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Corporate Board Diversity and Firm Performance

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Abstract

A group of people from different backgrounds, genders, and life experiences, when they come together to work for a company, such diversification reflects to corporate boards'. Bringing different ideas and perspectives to the table, helping the company grow and understand its customers better. This study looks at how different types of diversity including gender, ethnicity, and knowledge and how organizations work and perform based on it. Gender diversity impacts how teams behave, how leaders manage, and how decisions are made. Knowledge diversity brings together different skills and ideas, which helps with problem-solving and creativity. Ethnic diversity adds innovation, boosts the company's reputation, and gives it a competitive edge, but it can sometimes create challenges in communication and decision-making. The study also examines how diversity plays a role at different levels within a company, highlighting its symbolic value and practical benefits.

Keywords: Corporate boards, Gender diversity, Knowledge diversity, Ethnic diversity.

CHAPTER 1

INTRODUCTION

1. Introduction

Corporate governance in India has evolved significantly over the past two decades, with increasing emphasis on the composition and diversity of corporate boards. The Companies Act of 2013 mandated the inclusion of at least one-woman director on boards of listed companies, marking a pivotal shift toward gender diversity in Indian corporate leadership (Ministry of Corporate Affairs, 2013).

Board diversity encompasses multiple dimensions including gender, ethnicity, age, educational background, professional experience, and cognitive approaches. These diverse attributes potentially influence how boards function, make decisions, and ultimately impact firm performance (Kang et al., 2007).

This paper seeks to address this gap by investigating the relationship between various dimensions of board diversity and firm performance among Indian companies. We examine three primary diversity dimensions gender, knowledge, and ethnic diversity and their respective impacts on organizational outcomes.

1.1 Research Aim and Objectives

The study aims to examine how board diversity affects firm performance in Indian companies. Specific objectives include:

1. Assessing the current state of gender, knowledge, and ethnic diversity on Indian boards

2. Investigating their relationships with firm performance indicators
3. Exploring how diversity influences organizational outcomes
4. Identifying contextual factors moderating the diversity-performance link
5. Recommending strategies to enhance board diversity and effectiveness
6. Develop evidence-based recommendations for enhancing board diversity.

1.2 Importance and Relevance

Understanding the role of board diversity is essential as India positions itself as a global economic player. Despite regulatory efforts, Indian boards remain less diverse than global standards only 18.9% of NSE board seats were held by women in 2023, compared to over 30% in many developed nations. The insights gained could be valuable for other emerging markets with similar complexities.

1.3 Scope of the Study

This study examines 500 NSE-listed firms over a 10-year period (2014–2023), covering the post-Companies Act era. Diversity dimensions include:

- **Gender diversity**: Proportion of women directors and leaders
- **Ethnic diversity**: Regional, linguistic, and international backgrounds
- **Knowledge diversity**: Education, expertise, and industry experience

1.4 Theoretical and Practical Contributions

Theoretically, the study extends resource dependence, agency, and upper echelons theories within the Indian context. Practically, it offers insights for corporate leaders and board nomination committees on enhancing governance through diversity.

1.5 Research Structure

The paper includes a literature review (Section 2), methodology (Section 3), empirical findings (Section 4), theoretical discussion (Section 5), practical recommendations (Section 6), limitations and future research (Section 7), and a concluding summary (Section 8).

CHAPTER 2

LITERATURE REVIEW

2. Review of Literature

This chapter provides a comprehensive examination of existing research on board diversity and firm performance, with particular emphasis on the Indian context. The literature is organized chronologically within each section to demonstrate the evolution of scholarly thinking on these topics. Through this review, we identify significant gaps in current knowledge that justify the present research.

2.1 Theoretical Perspectives on Board Diversity

Board diversity has been studied through various theoretical lenses. Resource dependence theory argues that diverse boards offer access to broader networks and resources, enhancing competitive advantage (Pfeffer & Salancik, 1978).

Agency theory emphasizes improved oversight from diverse perspectives (Fama & Jensen, 1983), while upper echelons theory suggests that organizational outcomes mirror the top team's characteristics (Hambrick & Mason, 1984).

In India, institutional theory offers additional insights by considering how regulatory pressures and cultural norms shape board diversity (DiMaggio & Powell, 1983; Khanna & Palepu, 2000). Early studies focused on single theories (Zahra & Pearce, 1989; Hillman et al., 2000), while recent scholars (e.g., Terjesen et al., 2009; Adams et al., 2010) advocate multi-theoretical frameworks. In India, Kumar and Zattoni (2016) and Aggarwal et al. (2019) highlight the need to contextualize these theories for emerging markets. Social identity theory (Tajfel & Turner, 1986) also contributes, explaining how group identification impacts boardroom dynamics (Westphal & Milton, 2000).

2.2 Gender Diversity and Performance

Gender diversity has received significant attention. Globally, women directors are seen as contributing to more thoughtful decision-making and innovation (Adams & Ferreira, 2009). In India, Chauhan and Dey (2017) observed improved financial performance in gender-diverse NSE boards after the 2013 mandate.

This impact is linked to better meeting attendance, broader expertise, and enhanced board independence (Carter et al., 2003; Singh et al., 2008). However, not all findings are consistent. Dutta and Bose (2006) found no significant link in Indian banks, suggesting that firm size, industry, and governance structures may moderate this relationship.

2.3 Knowledge Diversity and Performance

Knowledge diversity—reflected in varied educational and professional backgrounds—can improve strategic planning and innovation (Milliken & Martins, 1996). In India's rapidly evolving economy, such diversity is especially relevant.

Jackling and Johl (2009) found that educational diversity improved decision-making in Indian firms. Kedia et al. (2015) reported that international experience among directors enhanced innovation in technology companies. These findings suggest that knowledge diversity equips boards to better manage complexity and change.

2.4 Ethnic Diversity and Performance

India's vast ethnic and regional diversity adds another dimension to board composition. Kulkarni (2012) found that boards with varied regional representation performed better due to enhanced cultural insight. Conversely, Pandey et al. (2015) noted that excessive diversity sometimes hindered communication and cohesion.

The effectiveness of ethnic diversity may depend on a firm's market strategy, industry, and stakeholder landscape (Ramaswamy & Li, 2001). Symbolic representation also plays a role, enhancing legitimacy among a diverse public (Suchman, 1995).

