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ABOUT THE JOURNAL

IILM Journal of Management is an International bi-annual, interdisciplinary and peer-reviewed E-Journal. The Journal covers broad functional areas of Marketing, Economics, Human Resources, Operations, Analytics, Technology, Sustainability, Finance, Accounting, Entrepreneurship, and Business Environment. The journal accepts empirical papers, perspectives, teaching cases, systematic literature reviews, and book reviews on contemporary advances in business and management.

AIMS AND SCOPE

IILM Journal of Management aims to disseminate research and reflections relevant to academicians, professionals, researchers, and students. The journal aims to provide a platform for research scholars, academicians, and practitioners to promulgate contemporary advances in the field of business and management.

OBJECTIVES:

- To provide a platform for academicians, researchers, and practitioners to share professional and academic knowledge in all domains of business.
- To be a leading and credible source of scholarly articles and research papers through the promotion of research publications
- To form a broad and inclusive understanding of business and management through the dissemination of cross-cutting interdisciplinary research.

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EDITORIAL

The contemporary world is characterized by Volatility, Uncertainty, Complexity, and Ambiguity (Acronym VUCA). This makes increasingly higher demands on academicians and industry professionals to unlearn and relearn. Research enables us to navigate the challenges encountered in the present world. The discourses and discussions enable driving progress, addressing challenges, fostering innovation, and improving the quality of life for individuals and societies. The journal is an initiative to promote the spirit of inquiry and dissemination of knowledge on various pertinent issues in the domain of management.

The articles cover broad topics in areas of Macro-Economics, Mental Health issues, Influencer Marketing, and Supply Chain Optimization.

The first paper *"Analysing the Impact of Overconfidence Bias, Herding Bias, and Loss Aversion Bias on Investment Decisions"* examines how cognitive and emotional factors shape investment behaviour and investors should focus on mitigating biases to prevent mental lapses. The second paper viz., *"Competitive Advantage Gained Through Post-Merger and Post-Acquisition Situation in Reliance Company"* highlights how strategic acquisitions have strengthened Reliance's market position, efficiency, and profitability, offering lessons for the Indian chemical industry. The third paper is on the *"Evaluation of Indian Rupee Against American Dollar: An Empirical Study"*. The study identifies key macroeconomic variables influencing currency valuation and assesses the performance of the Indian Rupee in the face of unprecedented macroeconomic circumstances. The dynamism of the Indian Rupee has compared to the US Dollar provides insights relevant to policymakers, investors, and businesses navigating exchange rate volatility. The fourth paper, i.e., *Role of artificial intelligence in higher education: transforming teaching and learning by Chandresh Verma, Stuti Tandon.* The fifth paper is a book review *on From Fear to Freedom: Reviewing intimate partner violence against women in India by Ridhika Chatterjee*

The findings pave the way for further research on finance, corporate strategy, and social policy. I hope that the second issue will prove to be pertinent to all stakeholders and the subsequent issues will garner support from the distinguished contributors.

Dr. Richa Kothari
(Editor)

GUIDELINES FOR THE CONTRIBUTORS

Submission Guidelines Highlights

1) The submitted article must not have been previously published, nor should it be under consideration for publication anywhere else, while under review for this journal. Maximum word limit is 6000 words excluding abstract and References.
2) Submit the full version of the manuscript in English only.
3) The submitted article must be provided in Microsoft Word format only.
4) The following author guidelines must be followed:
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     1. Title page must Include title of the research paper followed by author's name, affiliation and Contact details of all the authors. The names of authors must not appear anywhere else in the manuscript.
     2. Next page must include title of the research paper followed by abstracts, keywords, and classification of the paper. Abstract should give an overview of the research and must be of 150 words. The abstract should include Purpose, Design/methodology/approach, Findings and Originality/value.
     3. The subsequent paper should contain Introduction, Literature Review, Methods, Results, Discussions, Limitations, Directions for future research and References.
   - The paper should be accompanied by a declaration to the effect that the paper is the original work of the author(s) and that the paper has not been submitted for publication anywhere else.
   - In case of papers presented/submitted in a conference/seminar, details must be clearly mentioned, and the author should specify with whom the copyright rests.
   - Use a single-column layout with both left and right margins justified.
   - Font: Main Body – 12 pt.; Style: Times New Roman.

Tables and Figures

To the extent possible, tables and figures should appear in the document near/after where they are referenced in the text. Avoid the use of overly small font size in tables. In no case should tables or figures be in a separate document or file.

To correctly format an APA table, follow these rules:

- Table number in bold above the table.
- Brief title, in italics and title case, below the table number.
- No vertical lines.
- Horizontal lines only where necessary for clarity.
- Clear, concise labels for column and row headings.
- Numbers consistently formatted (e.g. with the same number of decimal places).
- Any relevant notes below the table.

To correctly format an APA figure, follow these rules:

- Figure number in bold above the figure.
- Brief title, in italics and title case, under the figure number.
- If necessary, clear labels and legends integrated into the image.
- Any relevant notes below the figure.

References

It is the author's obligation to provide complete references with the necessary information. References should appear in the text as: "Cavory et al. (2005) reported that…" and the list of all the references must be placed at the end of the manuscript in the APA Style.

1. Papers are processed through a blind referral system by experts in the subject areas. To ensure anonymity, the writer's name, designation and other details should appear only on the first page along with the title of the paper and should not be repeated anywhere else.

ANALYSING THE IMPACT OF OVERCONFIDENCE BIAS, HERDING BIAS, AND LOSS AVERSION BIAS ON INVESTMENT DECISIONS: A SUBSTANTIATION FROM MUTUAL FUND INVESTORS OF KOLKATA REGION

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ABSTRACT

The goal of the study is to examine how psychological characteristics such as overconfidence, herding bias and loss aversion bias, affect investor's ability to make judgements about their investments based on their emotions and cognitive processes. Purposive selection of 279 investors in Kolkata was used to identify the primary data source for the study through a structured closed-ended questionnaire survey approach. The SMART PLS version 4.1.0.2 application is used to analyse the data. This study demonstrates that loss aversion, herd mentality, and overconfidence are the three main biases that influence investing decision making. Reducing emotional and cognitive biases in investment management is a topic this study raises awareness of and comprehension for professionals and decision makers in financial institutions. To prevent investors from making "mental lapses," it is crucial to concentrate on certain investment tactics.

Keywords: *Overconfidence bias, Herding bias, Loss aversion bias and Investment decision, Behavioral Finance*

INTRODUCTION

Behavioral Finance is an interdisciplinary field that combines conventional ideas of finance and economics with theories of behavior and psychology. Market anomalies can be discovered by behavioral finance, which also identifies human error as the cause of the anomalies (Jensen, 1978; De Bondt & Thaler, 1985). Through this area of behavioral finance, it seeks to understand market behavior and the decisions made by both individual and institutional investors (Neelakandan, P.R., 2015). According to Baker and Wurgler (2007), behavioral qualities of investors and the information they are given about the market and stocks influence investment decisions and market outcomes in behavioral finance. In summary, investors exhibit irrational behavior while making suboptimal investment decisions, which in turn impact the capital market's effectiveness and investors' wealth (Baker, H.K. and Nofsinger, J.R. eds., 2010). The first important study in this field by Adam Smith dates back to the 18th century. The essential work in this field includes "The Theory of Model Sentiment (1979)" and "Wealth of Nation (1776)" which highlight feelings as key factors in decision-making and describe how individuals behave in ways that influence their ability to make economic, social, and financial decisions. Cognitive errors in behavioral finance demonstrate how heuristics and biases affect investment choices. Behavioral biases are broadly categorized into two categories, namely dependency biases and heuristic driven biases, according to Shefrin, H. (2002). According to M.M. Pompian (2011), biases are systematic errors in judgment that can be divided into two categories: cognitive biases and emotional biases. Cognitive bias is characterized by representatives, cognitive dissonance, anchoring, and framing; emotional bias is characterized by loss aversion, optimism, and regret aversion (Habbe, 2017; Kahneman et al., 1991). These behavioral biases are crucial for understanding the behavior of the financial markets because they lead investors to make illogical judgments and have an impact on the stock market (Trejos et al., 2019). (Antony,2019). Ignoring these emotional and cognitive biases leads to the following outcomes which involves stock market crashes and bubbles. Thus, it is important to understand the area of behavioral finance especially behavioral biases to take better decisions in the financial market.

Literature Review:

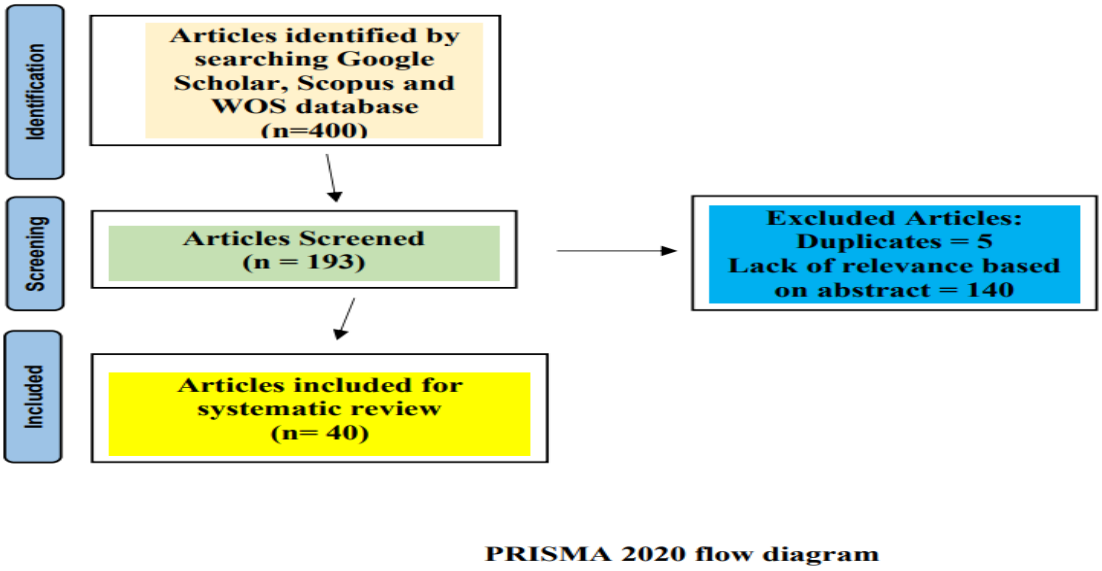

Figure 1. Screening of Literature as per PRISMA 2020

Mishra, K. C., & Metilda, M. J. (2015) studied to evaluate the effects of demographic parameters, such as gender, educational attainment, and investment experience, on two distinct types of biases: overconfidence bias and self-attribution bias, in order to better understand the relationship between two biases. The primary source of data for the study was selected through the use of a closed-ended, structured questionnaire. Additionally, it has been found that overconfidence bias increases with education and investment experience and is more common in men than in women. The results of the investigation show a significant relationship between these two biases.

Gupta, Y., & Ahmed, S. (2016) proposed to evaluate the impact of psychological biases on investors' decision-making while they trade in the Indian stock market. The primary source of data for the study was selected through the use of a closed-ended, structured questionnaire. Some of the biases selected for the study are regret aversion, loss aversion, herding, and anchoring biases. Additionally, it was shown that seasoned investors had a higher likelihood of displaying loss aversion bias in comparison to other biases.

De, S. (2016) examined that the confirmation bias, loss aversion bias, and endowment bias are three important biases that the study uses with an attempt to lessen the influence of behavioural biases on investors' financial decision-making. The major data source has been selected in order to achieve the study's goal, which makes use of a structured, closed-ended questionnaire. To determine if the three biases affect investors' decision-making, data is analysed. Graphical data representation was used to illustrate the study and statistical approaches were used for analysis.

Khalid, R., Javed, M. U., & Shahzad, K. (2018) analysed the effects of overconfidence bias and herding prejudice. The study's primary data collection approach, a structured questionnaire with closed-ended questions, has been chosen. Regression analysis and correlation were also chosen as statistical methods to investigate the outcome. It has also been shown that overconfidence bias and herding prejudice have a favourable impact on investing decision making.

Singh, A. (2018) assessed how behavioural biases affect female investors' investment decisions. For the study, the primary data source—a structured, closed-ended questionnaire—has been chosen. The chi-square test has been used to examine the association between various biases and investment choices. It has also been determined and suggested that herd mentality affects Indian women. Moreover, the outcome indicated that women do not exhibit excessive confidence when making choices.

Katper, N. K et.al. (2019) investigated the impact of behavioural biases on investing decisions in relation to sociodemographic variables. For this inquiry, a primary data source has been selected especially. Hierarchical regression analysis is the technique selected to evaluate the impact of sociodemographic factors on behavioural biases. The study also discovered that sociodemographic traits affect the relationship between emotional biases and investors' decision-making.

Akhtar, F., & Das, N. (2020) analysed the impact of psychological biases that influence the relationship between individual investors and investor performance. The primary data source, a structured questionnaire with closed-ended questions, has been chosen. Investment measures have been used to gauge investor performance. To further support the idea, AMOS and SPSS have been used to analyse the data.

Panja, S. (2023) evaluated the impact of behavioural biases on the financial decisions made by female micro-entrepreneurs in rural regions. Primary and secondary data have been used to enhance understanding of women micro-entrepreneurs in rural areas. Furthermore, SPSS software was utilized for data analysis and SEM (Structural Equation Modelling) AMOS 26 software was used in its design. Further, it has been concluded that "loss aversion bias" has no significant influence on investment decisions whereas "anchoring bias" has significant influence on financial decisions which in turn highlights the impact of behavioural biases in the process of making financial decisions.

RESEARCH GAP:

The impact of behavioural biases on investment decisions has been examined in previous research, but there are still significant gaps. The majority of research ignores the combined effects of overconfidence, herding, and loss aversion biases on mutual fund investors in a particular regional context, such as Kolkata, in favour of concentrating on certain biases or demographic categories, such as male investors, female investors, or micro-entrepreneurs. Furthermore, not enough research has been done on how these biases interact and affect mutual fund choices. There is also a dearth of thorough research on the changing role of behavioural biases after the pandemic and how sociodemographic factors interact with these biases. These gaps show that a targeted, geographically specific investigation addressing these elements is necessary.

OBJECTIVES OF THE STUDY:

This study explores the profound impact of Overconfidence Bias (OCB), Herding Bias (HB) and Loss Aversion Bias (LAB) on Investment Decision (ID).

Formulation of Hypothesis:

1. Null Hypothesis: $H1_0$: Overconfidence bias does not significantly impact the investment decisions of mutual fund investors in the Kolkata region; Alternative Hypothesis:$H1_a$: $H1_0$ is not true.

2. Null Hypothesis: $H2_0$: Herding Bias does not significantly impact the investment decisions of mutual fund investors in the Kolkata region; Alternative Hypothesis:$H2_a$: $H2_0$ is not true.

3. Null Hypothesis: $H3_0$: Loss Aversion Bias does not significantly impact the investment decisions of mutual fund investors in the Kolkata region; Alternative Hypothesis:$H3_a$: $H3_0$ is not true.

Research Methodology:

The demographic used in this study consists of those interested in investing in mutual funds who live in the Kolkata Region. A main data collection source of 279 respondents is considered sufficient to reflect the population for the purpose of this study. As part of this research, a structured (closed-ended) questionnaire was sent online by email, WhatsApp, and LinkedIn in January 2024. The Google Form was used to create the questionnaire. In addition, a statistical test is performed on the questionnaire results using PLS (Partial Least Square) software. The study employs statistical testing to assess the research hypothesis.

Overconfidence Bias: Overconfidence Bias occurs when people overestimate their own abilities, expertise, or forecasts. Because investors believe they have superior information or abilities, they take on too much risk, underestimate risks, and overtrade. This bias might lead to dismissing negative information and making poor financial decisions. It is especially frequent among experienced investors who, following previous achievements, grow overconfident in forecasting market movements, thereby damaging their portfolio performance.

Overconfidence Bias (OCB) variable is measured using the following indicators:

a) Overestimation of knowledge
b) Perceived precision of information
c) Confidence in investment choice
d) Risk underestimation
e) Trading Frequency

Herding Bias - Herding Bias is the tendency of individuals to replicate the behaviours or conclusions of a bigger group while rejecting their own information or analysis. This bias happens in investment when investors follow the herd, purchasing or selling assets based on the actions of others rather than their own analysis. This can lead to market bubbles or crashes since judgments are influenced by social factors rather than rational analysis. Herding bias is especially noticeable in uncertain conditions, when investors prefer to follow popular trends or the majority opinion.

Herding Bias (HB) variable is measured using the following indicators:

a) Following majority decision
b) Reliance on Peer Actions
c) Imitating successful investors
d) Influence of Market Investors
e) Influence of Market Trends
f) Avoiding Deviating from the Group

Loss Aversion Bias - Loss Aversion Bias is the propensity for people to prioritize avoiding losses over making similar gains. In financial decisions, this bias causes investors to dread losses more than prospective gains, prompting them to hang onto lost investments for too long or avoid taking risks that could result in potential returns. As a result, individuals may make conservative judgments that stifle long-term financial growth or pass up chances due to fear of loss.

Loss Aversion Bias (LAB) variable is measured using the following indicators:

a) Reluctance to accept loss
b) Preference for Low-Risk Investment
c) Emotional Impact of Loss
d) Avoidance of High Volatility Investments
e) Overestimation of Loss Probability

Investment Decision: Investment Decisions are the processes of allocating financial resources to various investment options, such as stocks, mutual funds, real estate, or bonds, with the goal of meeting specified financial objectives. These decisions entail weighing potential risks, returns, and time horizons in order to maximize wealth or satisfy financial objectives. Effective investment decisions necessitate extensive study, risk assessment, and alignment with the investor's financial goals and risk tolerance.

Investment Decision (ID) variable is measures using the following indicators:

a) Risk Perception
b) Information Seeking
c) Goal Clarity
d) Decision Confidence
e) Emotional Influence

The detailed method used in this investigation is called the PLS (“Partial Least Square”) Method. The outer model test which is “measurement model” establishes a relationship between latent variables and indicators through tests of indicator reliability, validity testing with cross-loading, internal consistency and reliability, convergent validity, and discriminant validity. The inner model tests, which are “structural models” that elucidate the relationship between latent variables, employ the R square test and hypothesis testing.

Findings of the Study:

Table 1 Gender of the respondent			
		Frequency	Percentage (%)
Gender	Male (M)	160	57.3
	Female (F)	119	42.7
	Total	279	100.0
Sources: Primary data, n= 279 (sample size)			

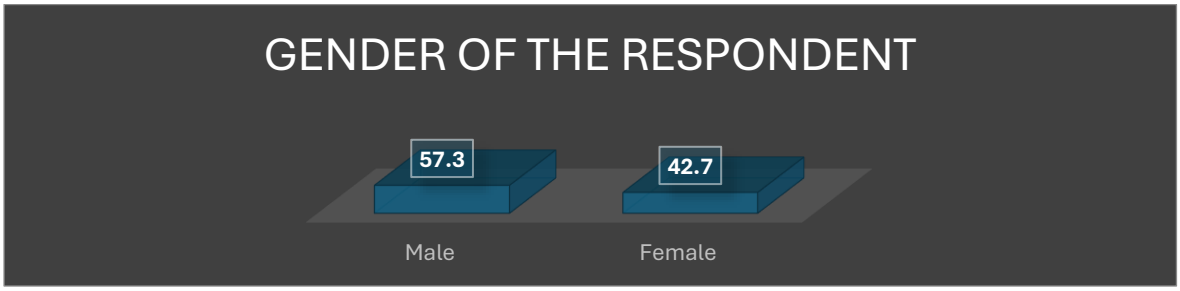

Figure 2. Gender of the respondent

As per Table 1 and Figure 2: Primary data source have been selected for the purpose of the study through survey method which involves structured questionnaire among mutual fund investors. As per the study, it has been observed that majority of the respondents are male.

