda, S. (2013) compares two common ways to figure out how much a company is worth: the Dividend Discount Model (DDM) and the Free Cash Flow Model (CFM). Researchers wanted to see how well these models work in different situations. They compared the calculated value of the company with the actual price of its stock. The study found that the DDM was better at figuring out the true value of a company than the CFM. However, these models might not work well for new or smaller companies, especially if they don't pay dividends.

Behr, A., Mielcarz, P., & Osiichuk, D. (2018) explored how to calculate the terminal value of a company using the discounted cash flow (DCF) method. The authors argue that traditional DCF models, which assume stable growth, might not be accurate because real-world business environments are very unpredictable. They tested this idea using data from companies listed on the Polish stock market and found that things like revenue, investments, and cash flows change a lot from year to year, making it hard to predict long-term value. The authors suggest that we need to find better ways to calculate terminal value that consider these real-world fluctuations.

Panigrahi, A., Vachhani, K., & Sisodia, M. (2021) examined the discounted cash flow (DCF) model and its application to Exide Industries, a company with potential in the batteryoperated electric vehicle market. The authors emphasize that while the DCF model is a useful tool for evaluating a company's financial health, it's important to be aware of its susceptibility to assumption bias. Even small changes in assumptions can greatly affect valuation outcomes. By adjusting growth and WACC values, the researchers generated bullish, base, and worst-case scenarios with target share prices. The authors highlight the DCF model's value in helping investors make sound trading decisions, despite its limitations.

Arora, T. (2021) explored the Capital Asset Pricing Model (CAPM) and its application to the Indian stock market, specifically the NIFTY 50 index. The study investigates the risk-return relationship of selected NIFTY 50 stocks and aims to determine if CAPM is a useful tool for identifying overvalued and undervalued stocks. The research analyzes stock data from January 2018 to December 2021 and examines the historical performance of individual companies like Adani Ports, Bajaj Finance, and Axis Bank. The paper concludes that CAPM is a valuable tool for investors in the NIFTY 50 market, offering insights into stock pricing and potential investment opportunities. The research also highlights the limitations of CAPM, acknowledging that it focuses solely on the NIFTY 50 and may not be generalizable to other stocks.

Wang, H. (2022) examines different business valuation models and uses the discounted cash flow (DCF) model to evaluate the company Netflix. The study used quantitative and qualitative data to predict financial information for the company over a six-year period, ultimately calculating the weighted average cost of capital (WACC) and the company's overall value. By comparing the calculated enterprise value with the official value, the authors find some differences, which they attribute to the inherent limitations of the DCF model, particularly its reliance on estimations. The paper concludes by suggesting that refining the model and using more precise numerical methods could improve the accuracy of the DCF model in business valuation.

Alfadilla, J., & Dalam, W. W. W. (2023) explored the intrinsic value of stocks in the property and real estate sector listed on the Indonesia Stock Exchange. The authors use two valuation methods: Discounted Cash Flow (DCF) and Relative Valuation (RV). The study analyzes six companies using historical financial data from 2015 to 2019 to project values from 2020 to 2024. The findings suggest that four companies (MTLA, JRPT, DMAS, and CTRA) were undervalued based on both DCF and RV methods. Two companies (MKPI and PPRO) were found to be overvalued. The authors recommend investors use multiple analyses and consider factors beyond financial data when making investment decisions.

Jagannayaki, K., & Lakshmi, T. V. (2024) used a Discounted Cash Flow (DCF) model to project the financial performance of Margin Sentiment Advisorys Limited over five years. The researchers use the company's past three years of financial data to model optimistic and pessimistic scenarios, finding that revenue is projected to increase in both. However, the company also faces rising operating expenses and cost of goods sold, suggesting a need to focus on both revenue growth and cost management strategies to ensure future financial health. The authors acknowledge the work of other researchers on topics like DCF analysis and target price accuracy in financial markets.

Objectives of the Study

1. To provide a comprehensive valuation of the Nifty 50 index using the Discounted Cash Flow (DCF) methodology.
2. To estimate the Intrinsic value of the Nifty 50 and compare it with its current market level.
3. To assess key market factors, including earnings growth, dividend yields, and risk premiums, influencing the valuation.
4. To evaluate the impact of macroeconomic variables such as government bond yields and market volatility on the index's performance.
5. To Compare Valuation Scenarios Using Different Timeframes.

Assumptions in the Valuation Methodology

1. Index Treated as a Collective Entity

- The Nifty 50 is treated as a single company for valuation purposes, aggregating metrics like earnings, dividends, and buybacks.

- Rationale: Simplifies the valuation process and aligns with methodologies used for index valuation.

2. **Proxy for FCFE**

- Free Cash Flow to Equity (FCFE) is approximated using dividends and buybacks, avoiding direct computation of FCFEs for each company.
- Reason: Calculating FCFE for 50 companies (or more in indices like S&P 500) is resource-intensive and less feasible.

3. **Risk-Free Rate**

- Assumed as the 10-year Indian government bond yield instead of adjusting for the country's default spread (CDS).
- Reason: CDS data is unavailable for extended periods (e.g., 15–20 years), and the adjustment's impact on valuation is deemed marginal.

4. **Buyback Data**

- Only 2024 buyback data is used instead of historical data spanning several years.
- Reason: Buybacks are rare in emerging markets like India, and their exclusion has minimal impact on valuation accuracy.

Limitations in the Valuation Methodology

1. **Exclusion of CDS Data**

   Ignoring the country's default spread means the **risk-free rate** might not fully account for sovereign risk, slightly overestimating or underestimating the discount rate.

2. **Terminal Growth Rate**

   Assumes a constant **long-term growth rate** (e.g., 6%) for cashflows after the forecast period. This simplification might not fully capture sectoral dynamics or macroeconomic changes.

Research Methodology

Research Design

The study follows a **descriptive research design**, which focuses on analyzing financial data and understanding patterns and trends in the Nifty50 Index. The research aims to evaluate the intrinsic value of the index using the **Discounted Cash Flow (DCF) model**. Both qualitative and quantitative methods are used, integrating macroeconomic indicators and company-specific metrics to assess financial health and future growth prospects.

Sample Design

The sample consists of financial and macroeconomic data related to the Nifty50 Index and its constituent companies. Key metrics include earnings per share (EPS) growth rate, risk-free rate, equity risk premium, dividend yield, and buyback data.

- **Time Period:** Data from the most recent 3 years was used for the base valuation, while data spanning the last 20 years was analyzed for historical comparisons.
- **Sectors:** The study focuses on the major contributing sectors within the Nifty50 Index, such as Financial Services, Information Technology, and Consumer Goods, to understand their role in the valuation process.

Sampling Method

The study uses a **purposive sampling method** to select relevant financial and economic data. This method ensures that only meaningful data that directly impacts the valuation of the Nifty50 Index is included.

- **Data Sources:** Information was collected from trusted sources like the National Stock Exchange (NSE) and secondary sources, including research articles, financial reports, and datasets from reliable online platforms.
- This approach ensures that the sample is highly specific to the research objectives, improving the reliability of the findings.

Valuation Methodology

Methodology for Valuation of Nifty50 Using the Discounted Cash Flow (DCF) Approach

The valuation of the Nifty50 Index applies the Discounted Cash Flow (DCF) approach, treating the index as a collective entity. This method determines the intrinsic value of the index by projecting future cashflows to equity holders and discounting them to their present value. The process is divided into the following steps:

Step 1: Define the Cashflows

- **Free Cash Flow to Equity (FCFE):** The cashflows available to equity shareholders are calculated. Instead of deriving FCFE for each individual company in the index, dividends and buybacks are used as proxies for cashflows.
- **Rationale:** Aggregating dividends and buybacks simplify the valuation and aligns with the long-term nature of shareholder returns.

Step 2: Estimate the Earnings Growth Rate

- **Growth Rate Determination:** The earnings growth rate is estimated based on historical data such as EPS growth trends or P/E ratio trends for the Nifty50 index.
- **Stable Projection:** Averages over different timeframes (e.g., 3, 5, 7, and 10 years) are considered to ensure reliable growth rate estimation.

Step 3: Determine the Discount Rate (Cost of Equity)

The **Capital Asset Pricing Model (CAPM)** is used to calculate the discount rate:

Cost of Equity = Risk-Free Rate + (Beta × Equity Risk Premium)

- **Risk-Free Rate:** The yield on the 10-year Indian government bond is used as a proxy for stable returns.
- **Beta:** The beta is set to 1, as the Nifty50 index represents the overall market.
- **Equity Risk Premium (ERP):** The ERP reflects the additional return required by investors for the risk of equity investments.

Step 4: Project Future Cashflows and Terminal Value

- **FCFE Forecast:** Future FCFEs are projected by applying the earnings growth rate to the base FCFE for a forecast period (e.g., 3–5 years).
- **Terminal Value:** After the forecast period, the terminal value is calculated using the **Gordon Growth Model:**

$$\textbf{Terminal Value} = \frac{\textbf{FCFE}_{(n+1)}}{\textbf{Cost of Equity} - \textbf{Terminal Growth Rate}}$$

- A constant long-term growth rate is assumed to project terminal cashflows.

Step 5: Discount the Cashflows to Present Value

- **Present Value of Cashflows:** All projected FCFEs and the terminal value are discounted to their present value using the Cost of Equity calculated earlier.
- **Formula:**

$$\text{PV} = \frac{\textbf{Cashflow}}{(1 + \textbf{Cost of Equity})^{t}}$$

Where t is the year in the forecast period.

Step 6: Compare Intrinsic Value to Current Index Value

- The intrinsic value of the Nifty50 index is obtained by summing the present values of projected FCFEs and the terminal value.
- **Classification:** The index is classified as:
  - **Overvalued:** If intrinsic value < current index value.
  - **Undervalued:** If intrinsic value > current index value.
  - **Fairly Valued:** If intrinsic value ≈ current index value.

Approach of the Valuation

The valuation of the Nifty50 Index is conducted using the Discounted Cash Flow (DCF) approach, treating the index as a single collective entity, similar to a company. The DCF methodology estimates the intrinsic value of the index by projecting its future cashflows (approximated as dividends and buybacks) and discounting them to the present value using the cost of equity. Below is the detailed breakdown of the valuation:

A. Treating Nifty50 as a Single Entity

The Nifty50 Index is considered as a single corporate entity to simplify the valuation process:

- **Index Level as Share Price**: The Nifty50 level (e.g., 24,467.45) is treated as the index's "share price."
- **Consolidated Financial Metrics**: Aggregated earnings, dividends, and buybacks of the index constituents are used as proxies for cashflows to equity holders.
- This approach aligns with global practices for index valuation and simplifies the analysis of 50 companies into a unified framework.

B. Historical Data Analysis and Key Inputs

To calculate the intrinsic value, detailed historical data from 1999 to 2024 was analyzed and processed. These inputs form the foundation of the valuation model:

1. **EPS Growth**

- **Calculation**: Using the Nifty50's historical yearly average levels and P/E ratios, the EPS for each year was calculated. The growth rates of EPS were determined over various periods to understand long-term trends.
- **Derived Data**:
  - **3-Year Average EPS CAGR**: 12.47%
  - **5-Year Average EPS CAGR**: 11.71%
  - **7-Year Average EPS CAGR**: 11.02%
  - **10-Year Average EPS CAGR**: 10.27%
- **Significance:** The 3-year average EPS CAGR (12.47%) is used as the expected growth rate for projecting future cashflows.

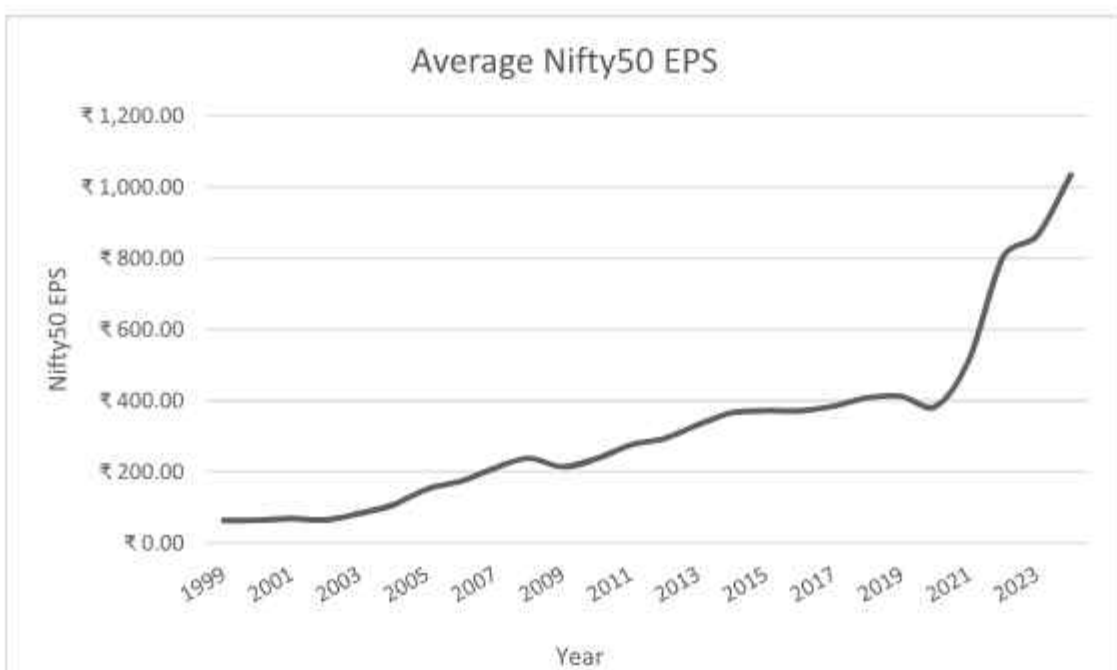

Fig. 5: Historical Growth of Nifty50 Earnings Per Share (EPS): 1999–2024

C. Earnings Yield (Dividends + Buybacks)

- **Calculation**:
  - Dividend data was sourced from NSE, and buybacks were calculated as 11.19% of dividends (based on data from Prof. Aswath Damodaran's website).
  - Total earnings = Dividends + Buybacks.
  - Nifty50 earnings yield was calculated as:

$$\text{Earnings Yield} = \frac{\text{Total Earnings}}{\text{Nifty50 Level}}$$

- **Derived Data**:
  - **3-Year Average Earnings Yield**: 1.44%\
  - **5-Year Average Earnings Yield**: 1.43%
  - **7-Year Average Earnings Yield**: 1.41%
  - **10-Year Average Earnings Yield**: 1.42%
  - **20-Year Average Earnings Yield**: 1.47%

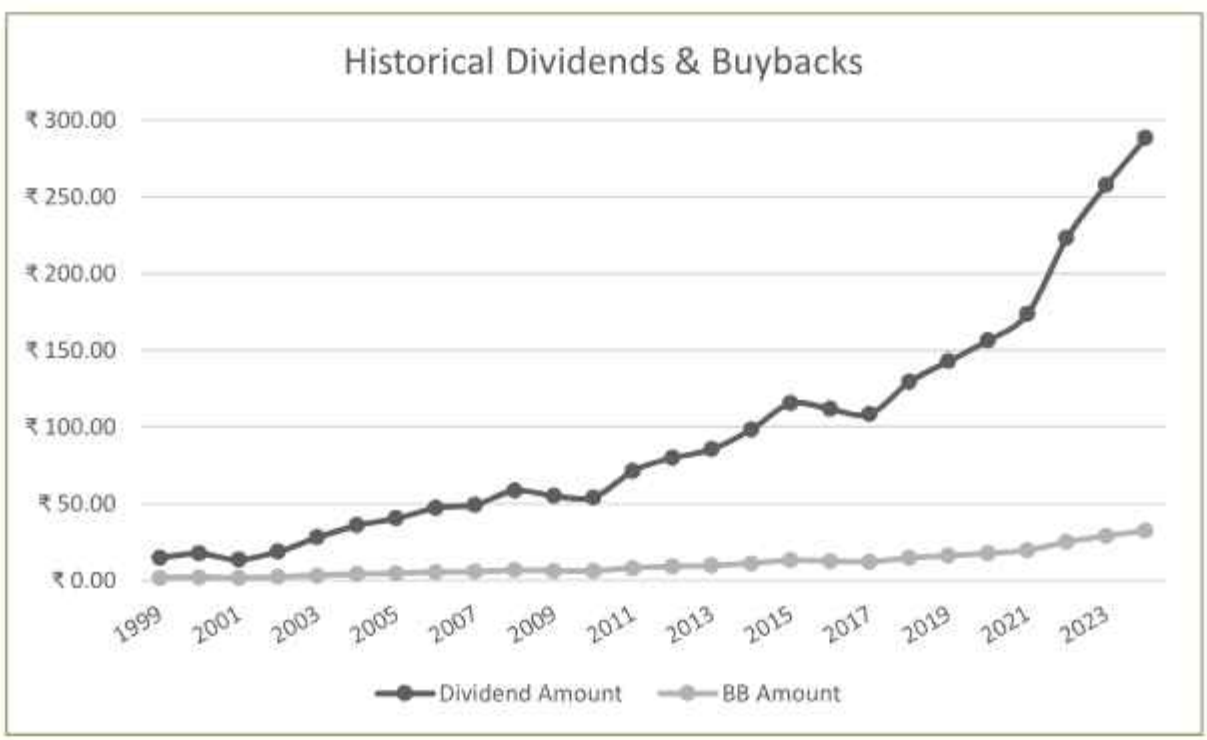

Fig. 6: Historical Trends in Nifty50 Dividends and Buybacks (1999–2024)

D. Risk-Free Rate

The risk-free rate represents the minimum return an investor expects from an investment with no risk of financial loss. It is typically based on the yield of long-term government bonds, such as the 10-year Indian Government Bond Yield, which is considered a reliable proxy for stable returns in the Indian context. In this valuation, the risk-free rate is 6.92%, reflecting current macroeconomic conditions. A lower risk-free rate reduces the cost of equity, increasing the present value of future cashflows and positively impacting the intrinsic value of the index.

- **Calculation**: The 10-year Indian government bond yield was analyzed using monthly data from 1999 to 2024.