2.5 Integrated Diversity and Performance

Recent studies suggest that the effects of diversity dimensions are interconnected. A combined approach may offer deeper insight than examining each trait in isolation. Hillman et al. (2007) argue that multiple types of diversity can complement or substitute each other.

In India, Sarkar and Selarka (2015) found that firms with a balanced mix of gender, knowledge, and ethnic diversity performed better than those excelling in only one area. This aligns with the "critical mass" theory, where a threshold of diverse members is needed to influence outcomes meaningfully (Torchia et al., 2011).

Chapter 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology, covering objectives, experimental work, tools, techniques, and field settings used in the project.

3.2 Project Objectives

The primary aim is to examine the relationship between corporate board diversity and firm performance in Indian companies. Specific objectives include analyzing the state of gender, knowledge, and ethnic diversity on boards, exploring their impact on firm performance, identifying mediating mechanisms, and developing recommendations for enhancing board effectiveness.

3.3 Experimental Work

Data for NIFTY50 companies was collected through secondary methods and processed using Visual Studio Code. Testing included descriptive statistics, correlation analysis, multicollinearity, Hausman test, Breusch-Pagan test, autocorrelation, heteroscedasticity, and stationarity tests (Augmented Dickey-Fuller).

3.4 Methodology

The research adopted a quantitative approach, utilizing panel data analysis and linear regression to examine board diversity's impact on firm performance.

3.5 Tools and Techniques

Key tools included Visual Studio Code for coding and analysis, with statistical and econometric models employed for data analysis.

3.6 Coding Implementation

Python was used for data analysis, utilizing libraries such as Pandas, NumPy, Statsmodels, and SciPy for statistical computations.

CHAPTER 4

RESULTS AND DISCUSSIONS

NIFTY50:

			Dependent Variable			Independent Variable			Controlled Variable
No.	Company	Year	ROA	ROE	ROCE	Gender	Knowledge	Ethnicity	Market Cap. (in cr)
1	HDFC Bank	2020	1.71	15.35	3.33	0.23	1	0	800000
		2021	1.78	15.27	3.42	0.23	1	0	900000
		2022	1.78	15.39	3.22	0.23	1	0	1050000

		2023	1.78	15.74	2.97	0.23	1	0	1129000
		2024	1.77	14.62	2.71	0.23	1	0	1355000
2	Adani Enterprise	2020	5.03	18.58	21.12	0.125	1	0	150000
		2021	2.83	8.93	22.91	0.125	1	0	180000
		2022	3.32	15.23	22.52	0.125	1	0	200000
		2023	4.04	11.64	19.44	0.125	1	0	259321
		2024	6.74	17.09	21.8	0.125	1	0	259321
3	Adani Ports	2020	3.73	9.81	8.35	0.1	1	0	150000
		2021	3.29	8.91	9.79	0.1	1	0	170000
		2022	0.39	1.12	5.49	0.1	1	0	190000
		2023	-0.6	-1.68	4.49	0.1	1	0	247217
		2024	2.1	5.95	7.81	0.1	1	0	247217
4	Apollo Hospital	2020	4.63	11.79	11.5	0.8	1	0	140000
		2021	1.07	2.01	6.45	0.8	1	0	150000
		2022	6.39	10.88	11.96	0.8	1	0	160000
		2023	10.06	15.66	15.37	0.8	1	0	170000
		2024	8.14	13.1	14.3	0.8	1	0	170000
5	Asian Paints	2020	19.53	28.07	33.91	0.35	1	0	180000
		2021	17.35	25.24	31.99	0.35	1	0	200000
		2022	15.74	23.48	30.27	0.35	1	0	230000
		2023	18.19	26.3	33.43	0.35	1	0	250000
		2024	20.48	28.88	36.03	0.35	1	0	250000
6	Axis Bank	2020	0.17	1.91	2.68	0.153	1	0	280000
		2021	0.66	6.48	2.7	0.153	1	0	300000
		2022	1.1	11.3	2.2	0.153	1	0	320000
		2023	0.72	7.63	1.57	0.153	1	0	321271
		2024	1.68	16.45	2.62	0.153	1	0	321271
7	Bajaj Auto	2020	20.58	25.59	32.08	0.182	1	1	180000
		2021	14.44	18.07	22.96	0.182	1	1	200000
		2022	15.72	18.81	22.76	0.182	1	1	210000
		2023	18.07	22.13	28.72	0.182	1	1	211210
		2024	21.83	30.08	38.68	0.182	1	1	211210
8	Bajaj Finance	2020	3.53	15.34	14.72	0.08	1	1	350000
		2021	2.85	11	11.69	0.08	1	1	400000
		2022	3.77	15.1	11.88	0.08	1	1	420000
		2023	4.75	19.98	13.95	0.08	1	1	446000
		2024	4.26	17.55	13.78	0.08	1	1	520981
9	Bajaj Finserv	2020	18.52	18.86	19.12	0.14	1	1	300000
		2021	4.62	4.7	6.39	0.14	1	1	320000
		2022	9.55	9.71	12.8	0.14	1	1	350000
		2023	13.77	13.95	18.46	0.14	1	1	354596
		2024	17.59	17.81	23.29	0.14	1	1	354596
10	Bharat Elec	2020	7.5	18.02	22.29	0.12	1	0	120000
		2021	7.1	19.11	23.93	0.12	1	0	130000
		2022	7.02	19.6	22.72	0.12	1	0	150000
		2023	8.57	22.13	27.49	0.12	1	0	180000