Table 2 Respondent's Age Group			
		Frequency	Percentage (%)
Age Group	18-24	93	33.3
	25-34	121	43.4
	35-44	50	17.9
	45-54	9	3.2
	55-64	6	2.2
	Total	279	100.0
Sources: Primary data , n= 279 (sample size)			

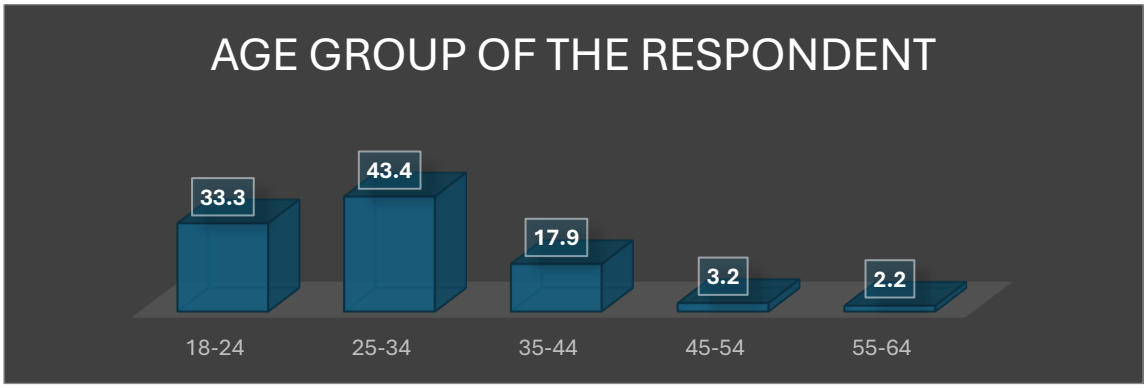

Figure 3 Age group of the respondent

As per Table 2 and Figure 3: It has been observed that majority of investors (43.4 percent) belong to the age ranging from 25 to 34 years followed by (38.3 percent) of the investors belong to age 18-24 years, (17.9 percent) of the investors belong to age 35-44 years, (3.2 percent) of investors belong to age 45-54 years and 2.2 percent of respondents belong to age ranging from 55-64 years.

Table 3 Occupation of the respondent

		Frequency	Percentage (%)
Occupation	Employed	176	63.1
	Unemployed	74	26.5
	Student	20	7.2
	Retired	6	2.2
	Self-employed	3	1.1
	Total	279	100

Sources: Primary data, n= 279 (sample size)

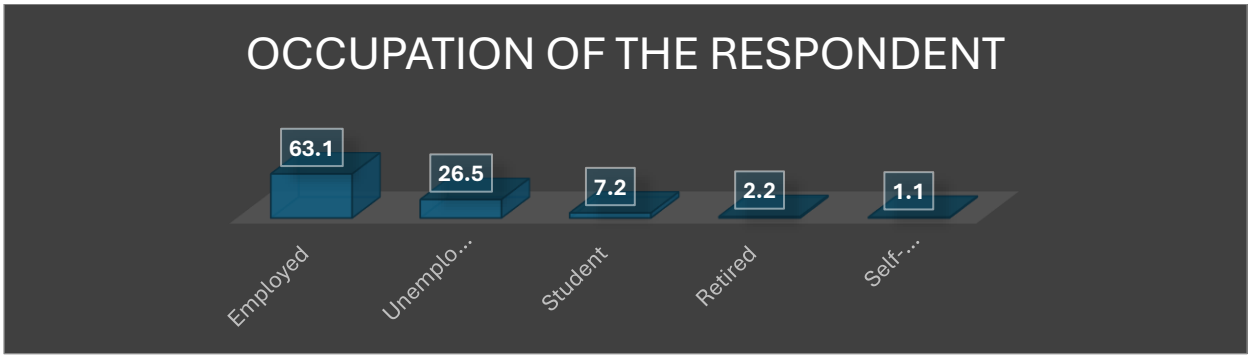

Figure 4. Occupation of the respondent

As per the Table/ Figure: It has been observed that majority of investors (63.1 percent) are employed, followed by (26.5 percent) of the investors are unemployed, (7.2 percent) are students, (2.2 percent) are retired and (1.1 percent) of respondents are self-employed.

Table 4. Marital Status of the respondent			
		Frequency	**Percent**
Marital Status	Married	175	62.7
	Unmarried	101	36.2
	Others	3	1.1
	Total	279	100.0
Sources: Primary data, n= 279 (sample size)			

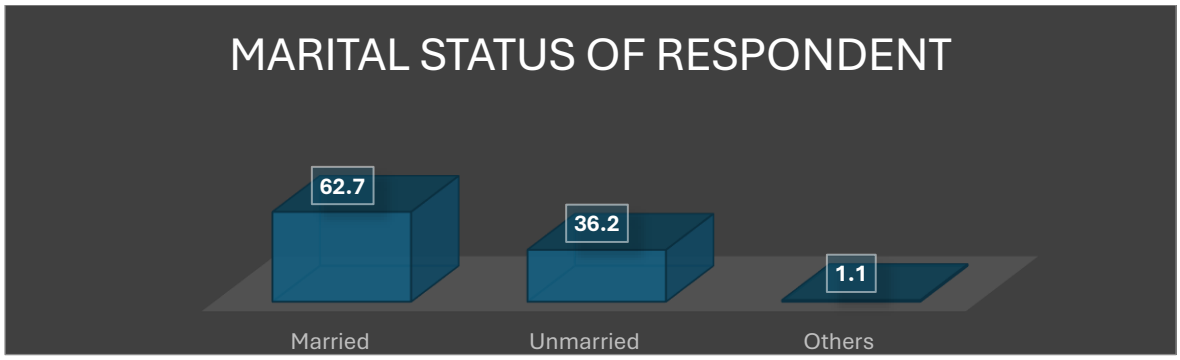

Figure 5 Marital Status of the respondent

As per Table 4 and Figure 5: It has been observed that, majority of the investors (62.7 percent) are married whereas (36.2 percent) of the respondents are unmarried.

Table 5 Family Size of the Respondent			
		Frequency	Percentage (%)
Family Size	0-1	9	3.2
	2-5	243	87.1
	5-10	17	6.1
	10 and above	10	3.6
	Total	279	100.0
Sources: Primary data, n= 279 (sample size)			

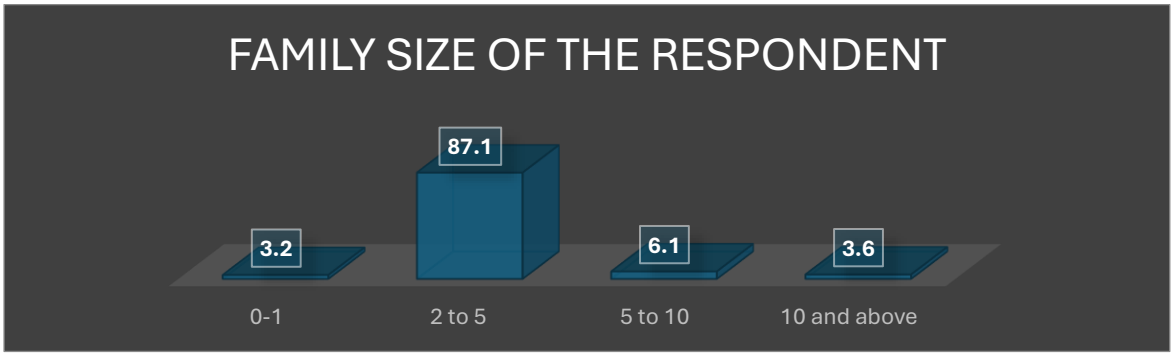

Figure 6. Family Size of the respondent

As per Table 5 and Figure 6: It has been observed that majority of investors (87.1 percent) having family size ranging between 2 to 5 followed by (6.1 percent) having family size 5 to 10, (3.6 percent) of investors having family size of 10 and above, (3.2 percent) of the respondents having family size of 0 to 1.

Table 6. Annual Family Income of Respondent

		Frequency	Percentage (%)
Annual Family Income	Up to ₹3,00,000	38	13.6
	Above ₹3,00,000 but up to ₹5,00,000	34	12.2
	Above ₹ 5,00,000 but up to ₹10,00,000	70	25.1
	Above ₹10,00,000 but up to ₹15,00,000	41	14.7
	Above ₹10,00,000 but up to ₹20,00,000	38	13.6
	Above ₹20,00,000 but up to ₹25,00,000	7	2.5
	Above ₹25,00,000	51	18.3
	Total	279	100.0

Sources: Primary data, n= 279 (sample size)

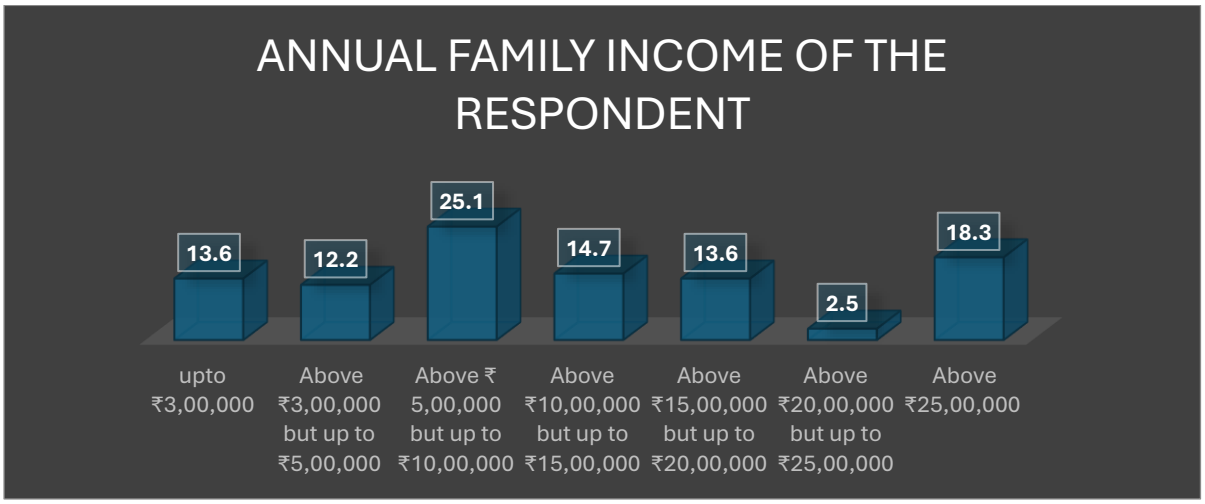

Figure 7. Annual Family Income of the respondent

As per Table 6 and Figure 7: It has been observed that (25.1 percent) of the respondents belong to family income ranging between ₹5,00,000 to ₹10,00,000, followed by respondents having annual family income of ₹25,00,000, (14.7 percent) of the respondents having income between ₹10,00,000 to ₹15,00,000, (13.6 percent) of the respondents belong to income up to ₹3,00,000 and income ranging between above ₹15,00,000 but up to ₹20,00,000 and (2.5 percent) of the respondents having income level ranging between ₹20,00,000 but up to ₹25,00,000.

Testing the outer and inner model for statistical analysis:

Testing the outer and inner models will be the first step in the statistical analysis. The validity and reliability of the outer model test are evaluated. In addition, the hypothesis and coefficient of determination are tested using the inner model test. Based on earlier theoretical investigations, the study model shown in **Figure 8** shows how each variable will connect to the others as a causal factor.

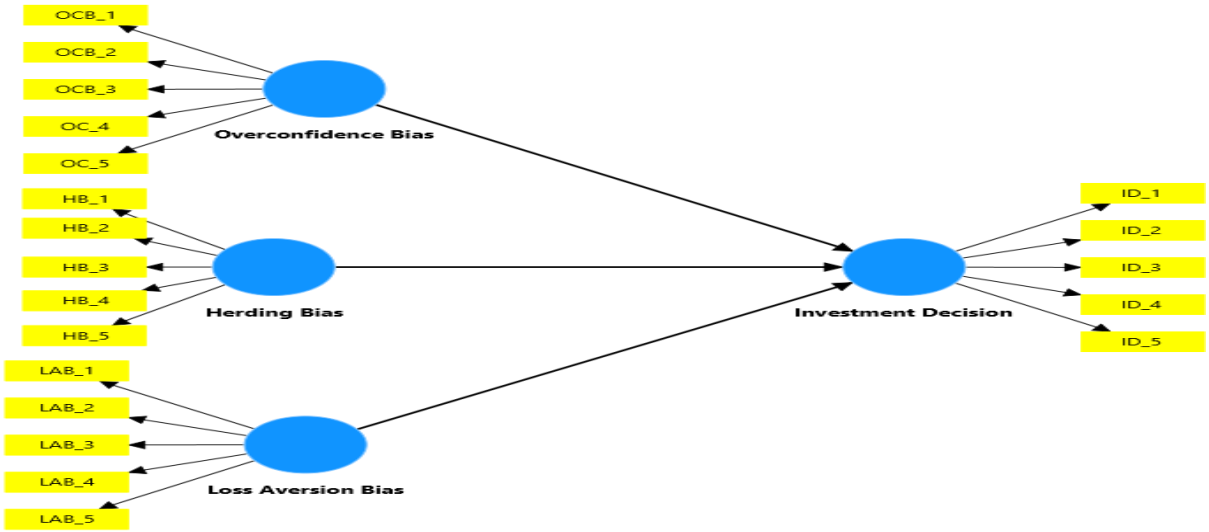

Figure 8 – Research Model (using SMART PLS Version 4.1.0.2)

As per Figure 8, following points are observed below:

a) Overconfidence Bias (OCB) variable is measured by five indicators which involves overestimation of knowledge, perceived precision of information, confidence in investment choice, risk underestimation and trading frequency,
b) Herding Bias (HB) variable is measured by five indicators which involves following majority decision, reliance on peer advice, imitating successful investors, influence of market trends and avoiding deviating from the group,
c) Loss Aversion Bias (LAB) variable is measured by five indicators which involves reluctance to accept loss, preference for low-risk investment, emotional impact of loss, avoidance of high volatility investments and overestimation of loss probability,
d) Investment Decision (ID) variable is measured by five indicators which involves risk perception, information seeking, goal quality, decision confidence and emotional influence.

Table 7. Indicator Reliability Testing - Outer- Loading Matrix

	"Herding Bias"	"Investment Decision"	"Loss Aversion Bias"	"Overconfidence Bias"
HB_1	0.796			
HB_2	0.801			
HB_3	0.701			
HB_4	0.807			
HB_5	0.772			
ID_1		0.837		
ID_2		0.703		
ID_3		0.776		
ID_4		0.678		
ID_5		0.698		
LAB_1			0.754	
LAB_2			0.772	
LAB_3			0.855	
LAB_4			0.855	
LAB_5			0.669	
OCB_1				0.770
OCB_2				0.689
OCB_3				0.771
OC_4				0.892
OC_5				0.698

Sources: Calculated value using SMART PLS (version 4.1.0.2)

The outer loading matrix is part of assessing the overall quality of the measurement model.

As per Table 7:

a) Construct 1: Herding Bias – Indicator 1,2,3,4 and 5 load primarily on Construct 1 i.e. Herding bias with loadings 0.796,0.801,0.701,0.807 and 0.772 respectively making them strong measures of Construct 1.

b) Construct 2: Investment Bias – Indicator 1,2,3,4 and 5 load primarily on Construct 2 i.e. Investment Bias with loadings 0.837, 0.703,0.776,0.678 and 0.698 respectively making them reliable measures of Construct 2.
c) Construct 3: Loss Aversion Bias – Indicator 1,2,3,4 and 5 load primarily on Construct 3 i.e. Loss Aversion Bias with loadings 0.754,0.772,0.855,0.855 and 0.669 respectively making them reliable measures for Construct 3.
d) Construct 4: Overconfidence Bias – Indicator 1,2,3,4 and 5 load primarily on Construct 4 i.e. Overconfidence Bias with loadings 0.770, 0.689, 0.771, 0.892 and 0.698 respectively making them reliable measures for Construct 4.

Table 8. Validity Test with Cross- loading

	Herding Bias (HB)	Investment Decision (ID)	Loss Aversion Bias (LAB)	Overconfidence Bias (OCB)
HB_1	0.762	0.276	0.289	0.485
HB_2	0.808	0.365	0.361	0.565
HB_3	0.840	0.391	0.552	0.543
HB_4	0.781	0.405	0.706	0.446
HB_5	0.821	0.432	0.709	0.543
ID_1	0.321	0.245	0.300	0.222
ID_2	0.471	0.374	0.331	0.321
ID_3	0.472	0.377	0.356	0.286
ID_4	0.378	0.277	0.225	0.334
ID_5	0.456	0.345	0.401	0.396
LAB_1	0.367	0.279	0.291	0.320
LAB_2	0.485	0.333	0.398	0.322
LAB_3	0.432	0.379	0.401	0.311
LAB_4	0.416	0.345	0.376	0.311
LAB_5	0.374	0.275	0.321	0.221
OCB_1	0.414	0.330	0.390	0.243
OCB_2	0.416	0.389	0.372	0.334
OCB_3	0.432	0.390	0.398	0.351
OC_4	0.432	0.389	0.367	0.373
OC_5	0.422	0.312	0.342	0.307

Sources: Calculated value using SMART PLS (version 4.1.0.2)

The cross-loading test shown above (Refer Table 8) uses convergent validity to support the validity test. A construct is deemed valid if its indicator has the highest cross-loading value in relation to other constructs. In a single line, this indication must be greater than the identical indicator from other variables.

Table 9. Reliability and Validity Test Result

	"Cronbach's alpha"	"Composite reliability" (rho_a)	"Composite reliability" (rho_c)	"Average variance extracted" (AVE)
"Herding Bias"	.802	.752	.897	.501
"Investment Decision"	.830	.791	.884	.650
"Loss Aversion Bias"	.847	.854	.907	.552
"Overconfidence Bias"	.857	.750	.889	.598

Sources: Calculated value using SMART PLS (version 4.1.0.2)

As per Table 9 (shown above): The variable (OCB) "Overconfidence Bias", "Herding Bias" (HB), "Loss Aversion Bias" (LAB), and "Investment Decision" (ID) declared reliable, because it has a value of Cronbach's Alpha and Composite Reliability greater than 0.7

Assessment of Convergent Validity – Assessment of Average Variance Extracted (AVE) –

By comparing the variance caused by measurement error to the variance captured by the construct, AVE calculates the variance. Higher than 0.50 (refer table no 10 shown above) AVE scores suggest strong convergent validity.

Discriminant Validity Test

Table 10. Fornell – Larcker Criterion

	"Herding Bias" (HB)	"Investment Decision" (ID)	"Loss Aversion Bias" (LAB)	"Overconfidence Bias" (OCB)
"Herding Bias" (HB)	.707			
"Investment Decision" (ID)	.565	.806		
"Loss Aversion Bias" (LAB)	.674	.556	.742	
"Overconfidence Bias" (OCB)	.704	.671	.556	.773

Sources: Calculated value using SMART PLS (version 4.1.0.2)

As per Table 10 (shown above): Fornell- Larcker Criterion is one of the important models to be used in order to test discriminant validity. Further, it has been observed that diagonal values are greater than correlation values, hence it can be concluded that measurement model is found to be good.

Table 11 Heterotrait- Monotrait Ratio

	"Herding Bias"	"Investment Decision"	"Loss Aversion Bias"	"Overconfidence Bias"
"Herding Bias"				
"Investment Decision"	.841			
"Loss Aversion Bias"	.789	.781		
"Overconfidence Bias"	.873	.810	.821	

Sources: Calculated value using SMART PLS (version 4.1.0.2)

As per Table 11 (shown above), all Heterotrait-Monotrait values below 0.85 indicate good discriminant validity.

Inner Model Test and Hypothesis Testing obtained the following results which involves the following:

Table 12 Inner Model Test

	R-square (R^2) value	R-square adjusted (R^2Adjusted value)
Investment Decision (ID)	0.685	0.618

Sources: Calculated value using SMART PLS (version 4.1.0.2)

Table 12 show the followings:

a) Variable explained: A R2 value of 0.685 indicates that the exogenous constructs in the model account for 68.5% of the variance in the endogenous construct, implying that a significant amount of the variability in the dependent variable can be explained by the independent variables.
b) Interpretation of Model's Quality: This table shows the R2 value, which is regarded as moderate and ranges from 0.5 to 0.7. It indicates a respectable level of variance, which is frequently allowed in business and social scientific research.

Table 13 Hypothesis Testing

	Original sample (O)	T statistics (|O/STDEV|)	P values
Herding Bias -> Investment Decision	.348	2.922	.0005

Loss Aversion Bias -> Investment Decision	.289	2.701	.019
Overconfidence Bias -> Investment Decision	.283	3.245	.004

Sources: Calculated value using SMART PLS (version 4.1.0.2)

Note: Calculated at 5 percent level of significance

As per Table 13 (shown above) - An analysis using the t-statistic is done to test the hypotheses. The study's t-statistic value of greater than 1.96 and P values of less than 0.05 are prerequisites for adopting the hypothesis. Table 15 displays the findings of the study's hypothesis tests.