Derived Data:

- **20-Year Average**: 7.43%
- **15-Year Average**: 7.41%
- **7-Year Average**: 6.90%
- **5-Year Average**: 6.73%
- **Latest (2024)**: 6.92%

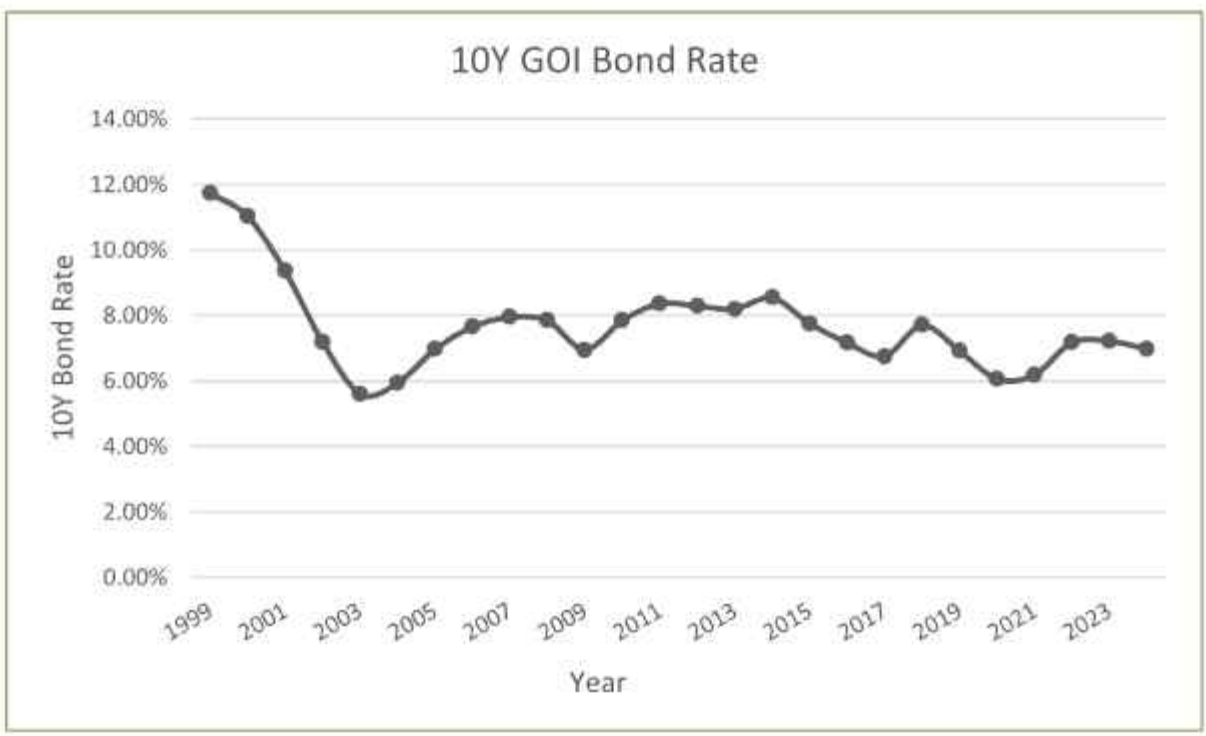

Fig. 7: Historical Trends in 10-Year GOI Bond Yields (1999–2024)

E. Equity Risk Premium (ERP)

The equity risk premium (ERP) is the additional return investors expect for investing in a riskier equity market instead of risk-free investments. It reflects the perceived riskiness of equities and varies depending on economic and market conditions. In this valuation, the latest implied ERP is 1.43%, indicating reduced market risk perception and strong investor confidence. A lower ERP decreases the cost of equity, enhancing the valuation of the Nifty50 Index by boosting the discounted value of projected cashflows.

Calculation: ERP was sourced from implied market risk premium data from 1999 to 2024.

Derived Data:

- **20-Year Average ERP**: 2.72%
- **15-Year Average ERP**: 2.30%
- **7-Year Average ERP**: 1.73%
- **5-Year Average ERP**: 1.70%
- **Latest ERP**: 1.43%

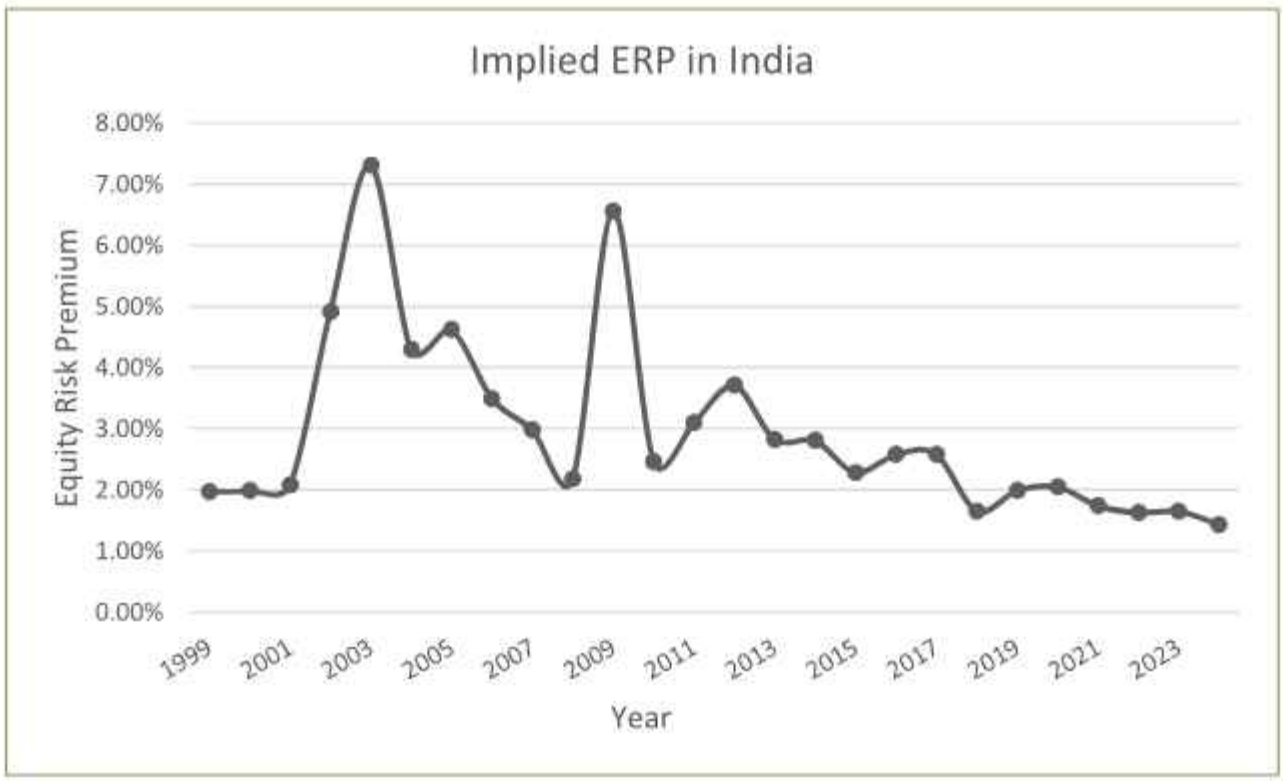

Fig. 8: Implied Equity Risk Premium Trends in India (1999–2024)

F. Beta

Beta measures the volatility of an asset or portfolio compared to the overall market. For the Nifty50 Index, Beta is assumed to be 1, as it represents the market as a whole. A Beta of 1 indicates that the index moves in tandem with the market, with no additional or reduced volatility. This assumption ensures the cost of equity calculation aligns with the Nifty50's role as a market benchmark.

G. Projection of Future Cashflows

Future cashflows were projected using the following methodology:

- **Formula for Cashflows:**
  Cashflows (Year t) = (Current Nifty50 Level x Total Yield) x $(1 + \text{Expected Growth})^t$
- **Total Yield:** 3-Year Average Earnings Yield = 1.44%.
- **Expected Growth:** 3-Year Average EPS CAGR = 12.47%.
- **Projection Period:** Cashflows were projected for 10 years (2025–2034). Beyond 2034, the terminal value was calculated using the Gordon Growth Model.
- **Terminal Value Formula:**

$$\textbf{Terminal Value} = \frac{\textbf{Cashflows (2035)}}{\textbf{Cost of Equity} - \textbf{Perpetual Growth Rate}}$$

- **Perpetual Growth Rate:** 6% (aligned with India's long-term GDP growth).

Year	Projected Cashflows
2025	₹ 396.78
2026	₹ 446.25
2027	₹ 501.87
2028	₹ 564.43
2029	₹ 634.79
2030	₹ 713.92
2031	₹ 802.92
2032	₹ 903.00
2033	₹ 1,015.57
2034	₹ 1,142.16
Terminal Value	₹ 51,474.98

H. Discounting Cashflows to Present Value

The projected cashflows and terminal value were discounted to present value using the Cost of Equity as the discount rate:

- **Cost of Equity Formula (CAPM):**
  Cost of Equity = Risk-Free Rate + (Beta × Equity Risk Premium)
- Risk-Free Rate: 6.92%.
- Beta: 1 (market representative).
- ERP: 1.43%.
- **Discounting Formula:**

$$\text{PV (Year t)} = \frac{\text{Cashflows (Year t)}}{(1 + \text{Cost of Equity})^{t}}$$

Year	Projected Cashflows	Discount Factor	Present Value (PV)
2025	₹ 396.78	0.9229	₹ 366.20
2026	₹ 446.25	0.8518	₹ 380.10
2027	₹ 501.87	0.7861	₹ 394.53
2028	₹ 564.43	0.7255	₹ 409.51
2029	₹ 634.79	0.6696	₹ 425.06
2030	₹ 713.92	0.6180	₹ 441.19
2031	₹ 802.92	0.5704	₹ 457.94
2032	₹ 903.00	0.5264	₹ 475.33
2033	₹ 1,015.57	0.4858	₹ 493.37
2034	₹ 1,142.16	0.4484	₹ 512.10
2034 - ∞ (Terminal Value)	₹ 51,474.98	0.4484	₹ 23,079.52

I. Intrinsic Value and Comparison

- **Intrinsic Value Calculation**:
  Intrinsic Value = Sum of PV of Projected Cashflows + PV of Terminal Value
- **Intrinsic Value**: 27,435.
- **Current Nifty50 Level**: 24,467.45.
- **Result**: The index is undervalued by **12.13%**, indicating a potential appreciation.

J. Result Interpretation

The Base Valuation suggests that the Nifty50 is undervalued, with significant upside potential. This indicates favorable investment opportunities, driven by strong EPS growth and stable cashflows in the form of dividends and buybacks. The analysis also highlights the robustness of the Indian equity market, supported by its long-term GDP growth.

Valuing the NSC Nifty50 Index			27434.87
Key Inputs		Assumptions	
Date	04-12-2024	04-12-2024	
Current Nifty50 Level	24467.45	24467.45	Undervalued
Total Yield	3 Years	1.44%	The market implied fair value of Nifty 50 is 27435. The Nifty50 is currently trading at 24468. A 12.13% appreciation is expected from this level.
Expected Growth	3 Years	12.47%	
Risk-Free Rate	Latest	6.92%	
Equity Risk Premium	Latest	1.43%	
Cost of Equity		8.35%	
Year	Expected Dividends and Buybacks	Cumulative PV factor (Risk-Free Rate + Equity Risk Premium)	Present Value of Expected Dividends and Buybacks
2025	₹ 396.78	0.9229	₹ 366.20
2026	₹ 446.25	0.8518	₹ 380.10
2027	₹ 501.87	0.7861	₹ 394.53
2028	₹ 564.43	0.7255	₹ 409.51
2029	₹ 634.79	0.6696	₹ 425.06
2030	₹ 713.92	0.6180	₹ 441.19
2031	₹ 802.92	0.5704	₹ 457.94
2032	₹ 903.00	0.5264	₹ 475.33
2033	₹ 1,015.57	0.4858	₹ 493.37
2034	₹ 1,142.16	0.4484	₹ 512.10
2034 - ∞	₹ 51,474.98	0.4484	₹ 23,079.52

Fig. 9: Excel Valuation Model for Nifty50 Index (Base Valuation)

Data/Valuation Analysis

The Base Valuation (Recent Data Approach) for the Nifty50 Index provides an in-depth understanding of its financial position and future growth potential. This analysis focuses on interpreting the valuation results, the factors driving the intrinsic value, and their implications for investors. By reflecting recent market conditions, this approach offers a forward-looking perspective.

A. Intrinsic Value vs. Current Index Level

- The intrinsic value of the Nifty50 Index is calculated as ₹27,435.
- The current Nifty50 level as of the valuation date is ₹24,467.45.
- Classification: The index is undervalued, with an expected potential appreciation of 12.13%.
    - This undervaluation signals that the market has not fully priced in the strong earnings growth and consistent shareholder returns of the Nifty50 companies.

B. Key Drivers of Intrinsic Value

The valuation results are primarily driven by the following factors:

1. **Earnings Growth (Expected Growth)**
    - The 3-year average EPS CAGR of 12.47% forms the cornerstone of this valuation.

- This high growth rate reflects strong financial performance and operational efficiency among Nifty50 companies, indicating their ability to generate increasing cashflows.
- Sectors such as Information Technology, Financial Services, and Consumer Goods have contributed significantly to this growth, driven by innovation, demand resilience, and macroeconomic factors.

Implication:

- A high expected growth rate enhances the intrinsic value, as it boosts projected cashflows over the forecast period.
- Investors can expect sustained earnings growth, making the Nifty50 a promising investment.

2. **Total Yield (Dividends + Buybacks)**

- The total yield, derived from the average dividend and buyback yields over the last three years, is 1.44%.
  - Dividend yields indicate the ability of companies to reward shareholders with consistent payouts.
  - Buybacks (11.19% of dividends) highlight management confidence in their companies' future prospects and contribute to shareholder value.

Implication:

- Although the total yield is modest compared to developed markets, it reflects the long-term potential of Indian companies to distribute earnings to shareholders.
- The combined yield strengthens the FCFE proxy, ensuring realistic cashflow projections.

3. **Favorable Macroeconomic Conditions**

- The latest risk-free rate of 6.92% reflects stable economic conditions and manageable inflation levels in India.
- A low equity risk premium (ERP) of 1.43% further underscores investor confidence in the Indian equity market.
  - The ERP's decline over time indicates reduced perception of risk and increased willingness of investors to participate in the market.

Implication:

- Favorable macroeconomic factors lower the discount rate (cost of equity = 8.35%), increasing the present value of future cashflows and driving up the intrinsic value.

4. **Terminal Value Contribution**

- The terminal value constitutes approximately 84% of the total intrinsic value of ₹27,435.
  - This highlights the importance of long-term growth assumptions in the valuation, especially for an index like Nifty50, where growth sustainability across sectors plays a vital role.

C. Comparison with Historical Averages

This valuation approach uses recent data, reflecting current market trends. Comparing it with historical averages highlights the following:

- Higher Expected Growth: Recent EPS growth (12.47%) outpaces the 10-year historical average of 10.27%, indicating stronger financial performance in the current period.
- Lower Discount Rate: The current risk-free rate (6.92%) and ERP (1.43%) are lower than their 20-year averages (7.43% and 2.72%, respectively), making valuations more optimistic.
- Improved Yield: Although the total yield (1.44%) aligns closely with historical averages, buybacks have gained prominence, signaling increased shareholder-centric policies.

Implication

- Recent data highlights a favorable market environment, with strong earnings growth, stable macroeconomic conditions, and increasing shareholder returns driving intrinsic value.

Scenario Analysis: Impact of Timeframe on Valuation Results

Comparing Valuations Based on Recent vs. Long-Term Historical Data

The valuation of the Nifty50 Index was conducted using two distinct scenarios to assess its intrinsic value under different assumptions. These scenarios are differentiated by the timeframes used for key inputs such as the risk-free rate, equity

risk premium, earnings growth, and total yield. The results highlight how changing the timeframe for historical data impacts the valuation outcome and the classification of the index.

Scenario 1: Base Valuation (Recent Data Approach)

This valuation approach represents an **ideal condition or a "Current Market Conditions Valuation"**. It uses the latest data from the past three years, reflecting the current economic environment and recent market trends. The objective is to determine the intrinsic value of the Nifty50 index based on the most up-to-date financial and macroeconomic inputs.

- **Inputs for Valuation:**
  - **Risk-Free Rate:** Latest 10-Year Government Bond Yield = 6.92%.
  - **Equity Risk Premium:** Latest Implied ERP = 1.43%.
  - **Expected Growth:** Average EPS CAGR (3 years) = 12.47%.
  - **Total Yield:** Average Nifty50 Earning Yield (3 years) = 1.44%.
- **Results:**
  - The intrinsic value of the Nifty50 index = ₹ 27,435.
  - Current Nifty50 Level = ₹24,467.45.
  - **Classification:** The index is undervalued, with a potential appreciation of **12.13%** from current levels.

This valuation is ideal for reflecting the present market conditions, providing investors with a forward-looking perspective based on recent financial and economic parameters.

Scenario 2: Historical Data Valuation (Long-Term Approach)

This alternative approach, referred to as the **"Historical Averages Valuation,"** uses the longest available historical data to represent a more conservative and long-term perspective of the Nifty50 index. This scenario incorporates 20 years of historical averages, smoothing out short-term fluctuations and focusing on long-term trends.

Valuing the NSC Nifty50 Index			12886.22
Key Inputs		Assumptions	
Date	04-12-2024	04-12-2024	
Current Nifty50 Level	24467.45	24467.45	Overvalued
Total Yield	20 Years	1.47%	The market implied fair value of Nifty 50 is 12887. The Nifty50 is currently trading at 24468. A 47.33% correction is expected from this level.
Expected Growth	10 Years	10.27%	
Risk-Free Rate	20 Years	7.43%	
Equity Risk Premium	20 years	2.72%	
Cost of Equity		10.15%	
Year	Expected Dividends and Buybacks	Cumulative PV factor (Risk-Free Rate + Equity Risk Premium)	Present Value of Expected Dividends and Buybacks
2025	₹ 395.45	0.9079	₹ 359.02
2026	₹ 436.08	0.8243	₹ 359.44
2027	₹ 480.88	0.7483	₹ 359.86
2028	₹ 530.29	0.6794	₹ 360.28
2029	₹ 584.77	0.6168	₹ 360.71
2030	₹ 644.85	0.5600	₹ 361.13
2031	₹ 711.11	0.5084	₹ 361.55
2032	₹ 784.17	0.4616	₹ 361.97
2033	₹ 864.73	0.4191	₹ 362.39
2034	₹ 953.58	0.3805	₹ 362.82
2034 - ∞	₹ 24,382.58	0.3805	₹ 9,277.04

Fig. 10: Excel Valuation Model for Nifty50 Index (Historical Data Valuation)

risk premium, earnings growth, and total yield. The results highlight how changing the timeframe for historical data impacts the valuation outcome and the classification of the index.

Scenario 1: Base Valuation (Recent Data Approach)

This valuation approach represents an **ideal condition or a "Current Market Conditions Valuation"**. It uses the latest data from the past three years, reflecting the current economic environment and recent market trends. The objective is to determine the intrinsic value of the Nifty50 index based on the most up-to-date financial and macroeconomic inputs.

- **Inputs for Valuation:**
  - **Risk-Free Rate:** Latest 10-Year Government Bond Yield = 6.92%.
  - **Equity Risk Premium:** Latest Implied ERP = 1.43%.
  - **Expected Growth:** Average EPS CAGR (3 years) = 12.47%.
  - **Total Yield:** Average Nifty50 Earning Yield (3 years) = 1.44%.
- **Results:**
  - The intrinsic value of the Nifty50 index = ₹ 27,435.
  - Current Nifty50

Inputs for Valuation:

- **Risk-Free Rate:** Average Rate (20 years) = 7.43%.
- **Equity Risk Premium:** Average Implied ERP (20 years) = 2.72%.
- **Expected Growth:** Average EPS CAGR (10 years) = 10.27%.
- **Total Yield:** Average Nifty50 Earning Yield (20 years) = 1.47%.
- **Results:**
  - The intrinsic value of the Nifty50 index = ₹12,887.
  - Current Nifty50 Level = ₹24,467.45.
  - **Classification:** The index is overvalued, with a potential correction of **47.33%** expected from current levels.