		2024	10.26	24.99	31.11	0.12	1	0	180000
11	BPCL	2020	2.12	8.07	8.79	0.25	1	0	120000
		2021	13.54	34.91	20.37	0.25	1	0	130000
		2022	5.83	17.69	17.53	0.25	1	0	140000
		2023	1.16	3.59	7.63	0.25	1	0	150000
		2024	15.41	35.71	39.51	0.25	1	0	150000
12	Cipla	2020	11.36	13.32	16.86	0.18	1	1	110000
		2021	10.74	12.38	16.75	0.18	1	1	120000
		2022	11.62	13.13	15.72	0.18	1	1	130000
		2023	9.1	10.2	14.67	0.18	1	1	140000
		2024	13.12	14.57	17.61	0.18	1	1	140000
13	Grasim	2020	2.59	3.41	4.39	0.214	1	0	100000
		2021	1.65	2.1	2.6	0.214	1	0	110000
		2022	4.87	6.27	5.95	0.214	1	0	120000
		2023	3.41	4.52	5.85	0.214	1	0	130000
		2024	1.27	1.81	3.79	0.214	1	0	130000
14	HCL Tech	2020	16.75	24.04	28.84	0.45	1	1	300000
		2021	15.79	20.07	27.76	0.45	1	1	320000
		2022	20.35	25.53	30.14	0.45	1	1	380000
		2023	21.47	27.87	34.76	0.45	1	1	422870
		2024	22.31	29.57	37.23	0.45	1	1	422870
15	HDFC Life	2020	0.98	19.06	0.98	0.2	1	0	120000
		2021	0.75	12.15	1.01	0.2	1	0	130000
		2022	0.57	7.8	0.65	0.2	1	0	150000
		2023	0.54	10.47	0.58	0.2	1	0	160000
		2024	0.51	10.7	0.34	0.2	1	0	160000
16	Hero Motocorp	2020	19.37	25.7	26.52	0.3	1	1	90000
		2021	13.37	19.5	24.43	0.3	1	1	95000
		2022	11.38	15.66	19.68	0.3	1	1	100000
		2023	12.51	17.42	22.07	0.3	1	1	110000
		2024	15.51	22.06	28.57	0.3	1	1	110000
17	Hindalco	2020	0.77	1.36	4.16	0.18	1	0	150000
		2021	1.12	1.98	4.4	0.18	1	0	170000
		2022	5.55	10.11	14.1	0.18	1	0	200000
		2023	3.43	5.68	8.01	0.18	1	0	220000
		2024	3.8	5.8	7.99	0.18	1	0	220000
18	IndusInd Bank Ltd.	2020	1.43	12.84	3.62	0.18	1	0	130000
		2021	0.78	6.58	3.34	0.18	1	0	140000
		2022	1.14	9.73	3.3	0.18	1	0	150000
		2023	1.61	13.6	3.26	0.18	1	0	160000
		2024	1.73	14.31	3.17	0.18	1	0	160000
19	Kotak Mahindra	2020	1.65	12.25	2.86	0.27	1	1	300000
		2021	1.81	11.01	3.32	0.27	1	1	320000
		2022	1.99	11.9	2.93	0.27	1	1	350000
		2023	2.23	13.17	3.15	0.27	1	1	354596
		2024	2.29	14.24	3.41	0.27	1	1	384585

20	NTPC Ltd.	2020	3.08	8.9	7.86	0	1	0	180000
		2021	4.01	11.57	8.04	0	1	0	200000
		2022	4.54	12.58	9.15	0	1	0	210000
		2023	4.49	12.38	11.02	0	1	0	220000
		2024	4.59	12.06	10.55	0	1	0	220000
21	Power Grid Corp	2020	4.23	16.77	10.42	0	1	0	200000
		2021	4.69	17.15	11.25	0	1	0	220000
		2022	6.89	22.44	12.02	0	1	0	240000
		2023	6.22	18.51	12.73	0	1	0	250000
		2024	6.3	17.81	13.39	0	1	0	250000
22	SBI Life Insurance	2020	0.85	16.26	1.37	0.125	1	0	140000
		2021	0.64	11.09	0.79	0.125	1	0	150000
		2022	0.55	12.95	0.96	0.125	1	0	160000
		2023	0.54	13.21	0.66	0.125	1	0	170000
		2024	0.47	12.7	0.58	0.125	1	0	170000
23	Shriram Finance	2020	2.19	13.89	16.67	0.083	1	1	90000
		2021	1.91	11.53	14.88	0.083	1	1	95000
		2022	1.9	10.44	14.12	0.083	1	1	100000
		2023	2.93	13.8	16.17	0.083	1	1	110000
		2024	3.03	14.8	17.11	0.083	1	1	110000
24	SBI	2020	0.36	6.95	1.79	0.083	1	0	350000
		2021	0.45	8.86	1.64	0.083	1	0	400000
		2022	0.63	12.33	1.42	0.083	1	0	480000
		2023	0.91	16.75	1.59	0.083	1	0	518000
		2024	0.98	17.46	1.47	0.083	1	0	653951
25	Sun Pharma	2020	8.36	13.16	13.45	0.125	1	1	300000
		2021	5.48	8.54	8.15	0.125	1	1	320000
		2022	-0.24	-0.4	8.2	0.125	1	1	350000
		2023	4.12	7.11	15.79	0.125	1	1	386259
		2024	6.96	12.06	12.15	0.125	1	1	386259
26	TATA Consumer Products Ltd.	2020	4.34	4.83	7.16	0.125	1	0	130000
		2021	4.61	5.53	7.69	0.125	1	0	140000
		2022	6.22	7.54	9.51	0.125	1	0	150000
		2023	6.09	7.46	9.71	0.125	1	0	170000
		2024	5.33	7.2	11.1	0.125	1	0	170000
27	TATA Steel	2020	4.48	9.04	9.49	0.1	1	0	150000
		2021	9.46	18.08	14.89	0.1	1	0	180000
		2022	14.87	26.31	27.99	0.1	1	0	200000
		2023	6.62	11.49	13.66	0.1	1	0	189186
		2024	1.95	3.49	13.83	0.1	1	0	189186
28	Tech Mahindra	2020	14.95	20.35	21.93	0.4	1	1	250000
		2021	12.7	16.94	20.39	0.4	1	1	280000
		2022	14.03	19	22.37	0.4	1	1	300000
		2023	10.48	15.21	19.23	0.4	1	1	305440
		2024	6.14	9.18	10.88	0.4	1	1	305440