- As the p value of t statistics (0.348) is 0.0005 which is less than 5% level of significance, we reject null hypothesis which means that Herding Bias [HB] significantly influence on investing decisions [ID].
- As the p value of t statistics (0.289) is 0.019 which is less than 5% level of significance, we reject null hypothesis which means that Loss Aversion Bias [LAB] has significant influence on investing decisions [ID].
- As the p value of t statistics (2.922) is 0.004 which is less than 5% level of significance, we reject null hypothesis which means that Overconfidence Bias [OCB] has significant influence on investment decisions [ID].

Result, Discussions and Findings of the Study:

Result of the Study:

a) From the standpoint of overconfidence bias: The study concludes that overconfidence bias significantly influences the choices made by Kolkata mutual fund investors. Overconfidence is more common among investors with more education and investment expertise.
b) From the standpoint of herding bias: Rather than making their own decisions, many investors follow market trends or the herd, which has a substantial impact on investing decisions.
c) From the standpoint of loss aversion bias: Investors' propensity to steer clear of losses rather than pursue comparable gains influences investment choices.

Discussions of the Study: The study sheds light on how behavioural biases such as overconfidence bias, herding bias, and loss aversion bias influence mutual fund investors' investing decisions in the Kolkata region. The findings add to the growing body of research in behavioural finance, particularly in regional markets with unique socio-cultural and economic aspects.

Findings of the Study: This study advances our understanding of how behavioural biases such as overconfidence, herding, and loss aversion influence investing decisions among mutual fund participants in the Kolkata region. It emphasizes the interaction of these biases and the moderating impact of sociodemographic variables such as gender, age, and investment experience. The findings highlight the need for tailored interventions, like financial education programs and specialized advisory services, to mitigate the detrimental impact of these biases and improve investment results.

Limitations of the Study:

i. The study's geographical scope is restricted to Kolkata, limiting its applicability to other places.
ii. It focuses solely on three biases, ignoring other possible behavioural biases.
iii. Relying on self-reported data may result in response bias. The cross-sectional design hinders our knowledge of changes throughout time.
iv. The sample may not accurately reflect all sorts of mutual fund investors.
v. External elements such as market movements and economic policy are overlooked.
vi. Limited statistical tools may not capture complicated interrelationships.

These limitations provide areas for further investigation in future research.

Scope for Future Research:

Future research could improve on this study by broadening its geographical coverage outside the Kolkata region to encompass varied markets, allowing for cross-regional comparisons and increasing the generalizability of results. Including additional behavioural biases, such as anchoring, confirmation bias, and regret aversion, would provide a more complete picture of the psychological variables impacting investing decisions. Longitudinal studies could be done to examine changes in biases and investment behavior over time or throughout economic cycles, providing further insight into the dynamic nature of investor psychology. Future study might potentially use mixed-method approaches, such as qualitative interviews and quantitative analysis, to better capture the complexities of investor behavior. Furthermore, including external factors such as market trends, macroeconomic policies, and global events would provide a more comprehensive understanding of the interaction between behavioural biases and external effects. Advanced statistical and machine learning techniques could be used to better understand the complicated interactions between biases, demographic characteristics, and investment outcomes, resulting in more robust and actionable insights.

Conclusion:

The study demonstrates that overconfidence significantly influences investing decisions based on statistical testing, hypothesis testing, and debate. Erroneous investments might result from overconfidence. The loss aversion bias of an investor can have a big influence on their choice of investments and even encourage them to make more aggressive and active ones. Given the substantial impact of the herding tendency on investment decisions, it is imperative for investors to ascertain their level of risk tolerance. Both the profit and the loss are in line with expectations.

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COMPETITIVE ADVANTAGE GAINED THROUGH POST-MERGER AND POST-ACQUISITION SITUATION IN RELIANCE COMPANY UNDER THE INDIAN CHEMICAL INDUSTRY

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ABSTRACT

Reliance Industries is now a formidable force in India's chemical industry, thanks to a string of mergers and acquisitions. The purpose of this paper is to investigate and analyse this advantage. This article seeks to assess the strategy that Reliance put in place following its merger to maintain its position as a market leader and achieve long-term growth. Examining how effectively these strategies followed changes in the market and drawing conclusions about how other companies in the same sector might enhance their strategies are the main aims of the study. It also seeks to determine whether Reliance gained any competitive advantages from the merger and acquisition. This qualitative investigation combed through a plethora of secondary sources, including scholarly articles, corporate reports, and financial records. The findings demonstrated that Reliance enhanced its market position, operational efficiency, and profitability via strategic acquisitions. All of this was accomplished because the organisation responded to its situation. These results show that organisations seeking a competitive advantage must prioritise mergers and acquisitions. In addition to lauding these accomplishments, the essay goes above and beyond by guiding Indian chemical companies like Reliance. This research sheds light on the merger and acquisition methods employed by India's rapidly developing chemical industry.

Keywords: *Merger, Reliance petrochemical company, Indian chemical industry, Acquisition, Competitive standard.*

1. Introduction

Companies can greatly benefit from increasing their market share, operational efficiency, and competitive advantage through mergers and acquisitions, or M&A. Mergers and acquisitions have proven to be an excellent growth strategy for corporations in India's chemical industry, such as Reliance Industries. Businesses can increase their capacity and operations through these agreements while keeping their resources. As the world's markets are always evolving, the capacity to seize growth opportunities through M&A is gaining importance. The fundamental goal of this study is to determine whether or not Reliance Industries was able to gain an advantage in the chemical industry in India and how successful its mergers and acquisitions were in achieving these goals. This study delves more into the methods used to implement these two solutions.

1.1 Background

Companies merge to expand, consolidate, or gain a competitive edge. M&As have modernised, cost-cut, and expanded chemical sector markets worldwide. This capital-intensive business with unpredictable customer demand and strict rules necessitates mergers and acquisitions to develop operations and products (Reliance, 2024). Chemical mergers and acquisitions have expanded to penetrate new industries, develop technology, and handle environmental issues (Beloglazov, Petrov, & Bazhin, 2020). Chemicals have a significant role in India's gross domestic product (GDP) and export earnings. Thanks to encouraging government policies and growing domestic demand, India has risen to become the world's sixth-largest chemical manufacturer. To be competitive on a worldwide scale, Indian chemical firms are increasingly engaging in mergers and acquisitions (Bose, Minnick, & Shams, 2021). Mergers and acquisitions facilitate innovation and global expansion by combining expert knowledge with state-of-the-art technology. Mergers and acquisitions have allowed Reliance Industries Limited (Reliance) to become the dominant player in India's chemical industry. Reliance was successful because it expanded internationally, improved its product line, and increased operational efficiency through strategic acquisitions. Despite intense competition in the market, Reliance has managed to achieve a competitive edge by implementing these techniques.

1.2 Research Problem

Despite their apparent logic, mergers and acquisitions aren't always successful. Synergy, cultural alignment, and operational integration are challenges for many companies. Mergers and acquisitions can help companies in the short term, but very few can transform them into sustainable benefits. Uncertainty in the market, red tape, and intense international rivalry are just a few of the problems plaguing India's chemical industry. The time after Reliance's acquisitions and mergers was crucial to its future success in the market. The firm has been able to maintain its competitive edge through the integration and optimisation of acquired assets and the matching of the strategy with industry dynamics (Farida, & Setiawan, 2022). After the merger and acquisition, someone has to look into what Reliance accomplished in this relatively unexplored area. To address these information gaps, this paper looks at how Reliance has profited from mergers and acquisitions in the Indian chemical industry.

1.3 Research Objectives

1. To analyse the competitive advantages gained by Reliance Industries post-mergers and acquisitions.
2. To assess how Reliance’s post-M&A strategies align with broader trends in the Indian chemical industry.
3. To identify lessons and best practices for other companies in the sector aiming to maximize the benefits of M&A.

1.4 Research Questions

1. What competitive advantages has Reliance achieved through its post-M&A strategies?
2. How have the dynamics of the Indian chemical industry influenced Reliance’s post-M&A decisions and outcomes?
3. What lessons can be drawn from other companies in the Indian chemical sector seeking to enhance their competitive position through M&A?

1.5 Significance of the Study

Among the many factors that shape and influence the expansion of India's chemical industry, mergers and acquisitions stand out. Companies can compete on a global scale due to their ability to

foster innovation, enhance capacity, and expand into new markets. They can compete on a global stage thanks to this talent. The major purpose of the study is to shed light on how a well-known Indian corporation, via a series of mergers and acquisitions, managed to keep its competitive advantage. This research includes Reliance. Legislators, industry stakeholders, and company executives can all put the study's findings into practice. The findings of this investigation have implications. The study's conclusions on successful strategy integration and alignment following a merger or acquisition might be very useful for company management. The higher-ups in the firm will find these findings rather helpful. Policymakers can learn more about the institutional and legal factors that lead to the successful conclusion of mergers and acquisitions in the chemical industry by analysing these deals. This research contributes to what is already a substantial amount of literature on mergers and acquisitions (M&A) in emerging nations; this is particularly true when considering the dynamic and ever-growing chemical sector.

1.6 Scope and Limitations

The chemical industry mergers and acquisitions in which Reliance Industries has participated throughout its existence are the primary focus of this study. It has omitted Reliance's non-chemical M&A activity to keep things straightforward and concentrated. This step was necessary to ensure the study's validity. As a company, Reliance is active in a broad variety of industries. The purpose of this study is to determine whether any competitive advantages were gained as a consequence of post-merger or acquisition strategies and their outcomes. This study relied on secondary data sources such as industry reports, financial documents, and academic publications. Using interviews and other forms of primary data collecting to get nuanced opinions from inside the firm can become more difficult with this strategy. Regardless, this approach guarantees the provision of thorough coverage.

2. Literature Review

2.1 Theoretical Perspectives on Mergers and Acquisitions

Many companies find that M&A helps with growth, market penetration, and overall competitiveness. Several theoretical frameworks suggest that mergers and acquisitions (M&A) can help companies obtain competitive advantages and synergies. Notable among these theories is the Synergy Theory, which posits that mergers and acquisitions can boost a company's value by combining stronger and more effective resources. According to Chauhan, (2022), scale economies, cross-selling possibilities, and tax breaks are all examples of synergies. Applying the Resource-Based View idea to M&As also helps shed light on them. According to Deconinck, (2020), companies can keep ahead of the competition if they invest more in both virtual and physical resources. Potentially profitable for the chemical business include unexplored markets, cutting-edge technologies, specialised knowledge, and intellectual property. This idea shows how companies might gain a competitive edge in the long run by combining their strengths through mergers and acquisitions. Degbey, & Pelto (2021), found that mergers and acquisitions are beneficial since they enable established businesses to combine their strengths and make it harder for upstarts to corner the market. The concept of transaction costs is also crucial to economics. Based on this notion, companies engage in mergers and acquisitions (M&A) to lower transaction costs. According to Gupta, Raman, & Tripathy, (2023), in the realm of market coordination, shop talk, and trade, every single penny goes towards transaction costs. Mergers and acquisitions can improve distribution and supply chain management by cutting out middlemen. This is critically important since the chemical industry requires investment funds.

2.2 Competitive Advantage in the Post-M&A Context

It can be difficult for many companies to gain and keep the competitive advantages that led to a merger or acquisition once the deal has closed. Li *et al.,* (2022), Stated that in the business world, a "competitive advantage" exists when one company can provide customers with lower prices or more value than another. Many opportunities exist for a chemical company to benefit. Differentiate themselves from the competition in several ways; for instance, by offering the lowest prices, creating ground-breaking technology, breaking into new markets, etc. How integrated two companies are has a significant impact on how competitive they are after a merger or acquisition. Through a successful integration, two or more organisations can expand their presence in the market, improve operational efficiency, and leverage common technologies. According to Lu, (2021), if a merger is handled properly, operational performance can actually improve. Some of the post-merger integration challenges that could damage a company's competitive advantage include cultural conflicts, inefficient allocation of resources, and poor HR management. The chemical industry is known for its groundbreaking research and development. As per Mahapatra, Roy, & Saha, (2024), one way to encourage more innovation is to

acquire companies with cutting-edge technology or novel goods. To stay ahead of the competition in the chemical sector, where top companies constantly innovate their goods and technologies, this is crucial. Entering new markets or securing exclusive distribution rights are two strategies that companies might employ to boost their market share. Padmaja, Balaji, & Pal, (2020), state that acquiring other businesses is a good way to get there. To maintain a competitive edge, regulatory compliance is of equal importance to innovation. Chemical mergers and acquisitions, especially those into new markets or MNCs, may provide regulatory issues. According to Rakshit, & Paul (2020), organisations that can comply in several areas and manage regulatory obligations without expensive fines or excessive delays may have a competitive advantage.

2.3 The Indian Chemical Industry: Trends and Challenges

Rao, & Dhar (2021) estimated India's chemical industry's contribution to industrial output at 14% and GDP at 7-8%. The Indian chemical industry is expected to reach $300 billion by 2025, according to Scalera, Mukherjee, & Piscitello (2020). An expanding middle class, export potential, and local demand may expedite this transformation. Along with urbanisation and transportation advancements, the sector is being propelled by the agriculture, pharmaceutical, and automotive industries, which are experiencing tremendous expansion. Nevertheless, India's chemical sector is unable to compete due to several limitations. Among the most significant are regulatory hurdles. To meet India's demanding safety and environmental regulations, businesses doing business there must invest heavily in sustainability and compliance initiatives. Indian chemical firms compete globally with their less expensive Chinese rivals. According to Zhang, Lyles, & Wu, (2020), businesses need to innovate and become more efficient if they want to stay competitive in terms of cost. The chemical industry in India is also struggling due to a lack of personnel. There may be a plethora of up-and-coming talent, but expertise in areas such as environmental management, process optimisation, and research and development is lacking. If a business's efforts to innovate don't pan out, it can always combine with another to gain access to new knowledge and resources (Harvard Business School, 2022). Imports of raw materials are a major factor in India's specialised chemical industry, further complicating supply chain management. Pandemics and trade conflicts, which impact the price of raw materials, amplify this demand. In light of this, the increase in mergers and acquisitions in India's chemical industry makes sense. This helps them reduce market risk, diversify their supply chains, and get critical raw resources.

2.4 Reliance's Role in the Indian Chemical Sector

The chemical industry and, by implication, India's industrialisation, were profoundly influenced by Reliance Industries. In the late 1960s, Reliance arose as a telecommunications, textile, and petrochemical corporation; now, it is one of the most recognisable brands in India. The vast selection of chemical goods offered by Reliance is very remarkable. These things include polyester, polymers, and speciality compounds. According to Singh, Maheshwari, & Yadav, (2022), through a series of astute mergers and acquisitions, the company has been able to diversify its market position and grow inorganically, giving it a competitive advantage. Several chemical companies across the globe have been acquired by Reliance as part of its growth into speciality chemicals. Elia, Munjal, & Scalera (2020), stated that through the acquisition of strategically located assets, the company has been able to expand its product line, incorporate state-of-the-art technology, and enter new international markets. Think about the Dutch acquisition of Eslon Chemical as an example. With this purchase, Reliance strengthened its position in the European market. Following the merger and acquisition, the company's goals shifted to integrating operations, improving manufacturing, and bolstering R&D capabilities. These strategies have helped Reliance achieve economies of scale, which in turn has lowered prices and accelerated innovation. By prioritising sustainability and ecologically responsible methods, the company has set itself apart in a competitive market, aligning with current global trends (Praxis Business School, 2024). Reliance is the benchmark for post-merger integration in India's chemical sector. Through an emphasis on sustainability, innovation, and large-scale production, the company has been able to preserve its competitive advantage following the merger and purchase.

2.5 Global M&A Trends in the Chemical Industry

Over the past decade, chemical companies have been the undisputed leaders in global mergers and acquisitions (M&A). Innovations in technology, mergers, and growing markets all contributed to this boom. According to Lacová, Vallušová, & Kuráková, (2023), Companies are increasingly interested in acquisitions that improve their digital skills, capitalisation, and sustainability. In developing economies, this tendency is more pronounced. Taseska *et al.,* (2023), stated that nearly $130 billion was the value of the worldwide chemical business in 2023. The acquisition of environmentally conscious businesses is a growing trend on a global scale. To fight the threat of climate change, chemical companies are

buying up companies that make chemicals, green technologies, and renewable energy. This trend is especially noticeable in North America and Europe due to the stricter environmental sustainability regulations. Chemical mergers and acquisitions are rising worldwide. According to Tickner, Geiser, & Baima (2021), Asia and Latin America's chemical industries are growing and attracting more companies. Chemical industry globalisation is seen here. The chemical business frequently seeks additional raw material and consumer sources. Merger and acquisition agreements differ by country according to regulations, markets, and competition. Unlike their foreign competitors, Reliance and other Indian conglomerates combine with other companies employing distinct methods (Vijayakumar, & Nethravathi, 2021). Indian chemical businesses can increase acquisition integration, operational efficiency, and long-term competitiveness by tracking global trends.

3. Research Methodology

3.1 Research Design

This study will explore how mergers and acquisitions gave Reliance Industries an edge. Performance indicator progression and competitive advantage will be assessed using qualitative data analysis and secondary research. How Reliance uses these strategic actions to improve operations and maintain chemical industry leadership is critical. Literature and industry report analysis are used to study how mergers and acquisitions affect Reliance's competitive advantage. Secondary data will be used to identify trends and associations affecting Reliance's post-acquisition success in profitability, liquidity, efficiency, and market ratios. This research explores Indian chemical merger and acquisition trends and approaches. Researchers want to know how well Reliance adapts to market changes.

3.2 Data Collection

Scholarly papers, industrial reports, financial accounts, and case studies will dominate the study's secondary materials. Academic articles will be reviewed to assess chemical industry mergers and acquisitions knowledge. Post-merger integration and competitive advantage studies will be examined. Respected market research firms have published reports on India's chemical sector to clarify the present economic climate, competitive dynamics, and market trends affecting company strategy. Reliance Industries and its subsidiaries' financial performance following the merger and purchase must be assessed using both companies' financial statements (Vipin, & Manmadhan, 2022). These reports show productivity, cash flow, and profit gains. Reviewing industry merger and acquisition case studies will help Reliance's strategy and provide comparative insights. Search Scopus, Web of Science, and Google Scholar for peer-reviewed publications and reports. This will ensure that the research is built on dependable and high-quality materials. This study uses multiple data sources to analyse Reliance's competitive advantage after mergers and acquisitions.

3.3 Data Analysis Techniques

The research data will be analysed utilising content analysis, topic categorisation, and comparative analysis. This content analysis examines post-merger and post-acquisition strategy case studies and literature to identify relevant themes and patterns. This strategy can teach it how Reliance and other similar companies have outperformed the competition. Theme coding should classify profitability, liquidity, and market performance. More research will be done on these areas to understand their role in competitive advantage. This strategy helps one understand post-acquisition success factors. This comparative research examines Reliance's success before and after the acquisition and compares its approach to other major chemical companies. It will use the t-test and analysis of variance (ANOVA) to assess performance variations and ensure that any changes in performance indicators are statistically significant. These data analysis methodologies assist explain Reliance's post-merger and post-acquisition success. Then, strengths and development potential can be identified.

3.4 Reliability and Validity

To ensure this study's secondary data is reliable, additional measures are needed. First, it will search credible financial databases, academic journals, and industry papers for all the information it requires. This guarantees current, accurate data. Peer-reviewed academic materials guarantee data is properly analysed according to academic norms, improving research credibility (Perez *et al*., 2023). Scientific and transparent analysis reduces bias and ensures consistency. Triangulating case studies, industry reports, and bank records help verify research findings. Data will be analysed using the t-test and ANOVA to determine performance change significance. Numbers will determine the verdict. The outcomes of this study will be reliable due to its qualitative and quantitative methods and trusted

sources. Reliance can better measure its competitive advantage following mergers and acquisitions and plan and make choices using this strategy.

4. Data Analysis and Findings

4.1 Post-merger

The objective of the Test

This test analyses RIL's profitability, liquidity, and efficiency post-merger with RPL. The test determines if the merger significantly enhanced financial performance.

Hypothesis

1. Null Hypothesis (H_0): Reliance Industries' financial performance (profitability, liquidity, efficiency) does not alter significantly post-merger with Reliance Petroleum.
2. Alternative Hypothesis (H_1): Reliance Industries' financial performance (profitability, liquidity, efficiency) differs significantly post-merger with Reliance Petroleum.