Interpretation and Implications

The two scenarios provide contrasting views of the Nifty50 Index valuation:

1. **Base Valuation (Current Market Conditions Valuation):** This approach assumes recent market trends and conditions as the basis, providing a forward-looking valuation ideal for short- to medium-term decision-making.
2. **Historical Averages Valuation:** This approach offers a more conservative, long-term perspective, accounting for historical cycles and broader trends. It helps investors understand the index's valuation under less optimistic assumptions.

The significant difference in results between the two scenarios demonstrates how market valuations can vary based on the chosen timeframe for key inputs. While the **Base Valuation** suggests the index is undervalued and presents growth potential, the **Historical Averages Valuation** indicates overvaluation, emphasizing the need for caution.

Findings and Interpretation

1. **Intrinsic Value vs. Current Market Value**
   - **Intrinsic Value of Nifty50 Index:** ₹27,435
   - **Current Market Level (as of the valuation date):** ₹24,467.45
   - **Result:** The index is undervalued, with a potential appreciation of **12.13%** from current levels.
     - This indicates that the market has not fully factored in the strong earnings growth and consistent shareholder returns of Nifty50 companies.

   Interpretation: The undervaluation presents an attractive investment opportunity, highlighting the index's potential for further growth.
2. **Robust Earnings Growth**
   - The **3-year average EPS CAGR** of the Nifty50 Index is **12.47%**, reflecting strong and consistent earnings growth over the recent period.

- This growth is driven by key sectors such as Financial Services, Information Technology, Consumer Goods, and Pharmaceuticals.

Interpretation: The high earnings growth rate indicates financial stability and operational efficiency across the index's constituent companies. This positions the index for sustained performance and value generation for investors.

3. **Stable Shareholder Returns (Dividends + Buybacks)**
   - **3-Year Average Total Yield:** 1.44%
     - **Dividend Yield:** Majority of the returns come from dividends, reflecting the companies' commitment to rewarding shareholders.
     - **Buybacks as a Percentage of Dividends:** 11.19%, highlighting management confidence in long-term growth.

Interpretation: While modest compared to developed markets, the total yield showcases the index's ability to provide consistent returns to shareholders, enhancing its attractiveness as a long-term investment.

4. **Favorable Macroeconomic Environment**
   - **Risk-Free Rate:** Latest 10-Year Government Bond Yield = **6.92%**
   - **Equity Risk Premium (ERP):** Latest implied ERP = **1.43%**
   - **Cost of Equity (Ke):** Calculated at **8.35%**, reflecting a low discount rate.

Interpretation: The stable macroeconomic environment, reflected in a low risk-free rate and ERP, reduces the cost of equity. This increases the present value of future cashflows, positively impacting the index's intrinsic value.

5. **Terminal Value Contribution**
   - The **terminal value** accounts for **83.97%** of the intrinsic value of ₹27,435.
   - This is based on a perpetual growth rate of **6%**, aligned with India's long-term GDP growth.

Interpretation: The significant contribution of the terminal value highlights the importance of long-term growth assumptions. It reflects investor confidence in sustained economic expansion and the resilience of Nifty50 companies.

6. **Scenario Analysis**
   - **Base Valuation (Recent Data Approach):** Intrinsic value = ₹27,435; Current level = ₹24,467.45; Potential upside = **12.13%**.
   - **Historical Averages Valuation (Long-Term Data Approach):** Intrinsic value = ₹12,887; Current level = ₹24,467.45; Potential downside = **47.33%**.

Interpretation :

The contrasting results highlight the sensitivity of valuations to the choice of inputs and timeframes. While the **Base Valuation** aligns with current market conditions, the **Historical Averages Valuation** adopts a conservative, long-term perspective. This emphasizes the need for careful consideration of assumptions in investment decisions.

Conclusion

The valuation of the Nifty50 Index using the **Discounted Cash Flow (DCF) approach** provides a comprehensive understanding of its intrinsic value, financial health, and growth potential. By treating the index as a single entity, this project simplifies the complexities of analyzing 50 diverse companies while maintaining the robustness of the valuation process.

The **Base Valuation (Recent Data Approach)** reflects the current market conditions, incorporating the latest financial and macroeconomic data. The intrinsic value of the Nifty50 Index was determined to be **27,435**, compared to its current level of **24,467.45**, indicating that the index is **undervalued** with an expected potential appreciation of **12.13%**.

The analysis highlights a **3-year average EPS CAGR of 12.47%**, demonstrating strong and sustainable growth among the Nifty50 companies. The low **risk-free rate (6.92%)** and **equity risk premium (1.43%)** indicate stable economic conditions and reduced perceived market risk, resulting in a cost of equity of **8.35%** that supports the intrinsic value calculation.

The terminal value, contributing approximately **84%** to the intrinsic value, underscores the significance of long-term growth expectations. However, scenario analysis reveals the sensitivity of valuations to assumptions. While the Base Valuation indicates undervaluation, a Historical Averages Valuation using long-term data suggests overvaluation, emphasizing the importance of timeframe selection in investment decisions.

In conclusion, the Nifty50 Index reflects India's economic growth and resilience, offering a well-diversified portfolio with significant growth potential. This project reinforces the index's position as a key benchmark for the Indian equity market, providing valuable insights for investors and stakeholders seeking medium- to long-term returns in a dynamic market environment.

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Ethics in Human Resource: A Study on Hiring Ethics and Employee Selection

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Abstract

The act of hiring an individual can have major ethical and legal implications for an organization. To better identify the concepts that influence hiring and employment selection ethics, a review of the recent literature found several areas of importance for both academics and hiring managers and other employees. Earlier researchers claim that hiring is influenced by the concepts of moral obligation, diversity, antidiscrimination, integrity, and employment fairness whenever they hire new personnel. Awareness and action in these areas will lead to motivating factors that can change attitudes while allowing ethical hiring practices to shape organizational culture. This Article presents a dichotomy of understanding that when organizations use a defined ethical hiring standard, employers are more likely to recruit and hire ethical candidates. This understanding creates the assumption that managers are obligated with the responsibility of being ethical gatekeepers for their respective organizations.

Key Words: Ethics, Hiring, Anti-discrimination, Integrity, Gatekeepers, Human Resource.

Introduction

The selection and hiring of employees is a never-ending cycle for managers in the industries. Hiring includes looking for an applicant or aspirant with experience, educational qualifications, or just an impressive personality. Hiring managers should also be aware of the ethical implications involved in hiring the right person, as ethics is a primary responsibility of management (Paine, 1994). Hiring managers face the challenging task of finding individuals who can fulfill and fit the organization's requirements with proper credentials while adhering to both regulatory and internal employment operations. Beyond the legal framework involved in employment practice, a manager should be aware of the ethical responsibilities associated with hiring practices. If an organization is only as effective as its employees, then it is the hiring manager who must understand that recruiting an ethical employee is of the utmost importance for the organization (York, 2014). The actions of a few compromised individuals who deliberately act in an unethical way or path can spoil the entire organization's reputation (Ashkanasy, Windsor, & Treviño, 2006). To prevent, or at least lessen unethical behavior, the role of all hiring managers should include the responsibility of being an ethical gatekeeper for their respective organizations. Companies that choose to operate according to an internal ethical standard should follow ethical hiring procedures and guiding principles (Alder & Gilbert, 2006) to assist managers in promoting ethical employees.

Literature Review:

The Literature review has been done on the areas like Morality, Diversity, Antidiscrimination, Integrity and fairness. Extant research demonstrates that an organization's employees are its primary source for creating a competitive advantage (Ruona & Gibson, 2004). If this is true, then a manager must ensure that new employees are the ethical human capital and competitive advantage that can help build an organization rather than create its demise. Ethical behavior in an organization does not just happen through spontaneity but through specific actions and managerial declarations. The important role of managers in hiring ethically and selecting ethical candidates cannot be understated.

The existing literature on ethical hiring focuses on some central themes—morality, diversity, antidiscrimination, integrity, and fairness—which are essential in selecting ethical human capital and maintaining organizational success. Previous research establishes that employees are the most critical contributors to competitive advantage in an organization (Ruona & Gibson, 2004). Hence, hiring ethically is not only a procedural task but also a strategic necessity.

Moral behavior in recruitment necessitates thoughtful managerial action and ethical responsibility. Alder and Gilbert (2006) posit that ethical recruitment entails transcending legal requirements to adopt moral accountability. Lantos (1999) concurs with this argument, underlining the moral responsibility of corporations to reconcile profit interests with ethical conduct. Ashkanasy et al. (2006) add further that cognitive moral development largely influences ethical decision-making in organizations.

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Boekhorst (2015) highlights that genuine leadership encourages workplace inclusion, which increases team performance and innovation. Acknowledging diversity in recruitment is not only morally right but also strategically advantageous. This is in line with overall HR strategies that encourage inclusivity through ethical practices.

Antidiscrimination is an enduring issue in ethical recruitment. Ladd, Pasquerella, and Smith (1994) caution against making hiring decisions based on liability alone, which creates the tendency to exclude those at greatest risk. Taylor (2009) also presents a Rawlsian approach that supports affirmative action as a means to counter structural disparities in hiring.

Paine (1994) advocates that managing for organizational integrity involves aligning organizational and individual values through leadership by example and ethical systems. Demuijnck (2009) supports this

Equity in hiring guarantees that hiring processes are unbiased and promote justice. Gardner et al. (2010) explain the ethical challenges of lateral hiring and the need for transparency and fairness. Martin and Cullen (2006) show through meta-analysis that ethical climates have a significant impact on fairness perceptions and employee behavior.

The literature on this subject matter provides a glimpse into the many elements that are involved in the ethics of hiring new employees. Several ideas regarding this area of business management have helped to define the ethical practices needed for ethical employee selection. Some of the most common themes include ideas such as moral obligation, diversity, anti-discrimination practices, integrity-based approaches, fairness/justice, and the need for honest communication.

Objectives of the Study

1. To assess the importance of ethics in the Hiring and Selection of employees in an organization.
2. To identify some of the common ethical dilemmas that HR professionals face during the recruiting process.

Obligation towards Morality

(Salvador Villegas, 2019) The decision to hire the right person for any unoccupied position is an action that should not be taken lightly. Managers must set the ethical climate of a company that can result in strengthening relationships, forging reputations, and creating the ultimate success of the firm, all of which are dependent on managerial acknowledgment of their ethical responsibility (Paine, 1994). Additionally, past researchers have argued that not only do hiring managers have the positional power to choose one candidate and reject other applicants, but more so, managers have a moral obligation to exercise their decision responsibly (Alder & Gilbert, 2006). A manager who disregards their obligation to be ethical in their hiring decisions and fails to choose the best candidates is increasing the chance of allowing bad apples to infiltrate their organization. As postulated by Ashkanasy et al. (2006), bad apples are morally flawed individuals who are predisposed to behave in an unethical manner and, when given the opportunity, will do so. Every organization is susceptible to the shortcomings of employees who act in unethical or immoral ways. To be sure, ethical hiring practices and managerial safeguards may not completely prevent poor employees from gaining employment. However, a manager who acts according to a moral obligation has the potential to mitigate the threat of hiring someone that could negatively affect the organization and its stakeholders. In response to the ethical discourse on employment practices, Lantos (1999) argues, "moral behavior builds trust, which attracts customers, employees, suppliers, and distributors, not to mention earning the public's goodwill. Conversely, immoral behavior chases these various groups away" (p. 225). Even if short-term gains created through immoral business activity are sacrificed due to ethical principles, the long-term result of operating purely could be highly beneficial for the organization. As other researchers have also proposed, hiring managers are responsible for ensuring that ethics are a significant priority when selecting new employees. A three-step process is suggested as a guide to assist managers in fulfilling their duty for ethical employment and hiring. First, in any hiring decision, ethical character should be identified through behavioral interview questions to better identify a candidate's character traits, such as openness, self-discipline, and personal virtues.

Second, existing business leaders and managers must demonstrate ethical activity in their mannerisms and deeds. Third, managers need to cultivate their sensitivity to be able to identify and become aware of ethical situations. (Lantos, 1999). As also defined in Rest's model of moral behavior (Johnson, 2015), there is a gap between knowing what to do and taking the actions necessary for implementation. According to Lantos (1999), if managers intentionally focus on creating ethical motivation paired with action, both for themselves and while carefully hiring employees, perhaps future press on business ethics will appear less criminal than it does today.

Assortment/Diversity

The business case for organizational diversity has clearly been defined in past research. Benefits of a diverse workplace include greater innovation, higher retention, better decision making, higher quality employees, an improved public image,

etc.. (Johnson, 2015). Diversity in employees can mean differences based on race, nationality, sex, religion, disability, and even genetic makeup (Roberts, 2016). Additionally, differences in education, experience, and values could potentially fall under the umbrella of diversity. Notwithstanding the business case for diversity, diversity also makes sense to employers for philosophical and ethical reasons. For example, hiring people of different backgrounds creates more good than it does harm (utilitarianism), respecting differences acknowledges the dignity of each person (deontology), promoting social justice, and reflects love of our neighbors in maximizing their unique potential (altruism) (Johnson, 2015). In terms of hiring diversity, the ethical nature of the process should not be evaluated on overall patterns but rather on the effect that the process has on the individual being selected for the position (Alder & Gilbert, 2006). Regardless of the strong moral and business reasons for seeking diversity in hiring practices, the strategy to achieve diversity must be intentional. Research shows that paying attention to the social makeup of the workforce can impact the overall motivation of the workforce (Lloyd & Mertens, 2018). Even with the legal precedent that protected class status should not be a contributing factor to hiring decisions, for diversity in hiring to occur, some type of affirmative action policy must be implemented (Alder & Gilbert, 2006). As defined by past research, affirmative action is "a class of public policies focused on achieving equality of opportunity, especially in the realms of tertiary education and employment, for certain historically oppressed groups" (Taylor, 2009, p. 478). As a framework for managing diversity in hiring practice, Alder & Gilbert (2006), propose a four-part action plan to increase the diversity of an organization that consists of. He proposes that diversity begins by eradicating a hiring manager's personal bias towards job applicants by requiring diversity training. Second, he suggests removing barriers that may be limiting under-represented groups of job seekers from applying for open positions. Barriers include using only online applications that require internet access or placing help wanted ads in newspapers that are not widely read. Next, he proposes that necessary steps need to be taken to increase a diverse mix of applicants by broadening recruitment efforts, such as engaging applicants from several different schools or areas of town. Finally, he concludes that diversity should emphasize favoring protected classes in the job selection process. For diversity to take hold and change the demographic makeup of an organization, the idea of embracing difference is important for hiring managers to understand. In an environment composed of culturally diverse groups, as compared to culturally homogenous groups, a climate of inclusion can help to create a sense of comfort that encourages all employees to apply their differences to specific work processes, necessary tasks, and organizational strategies (Boekhorst, 2015). Creating a diverse climate should a distinct hiring priority based on the ethical, business, and societal benefits that can be directly achieved from the contributions of people with dissimilar backgrounds. To achieve diversity requires a need to reduce both overt and unconscious discrimination in hiring.

Anti-discrimination

Refusing to hire someone based on protected class status is a blatant violation of U.S. labor laws. This includes practices that create an explicit discrimination termed by the EEOC as disparate treatment, and the practices that result in a defacto discrimination despite intentions, termed by the EEOC as disparate impact. Even with laws and regulations, the news is continually reporting on employers who were blatant in their refusal to hire someone due to some form of discrimination. Some researchers will argue that discrimination is human (Cuilla, Martin, & Solomon, 2014), and even with legal frameworks in place, the likelihood of eradicating manager bias is difficult, if not impossible. Other research has suggested that discrimination is not only immoral, but that hiring managers and the organizations that they represent have a moral obligation to enforce the principle of non-discrimination in employment (Demuijnck, 2009). To fulfill the moral obligation, Demuijnck (2009) postulates that firms must implement effective diversity training by setting long-term diversity objectives and by assigning specific managerial responsibilities to support this initiative. Successful hiring procedures require an organization to be genuinely motivated to help their managers avoid discriminatory behaviors. Some managers may be intrinsically motivated avoid Discriminatory behaviors, whereas others will rely on the corporate culture for guidance and structure (Lantos, 1999). Obvious and intentional discrimination based on protected factors is much easier to identify when it happens. When discrimination occurs through subconscious stereotyping or personal bias, unforeseen problems can arise in the hiring process. In her legal analysis of employment discrimination in relation to the harm principle, Roberts (2016), builds the case of detrimental stereotyping and the negative effects that it can cause through employee selection and employment. In her article, the researcher discusses the idea of actions that can cause certain stereotype threats. In some situations, even mentioning that someone falls into a diverse or protected class can be harmful trigger that may create disillusionment with the organization, depressed ability, a feeling of tokenization, or even a sense of exclusion (Roberts, 2016). Among other things, Roberts (2016) argues that some stereotype triggers could also leave an organization susceptible to employment discrimination where others may not. As proposed by the author, the best way to avoid unethical stereotyping in hiring is to create stringent internal policies and procedures through self-evaluation for the purpose of minimizing the occurrence of stereotypic harms (Roberts, 2016). Federal regulation has defined which classes are protected, however to maintain a climate of ethical hiring practices, there are other forms of discrimination that organizations should be made aware of. The literature has ample examples of ways that organizations can reduce

discrimination of unprotected factors in their hiring practices, but for the sake of brevity, only a few additional examples are presented. Some researchers have found that employers are beginning to take into consideration economic factors such as likelihood of an applicant to use medical benefits, a desire to restrict the personal liberties of employees outside of work, and requiring pre-employment health screenings which can be viewed as an invasion of privacy (Ladd, Pasquerella, & Smith, 1994). These same authors argue that " using non-jobrelated criteria for hiring is discriminatory and that hiring decisions should be based exclusively on the prospective employee's ability to do the job" (Ladd et al., 1994, p. 326). Some employers may try to justify this type of discrimination as a method of reducing corporate liability during hiring; however, the results of their actions are can be labeled as discriminatory and unethical. Corporate leaders and hiring managers who allow such actions to take place are a perfect example of moral disengagement by using moral justification to convince them that their harmful behavior is beneficial (Johnson, 2015). Some researchers are calling for corporations to begin reducing discrimination based on appearance bias (Harvard Law Review as cited by Cuilla, Martin, & Solomon, 2014). This research originally published in the Harvard Law Review cites several examples of how employers need to create policies that disregard personal attractiveness and unilaterally forbid pre-employment inquiries in regards to appearance (with the exception of grooming). Much of this research comes from recent studies where overweight individuals have reported being discriminated against due to their appearance rather than their ability to do the job for which they are applying. Echoing the strategy set forth by previous research, the anonymous author(s) suggest that employers need to reflect on their own practices and place emphasis on legitimate work related applicant criteria rather than consider appearance. The only way to stop this form of bias is to change the attitude of hiring managers and people in general. When managers adhere to ethical hiring practices, based in either personal values or corporate policies, they are acting with integrity. Bias and discrimination may not always be negative, and in some cases actually benefit an applicant for a positon. In his book Everyday Bias, researcher Howard Ross (2014) explains that sometimes interviewers may instantly favor an applicant over others due to some stereotype or associated feeling. According to Ross (2014), our unconscious biases are formed either individual or collectively, and they affect every decision we make including who we interview, how we interview, hire, assign jobs, promote, or take a risk in hiring.