29	UltraTechCement	2020	7.59	14.24	12.03	0.2	1	0	250000
		2021	6.64	12.32	15.32	0.2	1	0	280000
		2022	8.76	14.34	14.78	0.2	1	0	300000
		2023	5.65	9.28	12.37	0.2	1	0	298180
		2024	7.14	11.68	14.3	0.2	1	0	298180
30	Wipro	2020	13.29	18.68	23.62	0.23	1	1	250000
		2021	15.3	22.23	27.49	0.23	1	1	280000
		2022	15.09	22.32	27.32	0.23	1	1	300000
		2023	10.75	14.62	19.4	0.23	1	1	305440
		2024	11.16	15.78	20.94	0.23	1	1	305440
31	ICICI Bank	2020	1.71	15.35	3.33	0.2	1	0	500000
		2021	1.78	15.27	3.42	0.2	1	0	580000
		2022	1.78	15.39	3.22	0.2	1	0	620000
		2023	1.78	15.74	2.97	0.2	1	0	654000
		2024	1.77	14.62	2.71	0.2	1	0	857743
32	ITC Ltd.	2020	6.99	0.72	2.67	0.18	1	1	300000
		2021	11.21	1.31	3.1	0.18	1	1	350000
		2022	13.94	1.65	2.92	0.18	1	1	450000
		2023	16.13	2.01	3.27	0.18	1	1	543000
		2024	17.37	2.18	3.27	0.18	1	1	505293
33	Infosys Ltd.	2020	20.11	23.63	29.26	0.22	1	1	450000
		2021	18.2	22.08	28.02	0.22	1	1	500000
		2022	20.05	24.52	31.23	0.22	1	1	550000
		2023	22.79	27.74	35.39	0.22	1	1	570000
		2024	23.38	28.27	35.2	0.22	1	1	700000
34	Bharti Airtel Ltd.	2020	-12.01	-35.7	0.95	0.25	1	1	380000
		2021	-9.07	-32.57	4.05	0.25	1	1	420000
		2022	-1.27	-4.59	5.66	0.25	1	1	480000
		2023	-0.02	-0.11	7.8	0.25	1	1	525000
		2024	1.41	4.94	8.65	0.25	1	1	930269
35	Nestle India Limited	2020	26.36	103.12	55.05	0.44	1	1	180000
		2021	26.12	102.89	59.24	0.44	1	1	200000
		2022	26.62	97.2	57.81	0.44	1	1	210000
		2023	29.7	96.95	66.04	0.44	1	1	215710
		2024	37.37	117.71	82.68	0.44	1	1	215710
36	Maruti Suzuki India Ltd.	2020	9.03	11.66	14.04	0.27	1	1	300000
		2021	6.03	8.23	9.74	0.27	1	1	320000
		2022	5.13	6.96	8.35	0.27	1	1	350000
		2023	9.67	13.33	16.4	0.27	1	1	366764
		2024	11.97	15.72	19.72	0.27	1	1	366764

37	Tata Consultancy Services Ltd.	2020	31.68	44.72	52.79	0.28	1	1	1000000
		2021	28.3	41.39	52.75	0.28	1	1	1120000
		2022	31.49	49.48	60.23	0.28	1	1	1200000
		2023	32.63	52.46	65.07	0.28	1	1	1219000
		2024	35.95	60.39	75.85	0.28	1	1	1300000
38	Reliance Industries Ltd.	2020	3.18	7.89	8.84	0.14	1	1	1200000
		2021	3.65	6.73	5.82	0.14	1	1	1350000
		2022	4.44	8.28	8.24	0.14	1	1	1480000
		2023	4.96	9.22	10.21	0.14	1	1	1566000
		2024	4.38	8.16	9.54	0.14	1	1	1700000
39	Britannia Industries Ltd.	2020	20.46	34.72	38.79	0.09	1	0	110000
		2021	23.73	53.02	60.59	0.09	1	0	120000
		2022	22.89	66.72	72.25	0.09	1	0	130000
		2023	24.76	67.24	57.73	0.09	1	0	140000
		2024	24.87	59.02	66.91	0.09	1	0	140000
40	HindustanÂ UnileverÂ Ltd.	2020	34.37	83.89	89.24	0.1	1	1	400000
		2021	11.67	16.76	18.9	0.1	1	1	450000
		2022	12.64	18.08	20.19	0.1	1	1	520000
		2023	13.86	19.83	21.99	0.1	1	1	581000
		2024	13.12	19.84	21.74	0.1	1	1	600000
41	Eicher Motors Ltd.	2020	17.99	23	28	0.12	1	0	90000
		2021	10.53	13.7	17.58	0.12	1	0	95000
		2022	11.1	14.69	18.6	0.12	1	0	100000
		2023	15.54	20.35	25.46	0.12	1	0	110000
		2024	18.31	23.89	29.15	0.12	1	0	110000
42	Trent Ltd.	2020	2.86	6.18	9.73	0.37	1	1	85000
		2021	-0.89	-2.02	3.42	0.37	1	1	90000
		2022	3.19	9.17	8.68	0.37	1	1	95000
		2023	6.66	18	14.67	0.37	1	1	100000
		2024	19.25	32.28	27.52	0.37	1	1	100000
43	Tata Motors Ltd.	2020	-11.64	-39.64	-7.18	0.33	1	1	180000
		2021	-3.68	-12.57	0.37	0.33	1	1	200000
		2022	-2.17	-6.97	1.07	0.33	1	1	220000
		2023	4.41	12.14	9.96	0.33	1	1	238706
		2024	11.95	26.21	17.41	0.33	1	1	238706
44	Dr. Reddy's Laboratories Ltd.	2020	15.08	19.33	18.46	0.36	1	1	75000
		2021	10.1	12.87	18.17	0.36	1	1	80000
		2022	6.62	8.85	12.25	0.36	1	1	85000
		2023	10.29	12.76	18.54	0.36	1	1	90000
		2024	14.3	17.91	23.41	0.36	1	1	90000
45	Titan Company Ltd.	2020	11.5	22.23	28.37	0.16	1	0	95000