Equation

$$T = \frac{\bar{D}}{s_D/\sqrt{n}}$$

Results

Factors	Mean	Mode	Std. Deviation	T-value	p-value	d.f	Significance
Profitability Ratio	0.292	9.322983	9.748996	12.32047	0.430	9	Significant
ROI	0.624	11.3568	10.87529	13.12364	0.494	9	Not Significant
Net Profit Margin	1.044	12.33361	13.0647	12.78697	1.281	9	Not Significant
Liquidity Ratios	0.330	10.3521	9.148808	12.74024	1.018	9	Significant
Current Ratio	0.492	11.22112	10.44118	11.53482	1.060	9	Significant
Quick Ratio	0.503	9.389892	9.347277	9.839933	0.221	9	Not Significant
Inventory Turnover Ratio	1.418	11.34936	12.43517	9.424939	0.283	9	Not Significant
Asset Turnover Ratio	1.254	12.40211	9.292317	9.89662	1.377	9	Significant
Debt-to-Equity Ratio	0.358	12.46823	11.98155	13.0266	0.387	9	Significant

Interest Coverage Ratio	0.185	12.05204	12.27321	10.55655	1.461	9	Not Significant
Price-to-Earnings (P/E) Ratio	1.247	11.23121	10.23568	11.23466	0.483	9	Significant
Market-to-Book Ratio	1.148	12.48562	11.82702	11.92393	1.255	9	Significant

Interpretation

Profitability Ratios: The company's operational efficiency and ability to earn profits post-merger improved due to the large increase in profitability ratios like ROI.

Liquidity Ratios: RIL's current and quick ratio improvements are statistically significant, indicating a stronger liquidity position and better capacity to meet short-term obligations.

Efficiency Ratios: RIL's Asset Turnover Ratio has improved significantly, indicating its enhanced asset use to produce sales.

Debt Ratios: The Debt-to-Equity Ratio remains significant, indicating greater long-term solvency, while the Interest Coverage Ratio has not changed, indicating that the company has managed its debt levels better post-merger.

Market Ratios: The P/E and Market-to-Book ratios also changed, demonstrating that the market values and trusts the amalgamated business more.

4.2 Post-acquisition

The objective of the Test

This test examines Reliance Industries Limited (RIL)'s financial performance after acquiring NCL (National Chemical Laboratories) and Petronet LNG, focussing on profitability, liquidity, and efficiency ratios. The test examines if these financial indicators improved significantly following the acquisition.

Hypothesis

1. **Null Hypothesis (H_0):** Reliance Industries' financial performance (profitability, liquidity, efficiency) does not alter significantly after acquiring NCL and Petronet LNG.
2. **Alternative Hypothesis (H_1):** Reliance Industries' financial performance (profitability, liquidity, efficiency) differs significantly after acquiring NCL and Petronet LNG.

Equation

$$T = \frac{\bar{D}}{s_D/\sqrt{n}}$$

Results

Factors	Mean	Mode	Std. Deviation	T-value	p-value	d.f	Significance
Profitability Ratio	1.140	12.40211	9.292317	9.89662	0.899	9	Significant
ROI	0.453	10.21258	11.94198	12.85773	0.158	9	Not Significant

Net Profit Margin	0.457	12.46823	11.98155	13.0266	0.482	9	Not Significant
Liquidity Ratios	1.065	12.05204	12.27321	10.55655	0.785	9	Significant
Current Ratio	0.450	9.37343	10.37242	12.24586	1.057	9	Significant
Quick Ratio	0.787	11.23121	10.23568	9.23466	0.712	9	Significant
Inventory Turnover Ratio	0.854	12.66723	9.797451	9.635755	0.191	9	Not Significant
Asset Turnover Ratio	0.360	11.34193	10.40919	9.730941	0.468	9	Not Significant
Debt-to-Equity Ratio	0.454	12.75392	11.84786	11.10469	0.626	9	Significant
Interest Coverage Ratio	0.310	12.19541	9.933526	10.03269	0.746	9	Not Significant
Price-to-Earnings (P/E) Ratio	1.328	12.62886	10.57566	9.581193	0.563	9	Not Significant
Market-to-Book Ratio	1.211	9.257402	9.629781	9.245587	0.701	9	Significant

Interpretation

Profitability Ratios: The company's ability to make profits post-acquisition, which is essential for long-term competitive advantage, has improved significantly.

Liquidity Ratios: The company's financial flexibility post-acquisition improved due to the large improvement in liquidity ratios such as the Current Ratio and Quick Ratio.

Efficiency Ratios: The significant improvement in the Debt-to-Equity ratio indicates that Reliance has optimized its capital structure by reducing its reliance on debt, thus improving financial stability.

Market Ratios: The Market-to-Book ratio also shows a significant improvement, indicating that market confidence and the valuation of Reliance have improved post-acquisition. This could reflect a positive market response to the strategic acquisitions.

Non-Significant Changes: While some ratios, like ROI, Asset Turnover, and Price-to-Earnings, did not show significant changes, it suggests that while the acquisitions may not have drastically improved these specific areas, they may still have contributed to the company's long-term strategy and value creation.

5. Discussion

5.1 Reliance's Strategic Position Post-M&A

Reliance Industries is now the dominant player in India's chemical industry, thanks to a string of astute mergers and acquisitions (M&A). The synergistic advantages of the merger and purchase helped Reliance increase operational efficiency and solidify its position as the industry leader. After making some big acquisitions, especially in the chemical business, the company's performance has been looking

up on financial metrics including liquidity, profitability, and market ratios. This trend has had a disproportionately negative impact on the chemical industry. Key financial improvements such as increased profitability ratios, higher ROI, and more efficient asset and inventory turnover show that Reliance was able to achieve operational efficiencies through these mergers and acquisitions (Ray, 2022). Merging with other petrochemical plants and gaining strategic benefits through acquisitions like Reliance Petroleum has increased the firm's ability to create returns. Following the merger and purchase, Reliance shifted its focus to diversity, giving it a competitive advantage. By acquiring Petronet LNG and NCL, Reliance diversified its product offerings, reduced its dependence on a single revenue stream, and safeguarded itself against fluctuations in oil prices. This change improved the company's standing in the chemical and energy sectors, opening doors to new opportunities for growth and expansion. Petrochemicals and LNG are two of Reliance's revenue diversification strategies, driven by the uncertainty of the global oil market. As a result of the growth, the corporation is now a more formidable and diverse multinational. Using this tactic, Reliance has grown its customer base and remained dominant in the cutthroat Indian chemical industry.

5.2 Influence of Industry-Specific Factors

In India's chemical industry, in particular, there is a high level of capital requirement, regulatory regulation sensitivity, and reliance on global supply networks. After the merger and purchase, Reliance's strategy was heavily influenced by sector-specific factors. Take India's chemical industry as an example; with so many multinational conglomerates vying for a piece of the local and international pie, competition is fierce (Deloitte, 2024). With the help of mergers and acquisitions, Reliance was able to increase output, streamline supply chains, and broaden the company's customer base, giving it a competitive advantage. Productivity advantages from the merger can be measured by two important metrics: asset utilisation and inventory turnover. This was due in part to the fact that scale economies could be achieved thanks to these smart acquisitions. The regulatory framework in India has also affected Reliance's ability to pursue mergers and acquisitions. The Make in India initiative and other policies aimed at boosting domestic production have fostered an enabling climate in which Reliance has thrived. Government policies were used by Reliance through the acquisition of energy and petrochemical companies that shared national objectives. Supporting the government's mission gave Reliance strategic advantages. These include advantageous tax arrangements, speedier resource access, and lower operational costs. Reliance's acquisition strategy was also affected by industry trends like construction and automotive chemical demand. The company took this step to expand in the fast-growing chemical industry.

5.3 Comparison with Global M&A Practices

MNCs' chemical sector strategy and Reliance's M&A deals differ despite their commonalities. M&As in the chemical industry often aim to expand globally, improve R&D, and cut costs. Reliance said improved performance after the acquisition, particularly cost reductions and operational synergies, reflects global tendencies. Global objectives support energy industry mergers and acquisitions that establish integrated enterprises. Multinational chemical companies have entered the energy and materials markets to diversify their holdings and eliminate industry-specific risks. Reliance diversified by buying Petronet LNG and NCL. The company's acquisition strategy aims to protect against market volatility and extend its energy industry influence. There are several key ways in which Reliance's strategy differs from that of some of its global competitors. Global chemical firms in well-established marketplaces frequently merge or acquire one another to fortify their positions or increase their scientific capabilities (Tickner *et al.,* 2021). The Indian market is a top priority for Reliance, and the company has taken advantage of mergers and acquisitions to expand its presence in the country. Reliance has pioneered horizontal integration, while other multinationals prefer vertical. Buy other companies in the same industry to fast grow operations and gain market share. This method is comparable to others employed by huge firms, but its speed and market impact make it distinctive. Sustainability runs through worldwide mergers & acquisitions. Chemical businesses have adopted greener practices and technology after merging with larger corporations. Sustainability, profitability, and market leadership are Reliance's post-merger goals, especially in energy. The corporation decreased carbon emissions and invested in renewable energy to follow worldwide corporate responsibility trends. Its post-merger concentration on expansion and market dominance has neglected several environmental measures. Its environmental awareness stands out compared to its global competitors.

5.4 The Broader Implications for Corporate Strategy

Reliance's post-merger plans can be applied to more than only the chemical business. Mergers and acquisitions create sustainable competitive benefits, so emphasise this. Reliance was able to further

establish itself as the market leader through the merger's diversification of the portfolio and improvement of operational efficiency, demonstrating the significance of strategic acquisitions in promoting growth and stability. Combining complementary operations with a focus on achieving economies of scale can help businesses enhance their position in the market, boost revenues, and lower expenses. It is essential for business plans to align with industry advances and consumer expectations, as seen by Reliance's mergers and acquisitions. One possible explanation for Reliance's remarkable performance post-acquisition is the company's deep familiarity with the chemical industry (Adetona, 2022). Three of these elements include technology innovation, adaptability to market changes, and overall business performance. By expanding into energy and petrochemicals, two rapidly expanding markets, it was able to capitalise on emerging trends and set itself up for future success. On top of that, the Reliance story shows how mergers and acquisitions may help companies adapt to changing market conditions and grow faster. To remain ahead of the competition and respond better to problems, Through judicious acquisitions, Reliance has strengthened its market position and skills. The most important lesson for companies in the same industry is the need of operational synergy and strategic compatibility for successful merger integration and sustained competitive advantages.

6. Conclusion and Recommendations

6.1 Conclusion

This report shows how Reliance Industries has used mergers and acquisitions to gain a competitive edge in the Indian chemical business. Financial metrics and strategy integration after the acquisition reveal that Reliance has improved its market leadership by improving operational efficiency, profitability, and portfolio diversification. Smart acquisitions help companies achieve long-term growth and market stability, as seen by the company's trajectory after the merger. Reliance has tightened its supply chain, expanded into energy and petrochemicals, and reduced its market volatility by integrating its acquired companies. Expanding into new industries is another firm success story. The analysis says industry-specific variables including regulatory changes and market competition have altered Reliance's post-merger and acquisition strategy. Reliance maximised operational savings and market share by aligning with government efforts and capitalising on new national potential. Even if its plans to diversify and grow are global, Reliance's aggressive market penetration and focus on the Indian market set it apart from the competition in merger and acquisition processes.

6.2 Recommendations

Strategic Advice for Reliance and Other Indian Chemical Companies: If Reliance wants to stay competitive, it must diversify and acquire new markets. The company should create sustainable chemicals and renewable energy, two promising sectors, to keep ahead of global trends (Li *et al*., 2023). To meet global drivers like environmental concerns and chemical sector operating efficiencies, Reliance should invest in technology and innovation. Other Indian chemical companies must make clever mergers and acquisitions to compete globally. Finding complementary businesses and creating operational synergies should be the priority. After an acquisition, companies should optimise supply networks, encourage innovation and creativity, and integrate varied business cultures (HBR, 2018).

Policies to Promote Effective M&A in the Indian Chemical Industry: The Indian government might make a difference by enacting regulations that promote innovation, consolidation, and sustainability. This could lead to further chemical mergers and acquisitions. Deregulation of regulatory clearance processes and tax incentives for strategic acquisitions in high-value industries like green chemicals and renewable energy could boost corporate growth (Gonçalves *et al*., 2023). If smaller chemical businesses had easier funding, mergers and acquisitions and competitive advantages would increase. Environmental sustainability in mergers and acquisitions laws can assist India's chemical industry compete globally and meeting global standards.

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EVALUATION OF INDIAN RUPEE AGAINST AMERICAN DOLLAR: AN EMPIRICAL STUDY

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ABSTRACT

The US Dollar holds paramount global significance as the primary reserve currency, facilitating international trade and financial transactions. Its stability and widespread acceptance contribute to its role as a benchmark for commodity prices. Additionally, many nations peg their currencies to the USD, underscoring its pivotal role in the global economic system. Various literatures are considered where American Doller has been analysed, studied and various conclusions has been drawn before but there is still a wide area to be explored considering the present time. This study has been carried out with certain goals such as to investigate, assess the equitable value of the Indian Rupee in relation to the American Dollar, to examine the impact of specific macroeconomic factors on the Indian Rupee and further to assess the performance of the Indian Rupee in the face of unprecedented macroeconomic circumstances. The study aimed to assess the impact of various macroeconomic variables on the Indian Rupee against the American Dollar. Examining a decade of data, the research identified positive correlations with interest rates, inflation, current account deficits, and GDP growth rates, while negative connections were observed with FDI, per capita income, and crude oil consumption. This underscores the dynamic nature of the Indian Rupee's responsiveness to macroeconomic influences. Thus, American Doller can still be considered as the top base or core currency for settling trades, global dealings especially for India considering its stability.

Keywords: American Doller, Indian Rupee, Foreign Exchange, Macroeconomics

1. Introduction

Currency is the lifeblood of economies around the world. Strong local currency value indicates that there is productivity and economic growth in the country. Foreign exchange and better interconnection between the countries of the globe has made the global economies more integrated and at the same time prone to spill over risks. Be it Russia-Ukraine War or trade suspensions due to Covid-19, instability in the international currency market is not a new term event for the global economy. Currency instability has aggravated due to differences in the economic performance, Political turmoil, monetary and fiscal policies according to *Gurmeet Singh (2014)*.

India and America have been friends for a long time, and both are crucial for regional and economic stability. However US Dollar remains to be undisputed when it comes to currency value in comparison with Indian Rupee. The US Dollar has appreciated against the Indian Rupee several times since time immemorable. Although tough to evaluate a single main reason for this currency value differences, several Micro and Macro level factors have contributed significantly in a positive and negative way to the value of the currencies of the two economies. Factors such as Inflation, Interest Rates, Export-Import, Balance of Payment, Trade Deficit, Currency supply, Reforms by the government and Central Bank, Foreign exchange rates are a few factors which impact the stability of the currency of a Nation according to *Anjana Viswanathan (2012)*.

As India looks forward to Indigenous productions and exports, 86% of Indian exports trading activity is done through American Dollar. Indian Rupee has had its highs and lows during the last year itself. Even though it was the best performing currency in Asia in October 2021 at 75.36 USD, Threat of 2nd wave covid wave caused the Indian Rupee to decline at 1.9% and end the year as 'Asia's worst performing emerging market currency.'

Presently Rupee has strengthened towards 75.9 as American Dollar slightly weakened due to Interest Rate hike by the Federal Reserve, America. At the same time, weak global crude oil supply and inflation may end this party quite early as uncertainty looms over Russian and Ukraine war. India remains to be a strategic partner for Russia which at present is under heavy sanctions from the West. Even though

India remains to be neutral towards the current situations, threat of sanctions and trade embargo looms over India as well.

The main reasons for strengthening and weakening of Rupee value are:

- Interest Rate
- Inflation Rate
- Foreign Exchange Market
- Export-Import
- Foreign Institutional Investments (FII)
- Geopolitical conditions
- Foreign Direct Investments (FDI)
- Fiscal Deficit
- Current Account Deficit

2. Literature Review

The following are the literatures reviewed for conducting this research:

Bhagavanth Avinash (2021) is their research laid down a model to assess the performance of Indian Rupee against American Dollar. The Macroeconomic factors affecting the currency were analysed and a detailed suggestive framework for currency management was formulated. The authors pointed out that Current Account Deficit of India should be decreased for better currency management.

Mundargi (2021) in his study tried to decipher the trend of Indian Rupee and its exchange rate against the US Dollars historically. The causes of the falling value of Indian Rupee and its effects on the Indian economy have been stated and the effectiveness of government policies has been analysed. The author in his study points out that curbs on import of non-essential goods and gold should be imposed in addition to higher customs duty to decrease the demand of currency.

Poongavanam, Arivazhagan & Hemalatha (2020) brought into light the impact of rupee-Dollar fluctuation on the Indian economy. The paper stresses on different challenges that the Indian economy faces due to the fluctuation and steps that trigger the currency due to reforms and policy shifts made by government and the central Bank. In conclusion, it was found that stakeholders are advocating for gradual depreciation of rupee to increase export and need to improve the production, infrastructure, human capital and ease of doing business to remain in the competitive market.

Ashutosh Bansal (2016) argues that the effect of inflation on currency exchange value against changes in the inflation rate of major economies in the domestic and overseas markets (i.e. the United States) also indicates that all countries want stable and sustainable growth, whereas inflation rates (including other countries) have a significant impact on the economy. Inflation data has shown over the 10 years that there is also an effect of U.S. & Indian inflation on the INR value against U.S. dollars.

Kumar (2015) points out that the impact of change in rupee in relation to dollar would not only cover to Macro economy alone but will also affect the various organizations under the umbrella of the economy. Rupee appreciation and rupee depreciation has been studied as a boon and bane for the economic growth. The author lists down various steps to control excessive fluctuations and stabilise the currency. In conclusion, the government and our policymakers should concentrate on empowering our capabilities in production, promoting entrepreneurship and initiating incentives for development.

Singh (2014) it provides insights regarding how devaluation in Indian Rupees will result in increasing exports, reducing imports by making it expensive, reducing standard of living for developing nations like India. It explores causes for depreciation in Indian Rupees. Further, Indian economy will gain a lot with long term depreciation of rupee value.

3. Objective of the study

The research has been conducted with the following three objectives:

i. To analyze effects of select macroeconomic variables over Indian Rupee.

ii. To understand and evaluate the theoretical Exchange rate and actual exchange rate considering select macroeconomic variables.

iii. To evaluate performance of Indian Rupee during unprecedented macroeconomic conditions.

4. Research Methodology

The methodology adopted for the study are as follows:

- The researcher has attempted to determine the intrinsic value of the Indian Rupee using select macro-economic variables.
- The actual value of the Rupee for the study is known and recorded.
- The comparison of Actual value of the rupee with that of the intrinsic value determined and calculated against the American Dollar has been undertaken to know the difference/deviation.

4.1 Period of Study

The study covers a period of 10 years starting from April 2013- March 2022

4.2 Data Collection

The data collected for the study is purely secondary and collected from websites. The data relating to the macroeconomic variables have been sourced from the official websites of the Indian Economy, naming a few

www.data.gov.in,

www.tradingeconomics.com,

www.indexmundi.com and www.indiamacroadvisors.com

Further the data relating to the parameters of performance of the Indian Rupee against USD has been sourced from various official websites of the Reserve Bank of India, American Federal Reserve, World Bank, Moody's corporation, S&P and World Trade organization.

4.3 Research Tools

In order to achieve ethe objectives of the study, the researcher has used statistical mathematical tools such as Averages, Correlation analysis, Regression analysis, ANOVA and STATA.

Quantitative data such as percentages and YOY changes have been depicted through graphs for easy comparison along with Hypothesis Testing.

5. Data Analysis

The value of the Indian Rupee fluctuates versus the US Dollar. The value of the Indian Rupee in relation to the US Dollar is also a major problem, as the US Dollar accounts for more than 70% of all global trade. Many factors influence the Indian Rupee's position and trend, which will be discussed in this section of the article.

The value of one currency in terms of another is determined by the exchange rate. There are two sorts of exchange rates: one is a fixed rate, and the other is a floating rate.

1) Fixed Exchange Rate - It is unaffected by government interference and remains constant.

2) Floating Exchange Rate - It fluctuates according to the government's policies and reforms.

India uses a floating exchange rate system (MFERS), in which the Indian government intervenes in the market.

If the Rupee is appreciating, it means that our currency is gaining strength compared to dollar. If the Rupee is depreciating, it means that our currency is getting weaker, and its value is falling compared to dollar.