Integrity

When managers practice their duty of upholding the ethical identity and climate of an organization in hiring, they are exercising both moral character and integrity. Compliance with the law is not to be confused with integrity, but rather integrity is an essential element that influences every type of business decision (Johnson, 2015), including hiring. Adherence to governmental compliance acts as a guide to avoid legal repercussions, whereas taking an integrity-based approach to management goes much deeper affecting operations and behavior. In an environment that chooses to operate in an ethical manner, management will personify moral values, create an ethically supportive climate, and instill the idea of shared accountability among all employees (Paine, 1994). An organization that adheres to integrity focused guiding principles will be more likely to identify the ethical and job related skill set of potential applicants when determining suitability for possible employment (Paine, 1994). When hiring, employers can recruit, but should do so in a manner that is void of deception and moral transgressions (Gardner, Stansbury, & Hart, 2010), as these types of actions would not be permissible in an integrity based approach. During the hiring process, honest communication about the ethical expectations for the position should be communicated to all potential applicants (Evans, 2009; York, 2014). This forthcoming and public stance on ethical standards demonstrates the commitment and value placed on ethical activity within the organization. Individuals who are hired through an ethical process will most likely be appreciative of the honesty and integrity that was demonstrated prior to employment (Evans, 2009). If an organization deliberately focuses their activity to sustain a climate of integrity, this will also be reflected in both how they hire, and even more so, who they hire. Clear ethical expectations are an organizational necessity for both onboarding ethical and beneficial talent, while passing on potential bad apples. In situations like employee selection, managers and leaders should show coherence between their integrity and action (McFall as cited by Ciulla, Martin, & Solomon, 2014). Setting a corporate ethical standard allows both employees and potential employees to see integrity as a guiding corporate principle.

Fairness

The critical concepts of fairness/justice have permeated nearly every discussion on hiring ethics within this literature review. Rawls (1971), laid out an argument for fairness as he explains how often times individuals are quick to develop rules for societal action while being ignorant to their own self interests. These interests affect fair distribution of both benefits and burdens for everyone, including fairness in hiring criteria (Ladd et al., 1994). Through the scope of ethical employment protocol, the goal of fairness in hiring is not just have formal access to a position, but rather to actually be considered for an open position without the blindness caused by managerial self-interest (Rawls as cited by Demuijnck, 2009). Bias undermines fairness when a manger acts in accordance with their own self-interests by intentionally

withholding employment opportunities from individuals who are qualified for the position, however disregarded due to the manager's personal prejudices (Alder & Gilbert, 2006). Organizations who choose to uphold the values of fairness and justice have earned the right to be called ethical, whereas organizational values that prioritize profits or allow for the bending of rules tend to be considered unethical (Alder & Gilbert, 2006). In terms of acquiring new employees, fairness in the hiring process and selection of candidates is synonymous with ethical behavior.

Ethical dilemmas that HR professionals face during the recruiting process

While there are anti-discrimination laws in place that protect individuals from illegal treatment during the hiring process, the ethics of recruiting go beyond regulation and can impact the reputation of both a company and an individual recruiter. Here are some of the more common ethical dilemmas that can arise in recruiting:

Posting a job ad for a position that does not exist. There are a few reasons this may be done: to see what talent might be available in a potential new location; to attract passive candidates to build up a talent pipeline; to use up remaining postings in an expiring contract with an online jobs board, if only to collect resumes; to see if current employees will respond to a blind ad, indicating they are ready to jump ship; or to foster the idea that the company is growing and stable, rather than the opposite. If, for any of these reasons, a job ad is posted when no open position actually exists, applicants, employees, clients and customers may be led to distrust the company or recruiter due to unethical practices. Reputations can be ruined quickly with a simple social media post; allowing only actual openings to be advertised will alleviate this risk.

Misrepresenting the duties or requirements of an open position. This generally occurs when a position is difficult to fill, or a recruiting quota needs to be met and desperation sets in. Promising more autonomy or authority than a position has can lead to an unhappy hire and even more cost to the employer when the new hire quickly leaves. The same holds true for hiring someone who is overqualified, or hiring someone who is under qualified and becomes overwhelmed and unproductive. To maintain ethical practices and integrity as a recruiter and for your company, be completely transparent with applicants about what the job they are applying for entails.

Unethical employee referral practices. While a popular and successful tool to hire quality candidates, employee referral programs can create ethical issues of which HR should be aware. These issues can arise when senior-level employees make a referral and expect a hire, regardless of merit; a referred candidate is hired, and there is a sense that the referring employee is indebted to the hiring manager for "doing him or her a favor"; and special interests, such as a client referral, carry weight over merit.To ensure ethical standards, ongoing monitoring, including confidential employee feedback, of any referral system is required. Also consider making all referrals temporarily anonymous or limiting the levels of employees who can make referrals through the program. Focus on a candidate's merit, and highlight the reasons for the referral (e.g., experience, dependability, etc.) instead of focusing on the referrer. And be wary of any special favors being asked of HR that would circumvent normal hiring procedures.

Unethical use of social media. There are certainly legal risks in discovering and using protected-status information (e.g., age, ethnicity, or religion) against an applicant; there are also ethical concerns. At its most flagrant, unethical behaviors include recruiters' creating fake social media accounts to gain access to applicant profiles to mine private information about them and access their friends. Even when candidates are notified that you will be looking at their accounts and thus require them to provide social media passwords (not legal in some states), you've crossed a line into their private lives and accessed information that is not job-related and therefore should not be used against them. But what is seen cannot be unseen, so ethically—and legally—there are limits to using such information. Additionally, any information discovered on social media that cannot be independently verified lacks credibility and would be risky to use in a hiring decision. For example, a victim of identity theft may have no idea that a fake social media account in his or her name exists, nor that employers may be using it unfairly to assess his or her candidacy. To maintain ethical standards, consider limiting social media as a screening tool to positions requiring a social media presence or skills. At a minimum, conduct a risk-benefit analysis with your attorney to determine if such screening is advisable. If it is, create standardized assessments and use multiple raters. In all cases, verify the accuracy of any information found that could potentially be used against an applicant.

Conclusion

Several areas requiring further research have been discovered. Within the constructs of this review, and to grow the body of knowledge on this subject matter, it could be of significant importance to investigate properly and create a framework to define the role and value of ethical gatekeepers. Much of the literature selected for the study focuses on the importance of ethical acknowledgment and integrity to managers; however, based on the need to advance research in this field, deeper exploration into defining ethical gatekeepers seems prudent. Even though managers use tools for testing the ethical aptitude of job candidates that create a prediction for future ethical behavior, it appears that further testing of these

programs is still needed. Though human action and reaction can change from situation to situation, further exploration of this scale and other ethical testing tools could determine effectiveness and assist hiring managers in their search of ethical employees, should that become a corporate priority. Though only briefly mentioned, it would be of academic importance to explore how hiring practices directly impact the philosophical and sociological elements of Ethical Climate Theory - ECT (Martin & Cullen, 2006). Even as ethical business operations may be a good business practice, this does not mean that it will be profitable; in fact, ethical practices may not be profitable at all (Kline, 2012). As a matter of financial precedent, it would be important to research how ethical hiring affects organizational profitability, if at all. Along the same mindset, calculating the ethical awareness, growth, and operations in a firm before and after implementing an ethical hiring framework could be beneficial to organizational leaders. The common ethical dilemmas that HR professionals face during the recruiting process and how they can have their impact on the recruitment. The literature on the subject matter at the focus of this review is rich in information, but it has also opened the door to many areas that require further investigation. Proper and thorough research into these matters will grow the theoretical and practical understanding of how ethical hiring practices influence the many stakeholders of an organization, including leaders, customers, and society at large (Alder & Gilbert, 2006; Martin & Cullen, 2006).

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Role of Artificial Intelligence in Financial Trading

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Executive Summary

As technology develops, artificial intelligence (AI) techniques are being applied increasingly in the financial markets. A Systematic Literature Review (SLR) is performed using AI tools to examine financial trading approaches in this research work. Exploratory research is a preliminary investigation conducted to clarify concepts, gather insights, and identify patterns or relationships in a relatively uncharted area. When examining the role of Artificial Intelligence (AI) in financial trading, exploratory research helps in understanding the multifaceted impacts, challenges, and opportunities presented by AI technologies. AI techniques such as machine learning and deep learning have demonstrated their efficacy in forecasting price movements and optimizing trading strategies, offering significant advantages over traditional methods. Despite these advancements, challenges such as data quality, ethical considerations, and the need for real-time analysis persist. The literature highlights a gap in research, especially concerning developing markets and the incorporation of advanced AI models across various financial contexts. Future research should focus on these areas to harness AI's full potential in improving financial forecasting and trading strategies

Key words: Artificial Intelligence in Financial Trading, FinTech, AI-powered stock market prediction, Convolutional Neural Networks (CNNs), Support Vector Machines (SVM) for Financial Markets Prediction, Long Short-Term Memory Networks (LSTMs)

Introduction

Financial markets' time-variant, non-stationary, and non-linear characteristics make them a complex system. Additionally, they are susceptible to a range of factors, including global influence, political developments, and economic news (Leles et al, 2019). Artificial Intelligence (AI) techniques are now widely employed in financial markets, changing the way financial transactions are handled and enhancing the efficiency, security, and personalization of financial services. This is due to technological advancements and improvements. Financial technology, or FinTech, is a new frontier in finance that leverages technology not only for automated trading, investments, insurance, and risk management but also for innovation and long-standing market challenges (Gai et al, 2018).

In the financial industry, artificial intelligence has shown promise in areas including risk management, process automation, and customer service improvement. Using AI algorithms to analyze massive datasets and reduce risk, as well as automating repetitive processes and advanced analytics and natural language processing, can all lead to personalized consumer experiences. AI is also utilized in the banking sector, where it enhances fraud prevention protocols, enables offer customization, and democratizes access to banking services, especially in underserved areas. By enabling automated risk management, customized investment plans, and market forecasting, artificial intelligence (AI) is transforming the insurance and investing sectors (Ferreira et al, 2021).

Despite some progress, challenges persist in integrating AI into financial markets. The complex and ever-changing nature of economic indicators, the rapid processing of ultra-high frequency data, and the quality of data all present substantial hurdles. Additionally, the multidimensional aspect of financial markets means that even minor alterations to one element can greatly impact trading decisions and results (Dang, 2019).

Algorithmic trading that is enhanced by artificial intelligence (AI) has a significant impact on financial trading as it sifts through crucial data and provides cost-effective tools that are accessible to everyone, not just businesses.

AI investors, unlike human traders who are susceptible to emotions, are capable of making precise, reliable, and impartial decisions.

In the next phase, trading algorithms will incorporate Artificial Intelligence (AI), which will enable them to learn from thousands of past trading records. This is achieved through the use of machine learning algorithms that identify patterns in data and generate predictions.

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Therefore, AI algorithmic trading offers several advantages compared to traditional human algorithmic trading (Ta et al, 2018; Li et al, 2020).

Background of the Study

In financial trading, artificial intelligence (AI) has been having a profoundly disruptive impact on everything from analysis to execution. This influence's beginnings can be seen in the 1980s when early uses of machine learning—a fundamental AI technique—in quantitative trading methods appeared.

Here's a breakdown of the background of AI in financial trading:

- In the 1980s, machine learning algorithms were initially employed to create simple trading models that were able to examine data and spot patterns. This set the stage for future AI applications that are more complex.
- Technological Developments (1990s–2000s): The emergence of the internet and powerful computers fueled the creation of increasingly sophisticated AI algorithms. They were able to manage more information and spot more nuanced trends in financial markets as a result.
- The rise of algorithmic trading, which involves computer programs automating trade execution based on predetermined rules and models, was largely fueled by artificial intelligence (AI) in the 2000s. As a result, high-frequency trading (HFT) tactics that take advantage of transient market inefficiencies came into being.
- Concentrate on Wider Uses (2010s–present): AI's use in finance has grown beyond trading. These days, it's being used for things like
- **Risk Management:** AI methods are widely employed in financial trading for risk management. Artificial intelligence (AI) models are able to evaluate portfolio risk, spot possible market exposures, and instantly modify trading tactics to reduce hazards.
- **Fraud Detection:** AI systems are more accurate and efficient at spotting fraudulent activity in financial transactions.
- **Portfolio management:** AI-powered solutions help design and optimize investment portfolios according to the risk tolerance and goals of individual investors.
- **Present Situation:** AI is a quickly developing area of financial trade nowadays. Research keeps looking for new uses and refining those that already exist. Although AI provides substantial benefits, but there are also debates concerning the dangers and moral issues related to its application in financial markets, there are also discussions about potential risks and ethical considerations surrounding its use in financial markets.

Statement of the Problem

To create a predictive model for high-frequency stock market trading, corporations are using artificial intelligence approaches. Accurately predicting the short-term price fluctuations of certain stocks using historical data, sentiment analysis of news, and real-time market indicators is the goal. In a turbulent and cutthroat financial market environment, the model should make use of machine learning algorithms to maximize returns, limit risks, and optimize trading tactics. (Li et al ,2016)

- **A large number of data**: News stories, sentiment on social media, and real-time market movements are just a few of the data produced by financial markets.
- **Quick data analysis**: To take advantage of opportunities, this data must be examined rapidly and effectively to spot trends and patterns.
- **Human limitations**: People find it difficult to make objective trading judgments free from emotional influence and to evaluate enormous volumes of data in real-time.
- **Ethical and Regulatory Considerations**: The use of AI in financial markets brings up ethical and regulatory questions about accountability, equity, and transparency. Concerns about possible market manipulation and the effect on jobs in the financial industry are examples of ethical problems.
- **Bias and Fairness**: AI systems may unintentionally pick up biases from prior data, which could result in unjust outcomes or exacerbate already-existing market disparities. One of the biggest challenges in AI-driven trading is addressing prejudice and guaranteeing fairness.

Objectives of the Study

- **Examine Machine Learning Techniques**: Determine how well different machine learning techniques, including support vector machines and neural networks, anticipate financial markets and how they might be used in quantitative trading strategies (Henrique et al., 2019).
- **Determine Important Forecasting Indicators:** Examine how ensemble models and technical indicators affect stock market forecasts and contrast their results with more conventional forecasting techniques (Bustos & Pomares-Quimbaya, 2020).
- Identify gaps in the present research landscape by classifying the different uses of AI in finance into several groups, such as portfolio optimization, financial sentiment analysis, and AI-driven market predictions (Ferreira et al., 2021).
- **Examine Deep Learning Methods:** Examine how deep learning methods, such as Convolutional Neural Networks (CNN) and Long Short-Term Memory (LSTM)
- Networks, are used in stock market analysis and how they affect trading tactics (Li & Bastos, 2020)
- **Emphasize Potential Research Areas:** Determine which areas of the application of AI to financial markets require more investigation, especially when it comes to emerging nations and the employment of sophisticated models in a range of market scenarios (Henrique et al, 2019).

Literature Review

Survey articles on AI in financial trading were examined as the initial stage of the systematic review. Only surveys that examine artificial intelligence in financial markets are Numerous surveys have been carried out on AI in financial trading. Li et al. (2016), for example, give a pilot survey on machine learning for quantitative trading. The writers approached pricing patterns, forecasting, and portfolio selection among other aspects of quantitative trading. Furthermore, the following methods are employed to classify the stock market price prediction: wavelet analysis, neural networks, support vector machines, and text mining for portfolio selection learning.

Henrique et al (2019) provided a bibliographic analysis highlighting machine-learning approaches for forecasting financial market values. The most widely used models in price forecasting, according to the authors' analysis of 57 articles, are neural networks and support vector machines. The authors claim that there is still need for research on this topic and that using data from developing countries is an opportunity.

Numerous research and studies on the stock market have been conducted. For instance, a thorough assessment of stock market trend prediction was conducted by (Bustos & Pomares Quimbaya, 2020). From 2014 to 2018, the forecasting techniques are categorized, described, and contrasted. Their research and analysis demonstrate the importance of technical indicators for market projection. Moreover, forecasts from ensemble models are very predictive. Surprisingly, they assert that traditional methods still outperformed deep learning models, maybe because of insufficient datasets. Another review of works examining AI in stock market trading from 1995 to 2019 is provided by Ferreira et al, (2021).

The authors categorized AI applications in the stock market into four groups: financial sentiment analysis, portfolio optimization, AI-powered stock market prediction, and combinations of two or more approaches. Ajiga et al, (2024) conducted another study with a stock market focus. However, the authors' study considers two common machine learning techniques: Artificial Neural Networks (ANN) and Support Vector Machine (SVM). Numerous other research, including the ones below (Li et al., 2020) highlight the relationship between AI and the stock market.

Deep learning and deep reinforcement learning approaches were applied in trading in another section of the survey. For instance, Millea (2021) gave a succinct synopsis of DRL uses in cryptocurrency markets. The author claims that the convolutional neural network is the most widely used model and that the Sharpe ratio is frequently utilized as a performance metric.

On the other hand, a comprehensive literature review of deep learning and technical analysis in the stock market was conducted by (Li and Bastos, 2020). Four areas are the focus of their methodical study: trading strategy, price forecasting approach, profit evaluation and metrics, and risk management. Their research indicates that the LSTM method is most frequently used. Particularly in the stock market, deep learning has rapidly become a powerful method for predicting and forecasting volatile financial markets around the globe. The authors Ketsetsis et al, (2020) offered a systematic evaluation analyzing the deep learning approaches in the European stock market with a focus on the European Union stock market.

Research methodology

Research Design

Type of Research: Exploratory Research

Exploratory research is a preliminary investigation conducted to clarify concepts, gather insights, and identify patterns or relationships in a relatively uncharted area. When examining the role of Artificial Intelligence (AI) in financial trading, exploratory research helps in understanding the multifaceted impacts, challenges, and opportunities presented by AI technologies.

Data Source

The primary sources of secondary data included in the study are financial reports, published research publications, historical data from financial databases, and pertinent literature on trading algorithms and machine learning models.

Limitations of Study

- **Restricted Data Scope**: A lot of research, like that done by Henrique et al, (2019), ignores emerging economies in favor of developed markets. This restricts the findings' applicability in many economic circumstances.
- **Outdated Methodologies:** Some assessments, such as those by Bustos and PomaresQuimbaya (2020), place a strong emphasis on conventional approaches that do not take into account the most recent developments in machine learning, which could undervalue the efficacy of contemporary strategies.
- **Inadequate Dataset Quality:** Studies like Ferreira et al.'s (2021) show that there are issues with dataset quality, especially in deep learning applications where biased or limited datasets can distort results and produce inaccurate predictions.
- **Focus on Specific Models**: As Ajiga et al, (2024) point out, a lot of studies focus on a limited number of models (such as ANN and SVM), which may leave out other potential algorithms and trading-related AI techniques.
- **Lack of Comprehensive Performance Measures:** Although research on performance measures is covered in studies such as those by (Millea, 2021), comparisons are challenging due to the frequent absence of uniform evaluation frameworks across various investigations.