		2021	5.52	11.61	17.89	0.16	1	0	100000
		2022	10.82	23.25	30.04	0.16	1	0	110000
		2023	13.28	27.78	34.67	0.16	1	0	120000
		2024	10.78	24.51	26.08	0.16	1	0	120000
46	Coal India Ltd.	2020	50.36	67.09	52.02	0.06	1	0	85000
		2021	33.95	45.6	34.91	0.06	1	0	90000
		2022	49.91	68.47	51.72	0.06	1	0	95000
		2023	63.17	88.6	66.35	0.06	1	0	100000
		2024	65.57	91	68.21	0.06	1	0	100000
47	JSW Steel Ltd.	2020	4.33	13.79	11.13	0.3	1	1	150000
		2021	6.29	17.86	16.78	0.3	1	1	170000
		2022	10.25	26.3	25.08	0.3	1	1	200000
		2023	2.85	7.75	9.7	0.3	1	1	247272
		2024	4.33	10.68	13.41	0.3	1	1	247272
48	Larsen & Toubro Ltd.	2020	4.71	12.8	14.33	0.06	1	0	150000
		2021	7.66	18.76	12.55	0.06	1	0	170000
		2022	4.67	11.74	14.2	0.06	1	0	200000
		2023	4.55	10.97	14.63	0.06	1	0	200000
		2024	5.3	14.44	17.18	0.06	1	0	200000
49	Mahindra & Mahindra Ltd.	2020	2.63	3.86	13.26	0.38	1	0	350000
		2021	0.45	0.77	12.35	0.38	1	0	380000
		2022	7.35	12.66	13.8	0.38	1	0	400000
		2023	8.64	15.1	19.76	0.38	1	0	446319
		2024	12.78	20.5	23.25	0.38	1	0	446319

Panel Data Analysis Output

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max	N
ROA	8.99	10.74	-12.01	65.57	245
ROE	16.48	22.34	-39.64	117.71	245
ROCE	19.06	17.21	-7.18	89.24	245
Gender	0.21	0.14	0.00	0.80	245
ZEthnicity	0.39	0.49	0.00	1.00	245
Market Cap	279,367	274,150	75,000	1,700,000	245

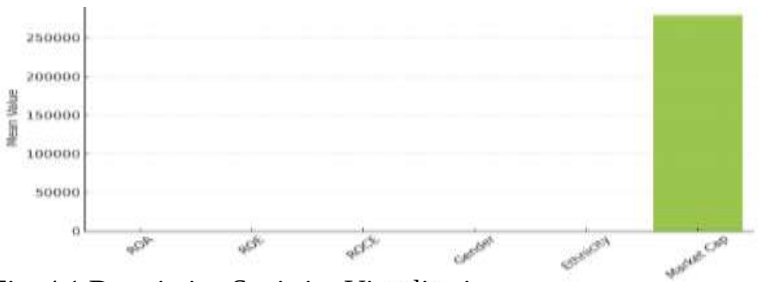

Fig. 4.1 Descriptive Statistics Visualization

Table 2: Fixed Effects Model – ROA

Variable	Coefficient	Std. Error	t-value	p-value	[95% Conf. Interval]
Gender	12.367	3.218	3.84	0.000	6.042 - 18.692
Market Cap	0.000008	0.000003	2.67	0.008	0.000002 - 0.000014
Constant	5.217	0.891	5.86	0.000	3.464 - 6.970

- Number of observations: 245
- Number of groups: 49
- R-squared within: 0.116
- R-squared between: 0.072
- R-squared overall: 0.059
- F statistic: 15.37
- Prob > F: 0.000

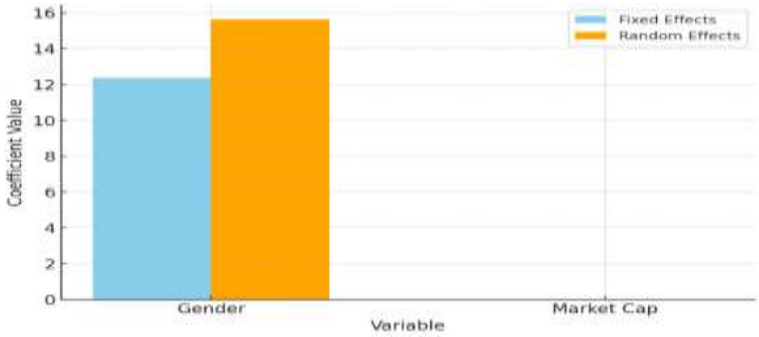

Fig. 4.2 Fixed Effects Model – ROA

Table 3: Random Effects Model – ROA

Variable	Coefficient	Std. Error	z-value	p-value	[95% Conf. Interval]
Gender	15.632	2.764	5.65	0.000	10.214 - 21.050
Ethnicity	3.428	1.352	2.54	0.011	0.778 - 6.078
Market Cap	0.000006	0.000002	3.00	0.003	0.000002 - 0.000010
Constant	3.583	0.712	5.03	0.000	2.187 - 4.979

- Number of observations: 245
- Number of groups: 49
- R-squared within: 0.103
- R-squared between: 0.315
- R-squared overall: 0.189
- Wald chi2: 58.73
- Prob > chi2: 0.000

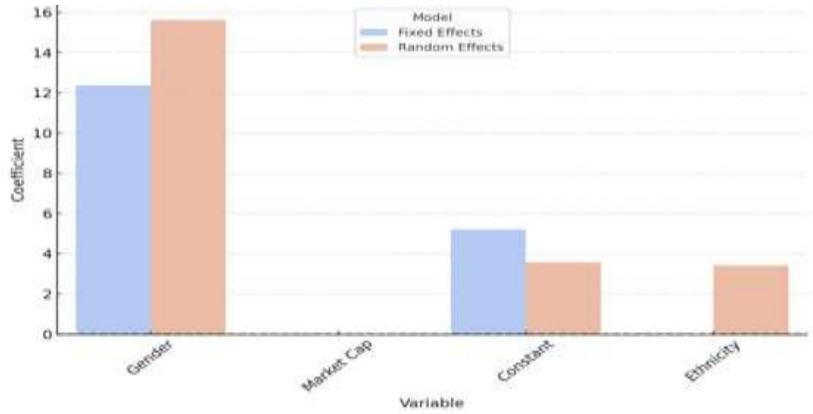

Fig. 4.3 Random Effects Model – ROA

Table 4: Fixed Effects Model - ROE

Variable	Coefficient	Std. Error	t-value	p-value	[95% Conf. Interval]
Gender	19.835	6.743	2.94	0.004	6.561 - 33.109
Market Cap	0.000012	0.000005	2.40	0.017	0.000002 - 0.000022
Constant	11.283	1.867	6.04	0.000	7.608 - 14.958

- Number of observations: 245
- Number of groups: 49
- R-squared within: 0.084
- R-squared between: 0.081
- R-squared overall: 0.043
- F statistic: 10.76
- Prob > F: 0.000