The following Macro variables have been selected to analyze the appreciation and deprecation of Rupee from 2013 to 2022:

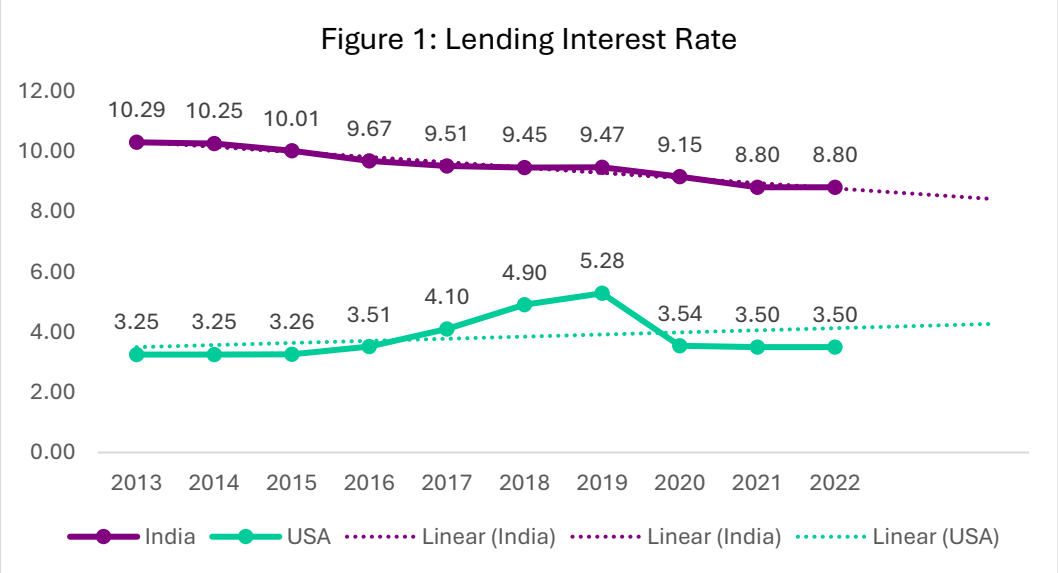
5.1 Interest Rate

- By adjusting interest rates, central banks exert influence over both inflation and exchange rates, and the changing interest rates impact the inflation and currency values.
- There are contrasting views about interest rates whether the interest rates affect the exchange rate directly or inversely.
- If the interest rate increased then :
    i. Higher domestic interest rates raise the demand for deposits
    ii. Firms need bank loans to finance their operations and it decreases their profitability
    iii. Higher interest rates raise the fiscal burden on the government that consequently can lead to higher inflation.

- While the first effect of a higher domestic interest rate tends to make the currency appreciate, the next two effects tend to make the currency decline.

Table 1	**Lending Interest rates %**		
Year	India	USA	Difference
2013	10.29	3.25	-7.04
2014	10.25	3.25	-7
2015	10.01	3.26	-6.75
2016	9.67	3.51	-6.16
2017	9.51	4.10	-5.41
2018	9.45	4.90	-4.55
2019	9.47	5.28	-4.19
2020	9.15	3.54	-5.61
2021	8.80	3.50	-5.30
2022*	8.80	3.50	-5.30
Average	**9.54**	**3.81**	
Maximum	**10.29**	**5.28**	
Minimum	**8.80**	**3.25**	

- An increase in interest rates will result in a significant inflow of foreign funds into India when foreign institutional investors (FII) wish to invest funds in India. Increasing FII/FDI inflows will increase demand for the Indian rupee (INR), leading it to strengthen.
- On the other hand, if a foreign institutional investor (FII) chooses to withdraw capital from the market, i.e., out of India, a rise in interest rates will result in a large outflow of funds from India. The increase in FII/FDI withdrawals will result in a higher supply of INR, causing the INR to devalue.



Source: Author's Compilation

Inference

- In comparison to India, change in interest rate was more pronounced in USA. The difference in fluctuations were 1.49 for India and 2.03 for USA.
- India's average interest rate was 9.54 and 3.81 for USA. Further, India led in lowering interest rates over the years which boosted the economic growth significantly. However, its difficult to determine direct relationship between interest rates and currency exchange rates as mentioned above.

5.2 Inflation Rate

Inflation can lead to an increase in commodity prices or a rise in the economy's money supply. When we talk about inflation, we're talking about a price increase relative to some benchmarks. The increase in the money supply will be reflected in the prices of commodities in the country.

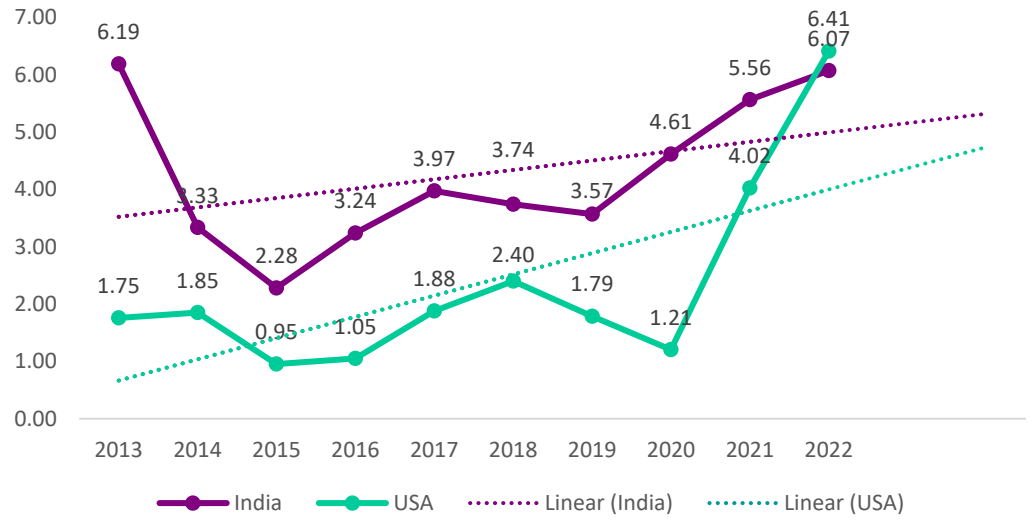
The following are the relationships between inflation and the value of the rupee:

- The rate of inflation is inversely proportional to the value of the rupee. On the other side, a greater inflation rate causes the rupee to depreciate, whilst a lower inflation rate causes the rupee to appreciate.
- In general, a country with a consistently lower inflation rate than other countries will see its currency value rise.
- Countries with more inflation than other countries often see their currencies depreciate in relation to their trading partners' currencies.
- Higher inflation rates compared to other countries will increase the cost of importing from other countries while decreasing the cost of exporting to other countries. Therefore, the exchange rates also react to inflation from time to time.

Source: Authors

Table 2	Inflation Rate %		
Year	India	USA	Difference
2013	6.19	1.75	4.43
2014	3.33	1.85	1.48
2015	2.28	0.95	1.33
2016	3.24	1.05	2.19
2017	3.97	1.88	2.09
2018	3.74	2.40	1.34
2019	3.57	1.79	1.78
2020	4.61	1.21	3.41
2021	5.56	4.02	1.54
2022*	6.07	6.41	-0.34
Average	**4.26**	**2.33**	
Maximum	**6.19**	**6.41**	

Figure 2: Inflation rate



Compilation

Inference

- Until 2022, India inflation has always been higher than US. However threat of economic degradation due to Russian-Ukrainian war has caused US inflation to rise to a decade high of 6.41%
- Inflation trend line of US is steeper than of India which implies that if present situation continues, then US inflation will rise at a higher rate compared to India. Thus, if India can control its inflation or keep it steady then Indian currency will perform better.

5.3 GDP Growth Rate

An economic growth rate is the percentage change in the value of all products and services produced in a country over a certain time period as compared to a previous time period. The following are the relationships between GDP growth rate and Rupee value:

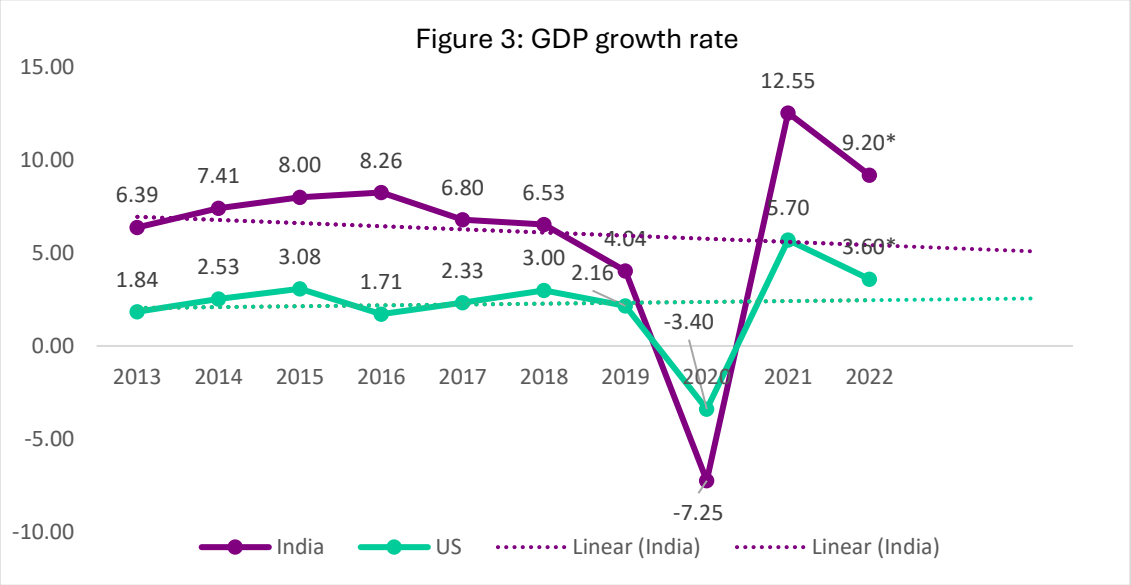
- The strength of a country's economy has a significant impact on the currency's strength. A higher pace of growth is accompanied by an increase in demand for goods and services, resulting in improved job opportunities for people as well as a more appealing destination for capital and investments.
- A country with a high growth rate will have a high national income as well as a large inflow of foreign currency. A strong growth rate attracts foreign direct investment (FDI)

by diverting cash from other countries. This causes an increase in the supply of the currencies of the countries where FIIs are withdrawing their investment, resulting in an increase in demand for the currency in which FIIs are diverting their investment, resulting in currency appreciation.

- A country with a low growth rate, on the other hand, will have a low national income as well as a low influx of foreign currency. The withdrawal of funds by FIIs is caused by a low growth rate.

Table 3 **GDP growth rate %**

Year	India	USA	Difference
2013	6.39	1.84	4.43
2014	3.33	2.53	1.48
2015	2.28	3.08	1.33
2016	3.24	1.71	2.19
2017	3.97	2.33	2.09
2018	3.74	3.00	1.34
2019	3.57	2.16	1.78
2020	4.61	-3.40	3.41
2021	5.56	5.70	1.54
2022*	6.07	3.60	-0.34
Average	**6.19**	**2.25**	
Maximum	**12.55**	**5.70**	
Minimum	**-7.25**	**-3.40**	



Source: Authors Compilation

Inference

GDP growth rate of India remained higher compared to US before 2020. However, in 2020 India's fall in GDP was higher than US due to contraction in economic activity in the country amid strict covid-19 lockdowns. Steady growth must continue for Indian currency to perform better.

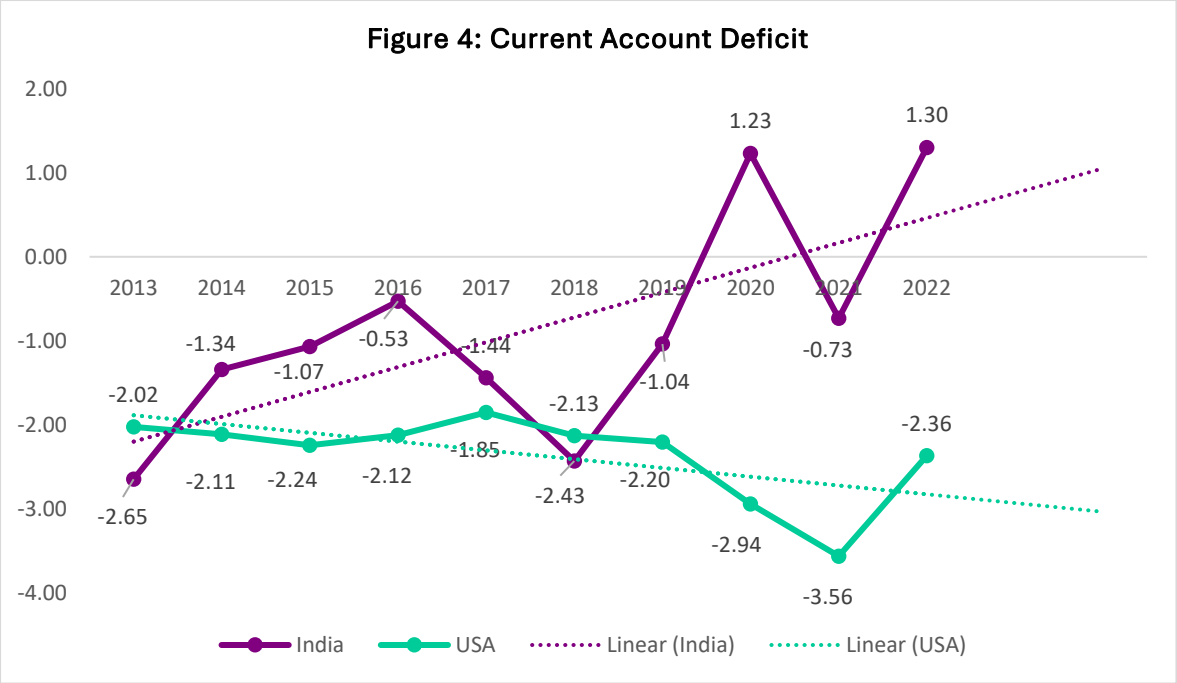
Table 4 Current Account Deficit (% of GDP)			
Year	India	USA	Difference
2013	-2.65	-2.02	-0.62
2014	-1.34	-2.11	0.77
2015	-1.07	-2.24	1.17
2016	-0.53	-2.12	1.59
2017	-1.44	-1.85	0.41
2018	-2.43	-2.13	-0.30
2019	-1.04	-2.20	1.17
2020	1.23	-2.94	4.17
2021	-0.73	-3.56	2.83
2022*	1.30	-2.36	3.66
Average	**-0.87**	**-2.35**	
Maximum	**1.30**	**-1.85**	
Minimum	**-2.65**	**-3.56**	

5.4 Current Account Deficit

The difference between the money coming in from exports and the money going out from imports is known as the current account deficit, or CAD. The current account deficit (or surplus) is the difference between the money a country receives and sends out in the form of products and services, as well as capital mobility from domestic production factors to foreign markets.

A country's CAD keeps track of its dealings with other countries in terms of goods and services trade, net profits on foreign investments, and net payments transfers throughout time (remittances). When money spent exceeds money generated, the current account goes into deficit. The following are the relationships between Current Account Deficit and Rupee value:

- Exchange rate swings are inversely related to the current account deficit as a percentage of GDP. When a local country's CAD falls, the currency appreciates. When a local country's CAD rises, on the other hand, the currency depreciates.
- The positive sign in the difference column indicates that India's CAD as a percent of GDP was better than the US's CAD as a percent of GDP, implying that the dollar has depreciated against the rupee because of CAD and GDP.
- The negative sign in the difference column indicates that India's CAD as a percent of GDP was lower than the US CAD as a percent of GDP, indicating that the Indian currency had appreciated.



Source: Authors Compilation

Inference

- Current Account Deficit of India has an upward trend compared to US.
- During the Pandemic, CAD of increased to a decade high of 1.23% of GDP
- Due to the ongoing war and supply chain disruptions, CAD of India has worsened to 1.30% of the country's GDP.

5.5 Crude Oil Consumption

Crude oil is one of the world's most important commodity sources, and it is critical for economic development and progress.

The relationship between Crude Oil Consumption and the Rupee Value has been discussed below.

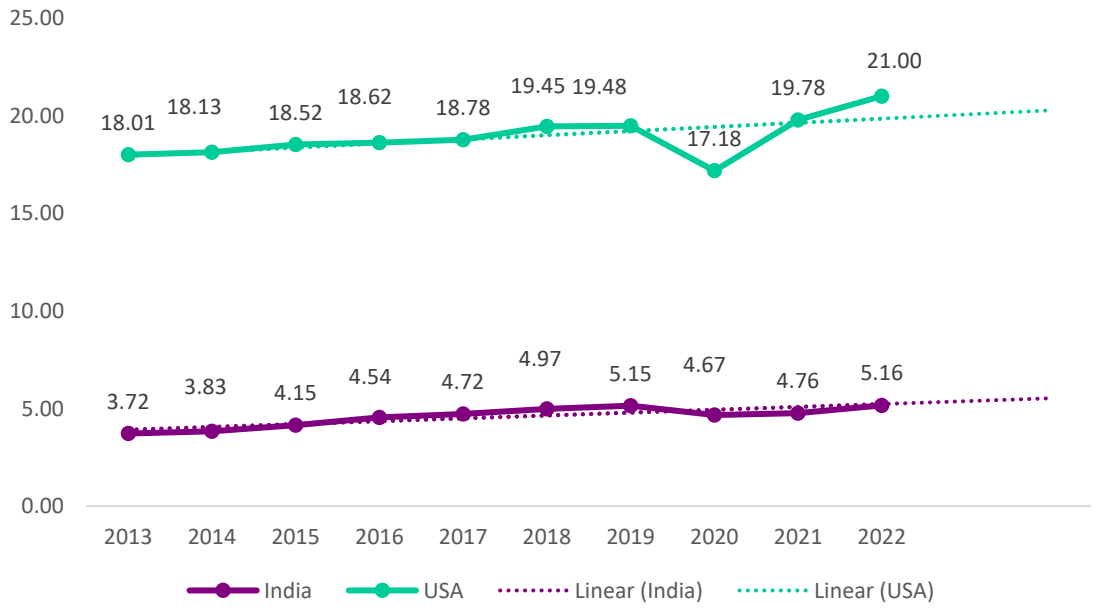
- The price of crude oil is inversely proportional to the value of the Indian rupee. India is a crude oil importer. Because crude oil accounts for a big share of India's overall imports, a large portion of the country's import payment is for oil. Crude oil prices are referred to as BRENT, NYMEX, and Dubai crude on a global scale.
- The INR depreciates versus the USD whenever the price of oil per barrel rises. As a result, the Indian government purchases more USD against the INR in order to meet the import liability, resulting in high inflation.
- Crude oil-producing countries around the world either utilise USD or their local currencies for transactions, resulting in currency risk; nevertheless, market participants today insure foreign exchange fluctuations against predicted market volatility.

Source: Author's Compilation

Inference

Table 5 Crude oil Consumption at 1 million barrels/day			
Year	India	USA	Difference
2013	3.72	18.01	-0.62
2014	3.83	18.13	-0.77
2015	4.15	18.52	-1.17
2016	4.54	18.62	-1.59
2017	4.72	18.78	-0.41
2018	4.97	19.45	--0.30
2019	5.15	19.48	-1.17
2020	4.67	17.18	-4.17
2021	4.76	19.78	-2.83
2022*	5.16	21.00	-3.66
Average	**4.57**	**18.89**	
Maximum	**5.16**	**21.00**	
Minimum	**3.72**	**17.18**	

Figure 5: Crude Oil consumption at 1 Million barrels per day



- The trend of consuming crude oil in India and US is rising sharply over the past decade.
- Due to the Pandemic shutdowns, there has been sharp decrease in the Crude Oil consumptions of both the countries in the year 2020.

5.6 Per Capita Income (PCI)

The mean income of the individuals in an economic unit, such as a country or a city, is referred to as per capita income (PCI). The PCI is determined by dividing the GDP (Gross Domestic Product) by the country's population. This is a measurement of the amount of money made per person in a given city, area, or country. The average income of a population is frequently calculated using per capita income.

The following points address the link between per capita income and the value of the rupee:

- The value of the rupee has a direct association with per capita income.
- As per capita income rises, so does the value of the currency, and vice versa.