Data Analysis

Examine Machine Learning Techniques

- **Support Vector Machines (SVM) for Financial Markets Prediction:** SVMs are popular in financial forecasting due to their ability to handle high-dimensional data and their effectiveness in both regression and classification tasks. One of the key reasons they are well-suited for market prediction is that they can classify non-linear relationships in financial data, which is crucial given the complexity of markets. By creating a decision boundary (hyperplane) that separates classes of data, SVMs identify patterns that may not be immediately apparent in financial time series data. These capabilities make them useful in predicting stock price movements, detecting anomalies, and constructing trading strategies based on historical data. (Li et al, 2016; Henrique et al, 2019).
- **Neural Networks in Quantitative Trading:** Neural networks, especially deep learning models like LSTM (Long Short-Term Memory) networks, have been increasingly applied to financial predictions. Their strength lies in capturing temporal dependencies and nonlinear relationships in market data. This is especially valuable for tasks like volatility forecasting, stock trend prediction, and portfolio management. In a quantitative trading context, neural networks are trained on historical market data to forecast future price movements or optimize asset allocations, which can inform buy or sell signals. (Li et al, 2016; Henrique et al, 2019).
- **Comparison and Use in Quantitative Trading:** The choice between SVMs and neural networks depends on several factors such as the complexity of the data and the specific financial task. Neural networks often outperform SVMs in handling large datasets with intricate patterns due to their ability to learn from vast amounts of data. However, SVMs can be more effective when the dataset is smaller or less complex. In quantitative trading strategies, both techniques can be combined with other AI and machine learning tools, such as sentiment analysis, to enhance decision-making and automate trading systems. (Li et al, 2016; Henrique et al, 2019).

Determine Important Forecasting Indicators

Bustos and Pomares-Quimbaya (2020) stress that when combined with technical indicators like SMA, MACD, and RSI, Random Forest outperforms traditional techniques, generating more reliable stock market predictions. This combination allows for a comprehensive understanding of market behavior, surpassing older forecasting models. (Li et al. 2016; Pomares-Quimbaya, 2020).

Identifying Gaps in The Current Research Landscape

To address the question of identifying gaps in the current research landscape by categorizing different uses of AI in finance (e.g., portfolio optimization, financial sentiment analysis, AI-driven market predictions), the document provides the following breakdown. (Li et al, 2016; Fischer & Krauss, 2018)

Portfolio Optimization: AI models, particularly neural networks and machine learning algorithms are used in portfolio selection strategies. These systems help to replicate stock index performance and optimize portfolios. Techniques like deep learning (e.g., deep neural networks and clustering algorithms) are frequently applied to reduce risk and improve asset allocation. **For example**, the asymmetric copula method is used for portfolio optimization (Li et al, 2016; Fischer & Krauss, 2018)

Financial Sentiment Analysis: Investor sentiment analysis has become crucial in stock market prediction. AI-driven techniques such as natural language processing (NLP) and data mining are used to extract investor sentiment from social media and news platforms. This information can predict stock returns and market movements based on public sentiment (Li et al, 2016; Fischer & Krauss, 2018)

AI-driven Market Predictions: AI is extensively used for forecasting market performance and volatility. AI models like Long Short-Term Memory Networks (LSTM), Convolutional Neural Networks (CNN), and advanced neural networks provide strong predictive capabilities for stock prices, volatility, and even cryptocurrency portfolios. These methods outperform traditional models in terms of accuracy (Li et al, 2016; Fischer & Krauss, 2018)

Examine Deep Learning Methods

Deep learning methods such as Convolutional Neural Networks (CNNs) and Long Short-Term Memory (LSTM) networks are increasingly utilized in stock market analysis due to their ability to capture complex patterns in data. (Li & Bastos, 2020).

Convolutional Neural Networks (CNNs): While the document does not detail CNNs specifically, it discusses the broader category of neural networks being used for stock price prediction, emphasizing their effectiveness in modeling the non-linear relationships in financial data. (Li & Bastos, 2020).

Long Short-Term Memory Networks (LSTMs): According to Zhang et al. (2022), LSTMs outperform classical Artificial Neural Networks (ANNs) regarding prediction accuracy and time efficiency, particularly when various proxies of online investor attention, like internet search volume, are taken into account. The application of these deep learning methods affects trading tactics by enabling the development of intelligent automated trading systems. These systems analyze historical stock price data to suggest the best-performing assets and inform trading positions (long or short) while managing associated risks (Li & Bastos, 2020).

Emphasize Potential Research Areas

In terms of emphasizing potential research areas in AI applications for financial markets, especially focusing on emerging nations and sophisticated models in different market scenarios, the research highlights several areas that require more exploration. Based on the detailed review in the document you provided, the following key areas for further investigation can be identified. (Henrique et al, 2019).

- **AI Adoption in Emerging Markets:** While AI applications in finance have gained considerable attention in developed markets, emerging nations remain underexplored.
- Research in AI's ability to handle unique challenges faced by emerging markets is crucial. These challenges include dealing with low data quality, regulatory uncertainties, and different market volatility patterns. There is a need for AI models tailored to the socioeconomic context of emerging economies to ensure better market predictability and financial inclusiveness. Investigating AI's role in increasing financial accessibility, improving credit scoring, and enabling microfinance in underdeveloped regions could also provide impactful insights. (Henrique et al, 2019).

- **Application of Sophisticated Models in Varied Market Scenarios:** Advanced AI techniques such as deep reinforcement learning, generative adversarial networks (GANs), and hybrid models are under-researched in less-studied market conditions. While these models have been widely tested in stable and liquid financial markets, they need to be tested in different financial scenarios, such as high-volatility or low-liquidity markets that are typical in emerging economies. Future research should focus on how these sophisticated models can adapt to diverse and unstable financial ecosystems while managing risks. (Henrique et al, 2019).
- **Ethics, Regulation, and Governance:** Another essential research area revolves around the ethical use of AI in financial markets, especially in regions with weaker regulatory oversight. As AI models become more ingrained in trading and financial decision-making, ensuring transparency, fairness, and accountability becomes paramount. Research into how regulatory frameworks can keep pace with AI innovation, preventing market manipulation or algorithmic bias, is essential. This is especially critical in markets where there is a lack of robust regulatory mechanisms. (Henrique et al, 2019).

Findings

- **Overview of AI Techniques:** A pilot study on the use of machine learning in quantitative trading was carried out by (Li et al, 2016). It covered crucial topics such as predicting, price trends, and portfolio selection. They emphasized techniques like text mining, support vector machines (SVM), neural networks, and wavelet analysis.
- **Dominance of Neural Networks and SVMs:** After examining 57 papers, Henrique et al (2019) determined that neural networks and SVMs were the most widely used models for financial forecasting. They underlined the necessity of more study, especially about data from emerging nations.
- **The Significance of Technical Indicators:** This was emphasized by Bustos and Pomares-Quimbaya (2020), who noted that these indications are essential for stock market forecasting. According to their findings, ensemble models did well, however, because of insufficient datasets, traditional forecasting techniques occasionally beat deep learning models.
- **Categorization of AI Application:** Financial sentiment analysis, portfolio optimization, AI-driven stock predictions, and hybrid techniques are the four primary categories into which Ferreira et al (2021) divided AI applications in the finance industry
- **Techniques for Deep Learning:** Millea (2021) talked about how deep reinforcement learning (DRL) is common in Bitcoin markets and mentioned the convolutional neural network as a popular model. In their 2020 study, Li & Bastos (2020), highlighted the usefulness of LSTM networks for risk management and trading strategy.

Research Gaps:

According to the review, there are important gaps in the use of AI in less-studied markets, and filling them could result in better financial forecasting techniques, (Millea, 2021)

Conclusion

The integration of Artificial Intelligence (AI) in financial trading has revolutionized the landscape by enhancing decision-making processes through sophisticated algorithms and data analytics. AI techniques such as machine learning and deep learning have demonstrated their efficacy in forecasting price movements and optimizing trading strategies, offering significant advantages over traditional methods. Notably, neural networks and support vector machines have emerged as dominant models, particularly for complex, non-linear market behaviours. Despite these advancements, challenges such as data quality, ethical considerations, and the need for real-time analysis persist. The literature highlights a gap in research, especially concerning developing markets and the incorporation of advanced AI models across various financial contexts. Future research should focus on these areas to harness AI's full potential in improving financial forecasting and trading strategies.

Recommendations

- Regulatory oversight
- addressing bias in AI models
- integrating AI with human oversight, and investing in AI development and training
- Include Data from Industry Experts and Broaden the Range of Financial Assets
- Diversify your data sources
- incorporate data in real-time □ consider regulatory and ethical papers.

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Exploring IT Stock Movements: A Technical Analysis Perspective

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Abstract

This study explores the application of technical analysis in evaluating the price movements of IT sector stocks, focusing on key indicators such as Exponential Moving Averages (EMA) and the Relative Strength Index (RSI). The research aims to identify historical price trends, determine support and resistance levels, and analyze stock performance using technical indicators. The study is based on secondary data sourced from the National Stock Exchange (NSE) and financial platforms, examining a sample of 10 IT stocks over a 10-month period. Findings indicate that EMA and RSI can serve as effective tools for recognizing trading opportunities and market trends, though their predictive accuracy is influenced by market volatility and external factors. The study emphasizes the importance of integrating technical analysis with fundamental insights for more comprehensive investment decisions in the fast-paced IT sector.

Keywords: Technical Analysis, Exponential Moving Average, Relative Strength Index, Market Trends, Price Movements

Introduction of the Topic

Overview of technical analysis

Technical analysis serves as a cornerstone methodology for investors and traders aiming to decipher the complexities of financial markets and forecast future price movements (Baz et al., 2013). Unlike fundamental analysis, which delves into the intrinsic value of an asset by scrutinizing macroeconomic factors and company-specific financials, technical analysis adopts a contrasting approach by primarily examining historical market data, encompassing price and volume, to discern patterns and trends (Yang et al., 2022; Zheng & He, 2021). The underlying premise of technical analysis posits that all known information, including market sentiment and expectations, is already reflected in the price of an asset, rendering the study of price action a direct pathway to understanding future market behaviour (Pathak, 2020).

Technical analysis can be used on a wide range of financial instruments, such as stocks, bonds, commodities, and currencies. Technical analysis is a vital tool for traders and investors seeking to maximize profits and reduce risk when it comes to stock analysis, especially in the fast-paced and rapidly expanding field of information technology (IT).

The IT Industry: A Rapidly Expanding Sector

The term "Information Technology" (IT) refers to a broad category of businesses and sectors that deal with hardware, software, telecommunications, and computing technologies. Thanks to advancements in cloud computing, artificial intelligence, cybersecurity, e-commerce, and mobile technologies, information technology has emerged as one of the most significant industries in the world in recent decades. In addition to being some of the biggest publicly traded companies in the world, software giants like Wipro, Infosys, TCS, and Oracle Financial Services Software Ltd. have significantly boosted the expansion of the global economy.

Crucial Components of IT Stock Technical Analysis

Investors mostly use a variety of charts and indicators to conduct technical analysis on IT equities. By displaying past price movements, these charts offer visual patterns that can be used to forecast future price behavior. The following are some of the most often utilized components in technical analysis for IT stocks:

- **Price Charts and Trendlines**; Technical analysis is based on price charts that illustrate how an asset moves over time. A stock's movement over a specified period of time is visually represented by these charts, which include line, bar, and candlestick charts. To help identify uptrends (bull markets) or downtrends (bear markets), trendlines are drawn across these charts to show the overall direction of a stock's movement.

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- **Levels of Support and Resistance**: Support is the price at which a stock typically attracts purchasing interest, leading to an upward price rebound. The opposite is resistance, which is a price level at which selling pressure usually appears and drives down the price of a stock. Since support and resistance levels serve as psychological barriers for traders and investors, determining them is essential to comprehending possible market reversals.
- **Moving Averages (MA):** These are mathematical computations that are used to identify patterns and smooth out pricing data. The two most popular kinds are the Simple Moving Average (SMA) and the Exponential Moving Average (EMA). A moving average can be used to identify a stock's general direction and eliminate daily price swings that could mask the broader trend.
- **Volume Analysis**: The quantity of shares exchanged during a specific time frame is referred to as volume. Volume is crucial for verifying trends in technical analysis. While a decline in volume could indicate a waning trend or possible reversal, an increase in volume during an uptrend is regarded as evidence of the strength of the price movement.
- **Technical Indicators**: A variety of technical indicators are employed to evaluate market conditions, possible entry and exit points, and trend strength. Typical indications consist of:
- **Relative Strength Index (RSI)**: A momentum oscillator that gauges the rate and direction of price changes to determine if a stock is overbought or oversold is the relative strength index, or RSI.
- **Moving Average Convergence Divergence (MACD)**: A trend-following momentum indicator that illustrates the correlation between two stock price moving averages is frequently used to spot possible buy or sell signals.
- **Bollinger Bands**: A volatility indicator that helps detect possible overbought or oversold situations by forming upper and lower bands around a moving average using standard deviations.

EMA Timeframes: A Comprehensive Guide

Compared to the Simple Moving Average (SMA), the Exponential Moving Average (EMA) is a sort of moving average that gives more weight to recent price data, making it more responsive to new price moves. In technical analysis, EMAs are frequently used to detect trends, anticipate possible reversals, and even out price swings. The EMA gives priority to recent prices, which makes it more appropriate for traders seeking faster reactions to market moves than the SMA, which gives equal weight to all price points within the selected period.

- **Short-Term EMAs:** Traders that wish to profit from rapid price movements within a day or even minutes usually employ them. These traders depend on EMAs that react quickly to price movements because they want to profit from short-term price swings.
- **5-period EMA**: The 5-period EMA is one of the fastest-reacting EMAs. It tracks very short-term price movements and is useful for traders who want to react quickly to the smallest market fluctuations. It's often used in very short time frames, like 1-minute or 5-minute charts, and can be beneficial for intraday traders and scalpers.
- **Purpose of Short-Term EMAs**: These EMAs are especially useful for fast- paced traders who aim to catch smaller market movements. They can signal potential buy or sell points quickly but are more prone to noise, requiring traders to use them carefully to avoid false signals.

Medium-Term EMAs: Medium-term EMAs are ideal for traders who hold positions for a few days or weeks. These EMAs balance responsiveness with trend confirmation, providing a smoother picture of the market's movement without reacting to every small fluctuation.

50-period EMA: The 50-period EMA is a widely followed indicator for identifying the medium- to long-term trend of an asset. It's slower than the 20-period or 26-period EMAs, making it ideal for traders and investors who prefer smoother signals and less frequent crossovers. It's especially useful for trend-following strategies where the goal is to capture moves over weeks or months.

Purpose of Medium-Term EMAs: Medium-term EMAs help traders identify longer trends while filtering out the noise from very short-term fluctuations. They are useful for swing traders who look to profit from market moves that occur over several days or weeks.

Long-Term EMA These are most commonly used by position traders or investors with a longer investment horizon. These EMAs respond more slowly to price changes and are typically used to confirm the overall direction of the market or the long-term trend of an asset.

200-period EMA: The 200-period EMA is one of the most popular long- term moving averages in technical analysis. It is considered a key level for identifying whether the market is in a long-term uptrend or downtrend. If the price is above the 200-period EMA, it suggests a bullish market, and if the price is below it, it suggests a bearish market. The 200-period EMA is often used by investors and traders who take longer-term positions, ranging from weeks to months.

Purpose of Long-Term EMAs: These EMAs help investors and traders understand the overall long-term trend of an asset. They are useful for identifying strong, sustained trends and are often used to confirm whether the price is in a bull or bear market,

Importance of Exponential Moving a Averages (EMA) in Technical Analysis

- Trend Identification: EMAs are effective tools for identifying the prevailing trend in the market. By smoothing out price data, they help traders clearly distinguish whether an asset is in an uptrend, downtrend, or sideways market. A price above an EMA typically indicates an uptrend, while a price below an EMA suggests a downtrend
- Dynamic Support and Resistance Levels: EMAs can act as dynamic support or resistance levels. In an uptrend, the price may find support at the EMA, and in a downtrend, the price may encounter resistance at the EMA. Traders use this dynamic nature to identify potential entry or exit points.
- Widely Accepted and Respected Indicator: EMAs are one of the most popular and widely used indicators in technical analysis, making them reliable tools that are respected by other traders. Their widespread use ensures that many market participants react to the same signals, reinforcing their effectiveness

The Relative Strength Index (RSI) Indicator

The Relative Strength Index (RSI) is a momentum oscillator that measures the speed and change of price movements. Developed by J. Welles Wilder in 1978, the RSI is used to identify overbought or oversold conditions in a market, helping traders assess the strength or weakness of an asset's price trend. The indicator ranges from 0 to 100 and is typically plotted beneath a price chart, providing visual signals for potential market reversals or continuation of trends.

RSI Interpretation

- **RSI > 70 (Overbought Condition)**: When the RSI exceeds 70, it suggests that the asset might be overbought and could experience a price correction or reversal. Traders may look for signals indicating that the trend is losing strength.
- **RSI < 30 (Oversold Condition)**: When the RSI drops below 30, it suggests that the asset might be oversold and could experience a potential reversal to the upside. This could be an opportunity for long positions in a reversal setup.
- **RSI Divergence**: Divergence occurs when the price of an asset moves in the opposite direction of the RSI. For example, if the price is making new highs but the RSI is not, it could indicate weakening momentum and a potential trend reversal.

Literature Review

C. Boobalan (2014) The research paper focuses on Forecasting Future Price movements and Investment Decision Support. The study describes the existing facts and figures related to the financial statements and price movements of the companies' securities. It involves analyzing and interpreting data to predict future price movements based on historical behavior. It highlights the importance of technical analysis as a key tool for predicting stock price movements and guiding investment decisions. By analyzing five Indian companies using the technical tools, the research demonstrates how these techniques help investors identify trends and make informed buy or sell decisions. However, the scholar acknowledges limitations, emphasizing the need for combining technical and fundamental analysis for more investment insights. The conclusion highlight the value of technical analysis in stock market investments while advocating for a balanced approach that incorporates fundamental insights for robust decision-making.

P.Venkatesh, et al.,(17.06.2021) This study's main objective is to perform a technical analysis of a few chosen steel industry companies to evaluate their price behavior, pinpoint significant market turning points, and ascertain the best periods to purchase or sell these stocks. Out of the 46 steel businesses that were picked based on their market capitalization, five large cap companies make up the sample. The technique of statistical random sampling has been applied. Newspapers, publications, company websites, and the NSE website are the sources of the data. To assess stock price changes in the Indian steel industry, the research technique for this paper combines technical analysis tools with secondary data analysis. To help investors make well-informed judgments about their portfolio strategies, the study intends to offer practical insights into the stock behavior of large-cap steel companies listed on the NSE through the use of

candlestick charts, SMA, ROC, and RSI. The researcher's viewpoint on this study could highlight several important elements about the methodology, conclusions, and possible contributions of the research to the field of financial analysis. They investigated the ways in which different technical indicators can help investors make well- informed choices about the purchase and sale of equities.

Kamal Nain Chopra (Sept. 2014) The study aims to comprehend the underlying principles of these optical phenomena and investigate their potential applications in fields such as medicine, energy production, and imaging technology improvement..

Madhura Ranade (2020) In order to predict market trends and make well- informed trading decisions, the research attempts to identify the best possible combination of technical indicators. Five distinct industries—banking and finance, IT, FMCG, pharmaceutical, and auto—were used to choose the stocks. Technical indicators include included moving averages, RSI, trend lines, and Bollinger Bands. Finding and validating the best technical analysis techniques for forecasting stock price movements and trading decisions was the goal of the study work. In terms of producing precise buy and sell signals for the chosen stocks over a six-month period, the study compares the efficacy of several indicators and finds that Bollinger Bands are the most dependable instrument, followed by RSI and Williams %R.