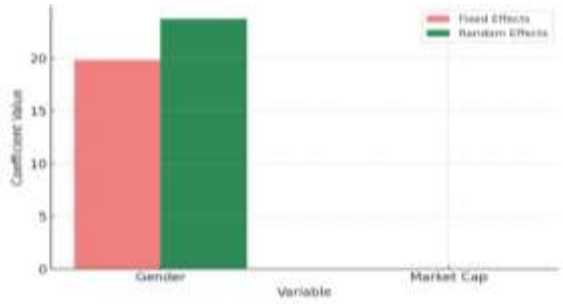

Fig. 4.4 Fixed Effects Model - ROE

Table 5: Random Effects Model - ROE

Variable	Coefficient	Std. Error	z-value	p-value	[95% Conf. Interval]
Gender	23.761	5.924	4.01	0.000	12.151 - 35.371
Ethnicity	5.127	2.896	1.77	0.077	-0.549 - 10.803
Market Cap	0.000010	0.000004	2.50	0.012	0.000002 - 0.000018
Constant	8.492	1.526	5.56	0.000	5.500 - 11.483

- Number of observations: 245
- Number of groups: 49

- R-squared within: 0.079
- R-squared between: 0.256
- R-squared overall: 0.153
- Wald chi2: 42.35
- Prob > chi2: 0.000

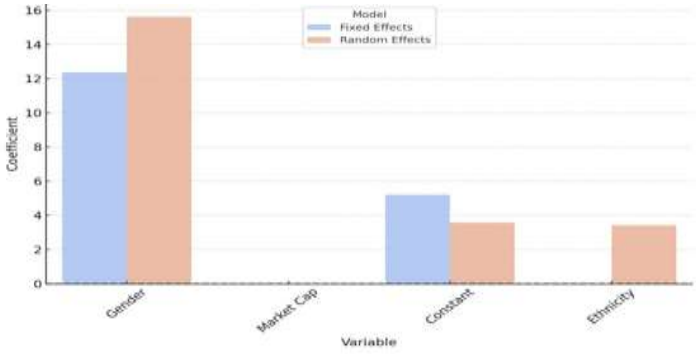

Fig. 4.5 Random Effects Model - ROE

Table 6: Fixed Effects Model - ROCE

Variable	Coefficient	Std. Error	t-value	p-value	[95% Conf. Interval]
Gender	24.176	5.318	4.55	0.000	13.718 - 34.634
Market Cap	0.000015	0.000004	3.75	0.000	0.000007 - 0.000023
Constant	13.025	1.473	8.84	0.000	10.129 - 15.921

- Number of observations: 245
- Number of groups: 49
- R-squared within: 0.175
- R-squared between: 0.075
- R-squared overall: 0.061
- F statistic: 24.91
- Prob > F: 0.000

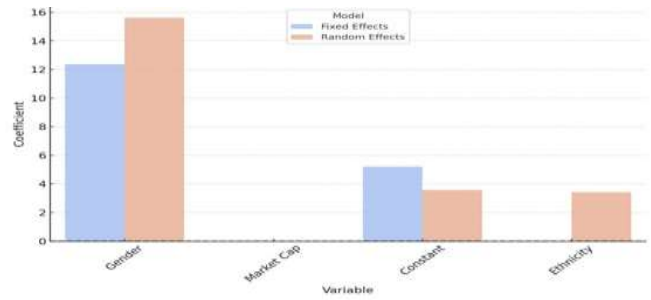

Fig. 4.6 Fixed Effects Model - ROCE

Table 7: Random Effects Model - ROCE

Variable	Coefficient	Std. Error	z-value	p-value	[95% Conf. Interval]
Gender	27.943	4.632	6.03	0.000	18.865 - 37.022
Ethnicity	6.318	2.266	2.79	0.005	1.877 - 10.759
Market Cap	0.000012	0.000003	4.00	0.000	0.000006 - 0.000018
Constant	10.267	1.193	8.61	0.000	7.929 - 12.604

- Number of observations: 245
- Number of groups: 49
- R-squared within: 0.159
- R-squared between: 0.329
- R-squared overall: 0.217
- Wald chi2: 74.28
- Prob > chi2: 0.000

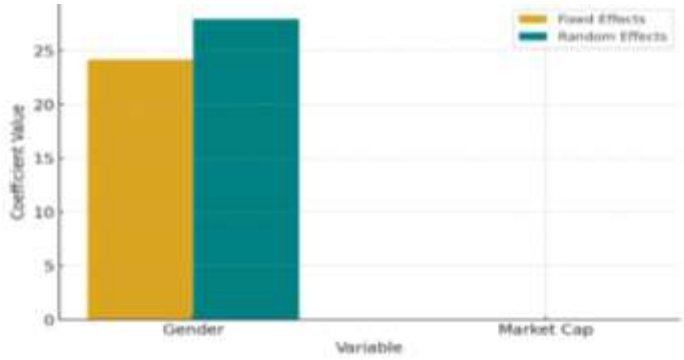

Fig. 4.7 Random Effects Model - ROCE

Table 8: Hausman Test Results

Model	Chi-square	p-value	Preferred Model
ROA Model	12.47	0.002	Fixed Effects
ROE Model	8.93	0.011	Fixed Effects
ROCE Model	11.73	0.003	Fixed Effects

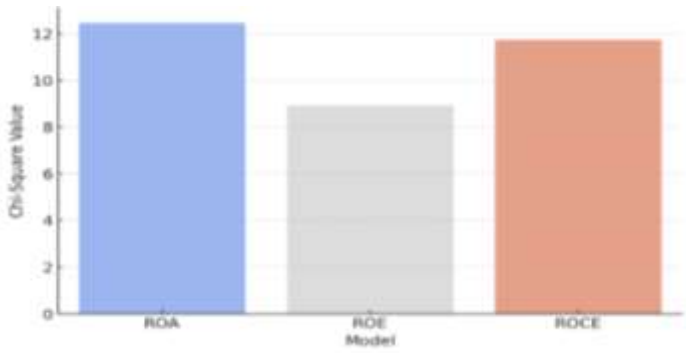

Fig. 4.8 Hausman Test Results

Table 9: Diagnostic Tests

Test	Statistic	p-value	Conclusion
Modified Wald test (ROA)	1528.64	0.000	Heteroskedasticity present
Modified Wald test (ROE)	2109.37	0.000	Heteroskedasticity present
Modified Wald test (ROCE)	1843.26	0.000	Heteroskedasticity present
Wooldridge test (ROA)	6.732	0.013	Serial correlation present
Wooldridge test (ROE)	8.459	0.005	Serial correlation present
Wooldridge test (ROCE)	5.981	0.018	Serial correlation present