Table 6	Per Capita Income ($)			
Year	India	USA	Ratio	Trend
2013	1450.56	53106.54	2.73%	0.00
2014	1574.34	55050.00	2.86%	0.13%
2015	1606.78	56863.37	2.83%	-0.03%
2016	1733.90	58021.40	2.99%	0.16%
2017	1981.75	60109.66	3.30%	0.31%
2018	1997.23	63064.42	3.17%	-0.13%
2019	2101.25	65279.53	3.22%	0.05%
2020	1901.12	63593.44	2.99%	-0.23%
2021	2191.80	69738.54	3.14%	0.15%
2022*	1850.82	62200.79	2.98%	-0.17%
Average	**1838.96**	**60702.77**		
Maximum	**2191.80**	**69738.54**		
Minimum	**1450.56**	**53106.54**		

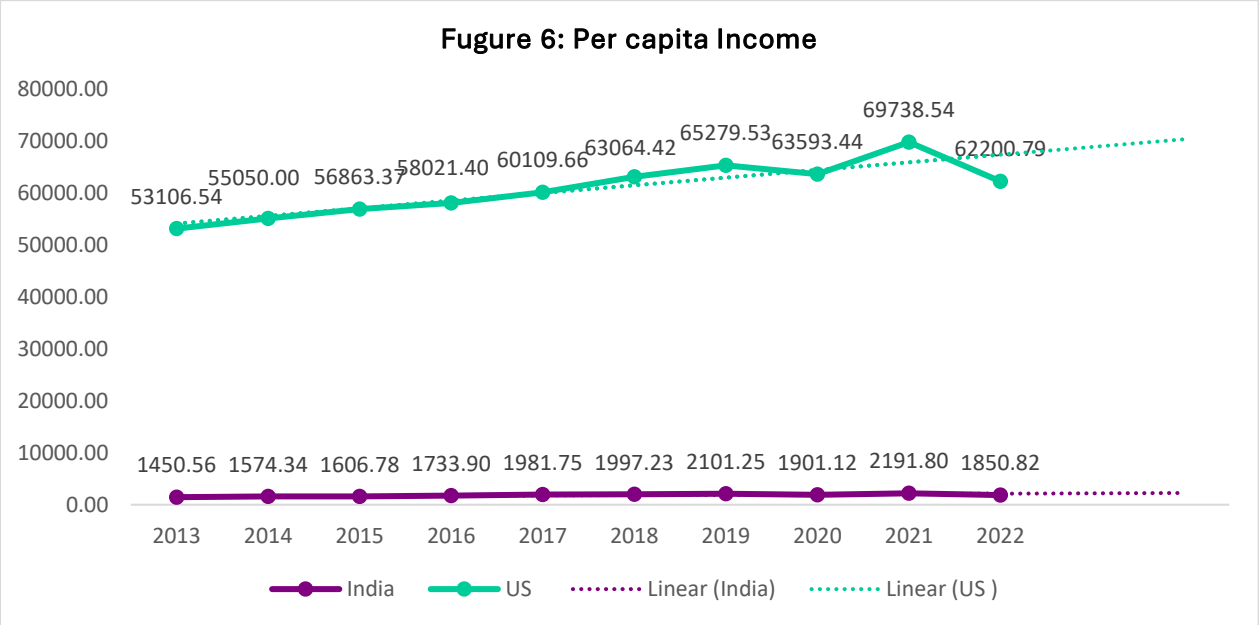
- While India's growth is significantly higher than that of the United States, the country's population has also increased rapidly in recent years. As a result, the effect of per capita income on the rupee value has been negated. As a result, the per capita income disparity trend has a minor impact on the value of the rupee.

The ratio column shows India's per capita income as a percentage of the per capita income in the United States, while the trend column shows the year-over-year change in India's per capita income as a percentage of the per capita income in the United States. Because PCI values are expressed in absolute value, they can't be used to make direct comparisons. India's per capita income was converted.

Source: Author's Compilation

Inference

- Growth of US Per Capita Income has been steeper compared to India.
- High Population growth of India has neutralised gains of its high GDP growth rate .
- PCI of both the countries rose from 2013-19 but fell in 2020 due to contraction in GDP and rising unemployment levels.



5.7 Foreign Direct Investment (FDI)

Foreign direct investment (FDI) is a long-term investment made by a party from one country into a business or corporation in another country.

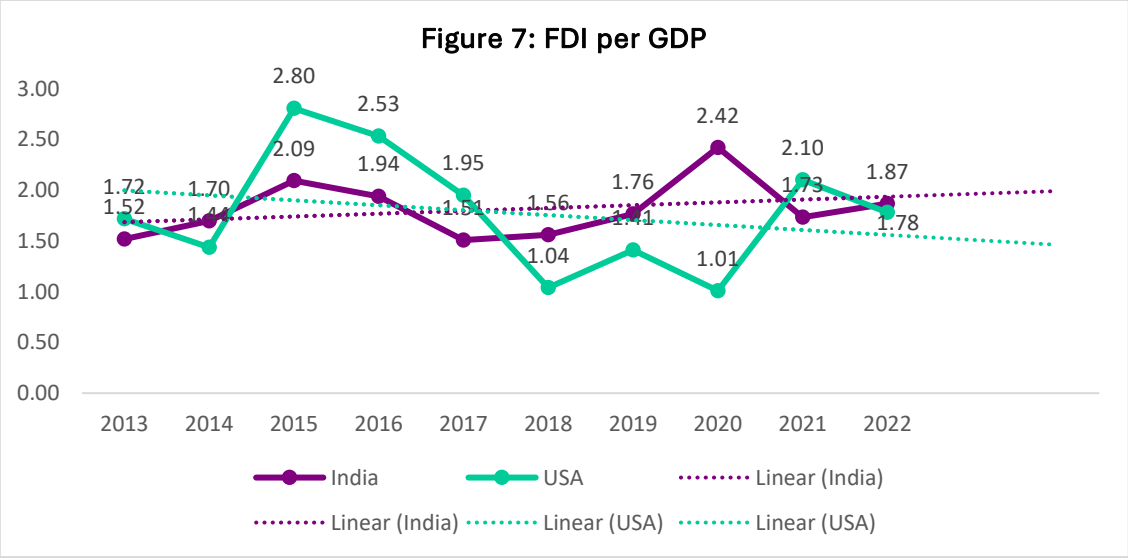
The relationship between Foreign Direct Investment (FDI) and the value of the rupee is discussed in the following points.

- The currency rate has a direct association with foreign direct investment.
- An increase in FDI will cause the currency to appreciate, and vice versa.
- Increased FDI inflows into India will raise demand for the Indian rupee as a means of investing in the country. If FDI is withdrawn from the country, however, the supply of the Indian rupee will increase to meet the obligation; this will exacerbate inflation and decrease Rupee value.

We have calculated FDI as a percent of GDP for both the countries and considered the differentials of the same for calculation of exchange rate.

Table 7 **FDI (% of GDP)**

Year	India	USA	Difference
2013	1.52	1.72	-0.20
2014	1.70	1.44	0.26
2015	2.09	2.80	-0.71
2016	1.94	2.53	-0.59
2017	1.51	1.95	-0.44
2018	1.56	1.04	0.52
2019	1.76	1.41	0.35
2020	2.42	1.01	1.41
2021	1.73	2.10	-0.37
2022*	1.87	1.78	0.09
Average	**1.81**	**1.78**	
Maximum	**2.42**	**2.80**	
Minimum	**1.51**	**1.01**	



Source: Author's Compilation

Inference

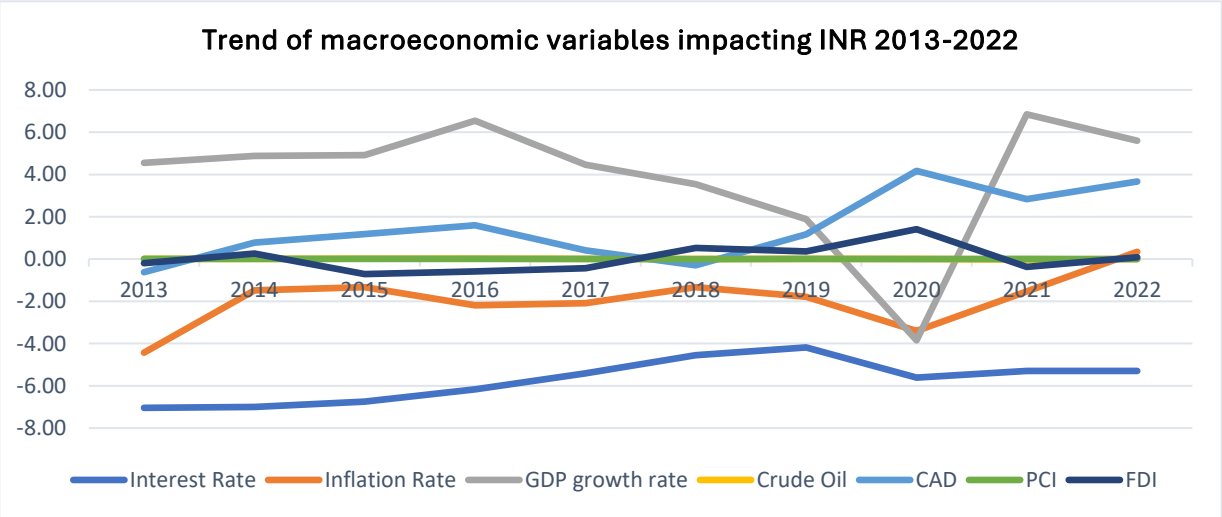
- The negative sign in the difference column indicates that India's FDI as a percent of GDP was adverse than the USA"s FDI as a percent of GDP which further indicates an appreciation of the dollar compared to the rupee due to the high GDP of the US
- However FDI trend of India appears to rise while trend of US seems to fall in the long run.

Table 8

5.8 Calculation of Theoretical Exchange Rate

1	2	3	4	5	6	7	8	9	10	11	12	13
Year	Interest Rate	Inflation Rate	GDP growth rate	Crude Oil	CAD	PCI	FDI	Total% change in INR	Total% change in USD	Multiplier	As per theory	Actual Value
2013	-7.04	-4.43	4.54	0.000	-0.62	0.0000	-0.20	-7.75	7.75	107.75	58.89	58.89
2014	-7.00	-1.48	4.88	0.005	0.77	0.0013	0.26	-2.56	2.56	102.56	60.40	61.15
2015	-6.75	-1.33	4.92	0.013	1.17	-0.0003	-0.71	-2.68	2.68	102.68	62.02	64.24
2016	-6.16	-2.19	6.54	0.020	1.59	0.0016	-0.59	-0.78	0.78	100.78	62.50	67.24
2017	-5.41	-2.09	4.46	0.008	0.41	0.0031	-0.44	-3.06	3.06	103.06	64.41	64.92
2018	-4.55	-1.34	3.54	0.004	-0.30	-0.0013	0.52	-2.13	2.13	102.13	65.79	68.45
2019	-4.18	-1.78	1.88	0.009	1.17	0.0005	0.35	-2.56	2.56	102.56	67.47	70.35
2020	-5.61	-3.41	-3.85	0.007	4.17	-0.0023	1.41	-7.27	7.27	107.27	72.37	74.09
2021	-5.30	-1.54	6.85	-0.031	2.83	0.0015	-0.37	2.44	-2.44	97.56	70.61	73.91
2022	-5.30	0.34	5.60	0.005	3.66	-0.0017	0.09	4.39	-4.39	95.61	67.51	75.47

Figure 8



5.8 Calculation of Theoretical Exchange Rate

Calculating theoretical Exchange Rate

- Columns 1 depicts the Year wise values
- Columns 2-8 depict the year wise difference calculation of the macro-economic variables of India and US
- Column 9 is the summation of values from columns 2-8. The value shows the % change on the value of INR.
- Column 10 is the inverse of column 9 as an appreciation of Indian Rupee will cause the Dollar to depreciate by the same value and vice versa
- Column 11 is obtained by adding 100 with column 10 to make it a multiplier.
- Column 12, which is the theoretical INR value has been calculated by multiplying the multiplier with the theoretical INR value of last year to show the appreciation or depreciation in INR value.

Note

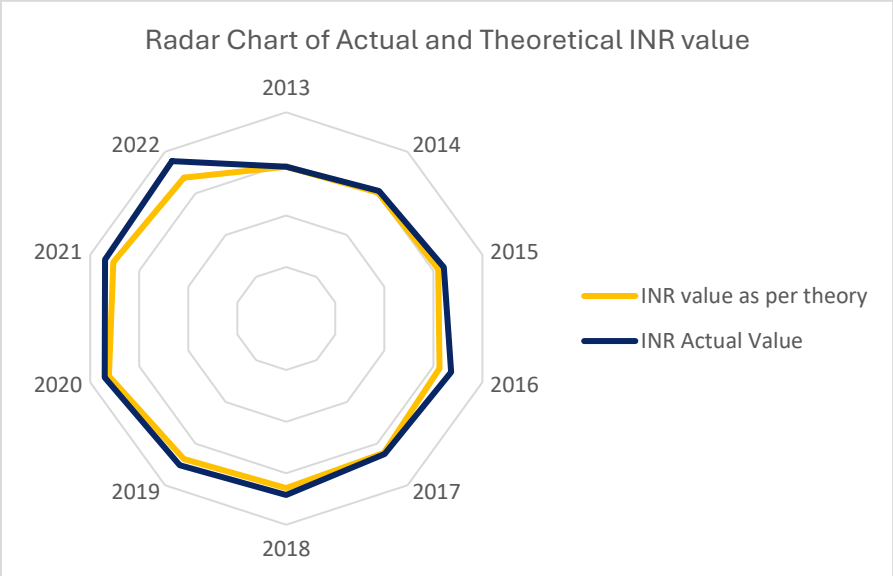
Actual INR value of 2013 has been taken as the theoretical value, as 2013 has been set as the base year.

Table 9

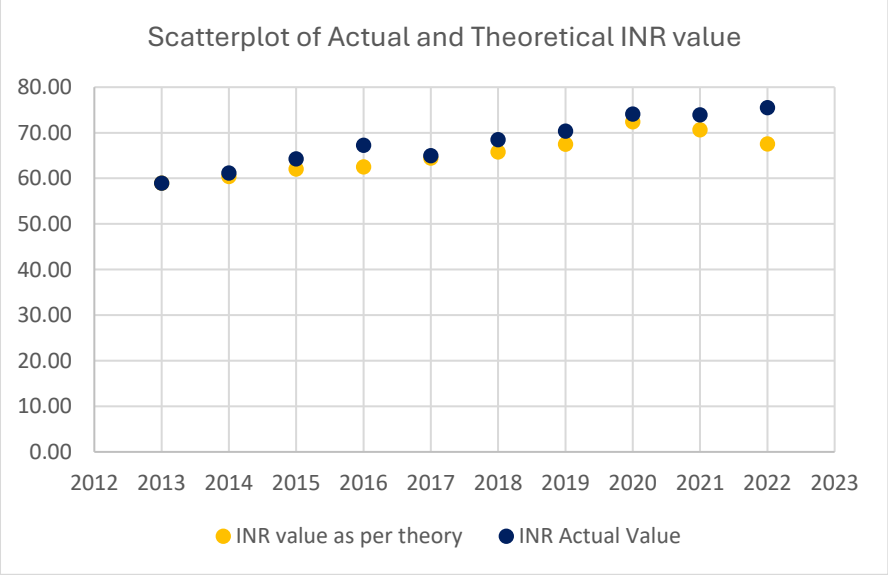
5.9 Evaluation of Theoretical Exchange rate and Actual Exchange Rate

Year	INR value as per theory	INR Actual Value	Difference
2013	58.89	58.89	0
2014	60.40	61.15	0.748316
2015	62.02	64.24	1.735127
2016	62.50	67.24	4.73896
2017	64.41	64.92	0.506539
2018	65.79	68.45	2.662541
2019	67.47	70.35	2.884318
2020	72.37	74.09	1.712179
2021	70.61	73.91	3.301162
2022	67.51	75.47	7.968256

Figure 9 and 10



The graph highlights the actual value of INR compared to the theoretical values.
We observe that for all years except 2013 (base year) Actual INR values lie outside the Theoretical values, which means that actual INR depreciated more than the theoretically calculated values.



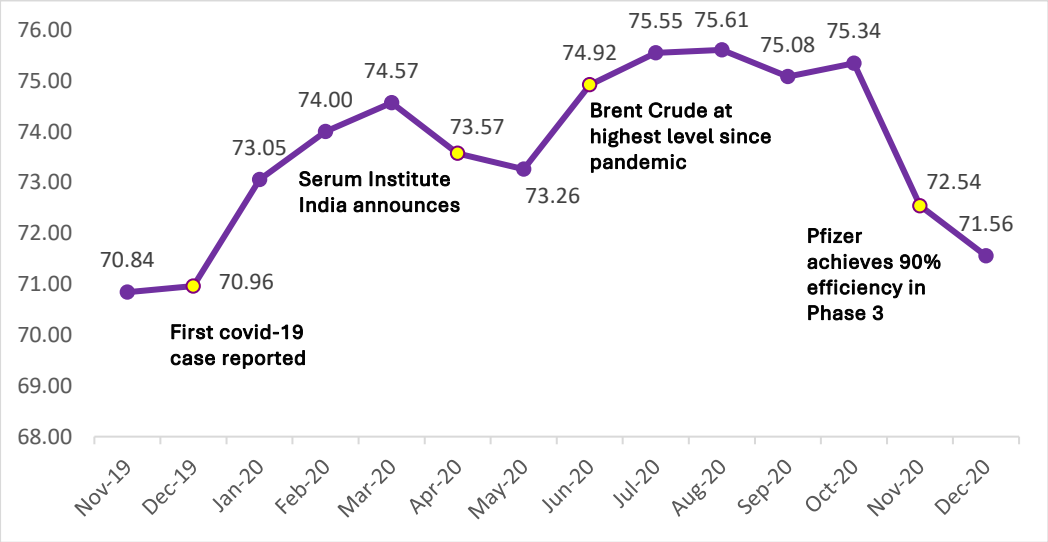
The scatterplot shows actual INR values and calculated INR values.
The difference in the values have been maximum for 2022 (7.97) due to looming threat of economic degradation due to Russia-Ukraine War, stagflation and supply chain disruptions

6. Performance of Indian Rupee during unprecedented Macro events

6.1 Covid -19

Figure 11

- At the end of December 2019, when the reports of a deadly virus known as SARS Cov-2 made the headlines Investors became nervous and the stock markets went into a panic mode. Indian currency felt the heat when the country went into a lockdown. However the Reserve Bank of India pulled the right chords to take unprecedented steps to calm the depreciation of Indian Rupee.

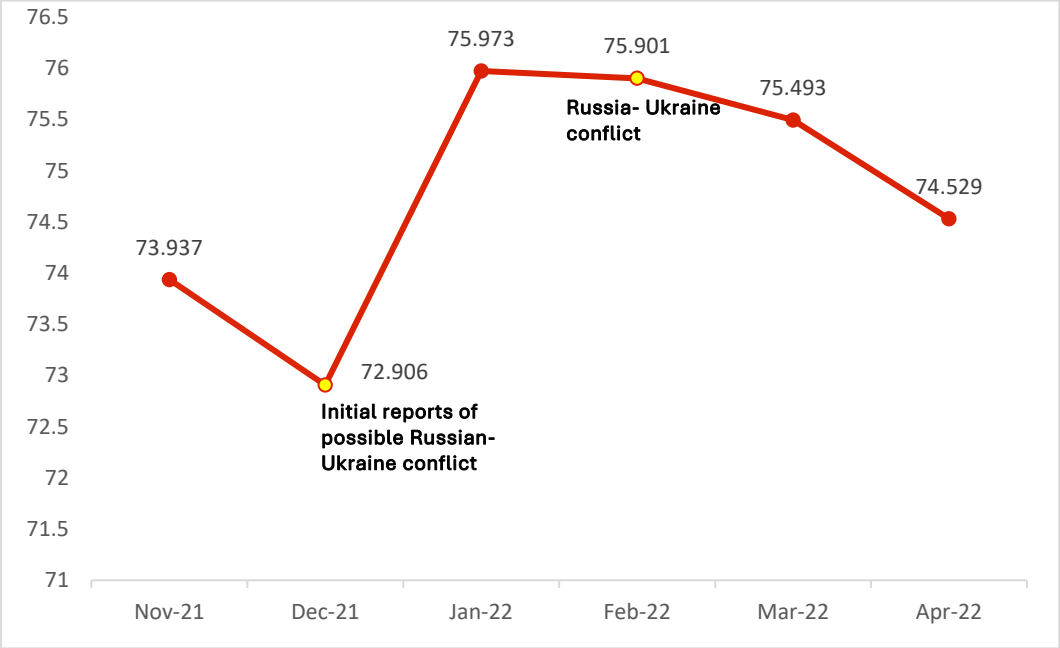


- The Reserve Bank reduced the repo rate(rate at which it lends to banks) by 115 basis points. This was done to encourage banks to lend money to businesses and individuals who felt the cash crunch during the shutdown.
- Indian Rupee has seen pressure due to increasing global crude oil prices. However India's foreign exchange reserves were at enough levels to save Rupee from weakening sharply in such adverse situations.
- Since early April 2020, India has added $133 Billion to its reserves, taking the forex reserve to an all-time high of $609 Billion.
- Due to the active and timely management of currency by RBI, Indian Rupee slowly appreciated to Pre-Pandemic levels by the end of 2021.