Ashok Bantwa & Faizan Ulhaqq Ansari (2019) With an emphasis on which firms offer the best return and risk mix, as well as how these companies compare in terms of market sensitivity and volatility, the study seeks to shed light on the investing potential of these IT equities. According to the researcher, NIIT Technologies, Tata Elxsi, and Infibeam Avenues have produced the highest rates of return. This suggests that they perform exceptionally well and are riskier than others. The two companies with the highest risk- adjusted returns are Mindtree and Tech Mahindra. For the amount of risk return, these businesses have been able to deliver comparatively high returns. All of the chosen firms' stock beta values vary greatly. However, there are no appreciable differences in the standard deviation, expected return by CAPM, absolute return of stock, or alpha value of stock for any of the chosen companies. The scholars would stress that while selecting equities from this group, investors should take into account both the prospective return and the accompanying risk.

Pravin Chowdary (2018) uses monthly stock returns for five public sector companies listed on the Bombay stock exchange from January to December 2017 to analyze technical analysis for the Indian stock market. The effect of market indexes on top PSUs is presented in this study. For a given year, just one PSU (NTPC) is unaffected by market indices. It provides deeper understanding of the effects of PSUs and BSE Indices in India.

Vinit Chitte (2019) The study focuses on applying technical analysis to examine the price trends and movements of a few Indian corporate stocks as well as the BSE SENSEX during the post-reform era. Technical analysis tools and indicators include BSE SENSEX charts and 30 reputable companies listed on the BSE that have been selected for analysis. According to the study, technical analysis is still a useful method for figuring out market mood and price patterns. The Indian securities market has had both quantitative and qualitative advances in the post-reform era, mostly due to the economic changes of 1991.The study also highlights the importance of exercising caution and recommends that technical analysis be used in conjunction with other techniques to get more precise forecasts and well- informed investing choices. According to the study's findings, the Indian securities market has grown significantly since the 1991 economic reforms, and the market's qualitative and quantitative development has been significantly influenced by these changes. Despite its subjectivity, technical analysis is still a valuable tool for assessing investor sentiment and market trends, which helps with decision-making in the Indian stock market. Future research, according to the scholars, should examine how to better combine it with other analytical techniques while accounting for investor psychology and market dynamics.

Thomas, A. E. (2014) This study's objective is to assess technical analysis from an Indian viewpoint and determine its applicability in the Indian stock market. Understanding the role of technical analysis, its applicability in the Indian stock market, comparison with other approaches, market conditions, and its usefulness for Indian investors are likely to be the main areas of focus for this study. Technical analysis is important in the Indian capital markets, particularly given the substantial changes the market has experienced in recent decades.. Since the financial sector reforms in 1992, India has become a world-class financial center thanks to the growth of a more open, effective, and globally competitive market infrastructure. Technological innovations that have improved accessibility and efficiency, like the dematerialization of shares and shorter trading cycles (T+2), have been welcomed by the Indian stock market.

Raval, V. H. & Vyas, K. (2013) Investigating the agreement and correlation between the two different investment styles—Technical Analysis and Fundamental Analysis—in the stock selection process is the primary goal of this study. The study's specific goal is to evaluate the stock selection processes of investors who employ these various strategies (or a mix of the two), especially when it comes to Nifty stocks. The research aims to investigate whether these two approaches—often seen as independent of one another—produce comparable or dissimilar stock picks by enlisting fifty investor participants from cities like Vapi, Valsad, Vadodara, and Ahmedabad.. Using technical analysis, which stresses price movements and market activity, and fundamental analysis, which focuses on the inherent worth of companies based on financial fundamentals, the study also looks at how much agreement there is among investors.

Pati, B. & Kadam, M. (2022) The main focus of this study is to analyze the strategic decision-making process for buying and selling growth-oriented stocks using two widely preferred technical indicators: Bollinger Bands and Momentum. The study aims to explore how these indicators, when used simultaneously, can improve the accuracy of investment decisions for growth stocks. Specifically, the research will focus on understanding how the combination of these two technical tools can help investors identify favorable market conditions for growth stocks, particularly in terms of their performance during different market trends (bullish vs. bearish). By examining the effectiveness of Bollinger Bands, which measure price volatility and help identify overbought or oversold conditions, alongside Momentum, which gauges the strength of price movements, the study aims to provide a more refined approach to stock selection and timing of trades for growth-oriented stocks.

Gala, D. M., Patil, B. V. & Kanthe, R. U. (2023) The focus of this abstract is to explore the use of Long Short-Term Memory (LSTM) machine learning techniques for stock market prediction and trading strategy development. The study aims to address the limitations of traditional trading methods—such as trend, breakout, and momentum indicators—by introducing LSTM models to predict future stock prices and optimize trading strategies in volatile market conditions. The researcher is experimenting with LSTM to predict the average price of selected stocks and comparing its performance with existing techniques like the Relative Strength Index (RSI) and the Moving Average Convergence Divergence (MACD) approach. The goal is to identify the strengths and weaknesses of different machine learning-based trading strategies and develop a more effective strategy that overcomes the shortcomings of current methods.

Rai, A., (2022) The focus of this abstract is to compare and evaluate the performance of various prediction models for stock prices listed on the National Stock Exchange (NSE) of India. The authors have applied different analytical and machine learning techniques—specifically, the Moving Average, Linear Regression, K-nearest Neighbors (KNN), and Long Short Term Memory (LSTM) models—to predict stock prices of Tata Steel, Bank of Baroda, and Tata Consultancy Services (TCS). The paper aims to explore the effectiveness of these models by comparing their performance based on Root Mean Square Error (RMSE) values, which measure the accuracy of each model's predictions. The goal is to determine which model provides the most accurate stock price predictions and to understand the impact of various parameters on prediction accuracy.

Manoharan, M. & Mamilla, D. R. (2020) The main focus of this study is to test the predictability and profitability of various bullish reversal candlestick patterns in combination with a stop loss strategy on 17 stocks from India's NIFTY 50 index over a 16- year period (2000 to 2015). The study uses backtesting methodology to identify the top 10 most frequently occurring candlestick patterns during the study period. It then analyzes the profitability of these patterns using performance metrics such as the Sharpe and Sortino ratios for a 10-day holding period. The study specifically finds that Harami and strong-line candlestick patterns are among the most profitable in terms of stock-specific returns.

Animesh Upreti, et.al., (2022) The main focus of this study is to evaluate the effectiveness of candlestick patterns in predicting market trends within the Indian stock market. It aims to explore how these patterns, which are fundamental to Technical Analysis, can be used to make more informed trading decisions. Given the complexities of market noise and the semi-strong efficiency of stock markets, accurately identifying valuable patterns is a challenging task for analysts. This study will involve an in-depth analysis of real-world market data from large-cap Indian equities, using deep learning techniques to train neural networks for recognizing candlestick patterns. The goal is to determine how these patterns can assist in forecasting stock movements and enhance trading strategies.

Objective

- To analyze Historical Price trends and patterns of IT stocks
- To demonstrate methods to identify trends (uptrends, downtrends, sideways movements) in IT stock charts.
- To identify support and resistance levels for each stock in the IT sector
- To apply technical indicators (EMA, RSI) for predicting IT stocks price movements

Research Methodology

The nature of this study is empirical. A class of research techniques known as empirical research methods involves gathering data. The study is a methodical, scientific investigation of the managerial aspects, including the process of problem identification, data gathering, analysis, and interpretation.

Research Design

The secondary source has been used to gather the data. Data from various journals, manuals, and research papers that have already been published and are accessible on websites and in printed sources are included in secondary data collection methods. The Information Technology Industry is one of the leading sectors in India, sharing 9.3% of the country's GDP, making it is one of the biggest sectors contributing to India's economic growth. IT stocks offers potential rewards. This includes consistent revenue growth, innovation, global exposure, and attractive dividends from well-established companies.

Sampling design

Sample size

10 stocks from NSE Nifty-50 for the period of 10 months i.e., March 2024 to December 2024.

Sampling method

Purposive sampling is the method of sampling that is implemented. Judgmental, selective, or subjective sampling are other names for the purposeful sampling. It resembles non- probability sampling in some ways.

Data sources

The sources of secondary data for this analysis include the National Stock Exchange of India Ltd (NSE), Investing.com, stock screeners, and Moneycontrol. The information is primarily gathered from the official website of the National Stock Exchange (NSE). Additionally, charts of IT stocks are obtained from Investing.com, while the selection of top-performing IT stocks is based on data from the MoneyWorks4Me website.

Data Analysis Tools

- **Candlestick Chart:** Japanese candlestick charts form the basis of the oldest form of technical analysis. Candlestick charts provide the information viz.. open price. High price, low price, and Close price, however. Candlestick charting provides a visual indication of market psychology, market sentiment, and potential weakness, making it a rather valuable trading tool.
- **Technical Indicators:** Technical indicators are mathematical formulas that clearly flash either buy or sell signals when applied to security prices. Price data includes any combination of the open, high, low, or close over some time and most of the indicators use only the closing prices. For analysis purposes, technical indicators are usually shown in a graphical form above or below a security's price chart. Once shown in graphical form, an indicator can then be compared with the corresponding price chart of the security.
- **Moving Averages:** Most chart patterns show a lot of variation in price movement. This can make it difficult for traders to get an idea of a security's overall trend. One simple method traders use to combat this is to apply moving averages. A moving average is the average price of a security over a set amount of time. They smooth a data series and made it easier to spot trends, something that is especially helpful in volatile markets.

Limitations of the Study

- Historical data: Technical analysis is based on historical data, which may not be indicative of future performance.
- Market volatility: Market conditions can change rapidly, which can invalidate technical analysis signals.
- Limited scope: This study only considers two technical indicators, and other factors, such as fundamental analysis, should also be considered when making investment decisions.

Analysis and Interpretation

Fig. 1.1 : Tata Consultancy Services Ltd.

Interpretation

EMA: A possible downtrend is indicated by the 5 EMA's present position below the 200 EMA. Additionally, the price is below the 5 EMA, indicating negative momentum. One important support level is the 200 EMA, a long-term moving average. The downtrend is confirmed by the price's present position below the 200 EMA. At the moment, the RSI is in the oversold zone at 32.81. This implies that the stock is oversold and may be about to rise again. A declining trend in the RSI suggests waning bullish momentum.

Support: A solid support level is the 200 EMA at 4126.07. Furthermore, the price has already found support near the 4200 level. Resistance: Several times, the price has encountered resistance at the 4400 mark. The price may indicate a possible trend change if it breaks above this level. The stock looks to be in a downward trend based on the chart pattern and current technical indicators. The RSI is going lower, and the price is below the 200 and 5 EMAs. The oversold RSI, however, indicates that a recovery may be feasible.

Fig. 1.2 : Infosys Ltd.

Interpretation

The 5 EMA is above the 200 EMA at the moment, suggesting an upward trend. Additionally, the price is above the 5-EMA, indicating bullish momentum. One important support level is the 200 EMA, a long-term moving average. The price has continuously remained above the 200 EMA, indicating that the trend is upward. Right now, the RSI is in the neutral zone at 40.95. According to this, the stock is neither oversold nor overbought.

The rising trend of the RSI suggests growing positive momentum. Support:

A solid support level is the 200 EMA at 1744.46. Furthermore, the price has previously found support near the 1800 level.

Resistance: On several occasions, the price has encountered resistance at the 1900 level. The price may indicate more upside potential if it breaks above this level.

□ The stock looks to be in an uptrend based on the chart pattern and current technical indicators.

The RSI is going upward, and the price is above the 200 and 5 EMAs.

Fig. 1.3 : HCL Technologies Ltd.

Interpretation

The 5 EMA is above the 200 EMA at the moment, suggesting an upward trend. Additionally, the price is above the 5-EMA, indicating bullish momentum. One important support level is the 200 EMA, a long-term moving average. The price has continuously remained above the 200 EMA, indicating that the trend is upward. Right now, the RSI is in the neutral zone at 52.13. According to this, the stock is neither oversold nor overbought. The rising trend of the RSI suggests growing positive momentum. Support: A solid support level is the 200 EMA at 1690.71. Furthermore, the price has previously found support near the 1750 level. Resistance: On several occasions, the price has encountered resistance at the 1900 level. The price may indicate more upside potential if it breaks above this level. The stock looks to

Fig. 1.4 : Wipro Ltd.

be in an uptrend based on the chart pattern and current technical indicators. The RSI is going upward, and the price is above the 200 and 5 EMAs.

Interpretation

5 EMA: A possible downtrend is indicated by the 5 EMA's present position below the 200 EMA. Additionally, the price is below the 5-EMA, indicating negative momentum. One important support level is the 200 EMA, a long-term moving average. The downtrend is confirmed by the price's present position below the 200 EMA.Right now, the RSI is in the neutral zone at 51.14. According to this, the stock is neither oversold nor overbought. The trending downward trend of the RSI indicates a decline in bullish momentum. Support: A solid support level is the 200 EMA at 266.14. Furthermore, the price has previously found support near the 280 level. Resistance: The price has repeatedly encountered resistance at the 300 level. The price may indicate a possible trend change if it breaks above this level. The stock looks to be in a downward trend based on the chart pattern and current technical indicators. The RSI is going lower, and the price is below the 200 and 5 EMAs.

Fig. 1.5: LTMindtree Ltd.

Interpretation

5 EMA: The price is above the 5 EMA, showing bullish momentum, and the 5 EMA is currently above the 200 EMA, indicating an upward trend.One important support level is the

200 EMA, a long-term moving average. Confirming the upward trend, the price has continuously remained above the 200 EMA. At the moment, the RSI is in the oversold zone at 27.53. This implies that the stock is oversold and may be about to rise again. A declining trend in the RSI suggests waning bullish momentum. Support: A solid support level is the 200 EMA at 5676.78. Furthermore, the price has previously found support at the 6000 level. Resistance: The price has often encountered resistance at the 6500 mark. The price may indicate more upside potential if it breaks above this level. The stock looks to be in an uptrend based on the chart pattern and current technical indicators. But given the recent price decline and the oversold RSI, a pullback or consolidation phase may be imminent.

Fig. 1.6: Tech Mahindra Ltd.

Interpretation

The 5 EMA is above the 200 EMA at the moment, suggesting an upward trend. Additionally, the price is above the 5-EMA, indicating bullish momentum. One important support level is the 200 EMA, a long-term moving average. The price has continuously remained above the 200 EMA, indicating that the trend is upward. Right now, the RSI is in the neutral zone at

44.29. According to this, the stock is neither oversold nor overbought. The rising trend of the RSI suggests growing positive momentum. Support: A solid support level is the 200 EMA at 1523.24. Furthermore, the 1600 level has previously served as support for the price. Resistance: The price has repeatedly encountered resistance at the 1700 level. The price may indicate more upside potential if it breaks above this level. The stock looks to be in an uptrend based on the chart pattern and current technical indicators. The RSI is going upward, and the price is above the 200 and 5 EMAs.

Fig. 1.7: Info Edge India Ltd.

Interpretation

The 5 EMA is above the 200 EMA at the moment, suggesting an upward trend. Additionally, the price is above the 5-EMA, indicating bullish momentum. One important support level is the 200 EMA, a long-term moving average. The price has continuously remained above the 200 EMA, indicating that the trend is upward. Right now, the RSI is in the neutral zone at 59.67. According to this, the stock is neither oversold nor overbought. The rising trend of the RSI suggests growing positive momentum. Support: A solid support level is the 200 EMA at 7661.83. Furthermore, the price has already found support at the 8000 level. Resistance: The price has repeatedly encountered resistance at the 9000 level. The price may indicate more upside potential if it breaks above this level. The stock looks to be in an uptrend based on the chart pattern and current technical indicators. The RSI is going upward, and the price is above the 200 and 5 EMAs.

Fig. 1.8 : Oracle Financial Services Software Ltd.

Interpretation

The 5 EMA is above the 200 EMA at the moment, suggesting an upward trend. Additionally, the price is above the 5-EMA, indicating bullish momentum. One important support level is the 200 EMA, a long-term moving average. The price has continuously remained above the 200 EMA, indicating that the trend is upward. Right now, the RSI is in the neutral zone at 58.22. According to this, the stock is neither oversold nor overbought. The rising trend of the RSI suggests growing positive momentum. Support: A solid support level is the 200 EMA at 10103.99. Furthermore, the price has already found support

at the 11,000 mark. Resistance: The price has repeatedly encountered resistance at the 12772.30 level. The price may indicate more upside potential if it breaks above this level. The stock looks to be in an uptrend based on the chart pattern and current technical indicators. The RSI is going upward, and the price is above the 200 and 5 EMAs.

Fig. 1.9: PB Fintech Ltd.

Interpretation

The 5 EMA is above the 200 EMA at the moment, suggesting an upward trend. Additionally, the price is above the 5-EMA, indicating bullish momentum. One important support level is the 200 EMA, a long-term moving average. The price has continuously remained above the 200 EMA, indicating that the trend is upward. Right now, the RSI is in the neutral zone at 58.92. According to this, the stock is neither oversold nor overbought. The rising trend of the RSI suggests growing positive momentum. Support: A solid support level is the 200 EMA at 1545.56. Furthermore, the 1600 level has previously served as support for the price. Resistance: The price has often encountered resistance at the 2100 level. The price may indicate more upside potential if it breaks above this level. The stock looks to be in an uptrend based on the chart pattern and current technical indicators. The RSI is going upward, and the price is above the 200 and 5 EMAs.

Fig. 1.10: Persistent Systems Ltd.

Interpretation

5 EMA: At this moment, the 5 EMA is above the 200 EMA, suggesting an upward trend. Additionally, the price is above the 5-EMA, indicating bullish momentum. 200 EMA: This long-term moving average serves as a crucial level of support. The price has continuously maintained an upward trend by staying above the 200 EMA. Right now, the RSI is in the neutral zone at 58.89. According to this, the stock is neither oversold nor overbought. The rising trend of the RSI suggests growing positive momentum. Support: A solid support level is the 200 EMA at 4964.24. Furthermore, the price has previously found support at the 5000 level. Resistance: The price has often encountered resistance at the 6500 level. The price may indicate more upside potential if it breaks above this level. The stock looks to be in an upward trend based on the present

technical indicators and chart pattern. The RSI is going upward, and the price is above the 200 and 5 EMAs.One tool in the investment toolbox is technical analysis. To make well-informed investment decisions, you must combine technical and fundamental analysis with your personal risk tolerance and investing objectives.

Findings

Overall Trend:

- Rising Trend: The price is above the 200-day EMA in the majority of the examined charts, and the 5-EMA is above the 200 EMA as well, suggesting a generally bullish trend.
- Downward Trend: A possible downtrend is indicated when the price and the 5 EMA are below the 200 EMA in a few instances.

RSI Indicator:

- Neutral Zone: The majority of stocks have an RSI value in the between 30 and 70 range, which denotes neither an overbought nor an oversold situation.
- Oversold Zone: When a stock's RSI falls below 30, it indicates that it is oversold and may be about to rise again.
- Growing Momentum: The RSI is often heading upward, which denotes growing bullish momentum.

Support and Resistance Levels:

- Support Levels: For all stocks, the 200-day EMA continuously serves as a solid support level. Furthermore, in the past, particular price points have served as support.
- Resistance Levels: Certain price points have served as barriers, preventing more price growth.