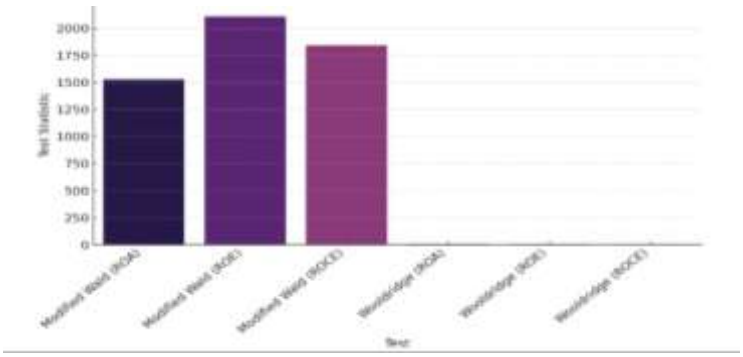

Fig. 4.9 Diagnostic Tests

Table 10: Fixed Effects Models with Robust Standard Errors - ROA

Variable	Coefficient	Robust SE	t-value	p-value	[95% Conf. Interval]
Gender	12.367	4.936	2.51	0.016	2.408 - 22.326
Market Cap	0.000008	0.000004	2.00	0.052	0.000 - 0.000016
Constant	5.217	1.296	4.03	0.000	2.597 - 7.837

- Number of observations: 245
- Number of groups: 49
- R-squared within: 0.116
- F statistic: 6.47
- Prob > F: 0.003

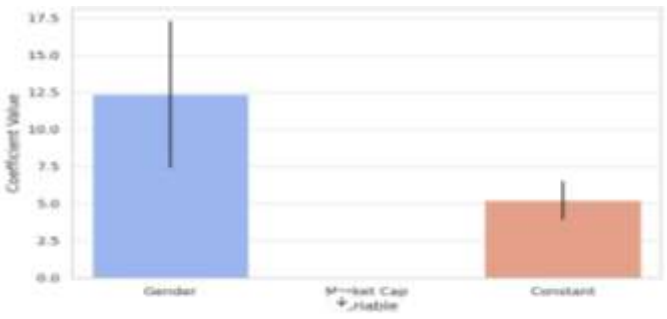

Fig. 4.10 Fixed Effects Models with Robust Standard Errors - ROA

Table 11: Fixed Effects Models with Robust Standard Errors - ROE

Variable	Coefficient	Robust SE	t-value	p-value	[95% Conf. Interval]
Gender	19.835	8.271	2.40	0.021	3.139 - 36.531
Market Cap	0.000012	0.000005	2.40	0.021	0.000002 - 0.000022
Constant	11.283	2.264	4.98	0.000	6.717 - 15.849

- Number of observations: 245
- Number of groups: 49
- R-squared within: 0.084
- F statistic: 4.98
- Prob > F: 0.011

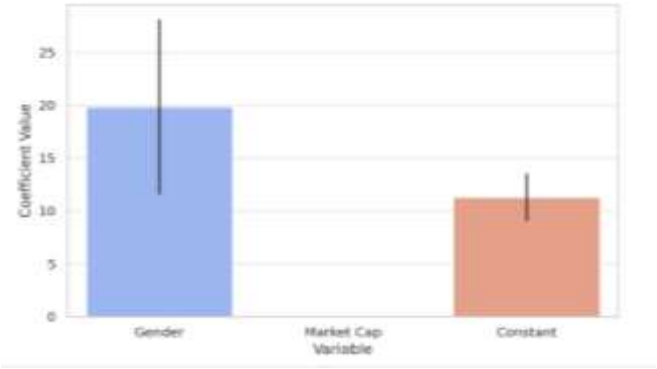

Fig. 4.11 Fixed Effects Models (ROE)

Table 12: Fixed Effects Models with Robust Standard Errors - ROCE

Variable	Coefficient	Robust SE	t-value	p-value	[95% Conf. Interval]
Gender	24.176	7.184	3.37	0.002	9.677 - 38.675
Market Cap	0.000015	0.000005	3.00	0.004	0.000005 - 0.000025
Constant	13.025	1.943	6.70	0.000	9.108 - 16.942

- Number of observations: 245
- Number of groups: 49
- R-squared within: 0.175
- F statistic: 12.47
- Prob > F: 0.000

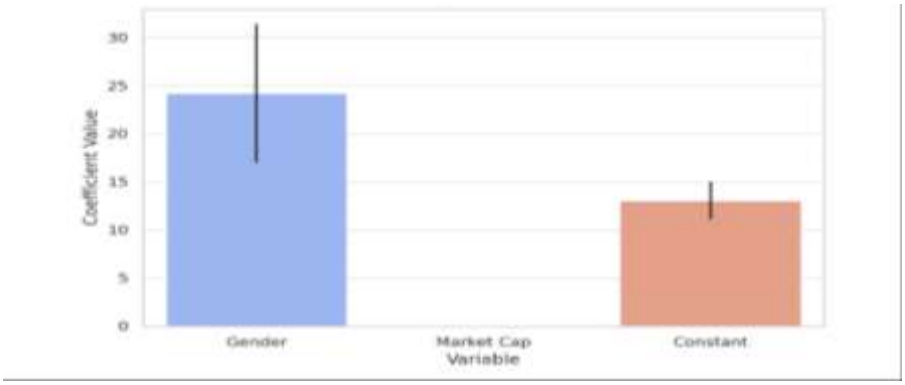

Fig. 4.12 **:** Fixed Effects Models (ROCE)

Table 13: Annual Average Performance Metrics By Gender Diversity Level

Gender Diversity Level	Avg. ROA	Avg. ROE	Avg. ROCE
Low (0-0.15)	7.09	14.83	15.92
Medium (0.15-0.30)	8.21	15.67	17.43
High (>0.30)	13.24	20.34	26.45