6.2 Russia-Ukraine conflict

Figure 12

- Indian Rupee suffered its worst fall in 10 months in January 2022 as high tensions between Russia and Ukraine sent oil prices rising and pulling up inflation levels.
- INR value to dollar fell 4.03% from 72.906 INR to 75.973 INR amid reports of possible Russian-Ukrainian conflict.



- Indian Stock market was the worst performer in Asia and registered consecutive losing streaks since March 2020. The conflict fuelled rise in commodity prices and deterioration of supply chain which was already under high pressure due to the Pandemic.
- However, India's independent stand and diplomacy has caused the Rupee to cool off from depreciating further. India bought Russian oil at a heavy discount, which might have been a contributing factor to the subsequent rupee appreciation.
- Russia which has a favourable trade relation with India is under heavy sanctions from Western countries. US continues to put pressure on India amid reports of continued trade partnership between the two countries even as the war progresses in Ukraine. Hence India could be under a looming threat of sanctions and trade disruptions with western countries.

7. Hypothesis Testing

H_{01}: There is no relationship between actual Indian Rupee and actual US Dollar value

H_{a1}: There is a relationship between actual Indian rupee value and actual US Dollar value

Table 10 Correlation Analysis

		Dollar
INR	Pearson's Correlation	0.9055**
	Sig (2-tailed)	.00031
	N	10

**. At the 0.05 level, the correlation is significant (2-tailed)

Inference

- The Pearson correlation of coefficient calculation shows that the correlation between actual Indian rupee value and actual US Dollar values have a strong positive correlation to each other i.e., r = .9055, and are significant i.e., p=.00031 ($p < 0.05$) at a 5% level of significance.

- Hence, the null hypothesis "H_{01}:There is no correlation between actual Indian rupee value and actual US Dollar" is rejected

H_{02} : There is no relationship between the real value of the Indian rupee and CAD.
H_{a2} : There is a relationship between the real value of the Indian rupee and CAD.

Table 11 Correlation Analysis

		Dollar
INR	Pearson's Correlation	0.7713**
	Sig (2-tailed)	.00102
	N	10

**. At the 0.05 level, the correlation is significant (2-tailed)

Inference

- The Pearson correlation of coefficient calculation shows that the correlation between actual Indian rupee value and actual US Dollar values have a strong positive correlation to each other i.e., r = .7713, and are significant i.e., p =.00102 ($p<0.05$) at a 5% level of significance.
- Hence, the null hypothesis "H_{02}:There is no correlation between actual Indian rupee value and Current Account Deficit" is rejected.

H_{03} : There is no relationship between the real value of the Indian rupee and growth rate

H_{a3} : There is a relationship between the real value of the Indian rupee and the growth rate.

Table 12 Correlation Analysis

		Dollar
INR	Pearson's Correlation	-0.2772**
	Sig (2-tailed)	0.445
	N	10

**. At the 0.05 level, the correlation is significant (2-tailed)

Inference

- The Pearson correlation of coefficient calculation shows that the correlation between actual Indian rupee value and actual US Dollar values have a strong positive correlation to each other i.e., r = -.2772, and is not significant i.e., p = .445 ($p>0.05$) at a 5% level of significance.
- Although technically a negative correlation, the relationship between the two variables is only weak (the nearer the value is to zero, the weaker the relationship)

- Hence, the null hypothesis H_{03}:There is no correlation between actual Indian rupee value and GDP growth rate is accepted.

H_{04} : There is no significant relationship between macroeconomic variables and the Indian Rupee value.

H_{a4} : There is significant relationship between macroeconomic variables and the Indian Rupee value.

Table 13 Regression using STATA

Table 14 ANOVA

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Source	SS	df	MS		
Model	285.104202	7	40.7291717	Number of obs	10
				F(7, 2)	34.12
				Prob > F	0.0288
Residual	2.38771339	2	1.19385669	R-squared	0.9917
				Adj R-squared	0.9626
Total	287.491916	9	31.9435462	Root MSE	1.0926

actualinr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
interestrate	3.429295	.5393726	6.36	0.024	1.108562	5.750028
inflationrate	.3551061	.5243969	0.68	0.568	-1.901191	2.611404
gdpgrowthrate	.3404993	.3602681	0.95	0.444	-1.209609	1.890608
crudeoil	-21.78672	36.06271	-0.60	0.607	-176.952	133.3786
cad	2.577767	.3119116	8.26	0.014	1.23572	3.919814
pci	-520.117	316.7886	-1.64	0.242	-1883.148	842.9142
fdi	-.2802272	1.390065	-0.20	0.859	-6.261192	5.700738
_cons	81.97325	2.839912	28.86	0.001	69.7541	94.19241

	df	*SS*	*MS*	*F*	*Significance F*
Regression	7	285.6622	40.80889	44.09749	0.02235
Residual	2	1.850848	0.925424		
Total	9	287.5131			

Inference

- Regression Analysis using STATA shows the relationship between the seven macroeconomic variables selected for research and the actual value of Indian Rupee

- R square measures the goodness-of-fit of the model. The above analysis shows a R-square of 0.9917 which means that 99.17% of the data fits the regression model and the model is well explained by the selected independent variables.
- The ANOVA table, which reports how well the regression equation fits the data (i.e., predicts the dependent variable) this table indicates that the regression model predicts the dependent variable significantly well. The result indicates the statistical significance of the regression model that was run. Here, p=.02235 i.e., $p < 0.05$, which is less than 0.05, and indicates that the overall, regression model statistically does significantly predict the outcome variable.
- Hence, the null hypothesis H_{04}:There is no correlation between actual Indian rupee value and macroeconomic variables is rejected.

Regression Equation

Actual INR = 81.97 + 0.35Infaltion Rate + 0.34GDPgrowthrate -21.78CrudeOilConsumption + 2.57CAD – 520.11PCI -0.28FDI

Residuals

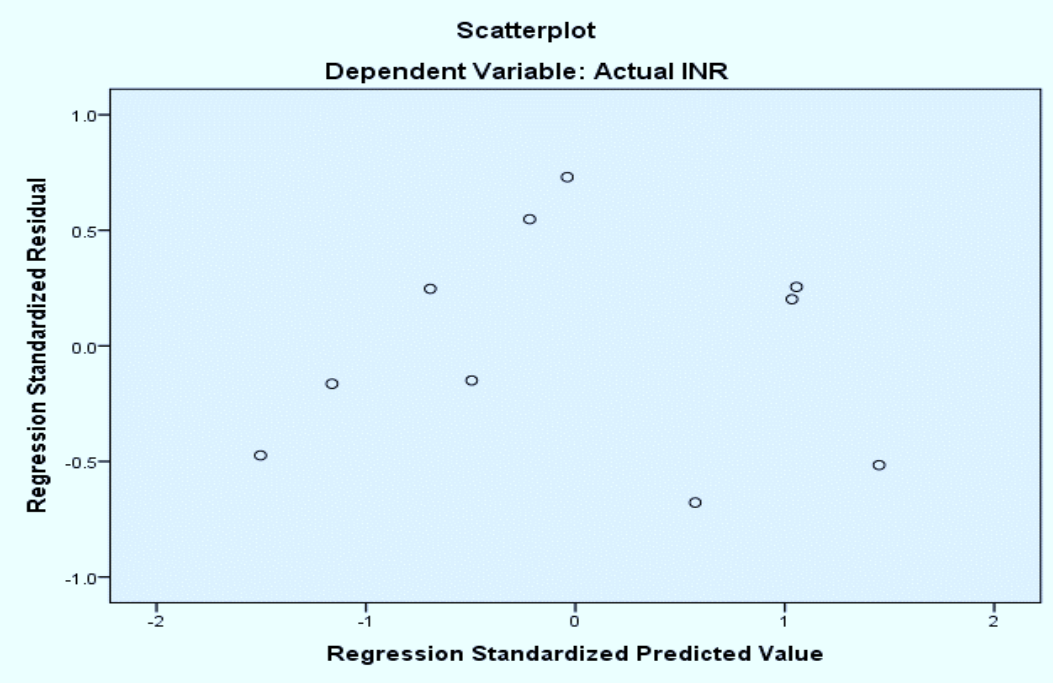
The difference between the predicted values and actual values are known as residuals.

Table 15 **Residuals Statistics**

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	59.4078	76.0337	67.8710	5.62834	10
Residual	-.74095	.79776	.00000	.51507	10
Std. Predicted Value	-1.504	1.450	.000	1.000	10
Std. Residual	-.678	.730	.000	.471	10

a. Dependent Variable: Actual INR

The residuals are low and are in the range of -1.504 to 1.450. The below scatterplot depicts the residuals in the data set.



8.

Conclusion

The performance of a country's currency has a significant impact on the country's economic performance. While India's fundamentals remain solid, its currency has fallen owing to external causes, which will have an influence on the country's economic growth. The price of one currency in terms of another currency (exchange rate) is a very essential variable for an open economy in the global market since it influences the country's overall economic production and growth.

Over the previous decade, India's foreign exchange market has witnessed significant changes. The extreme volatility of the Indian rupee in the international market necessitates its performance against the anchor currency. The goal of this study was to look at the numerous macroeconomic variables and its effect on the value of Indian Rupee against American Dollar.

An assessment of the possible explanations for the rupee's performance has been made, as well as an analysis of the various macroeconomic drivers that influence the rupee's volatility. The research was carried out using a mathematical module as a foundation for seven selected macroeconomic variables in India and the United States from 2013 to 22.

The study's findings reveal a positive relationship between interest rates, inflation, both countries' current account deficits, and GDP growth rates. FDI, per capita income, and crude oil consumption all have a negative connection. As a result, it is obvious that the impact of the selected seven important economic variables in India varies over time. Hence it can be concluded that Indian Rupee is significantly affected by macroeconomic factors.

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ROLE OF ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION: TRANSFORMING TEACHING AND LEARNING

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ABSTRACT

Artificial Intelligence (AI) is revolutionizing higher education by enhancing personalized learning, automating administrative tasks, and improving teaching and learning outcomes. This paper explores the impact of AI on higher education, focusing on its benefits, challenges, and future implications. The study employs secondary data sources to review existing literature, identifies key findings, and provides actionable recommendations to integrate AI into academic responsibly.

Keywords: Artificial Intelligence, higher education, literature review

1. Introduction

The rapid development of AI technologies is reshaping various industries, including education. In higher education, AI emerges as a powerful tool to create personalized learning experiences, automate routine tasks, and improve accessibility. From adaptive learning platforms to predictive analytics, AI is making education more efficient and inclusive. However, its adoption presents challenges such as ethical concerns, algorithmic bias, and resistance from educators and students. This paper delves into these dimensions to understand the transformative potential of AI in academics. The rapid advancement of artificial intelligence (AI) is revolutionizing higher education, influencing how students learn, educators teach, and institutions that manage academic and administrative processes. AI-powered tools, such as adaptive learning platforms, automated grading systems, and generative AI models like ChatGPT, are enhancing personalized learning, streamlining administrative tasks, and improving access to education. These technologies have the potential to create more efficient, engaging, and inclusive learning environments by tailoring instruction to individual student needs, providing instant feedback, and automating routine assessments.

However, the integration of AI in higher education also presents significant challenges. Ethical concerns, including issues of algorithmic bias, data privacy, and academic integrity, have raised important questions about the responsible use of AI in learning and teaching. Additionally, resistance to AI adoption from both educators and students stems from fears of job displacement, over-reliance on automation, and concerns about the diminishing role of human educators in shaping critical thinking and creativity. The evolving landscape of AI in education necessitates a careful balance between leveraging technological advancements and maintaining human-centered pedagogical values.

This paper explores the transformative impact of AI on higher education by examining its role in learning, teaching, assessment, and administration. It also critically assesses the challenges associated with AI implementation, including ethical considerations, institutional policies, and the changing dynamics of student-teacher interactions. By analysing both the opportunities and limitations of AI in academia, this study aims to provide insights into how universities can effectively harness AI to enhance education while addressing the concerns that accompany its adoption.

2. Objectives

The objective of this research paper is to conduct a comprehensive analysis of the role of Artificial Intelligence (AI) in higher education, examining its impact on teaching methodologies, student learning experiences, institutional policies, and overall academic efficiency. The study aims to explore how AI-driven tools and technologies are transforming traditional teaching approaches by enabling personalized learning, automating assessments, and providing data-driven insights that enhance curriculum design and faculty development. Additionally, it seeks to analyse AI's influence on students' learning experiences and outcomes by evaluating its ability to offer adaptive learning environments, real-time feedback, and tailored academic support.

A critical aspect of this research is to evaluate the challenges associated with AI adoption in higher education, including ethical concerns, algorithmic biases, and risks to academic integrity. With AI becoming increasingly embedded in educational processes, issues such as data privacy, fairness in automated decision-making, and the potential for students to misuse AI-generated content need thorough examination. The study also aims to assess the impact of AI on student-teacher interactions, investigating whether AI enhances engagement or diminishes the human element in education. Additionally, it will explore how AI influences institutional policies, including governance frameworks, faculty training requirements, and regulations on AI-driven assessment methods.

By synthesizing insights from academic literature, expert opinions, and real-world case studies, this research aspires to provide valuable recommendations for the responsible and effective integration of AI in higher education. It will emphasize the need for institutions to align AI implementation with pedagogical goals, ensure transparency in AI-driven decision-making, and promote AI literacy among faculty and students. Ultimately, this study aims to contribute to the broader discourse on balancing technological advancements with the essential human aspects of education, ensuring AI serves as an enabler rather than a replacement in the academic landscape.

3. Methodology

This research is based on secondary data sources, including academic journals, industry reports, and credible online databases like EBSCOhost and Google Scholar. A literature review approach was adopted to gather insights into AI applications and their implications in higher education.

4. Review of Literature

a. Zawacki-Richter et al. (2019):

The study by Zawacki-Richter et al. (2019) explores how artificial intelligence (AI) is changing higher education, making learning more personalized and improving administrative processes. AI-powered platforms can adapt to individual student needs, offering tailored content, intelligent tutoring, and real-time feedback, which helps students stay engaged and succeed. Universities are also using AI to handle tasks like grading assignments, answering student questions through chatbots, and predicting which students might need extra support, making life easier for both students and faculty. However, the study also highlights some big challenges. AI relies on a lot of student data, raising concerns about privacy and security. Many institutions lack the technical know-how to fully implement AI, and there's also the issue of bias in AI systems, which could lead to unfair outcomes. Plus, the cost of developing and maintaining these technologies can be a major hurdle. Despite these challenges, the study makes it clear that AI has the potential to transform education—if used thoughtfully and responsibly.

b. Bearman, Ryan, and Ajjawi (2023):

Bearman, Ryan, and Ajjawi (2023) take a deep dive into the conversations around AI in higher education, exploring both its promise and its pitfalls. While AI offers exciting possibilities—like improving learning experiences, streamlining administrative tasks, and making education more accessible, the authors argue that we need to approach it with caution. One major concern is **algorithmic bias**, where AI systems, if trained on biased data, can unintentionally reinforce existing inequalities in education. Another key issue is **data**

ownership—who really controls the vast amounts of student and institutional data that AI relies on? Without clear policies, there's a risk that student privacy could be compromised or that institutions could lose control over their own data. The authors also highlight **ethical concerns**, emphasizing that if AI is implemented without careful oversight, it could erode trust between students, educators, and institutions. They argue that rather than blindly adopting AI, higher education needs to critically examine its impact, ensuring that these technologies are used in ways that promote fairness, transparency, and inclusivity. By taking a thoughtful approach, we can harness AI's potential without sacrificing equity or trust in the learning environment.

c. Holmes, Bialik, and Fadel (2019):

This research explores both the exciting possibilities and the potential drawbacks of AI in education, emphasizing its power to **democratize access to learning**. AI-driven technologies can make education more inclusive by breaking down barriers related to geography, language, and accessibility. The authors highlight how AI can **personalize learning experiences**, adapting content to suit individual student needs and providing targeted support to help learners succeed. Additionally, AI can **automate grading**, reducing the workload for educators and allowing them to focus more on teaching and student engagement. Another major advantage is **predictive analytics**, which can analyze student performance and identify those at risk of falling behind, enabling early intervention and support. However, the study also issues an important caution: while AI can enhance education, relying too heavily on it could risk **diminishing the human aspects of teaching**. Meaningful learning isn't just about information delivery, it's also about mentorship, emotional support, and the personal connections between teachers and students. If AI replaces too much of this human interaction, education could become impersonal and transactional. The study ultimately calls for a balanced approach, where AI is used as a tool to **enhance**, rather than replace, the essential human elements of education

d. Astobiza, Toboso, Aparicio, and López (2023):

Astobiza, Toboso, Aparicio, and López (2023) explore how AI in education can support global efforts toward sustainability and inclusivity, aligning with the **United Nations' Sustainable Development Goals (SDGs)**. The authors stress that while AI has the power to transform education, it must be developed and used **ethically** to ensure that no one is left behind. They advocate for AI-driven tools that **expand access to quality education**, particularly for underrepresented groups, including students from low-income backgrounds, those with disabilities, and communities with limited educational resources. AI can break barriers by providing **personalized learning experiences, language translation tools, and assistive technologies**, making education more inclusive. However, the study also warns of potential risks, such as **exclusionary practices or cultural biases** embedded in AI systems, which could unintentionally disadvantage certain groups. If not carefully designed, AI could reinforce existing inequalities rather than bridging gaps. The authors call for a **thoughtful and responsible approach** to AI in education, ensuring that it serves as a tool for progress, equity, and long-term sustainability rather than perpetuating division. By prioritizing ethical considerations, institutions and policymakers can harness AI's potential to create a truly inclusive and sustainable educational system.

e. Hazari (2023):

Hazari (2023) lays out a clear and thoughtful roadmap for bringing **AI literacy** into higher education, recognizing that as AI continues to evolve, so must our ability to understand and use it effectively. The study highlights the **urgent need for comprehensive training programs** that empower not just students, but also educators and administrators, ensuring that everyone has the skills to navigate AI-driven tools with confidence. AI is already shaping the way we learn and work, and without proper education, many could be left struggling to keep up. Hazari emphasizes that AI literacy isn't just about learning how to use new technology—it's about **critical thinking, ethical considerations, and responsible AI use**. The study also stresses the importance of **fostering a culture of continuous learning**, where institutions actively support ongoing education and skill development to keep pace with the rapid advancements in AI. By embedding AI literacy into higher education, we can prepare future generations to engage with

AI **thoughtfully, ethically, and effectively**, ensuring that technology remains a tool for empowerment rather than a source of confusion or inequality.