Future Performance Forecast

- Upside Potential: There is a chance for additional upside for stocks with a bullish trend, above both EMAs, and an increasing RSI.
- Pullback/Consolidation: Before starting to rise again, stocks may pull back towards the 200-day EMA or go through a consolidation phase.
- Downside Risk: Stocks in a downward trend that are below both EMAs and with a declining RSI are vulnerable to more declines. On the other hand, oversold RSI readings could point to a possible recovery.

Recommendations

For Stocks in an Upward Trend:

- Keep an eye on the 200 and 5 EMAs: The price is expected to continue its upward trend as long as it stays above both EMAs.
- Keep an eye out for RSI divergence: This could indicate a possible pullback if the price reaches new highs but the RSI does not.
- Determine resistance levels by keeping an eye on price movements surrounding them. More upside potential could be indicated by a breach above a significant resistance level.
- Think about locking in gains by taking profits if the price hits a significant resistance level or the RSI crosses into overbought zone.

For Stocks in a Downtrend

- Keep an eye on the 200 and 5 EMAs. If the price drops below the latter, the downtrend is confirmed.
- Keep an eye out for RSI divergence: If the price drops further but the RSI does not, this could indicate a bullish divergence and a possible recovery.

- Determine support levels by keeping an eye on price movement surrounding them. Further downside potential could be indicated by a breach below a crucial support level.
- Exercise caution when shorting stocks: If you feel comfortable shorting stocks, think about using appropriate risk management techniques.

For Stocks with Oversold RSI

- Keep an eye out for a rebound: The RSI's oversold conditions imply that one may be on the horizon.
- Keep an eye on price movement near support levels: Seek out support levels where the price may bottom out and begin to rise again.
- Think about buying on dips: If the price moves back toward support levels, think about placing a stop-loss order below the support level and buying on dips.
- Take into account fundamental analysis: To make wise investing choices, integrate technical and fundamental analysis.

Managerial Implications

- **Well-Informed Investment Decisions**: By forecasting future price fluctuations and identifying possible entry and exit locations, technical analysis can assist investors and portfolio managers in making better-informed investment decisions.
- **Performance Evaluation:** Technical analysis can be used to assess how well various trading methods perform and determine which ones work best in various market circumstances.

Suggestions

- When investing in IT companies, technical analysis can be a useful tool. To lower overall risk, diversify your portfolio across several industries and asset classes.
- A more thorough understanding of a company's worth and possible future performance can be obtained by combining technical and fundamental study.
- Since market trends can significantly affect the price of individual stocks, it's crucial to take the overall state of the market into account when applying technical analysis.
- Since technical analysis is a topic that is always changing, it's critical to keep up with the newest methods and resources. Although technical analysis can produce signals, impulsive actions that go against the signals are frequently caused by emotional variables like fear and greed. Developing emotional self-control is essential for profitable investing.
- Make use of sophisticated trading platforms and software tools that include charting features, automated trading features, and technical analysis indicators. Thoroughly back test any technical analysis-based trading strategy utilizing previous data before to putting it into practice.
- This aids in locating possible weaknesses, maximizing entrance and departure opportunities, and evaluating the strategy's past financial success.

Conclusion

According to technical analysis, this strategy might be a useful tool for investors looking to control risk and spot possible trading opportunities in the fast-paced IT industry. Investors can learn about market sentiment, predict future price movements, and create well-informed trading strategies by examining past price trends, volume patterns, and other technical indicators.

The state of the market is always changing, and unanticipated circumstances can have a big effect on stock values. Consequently, it is crucial to have a diversified investment strategy that takes into account wider market trends and blends technical and fundamental analysis. Additionally, successful investing in the IT industry requires a deep grasp of one's personal risk tolerance, emotional control, and ongoing learning. In the end, technical analysis is a useful instrument in a larger investment framework; it offers insightful information but does not ensure profits.

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Adoption of Sustainable Packaging in the FMCG Sector

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Abstract

This research examines consumer knowledge, perceptions, and actions related to sustainable packaging within the FMCG sectors. A survey was carried out to gather data from 200 consumers of FMCG products. The findings show that most consumer recognize recyclable packaging and are prepared to spend more for eco-friendly packaging. The research also discovered that awareness, readiness to pay, and how often consumer check packaging for sustainability attributes all significantly enhance the importance of sustainability to consumers. These results indicate that FMCG firms can enhance their sustainability efforts by raising consumer awareness about eco-friendly packaging choices and by promoting the benefits of such packaging.

***Key words**: FMCG Industry, Sustainable Packaging, Recyclable Materials, Biodegradable Materials, Environmental Impact, Regression Analysis.*

Introduction

The **Fast-moving consumer goods (FMCG)** industry ranks as the 4th major sector in the Indian economy. It is defined by rapid turnover of consumer-packaged goods, meaning products that are created, circulated, promoted, and expended quickly. Currently, the market is primarily led by FMCG products such as detergents, toiletries, oral care items, cosmetics, and more. The FMCG industry in India additionally encompasses pharmaceuticals, consumer electronics, soft drinks, packaged food items, and chocolates. As the industry includes a wide array of products, various companies lead the market in distinct sub-sectors. Nonetheless, among the leading FMCG firms in India are Dabur (60%), and Colgate (54.7%), and Hindustan Unilever (54%).

The Fast-Moving Consumer Goods (FMCG) sectors in India are a crucial component of the nation's economy, characterized by urban supremacy and swift rural expansion. Urban region generates 60% of FMCG income, while rural and semi-urban areas represent more than 40%, spurred by increasing consumption and demographic importance. Top FMCG firms such as Dabur and Hindustan Unilever obtain a significant share of their income from rural areas, emphasizing their growth opportunities. Indian's youthful population, rising urbanization, and technological progress have significantly propelled FMCG growth. E-commerce, supported by the rise of smartphones and improved net access, is predictable to account for 11% of FMCG sales by 2030. The government has aided the sector by introducing measures such as 100% FDI in SBRT and cash-and-carry formats and implementing GST, which has lowered taxes on necessary items.

Types of FMCG

FMCGs comprise multiple subcategories:

- ✓ Processed foods: Cheese items, breakfast cereals, and packaged pasta.
- ✓ Prepared meals: Meals ready for consumption.
- ✓ Drinks: Packaged water, energy beverages, and fruit drinks.
- ✓ Pastries: Cookies, croissants, and bagels.
- ✓ Perishable items, frozen items, and self-stable products: Produce, green, and seeds.
- ✓ Medications: aspirin, analgesics, and various drugs available for purchase over the counter.
- ✓ Cleaning Supplies: Baking soda, oven cleanser, and glass and window cleaner.
- ✓ Makeup and personal care items: hair care items, Correctors, dental cream, and cleanser.
- ✓ Office materials: writing instruments, graphite sticks, and highlighters.

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10 Biggest Fast-Moving Consumer Goods Firms by Revenue

The world's 10 biggest FMCG companies are as follows (all amounts in U.S. dollars, as of mid-2024)

- ✓ Nestle: A Swiss global corporation specializing in the processing of food and beverages. It produces a range of items, such as candy, baby formula, bottled water, dairy items, and cereals. A of mid-2024, the company boasts a marketplace capitalization of $279 billion and described income of $99.32 billion for 2023.

Nestle's main objectives for circularity:

By 2025: Over 95% of plastic packaging will be created for recycling processes.

- ✓ PepsiCo: A united state-Based food Corporation that manufactures beverage and snack items. Its market cap stands at $228 billion, while its revenue for 2023 was $91.47 billion.

PepsiCo's primary objectives for circularity:

By 2025: Ensure all of its packaging is designed to be decomposable, compostable, biodegradable.

By 2023: Decrease virgin plastic from non-renewable bases per serving in its global beverages and convenience foods range by 50%.

- ✓ Procter and Gamble Company (PG): Procter and Gambles is U.S. consumer goods firm that produces a range of health, personal care, and hygiene item, including soaps, textile, and beauty products. The firm boasts a market capitalization of $395.32 billion and generates $84.06 billion in revenue in 2023.

Procter and Gamble's main objectives for circularity:

By the year 2030: All packaging must be recyclable or reusable.

By 2030: 50% decrease in new petroleum plastic resin in its packaging.

- ✓ JBS foods (JBSAY): JBS Foods is a Brazilian company engaged in meat processing, offering beef, chicken, salmon. Pork, and various meat byproducts. It boasts a marketplace cap of $ 11.85 billion and generated $ 72.92 billion in revenue for 2023.
- ✓ Unilever plc (UL): Unilever is a UK-based FMCG firm that produces beauty items, breakfast cereals, energy beverages, health products, and various other everyday essentials. It boasts a market capitalization of $ 142.40 billion and generated approximately $ 63.91 billion in revenue for 2023.
- ✓ Anheuser-Busch InBev SA (BUD): AB InBev is a beer company based in Belgium. It is the biggest beer producer globally, including Budweiser. Its market capitalization stands at $107.38 billion, with revenue of $59.40 billion for 2023.

Ln Bev's main objectives for circularity:

By 2025, all of its products will be packaged in material that can be returned or consist primarily of recycled content.

By the year 2025: All of its acquired electricity will be sourced from renewable energy.

By 2025: A 25% decrease in Co2 emissions throughout the entire value chain.

- ✓ Tyson Food Inc. (TSN): Tyson Foods is a U.S. company that processes meat, specializing in chicken, pork, and beef. It is associated with prominent names like Jimmy Dean and Hillshire Farms. Its market cap is $ 19.43 billion, with a revenue of $ 52.88 billion recorded in 2023.
- ✓ Coca-Cola Co. (KO): Coca-Cola is a U.S. beverage firm that manufactures soda, athletic drinks, and various other drinks. It boasts a market cap of $273.94 billion and generated $45.75 billion in revenue in 2023.

The main circularity objectives of the Coca-Cola Company:

By 2030: Decrease total greenhouse gas emissions by 25%

By 2030, Incorporate a minimum of 50% recycled content in its packaging.

- ✓ L'Oreal Co. (LRICY): A French company that produces cosmetics such as skincare, makeup, fragrances, hair dye, and hair care items. It boasts a market capitalization of $239.84 billion and generated revenue of $44.57 billion in 2023.
- ✓ British American Tobacco (BTI): British American Tobacco is company based in the UK that specializes in cigarettes and various nicotine-containing products. It boasts a market capitalization of $68.52 billion and generated revenue of $34.80 billion in 2023.

Sustainable Packaging

Sustainable packaging encompasses materials and techniques aimed at reducing environmental harm while ensuring functionality and economic practicality. It highlights the importance of life cycle assessments (LCA) for assessing the

complete supply chain, from design and material choice to recycling or reuse at the end of life. The aim is to minimize ecological footprints and promote the sustainability of natural ecosystems while safeguarding the needs of future generations.

Current sustainable packaging efforts extend beyond mere "green" assertion, emphasizing the reduction of carbon footprints, the use of recycled materials, and the promotion of reuse. Initiatives are motivated by consumer needs, social activism, and regulatory influences, encompassing every phase of packaging, distribution, and logistics. Although packaging makes up a minor portion of a product's total environmental effect, it is frequently regarded as a significant indicator of a company's sustainability initiatives.

Threats in Traditional Packaging over Eco-Friendly Packaging

Traditional packaging techniques are largely based on non-biodegradable substances like plastic, which present considerable dangers to the environment. Plastic packaging adds to pollution during its manufacturing, use, and disposal. It frequently finds its way into landfills or the ocean, taking centuries to break down and harming oceanic creatures. Moreover, the extraction and manufacturing of materials such as plastic and metal lead to greenhouse gas emissions and the reduction of resources.

Compensations of Biodegradable Packaging

a. Environmental Advantages: Eco-Friendly Packaging minimizes waste, utilizes renewable resources, and incorporates sustainable methods. It encourages the use of recyclable and compostable resources that decompose through recycling and decrease the carbon emissions linked to manufacturing and shipping.

b. Economic advantages: Implementing sustainable packaging methods can result in long-term cost reduction. By minimizing packaging waste, companies can decrease disposal expenses. Sustainable packaging frequently demands less energy and fewer resources in its production, leading to lower operational expenses.

c. ESG compliance: Factors related to Environmental, Social, and Governance (ESG) are becoming more significant for both consumers and investors. By adopting sustainable packaging, businesses can showcase their dedication to environmental stewardship, which can help recover their product reputation, draw in customers, and appeal to socially conscious investors.

Why is Sustainable Packaging important for FMCGs?

Moreover, sustainable packaging is crucial for FMCG companies for a variety of compelling reasons:

1. Buyer Anticipations-
   - Today's consumer is placing greater importance on sustainability in their buying choice. They Favor its wrapped in eco-friendly material and are more inclined to back brands that show dedication to sustainability.
   - By implementing sustainable packaging strategies, FMCG companies can boost brand loyalty, appeal to environmentally aware consumers, and set themselves apart in a competitive market.
2. Regulatory Adherence-
   - Authorities and regulatory agencies are implementing tougher rules and requirements to minimize environmental effects and encourage sustainable practices. FMCG firm need to adhere to these regulations to prevent penalties, fines, and harm to their reputation.
   - By adopting sustainable packaging, FMCG companies can remain proactive regarding regulatory shifts and showcase corporate responsibility.
3. Efficiency in Resources and savings on costs-
   - Sustainable packaging frequently entails maximizing material efficiency, decreasing waste, and lowering energy use across the packaging lifecycle. Consequently, FMCG firm can attain resource efficiency, reduce production expenses, and enhance operational sustainability through the use of environmentally friendly packaging options.
   - Moreover, advancements in eco-friendly packaging materials and technologies may result in lasting cost savings and competitive benefits.

4. Brand Image and Reputation
   - Sustainable packaging efforts help enhance a brand's reputation and image positively. Customers view brands that emphasize sustainability as more socially responsible and trustworthy.
   - Thus, FMCG firms that adopt sustainable packaging in their offerings can showcase their dedication to environmental responsibility and corporate social responsibility. Consequently, this improves brand value, encourages customer loyalty, and draws in socially aware investors.
5. Mitigation of environmental effects
   - Conventional packaging material, such as disposable plastics, leads to environmental pollution, ecosystem harm, and global warming. By adopting sustainable packaging options, FMCG companies can decrease their environmental impact, lessen plastic waste production, and alleviate ecological damage.
   - Sustainable packaging options emphasize renewable materials, recyclability, biodegradability, and the principle of a circular economy. Overall, these elements promote a more sustainable planet and safeguard natural resources for future generations.
6. Supply Chain Strength and Risk Mitigation
   - FMCG firms depend on intricate global supply chains to obtain, produce, and deliver products. Environmental disturbance, resource scarcity, and alteration in regulation can risk the continuity of supply chains and the stability of operations.
   - Therefore, employing sustainable packaging methods can strengthen supply chain flexibility by expanding substantial sources, lessening reliance on limited resources, and improving risks linked to environmental challenges.

Existing trends and approaches for biodegradable packaging

While sustainable packaging has historically been linked to standard choices like cardboard or recycled materials, contemporary companies now have many alternatives available to them.

- Applying downgauging to reduce your carbon emissions. Sometimes called "lightweighting," downgauging involves decreasing the thickness of packaging film in items. This method preserves packaging effectiveness while simultaneously decreasing waste production.
- Incorporating high-barrier mono-materials into packaging, particularly ideal for perishable goods. Mono materials are created for straightforward recyclability. Nonetheless, it contains particular chemicals that block UV, water vapor, or oxygen from passing through the film.
- Substituting single-use plastics with reusable metal or glass containers. Many FMCG brands have embraced this strategy, motivating customer to return their empty packaging when they get their new product. Stores have drop-off bins for brands, allowing customers to return their used packaging and minimize landfill waste. It offers a convenient way for customer to responsibly dispose of their packaging while also strengthening the brand's dedication to sustainability.

Digital Campangins

1. Dabur Indian limited

- Dabur Indian Limited (Dabur), a prominent Fast-Moving Consumer Goods (FMCG) firm in India, declared that it has achieved the status of being India's first 100% Plastic Waste Neutral Company.
- Dabur is the first FMCG company to reach this milestone. Dabur gathers, processes, and recycles and equivalents quality of plastic waste equivalent to what is used in its product packaging annually, leading the company to become a "Plastic Waste Neutral Company".
- Dabur introduced its initiative for managing plastic waste in 2017-2018. As of February 2022, through this initiative, Dabur has gathered more than 54,000 MT of plastic waste from various locations in India.

Fig. 1

2. ITC Limited

- They have adopted a 3- strong strategy for the eco-friendly packaging. They are: Better plastics, Less Plastics, No plastics.
- Sustainable Packaging Objectives: ITC guarantees that 100% all its packaging is either reusable, recyclable, or biodegradable.
- Sustainable Product: Provide recyclable and compostable options such as the filo series, Indo Bowl, and Tribe Kraft.
- Green Manufacturing: Utilizes sustainable natural fibres for packaging at its facility in Madhya Pradesh.
- Brand Initiative: FMCG brands such as Aashirvaad and Sunfeast use sustainable packaging.
- Environmental Impact: Decreased plastic packaging to 30%, handling 70,000 tonnes of plastic wate in FY'24.

Fig. 2

3. Unilever

- Decreasing Virgin Plastic: Unilever plans to cut its virgin plastic usage by 30% by 2026 and 40% by 2028.
- Recyclable and Reusable Packaging: The organisation aims for its plastic packaging to be reusable, recycle, or compostable by 2030 for firm plastics and 2035 for flexible plastics.
- Rise in Recycled Plastic Utilization: Unilever aims for 25% recycled plastic in its packaging by 2025, with 22% accomplished in 2023.
- Plastic collection and Processing: The organisation intends to gather and handle a greater amount of plastic packaging than its market by 2025, achieving 61% in 2023.
- Support for Global Plastics Treaty: Unilever is promoting a UN treaty aimed at plastic pollution that established legally enforceable global regulations to enable systemic transformation.

Fig. 3

4. Britannia

- Sustainability Vision: Emphasise reducing ecological impact and improving the food value chain.
- Renewable Energy: Aiming for 57% electricity from renewable by 2026.
- Sustainable Packaging: By 2024, 70.3% of Packaging is expected to be recycle.
- The Campaigns highlights Britannia's effort in ESG, including plastic neutrality and responsible water management.
- The initiative supports Britannia's wider strategy of advocating for responsible environmental practices.

Fig. 4

Literature Review

(Dr. Sukhmani1, 2013)- This study analyses 100 FMCG firms implementing sustainable packaging, emphasizing the difficulties and innovative strategies needed for environmental accountability. It investigates the effects, motivations, and differences in implementing sustainable packaging methods. The research employs statistical methods such as ANOVA and Factor Analysis to emphasize the necessity for companies to manage both social and environmental performance.

(Wong Ker Xin, 2019)- This qualitative research examines the advantages of environmentally friendly packaging in sustainable supply chain management in the FMCG sector. Conversations with industry experts were held to explore the connection between advantages such as cost savings, brand reputation, adherence to regulations, and ecological effects. The results demonstrate a direct connection between environmentally friendly packaging and enhanced sustainable supply chain practices in FMCG firms.

(Priyanshi Jain, 2022)- The FMCG sector encounters heightened pressure to implement sustainable packaging because of rising consumer awareness about environmental effects. This study investigates consumer attitudes and actions regarding eco-friendly packaging, analysing factors that impact buying choices. An examination of 30 research articles and focus group discussions revealed inconsistencies between consumer comprehension and the product on the market. Findings from this research intend to address these gaps and showcase trends and practices that can aid the FMCG industry.