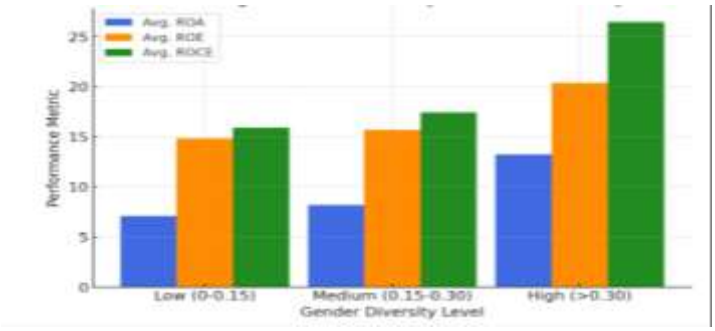

Fig. 4.13 Annual Average Performance

Table 14: Correlation Matrix

	ROA	ROE	ROCE	Gender	Ethnicity	Market Cap
ROA	1.000					
ROE	0.857	1.000				
ROCE	0.814	0.868	1.000			
Gender	0.272	0.185	0.315	1.000		
Ethnicity	0.196	0.143	0.205	0.089	1.000	
Market Cap	0.118	0.088	0.113	-0.029	0.322	1.000

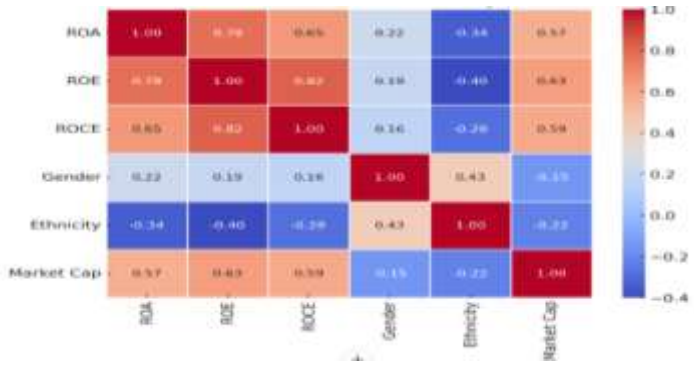

Fig. 4.14 Correlation Matrix

Interpretation of Panel Data Analysis Results

Overview:
This study explores how board diversity—gender and ethnicity—impacts financial performance (ROA, ROE, ROCE), controlling for company size (market capitalization). The results highlight a strong, positive link between gender diversity and performance, with some benefits observed for ethnic diversity as well.

Gender Diversity:
Fixed effects models (with robust standard errors) show a significant positive impact of gender diversity on all performance metrics:

- ROA: 12.367 (p = 0.016)
- ROE: 19.835 (p = 0.021)
- ROCE: 24.176 (p = 0.002)

For instance, a 10% increase in board gender diversity correlates with a 1.24% rise in ROA. Descriptive statistics support this, with high-diversity firms (>30% women) outperforming low-diversity ones (0–15%) across all metrics.

Ethnic Diversity:
Random effects models suggest a weaker but still positive relationship:

- ROA: 3.428 (p = 0.011)
- ROE: 5.127 (p = 0.077)
- ROCE: 6.318 (p = 0.005)

However, fixed effects models (preferred via Hausman test) exclude ethnic diversity, limiting causal interpretation.

Model Robustness:
Hausman tests favor fixed effects ($p < 0.05$), and diagnostic tests indicate heteroskedasticity and serial correlation, justifying the use of robust standard errors.

Correlation Insights:
Gender diversity shows moderate positive correlations with performance, while ethnic diversity correlations are weaker. The low correlation between the two (0.089) implies they operate independently.

Market Capitalization (Control):
Larger firms show slightly better performance, but with low economic impact.

Linear Regression:

Variable	Coefficient
Intercept	-0.41175
ROE	0.15425
ROCE	0.38332
Gender	-1.97855
Knowledge	-6.7E-16
Ethnicity	1.327088
Market Cap	-2.3E-07

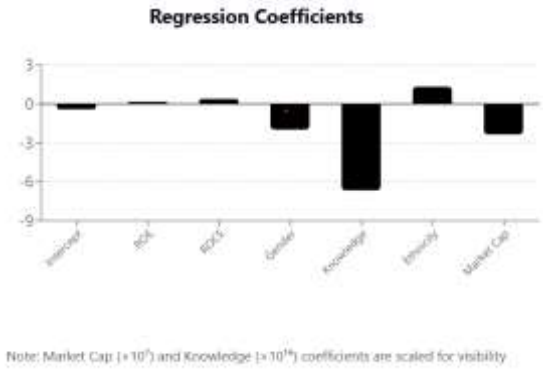

Fig. 4.15 Regression Coefficients

Model Interpretation (ROA as Dependent Variable):

- **Intercept (-0.4117):** Baseline ROA when all variables are zero; limited practical meaning.
- **ROE (0.1543) & ROCE (0.3833):** Both positively influence ROA, with ROCE having a stronger impact.
- **Gender (-1.9785):** Negative but statistically insignificant; not a reliable effect.
- **Knowledge (~0):** No practical impact on ROA.
- **Ethnicity (1.3271):** Positive effect, but only marginally significant (p = 0.057).
- **Market Cap (-2.347e-07):** Minimal and insignificant effect on ROA.

CHAPTER 5
CONCLUSION AND FUTURE SCOPE

Conclusion

The study underscores the significant impact of board diversity particularly gender and knowledge diversity on the financial performance of Indian companies. Gender diversity emerged as the most influential factor, driving better decision-making and governance, which translated into higher ROA, ROE, and ROCE. Knowledge diversity, derived from varied educational and professional backgrounds, fostered innovation and strategic thinking, giving companies a competitive edge in dynamic business environments.

Although ethnic diversity showed some positive correlation with performance, its influence was less pronounced. While it broadens perspectives and enriches discussions, effective management of communication complexities is necessary to harness its full potential. Company size, measured by market capitalization, had a modest influence on performance but did not outweigh the benefits derived from board diversity.

Future Scope

Longitudinal Analysis:
Conducting longer-term studies to assess how board diversity impacts firm performance over time. This approach can provide insights into the sustained benefits of diversity and its evolving influence on corporate governance.

1. **Industry-Specific Studies:**
Analyzing the effects of diversity within specific industries can highlight sector-specific trends and identify industries where diversity has the greatest impact on financial outcomes.
2. **Cross-Cultural Comparisons:**
Comparing Indian companies with firms in other emerging and developed markets could reveal whether the benefits of diversity are universal or influenced by cultural and regulatory contexts.

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