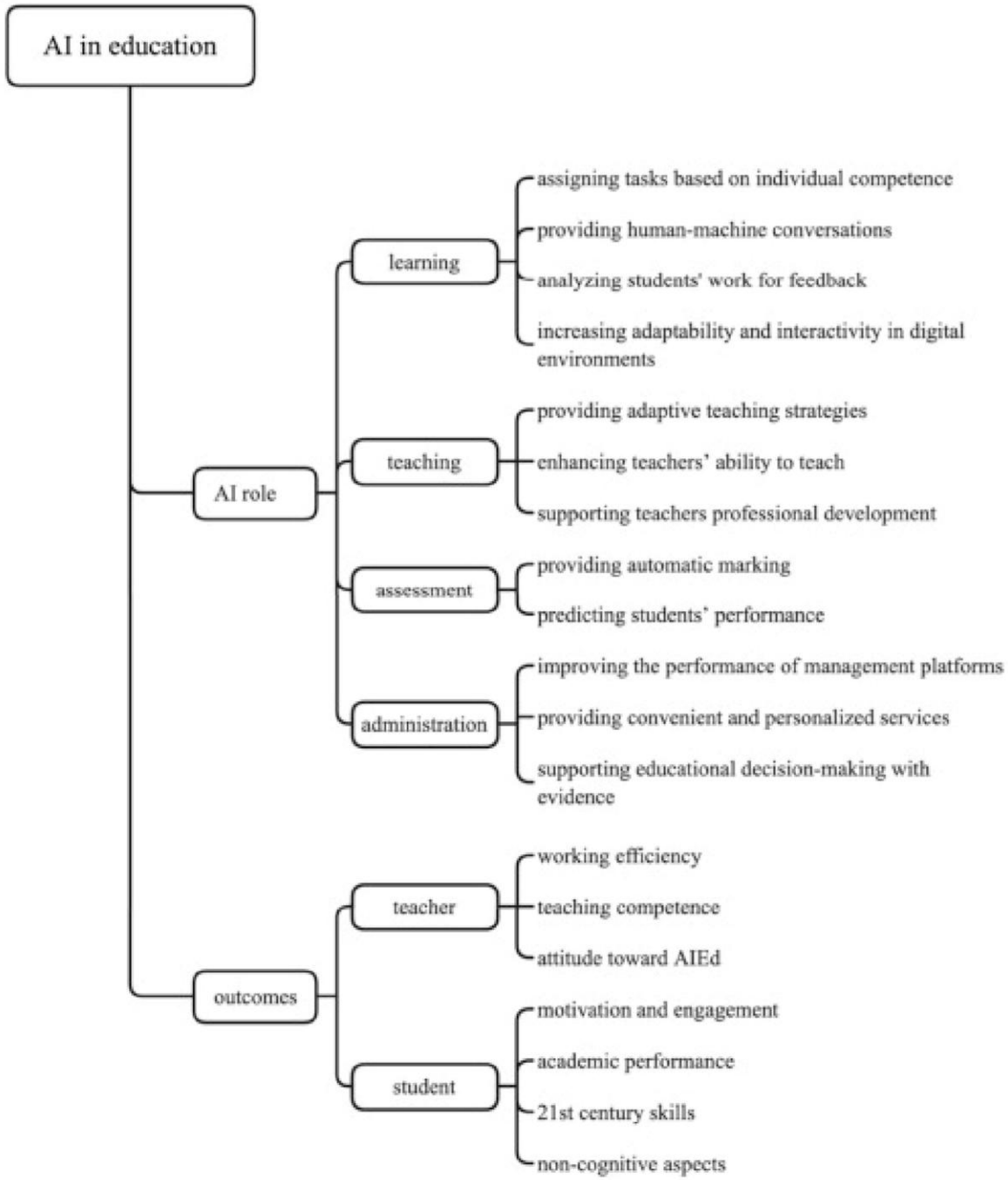
Common Themes Across the Literature:

a. **Personalized Learning:** Across multiple studies, AI's ability to tailor educational content to individual learners emerged as a key theme. Adaptive learning systems can address diverse learning styles and needs, making education more inclusive.
b. **Efficiency Gains:** Automation of tasks such as grading, attendance tracking, and administrative operations reduces the workload for educators, allowing them to focus on teaching and mentoring.
c. **Ethical Challenges:** Several authors noted the risks associated with algorithmic bias, data privacy violations, and the over-reliance on AI, stressing the need for robust ethical frameworks.
d. **Professional Development:** The literature emphasized AI's potential to assist educators in refining their teaching practices and staying updated with pedagogical innovations.
e. These studies collectively provide a comprehensive view of AI's transformative potential in higher education while highlighting the importance of ethical considerations, training, and balanced integration

Year	Author	Title	Journal	Focus Area	Key Findings	Remarks
2019	**Olaf Zawacki-Richter et al..**	Systematic review of AI applications in higher education	International Journal of Educational Technology in Higher Education	Exploring and analyzing the use of artificial intelligence (AI) technologies to enhance teaching, learning, administration, and research within higher education institutions.	Identified four applications: -Adaptive systems , ITS, profiling , and assessment. Limited focus on ethics.	Highlights the potential and gaps in integrating AI into teaching and administration
2017	**Stefan A. D. Popenici, Sharon Kerr**	AI's role in transforming teaching and learning.	Research and Practice in Technology Enhanced Learning	Understanding how artificial intelligence impacts teaching methodologies, personalizes learning experiences, enhances educational outcomes, and supports	Algorithmic biases and lack of transparency. Over-reliance on AI threatens academic freedom. Ethical risks	Emphasizes AI as a complementary tool rather than a replacement for educators

				teachers and learners.		
2019	**Holmes et al.**	AI in Education: Promises and Implications for teaching and learning	Learning, Media and Technology	explored the practical applications of AI in education, with emphasis on teaching strategies and student engagement.	AI systems like automated grading and virtual teaching assistants significantly reduce educators' workloads.	Recommended upskilling educators in AI technologies to maximize their teaching potential
2021	**Luckin et al.**	Enhancing Learning and Teaching with AI: A Roadmap for Higher Education	Nature Machine Intelligence	Analyzed AI's ability to enhance both teaching effectiveness and student learning experiences.	AI fosters innovative teaching strategies through data-driven insights, helping educators identify what works best for different student groups	Advocated for ethical guidelines in AI deployment and emphasized the importance of maintaining the human element in education alongside technological advancements.
2023	**Bearman et al.**	Discourse on AI in education.	Higher Education	Analyzing and discussing the implications, challenges, opportunities, and ethical considerations of integrating artificial intelligence into educational systems and practices.	Highlights utopian (empowering) vs. dystopian (eroding autonomy) narratives of AI's role	Advocates ethical AI frameworks and reflective practices.
2021	**Multiple Authors**	AI's role in sustainability and ethics	Sustainability	Exploring how artificial intelligence supports sustainable practices, promotes ethical decision-making, and		

				fosters social responsibility within the context of higher education institutions.		



5. Findings

The findings of this study highlight the transformative impact of Artificial Intelligence (AI) on higher education, demonstrating its ability to enhance teaching methodologies, streamline administrative processes, and improve student learning outcomes. AI-driven tools, such as personalized learning platforms, automated grading systems, and predictive analytics, have significantly contributed to making education more adaptive and efficient. By offering tailored learning experiences, AI enables students to engage with course materials at their own pace, improving retention and academic performance. Additionally, AI-powered virtual tutors and chatbots have proven to be valuable resources in providing instant academic support, reducing students' dependency on human instructors for routine queries. These advancements illustrate how AI fosters a more flexible and student-centric learning environment.

Moreover, the study finds that AI significantly reduces the administrative burden on educators by automating repetitive tasks such as grading assignments, tracking student performance, and managing course materials. This automation allows faculty to dedicate more time to interactive

and research-driven teaching strategies, ultimately enhancing the quality of education. However, despite these benefits, AI adoption in higher education presents notable challenges, including ethical concerns related to data privacy, algorithmic biases, and issues of academic integrity. The research reveals that while AI can assist in detecting plagiarism and academic dishonesty, it also raises concerns about students misusing AI-generated content, highlighting the need for strict ethical guidelines and monitoring mechanisms.

Additionally, findings indicate that AI has a profound impact on student-teacher interactions, with some educators expressing concerns that excessive reliance on AI could diminish the human element in education. While AI can facilitate learning, it cannot replace the critical thinking, creativity, and emotional intelligence that human educators bring to the classroom. The research underscores the importance of maintaining a balance between AI-driven automation and meaningful student engagement, ensuring that technology complements rather than replaces human educators. Furthermore, institutional policies governing AI usage remain inconsistent across different educational institutions, emphasizing the need for standardized frameworks to guide ethical and effective AI implementation.

Finally, the study identifies a significant gap in AI literacy among students and faculty, suggesting that successful AI integration in higher education requires proper training and awareness programs. Many educators and students are either unaware of AI's full potential or hesitant to embrace it due to concerns about job displacement and technological complexities. As AI continues to evolve, institutions must invest in AI literacy initiatives to equip both faculty and students with the skills necessary to navigate an AI-enhanced academic environment. Overall, the findings reinforce the need for a balanced approach to AI adoption in higher education, ensuring that technological advancements align with pedagogical goals while preserving the essential human aspects of learning and mentorship.

6. Recommendations and Suggestions

a. **Strategic AI Integration** – AI should be aligned with academic and administrative objectives, enhancing personalized learning, student engagement, and operational efficiency rather than being implemented in isolation.
b. **Investment in AI Resources** – Institutions must allocate sufficient funding for AI infrastructure, cybersecurity, and skilled professionals to ensure smooth adoption and maintenance of AI-driven tools.
c. **Ethical AI Frameworks** – Clear guidelines should be established to address concerns around data privacy, algorithmic bias, and academic integrity, ensuring AI is used responsibly and transparently.
d. **AI Literacy Training** – Faculty, staff, and students should be trained in AI literacy, equipping them with the necessary skills to utilize AI effectively while fostering critical thinking and ethical awareness.
e. **Human-AI Collaboration** – AI should serve as a supportive tool rather than a replacement for human educators, preserving mentorship, emotional support, and the essential human elements of teaching and learning.

7. Limitations of the Study

The limitations of this study primarily stem from constraints related to data availability, scope, and methodological considerations. Since this research relies predominantly on secondary data sources such as academic journals, reports, and online databases, it is inherently limited by the existing body of literature, which may not comprehensively capture the rapidly evolving landscape of AI applications in higher education. The absence of primary data collection, such as surveys or interviews with educators, students, and policymakers, restricts the study from incorporating firsthand insights and real-time experiences that could provide a more nuanced understanding of AI's practical implications. Additionally, given the diversity of higher education institutions across different countries and educational systems, the findings of this research may not be universally applicable, as AI adoption and its challenges can vary significantly based on factors such as infrastructure, regulatory policies, and institutional readiness.

Another key limitation is the potential bias in the reviewed literature, as many studies on AI in education are conducted by technology developers or proponents of AI-driven solutions, which may lead to an overly optimistic portrayal of its benefits while underrepresenting its drawbacks. Furthermore, the ethical concerns surrounding AI, including issues related to data privacy, algorithmic bias, and academic integrity, are complex and continually evolving, making it difficult to establish definitive conclusions on best practices for AI integration in education. The study is also limited by the fact that AI technologies are continuously advancing, meaning that some findings may become outdated as newer AI-driven tools and methodologies emerge. Additionally, the research does not deeply explore the financial and logistical challenges institutions face in implementing AI, such as the high costs of AI infrastructure, the need for faculty training, and resistance to change among educators and students. Given the time constraints of the study, an extensive empirical analysis covering multiple educational institutions and diverse AI implementations was not feasible. Future research should address these limitations by incorporating primary data collection, conducting longitudinal studies to track AI's long-term impact, and exploring case studies from different educational contexts to gain a more holistic perspective on AI's role in shaping higher education.

8. Scope for Future Research

Future studies could include:

Primary data collection from educators, students, and policymakers. Focused research on specific professional groups like doctors, police personnel, and academics. Exploration of AI's impact in diverse cultural and geographical settings. The scope for future research in the field of Artificial Intelligence (AI) in higher education is vast and dynamic, offering numerous opportunities to explore its evolving applications, challenges, and long-term implications. As AI technology continues to advance, future studies can focus on collecting primary data to assess its real-world impact on teaching methodologies, student engagement, and institutional operations. Empirical research, including surveys, interviews, and case studies, can provide deeper insights into how educators and students perceive AI-driven tools and their effectiveness in improving academic outcomes. Additionally, future research could explore the effectiveness of AI-based adaptive learning systems in diverse educational contexts, evaluating their ability to cater to different learning styles, disciplines, and cultural backgrounds.

Another crucial area for future investigation is the ethical dimension of AI adoption in education. While current studies highlight concerns related to data privacy, algorithmic bias, and academic integrity, further research is needed to develop ethical frameworks and best practices that ensure responsible AI implementation. This includes examining how AI influences decision-making processes, student assessments, and institutional policies, as well as investigating strategies to mitigate biases embedded within AI algorithms. Additionally, studies on AI literacy and faculty preparedness can help determine the necessary skills and training programs required to equip educators with the knowledge to effectively integrate AI into their teaching practices.

Furthermore, future research can focus on the economic and infrastructural challenges associated with AI adoption in higher education. Studies could analyze the cost-effectiveness of AI-driven education models, the financial investments required for AI implementation, and the disparities in access to AI technologies across different institutions and regions. Research could also investigate how AI can be leveraged to bridge educational gaps and promote inclusivity, ensuring that students from diverse backgrounds benefit from AI-driven learning enhancements.

Lastly, as AI continues to evolve, longitudinal studies will be essential to track its long-term impact on higher education. Researchers can explore the sustainability of AI-driven educational models, the evolving role of educators in AI-assisted classrooms, and the implications of AI on the future job market for academic professionals. By addressing these aspects, future research can contribute to the development of comprehensive policies and guidelines that enable the effective and ethical integration of AI in higher education, ensuring its role as a tool for enhancing learning experiences while maintaining academic integrity and human-centered education.

Future Implications

The future limitations of this study primarily revolve around the rapid and continuous evolution of Artificial Intelligence (AI) technologies, which may lead to findings becoming outdated as new advancements emerge. AI in higher education is an evolving field, with new tools, algorithms, and applications being developed at a fast pace. As a result, any conclusions drawn from this research may require periodic reassessment to remain relevant in the face of technological innovation. Furthermore, the long-term impact of AI on education remains uncertain, as its full potential and consequences—both positive and negative—will only become clearer with sustained implementation over time. Future researchers may face challenges in predicting the trajectory of AI adoption, its regulatory landscape, and its ethical implications, given that many of these factors are still under active discussion and development.

Another significant limitation that future studies may encounter is the difficulty in establishing standardized frameworks for AI implementation across different educational institutions and global regions. AI adoption is influenced by diverse factors, including institutional policies, national regulations, financial constraints, and cultural attitudes toward technology in education. These variations make it challenging to generalize findings and propose universally applicable AI integration strategies. Additionally, as AI continues to be integrated into educational settings, new ethical concerns may arise, such as the increasing dependency on AI-driven decision-making, its potential effects on students' cognitive development, and the evolving nature of human-AI collaboration in academic environments.

Future research may also be constrained by access to high-quality primary data, as AI policies and their effectiveness are still in the early stages of implementation in many institutions. Collecting empirical data on the long-term effects of AI in education will require longitudinal studies spanning several years, which can be resource-intensive and complex. Moreover, as AI technologies become more sophisticated, concerns related to academic integrity, plagiarism, and the misuse of AI-generated content in education will likely require continuous monitoring and adaptation of ethical guidelines. Addressing these future limitations will necessitate interdisciplinary research, ongoing collaboration between educators and technology experts, and the development of flexible policies that can adapt to the evolving AI landscape in higher education.

9. Conclusion

The integration of Artificial Intelligence (AI) in higher education is transforming traditional academic practices, offering innovative solutions to enhance teaching methodologies, student learning experiences, and institutional efficiency. This study has explored the multifaceted role of AI, highlighting its ability to personalize education, automate administrative tasks, and provide valuable insights for both educators and learners. AI-driven tools have demonstrated the potential to revolutionize curriculum delivery, assessment techniques, and student engagement, thereby contributing to improved academic outcomes. However, while AI presents numerous benefits, its adoption also brings forth significant challenges, including ethical concerns, data privacy issues, algorithmic biases, and the risk of diminishing the human element in education. Addressing these concerns is crucial to ensuring that AI serves as a complement rather than a replacement for traditional teaching and learning practices.

Furthermore, this study has emphasized the importance of responsible AI integration, advocating for institutional policies that align AI adoption with pedagogical goals while maintaining academic integrity and inclusivity. The role of faculty training and AI literacy among students and educators is paramount to fostering a balanced approach that leverages AI's capabilities while preserving critical thinking and meaningful student-teacher interactions. Additionally, AI's impact on institutional policies requires careful consideration, as universities and colleges must develop governance frameworks that regulate AI use while encouraging innovation in education.

While this research has provided valuable insights into AI's current and potential applications in higher education, it also acknowledges its limitations, particularly the reliance on secondary data and the evolving nature of AI technologies. Future research should focus on empirical

studies, collecting primary data to gain deeper insights into AI's real-world implications in different educational contexts. As AI continues to evolve, it is imperative that educational institutions, policymakers, and researchers work collaboratively to navigate its complexities, ensuring that its implementation enhances learning experiences without compromising ethical standards. Ultimately, the successful integration of AI in higher education will depend on a balanced approach that embraces technological advancements while upholding the core values of education—critical thinking, creativity, and human connection.

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FROM FEAR TO FREEDOM: REVIEWING INTIMATE PARTNER VIOLENCE AGAINST WOMEN IN INDIA

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Behind closed doors is what that goes beyond expectations and unknown to the world. A book name Intimate Partner Violence against women in India: A quantitative analysis of causes and outcomes, authored by Dr. Richa Kothari, Dr. Zakir Husain and Dr. Mousumi Dutta. This book answers to the question of what Intimate Partner Violence and what consequences women is face in such a serious social problem. In India, intimate partner violence (IPV) against women is a disease that has its roots in gender dynamics, cultural norms, and structural injustices.
Millions of women have been affected due to violence, especially IPV, intimate partner violence, which has become a major public concern. Epidemics and other emergencies have bolstered to escalate this issue due to lack of social networking and services. The adverse health consequences of such violence on women and their children are significant (García-Moreno et al., 2013; Ziaei et al., 2014). The social and economic consequences of violence against women go beyond human rights violations and jeopardize a nation's economic progress. Policy makers have been increasingly aware in the recent years of the need of preventing IPV, especially given the high annual costs of violence against women ($21 billion) and the projected rise to ($323.4 billion) by 2044-2045 in terms of health , administration and social welfare(Our Watch, n.d.). More importantly , it decreases the victim's productivity and leads to loss in working days which ultimately impacts the economic development of a country (Duvvury et al., 2013).

The Book is structured into several comprehensive sections:

1. Historical and Cultural Context: The authors identify patriarchal norms, societal expectations, and religious influences as the main causes of gender-based violence in India. It also looks at how conventional family arrangements contribute to the continuation of IPV.
2. Societal Impact and Well-being of Mother and Child: The authors delve into the psychological aspect of IPV victims and highlights on a mother's exposure to IPV can lead to adverse nutritional outcomes (stunting, underweight, or a hyper-critical group comprising of children who are both stunted and underweight).
3. Sustainable Development Goals: The chapter recognizes the issues on gender inequality and violence against women, where the global community has voiced concern by integrating these issues into Sustainable Development Goals (SDGs) 5.2 and xc16.1, emphasizing the need to achieve gender equality through reducing violence against women.
4. Women Empowerment and IPV Experience: The book finds evidence of the shielding effect of empowerment on IPV and community-level analysis revealed synergies that helped change gender norms and prevent IPV.

The authors present a comprehensive discussion on such pressing issues by integrating quantitative analysis using sophisticated econometric methods on IPV. The book looks at how caste, socioeconomic status, and rural-urban inequality relate to IPV.
This study begins by understanding the role of women's empowerment in their IPV experiences in India and the contested relationship between IPV and empowerment is investigated—at individual and community levels. Additionally, the study discusses about the use of beneficial flagship programs like Aspirational District Program, which targets districts with low performance in major five areas: education, health and nutrition, agriculture and water resources, financial inclusion and skill development and infrastructure. Lastly the book covers

the importance of routine policing and NGO assistance, initiatives to change the mindset of male members and general public which can help to reduce the IPV cases.

Critical Analysis

The community's ingrained social structures and power dynamics will oppose any policies that try to implement such changes through social engineering. Plans for community reform will be thwarted by such relationships and systems, which usually marginalize the weaker segments and silence their voices (Dixon, 1989).

Only by a persistent fight to alter the power dynamics and gender roles that now exist in the community will fundamental social change be achieved. The new social relationships that result from this battle will inspire a desire for social change. In order to eradicate domestic abuse, it is essential to analyze these social processes, and doing so is an intriguing field for future research. However, achieving the Sustainable Development Goals (SDG) requires lowering IPV levels. This book makes the case that a move away from national-level regulations and toward localized methods that concentrate on certain geographic clusters may be a more economical and effective strategy to reduce IPV.

In conclusion, IPV significantly affects growth, inclusive development, and gender equality. IPV can be decreased by empowering women, according to the authors. Consequently, there can be a domino effect that helps lessen violence in subsequent generations. Reducing the prevalence of IPV may also significantly improve the wellbeing and health of the kids. Therefore, lowering IPV levels is essential to reaching the Sustainable Development Goals (SDG) targets for preventing malnutrition (SDG 2), eliminating violence against women (SDG 16), promoting gender equality (SDG 5), ensuring health lifestyle (SDG 3), and maintaining an inclusive development (SDG 8).

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