(Sandhiya Vaidhyalingam1, 2024)- This study explores how 100 FMCG companies are embracing sustainable packaging in response to growing demands from the government, media, and consumers. It emphasizes the necessity for businesses to adopt sustainable packaging to aid in the creation of environmentally friendly products. The research employed multiple assessments to examine the effects, motivations for adoption, and obstacles in executing sustainability within FMCG firms. It highlights the obligation of businesses to minimize emissions and waste by adopting sustainable methods.

(Adesoye, 2024)- This research explores the effect of sustainable packaging on brand loyalty within the FMCG industry, emphasizing eco-friendly materials and clear communication. It emphasizes the importance of sustainability in fostering consumer trust, emotional bonds, and lasting loyalty, while also considering the trade-offs involved with operational expenses. The results emphasize the necessity of integrating sustainable packaging into brand approaches.

(Ayodeji Abatan 1, 2024)- This review examines how sustainable packaging innovations affect Health, Safety, and Environmental (HSE) practices in the FMCG sector. It emphasizes how sustainable materials, compostable packaging, and lightweight constructions lessen environmental effects, increase work safety, and boost operational efficiency. Embracing sustainable packaging enhances brand image, ensures adherence to regulations, and promotes lasting profitability.

Objectives of the Study

- ✓ Assess the degree of consumer knowledge about sustainable packaging practices in the FMCG industry.
- ✓ Determine the elements the affect consumer choices regarding sustainable packaging, including ecological issues, pricing, and moral values.
- ✓ Examine consumer buying habits, focusing on how often and why they select items with biodegradable packaging.

- ✓ Assess customers willingness to pay extra aimed at products featuring sustainable packaging and the consequences for FMCG companies.

To measure the effect of awareness, payment willingness, and behaviour on the significance of sustainable packaging through MLR

Research Methodology

1. **Research Design-** This study will utilize a quantitative design to examine consumer attitudes and activities relates to sustainable packaging in the FMCG industry. Structured survey will be active to gather information on consumer, awareness, attitudes and buying behaviour.
2. **Sampling-** A simple random sampling technique will be utilized to choose 200 FMCG consumers.
3. **Data Collection-** Information will be gathered through an online questionnaire, shared through platforms like Google Forms. The questionnaire will consist of a combination of Likert Scale, Multiple-Choice, and Yes/No questions addressing:
   - ✓ Awareness of sustainable packaging.
   - ✓ Attitudes towards sustainable packaging.
   - ✓ Consumer behaviour regarding sustainable packaging.
4. **Data Analysis-** Descriptive statistics will be employed to analyse the data, summarizing the behaviour of the sample. Advanced statistical methods, which includes Multiple Liner Regression (MLR), will be used to examines the relationship between variables, such as the Awareness of biodegradable packaging practices, willingness to pay a premium for sustainable packaging, then frequency of examining the packaging for sustainability features.

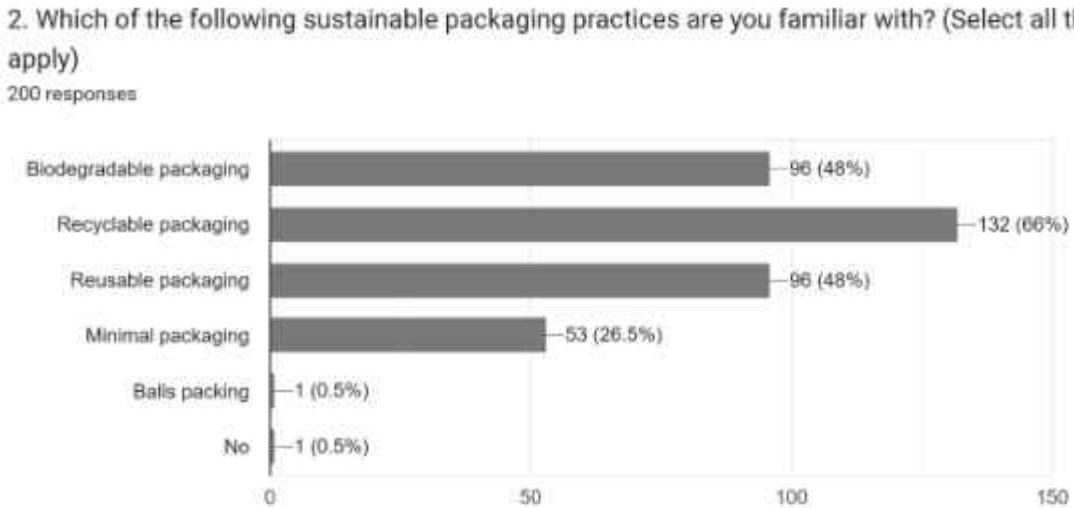
Scope of the Study

This study cores on the implementation of sustainable packaging within the

FMCG sectors, particularly examining consumer awareness, attitudes, and behaviours related to eco-friendly packaging. The study seeks to examine the elements that affect buying choices, the readiness to pay extra for eco-friendly items, and the effect of sustainable packaging on consumer trust and brand loyalty. It explores the link between consumer view and sustainable packaging methods, offering guidance for FMCG firms on incorporating sustainability into their business approach

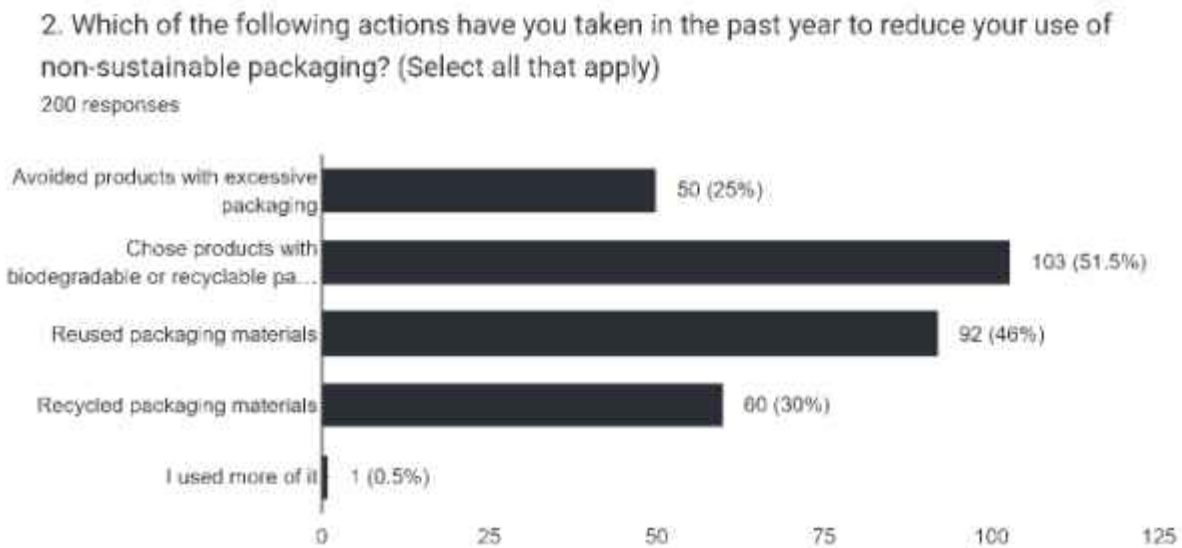
Data Analysis and Interpretation

Section 1: Sustainable Packaging Awareness

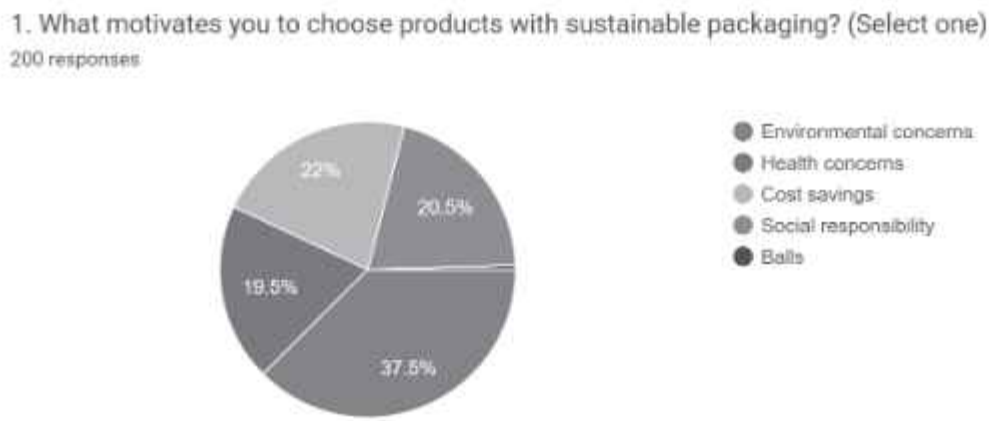


- larger portion (66%) of participants is aware of recycle packaging, establishing it as the most acknowledge sustainable method.
- 48% of respondents are equally aware of both biodegradable and reusable packaging.
- Just 26.5% of participants recognize minimal packaging as an eco-friendly approach.
- Balls packaging and No were selected only 0.5% each.
- In general, participants show a good understanding of essential sustainable packaging techniques, particularly highlighting recyclable packaging.

Section 2: Behaviour Towards Sustainable Packaging



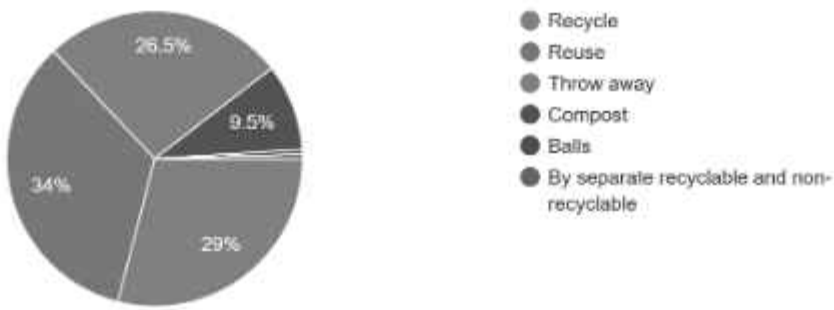
- More than half (51.5%) of participants selected items with biodegradable or recyclable packaging to minimize the use of non- sustainable packaging.
- 46% of participants repurposed packaging material, reflecting a forward-thinking attitude towards sustainability.
- 30% of participants recycled their packaging, indicating a moderate level of involvement in recycling.
- 25% of participants avoided with the excessive packaging, indicating a restricted awareness or practicality of this behaviour.
- 0.5% of those surveyed acknowledge a rise in the use of non-sustainable packaging, indicating a robust overall dedication to reduction initatives.



- A significant portion (37.5%) of participants is influenced by environmental issues when selecting products with eco-friendly packaging.
- 22% of participants are motivated by feeling of social duty.
- 20.5% of those surveyed view cost savings as a key incentive.
- Balls received minimal responses.

2. How do you usually dispose of packaging waste? (Select one)

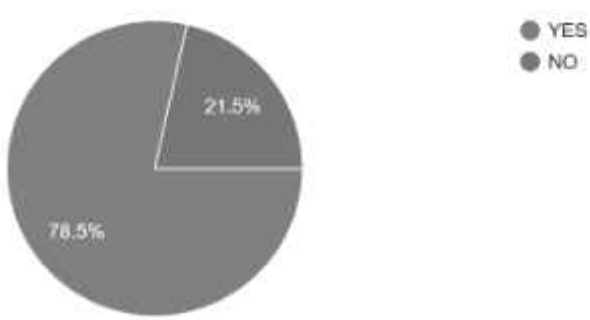
200 responses



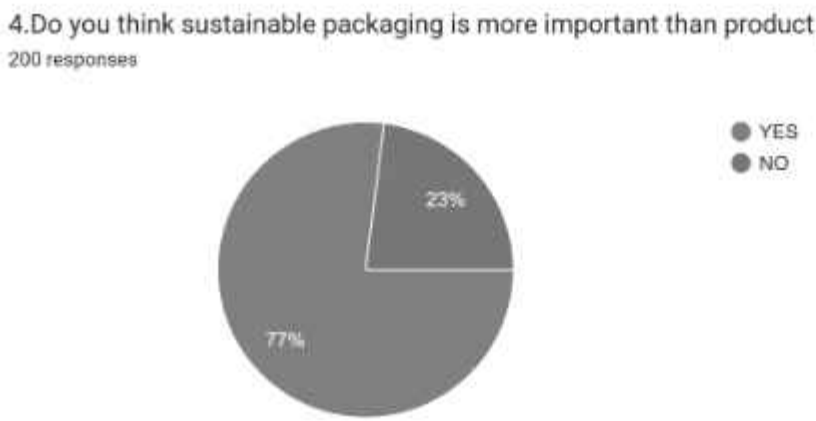
- 34% of participants get rid of packaging waste by tossing it, establishing it as the prevalent approach.
- 29% of respondents recycle their packaging refuse, showing a strong awareness of waste management.
- 26.5% of packaging waste is reused, showcasing a significant tendency of repurposing.
- Just 9.5% of participants compost packaging waste, indicating potential for enhancements in handling organic waste.

3.Have you ever chosen a product because of its sustainable packaging?

200 responses



- 78.5% of participants selected products due their sustainability packaging, indicating a significant inclination towards environmentally friendly choices.
- 21.5% of participants have not emphasised sustainable packaging, showing a smaller group that is less influenced by environmental considerations in their buying choices.



- 77% of participants prioritize sustainable packaging over product cost, reflecting significant environmental concerns.
- 23% emphasize product cost more than eco-friendly packaging, indicating a limited demographic with budget-centred view.

Multiple Liner Regression (MLR) Analysis:

- H0- The model fails to account for a substantial portion of variance in sustainability importance.
- H1- The model accounts for a notable portion of variance in sustainability importance.

Variables Entered/Removed			
Model	**Variables Entered**	**Variables Removed**	**Method**
1	Frequency of Checking (X), Awareness (X), Willingness to Pay (X).		Enter
	a. Dependent Variable: Sustainability Importance (Y)		
	b. All requested variables entered.		

Source: Authors Original Source

Model Summary					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1	0.948	0.899	0.897	0.454	2.274

Source: Authors Original Source

ANOVA					
Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	359.605	3	119.868	581.612	0
Residual	40.395	196	0.206		
Total	400	199			

Source: Authors Original Source

Coefficients						
Model	**Variable**	**B**	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	-0.109	0.082		-1.333	0.184
	Awareness (X)	0.36	0.039	0.373	9.282	0
	Willingness to Pay (X)	0.346	0.04	0.348	8.626	0
	Frequency of Checking (X)	0.317	0.04	0.309	7.985	0

Source: Authors Original Source

Residuals Statistics					
	Minimum	**Maximum**	**Mean**	**Std. Deviation**	**N**
Predicted Value	0.91	5.01	3	1.344	200
Residual	-1.009	1.062	0	0.451	200
Std. Predicted Value	-1.551	1.495	0	1	200
Std. Residual	-2.223	2.339	0	0.992	200

Source: Authors Original Source

Interpretation

1. **Variable Entered/ Removed**

- Independent Variable (X)
  - X1: How aware are you of sustainable packaging practices in the FMCG sector? **(Awareness)**
  - X2: How willing are you to pay a premium for products with sustainable packaging? **(Willingness to Pay)**
  - X3: How often do you check the packaging of a product for sustainability features before making a purchase? **(Frequency of Checking)**
- Dependent Variable
- How important is sustainable packaging to you when making purchasing decisions? **(Sustainability Importance)**

Method: Enter method where all variables were entered simultaneously.

Model Summary

* R (correlation coefficient): 0.948 indicates a strong positive correlation between the independent and dependent variables.
* R square (coefficient of determination): 0.899 (89.9%) of the variation is sustainability is accounted for by the predictors.

Whereas, the independent variable can explain 89.9% variability in the dependent variable.

* Adjusted R square: 0.897. Modified to account for the number of predictors in the model.
* Standard Error of the Estimate: 0.454 reflects the usual prediction error.
* Durbin- Watson Value: 2.274 Residuals show no significant autocorrelation (optimal range is 1.5 - 2.5).

3. **ANOVA (Analysis of Variance)**

- Significance(p-value)- p-value is 0.000 this means the model is statistically significant ($p < 0.05$), which means the H0 is rejected and H1 is accepted.
- Meaning independent variable collectively have a significant impact on sustainability importance.

4. **Coefficients**

- Contant (-0.109): The significance of sustainability when every predictor is null.
- Awareness: An increase of one unit boosts sustainability importance by 0.360.
- Willingness to Pay: An increase of one unit raises it by 0.346.
- Frequency of Checking: A one-unit increase advances it by 0.317

Standardized Coefficients (beta):

- Awareness (0.373): Most significant impact.
- Willingness to Pay (0.348): The second most significant.
- Frequency of Checking (0.309): The third most significant.

Every variable has a important effect on the importance of sustainability. Awareness exerts the greatest impact, with Willingness to pay and frequency of checking following closely.

(Sustainable Important= -0.109+0.306*Awarness+0.346*Willingness to pay+0.314*Frequency of Checking).

- A negative constant signifies that the importance of sustainability would be initially negative in the absence of the predictor's influence.

5. **Residential Statistics.**

- Estimated Value: Vary between 0.91 and 5.01, with an average of 3.00.
- Residuals (Errors): Vary between -1.099 and 1.062, having a mean of 0.000 and a standard deviation of 0.451.
- Standardized Residuals: Ranging from +2.5, showing no major outliners.

6. **Conclusion**

- The overall model is important where p value 0.000, R square is 0.899.
- Each predictor (X1, X2, X3) has a significant positive effect on sustainability importance (Y).

Findings and suggestion

- Awareness: 66% of participants know about recyclable packaging, while awareness of biodegradable and reusable packaging stands at 48%.
- Behaviour: 51.5% prefer biodegradable or recyclable packaging, motivated by environmental issues (37.5%).
- Purchase Influence: 78.5% favour eco-friendly packaging, and 77% choose it over price.
- Statistical Insight: Awareness, payment willingness, and checking frequency significantly influence the importance of sustainability.
- Corporate Initiatives: Companies in the FMCG sector, such as Dabur and Unilever, spearhead efforts focused on recyclable, reusable, and compostable packaging.
- Increase Awareness: Inform about lesser-known technique such as minimal and compostable packaging.
- Promote Activity: Implement rewards for recycling and repurposing.
- Corporate Focus: Employ lightweight, single-material packaging and enhance waste management system.
- Cost Strategies: Highlight the long-term benefits of sustainable packaging in term of savings.
- Policy Assistance: Promote enforced sustainable packaging regulations and financial incentives.

Conclusion

The research emphasizes the significance of eco-friendly packaging in the FMCG industry, as user awareness of recyclable and biodegradable alternative increases. consumers place sustainability above due to environmental issues, as indicated by the MLR model, which revels that awareness, willingness to pay, and examining packaging significantly shape preferences.

Prominent FMCG companies such as Dabur and Unilever are integrating recyclable, reusable, and compostable packaging to meet sustainability objectives and improve their brand perception. To advance future, businesses must emphasize raising awareness, encouraging recycling, and utilizing innovative materials, while managements can implement regulations and provide incentives. biodegradable packaging is vital for both environmental and marketable success.

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