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Editorial

The '*Orissa Commerce Association'* is one of the vibrant state-level associations of the country. It has been serving the research community by publishing '*Orissa Journal of Commerce'*, a quarterly peer-reviewed research Journal for over four decades. The current Issue of the Journal contains eleven research papers and articles from diverse fields of commerce and management.

The *first article* highlights the opportunities, issues and challenges of infrastructure projects of India. The paper also provides insight to overcome some of the challenges. The *second paper* attempts to investigate the relationship and influence of FII on the National Stock Exchange's Sectoral indices. Granger causality test is applied to identify the relationship. The result reveals that, FIIs have a unidirectional causal relationship with energy, financial services, infrastructure and MNC and no causal relationship found with bank, consumption, metals, PSE, and service sector.

The *third paper*, aims to analyse the determinants of share prices in the National Stock Exchange of India. The study reveals that 58 per cent of the fluctuations of share prices in India are affected due to the variables like Earnings per Share, Price to Earnings Ratio, Price to Book Ratio, Return on Net Worth, Dividend per Share, Price to Net Profit Ratio, Profit before Dividend, Interest and Tax and Gross Domestic Product. In the *next paper*, the authors have made thoughtful efforts to investigate the influence of the stock liquidity (measured by Amihud's illiquidity) of a company on its capital structure using the top 100 non-finance firms listed in the NSE from 2010-11 to 2019-20. The results endorse the usefulness of the notion of pecking-order in the context of Indian companies.

The *fifth paper* has undertaken to test the market efficiency of Nifty Index Futures contract from 1st January, 2018 to 1st January, 2021. Random walk theory is used to test the context and Ljung- Box test is also applied. Findings of the study reveals that past prices of future contracts cannot be used as base to forecast the terminal prices and abnormal profit can be made as they are random in nature. The *next paper* analyzed the factors that determine the level of research & development investments in a panel data of 368 Indian listed companies over eleven years from 2011 to 2021, and examines the immediate as well as lagged effect of R&D intensity on firm performance using a dynamic GMM estimator. The findings show a higher level of R&D investments as a potential source of insecurity among investors; evident by positive impact of R&D intensity on firm's current financial performance and negative impact on its market value.

The *seventh paper* aimed at verifying the influence of human resource accounting practices and its impact on the financial performance of 30 select small-scale industries located in Odisha by using panel regression. The study confirms that human resource accounting is a very important element of

management in the small-scale industries as it has a direct impact on the financial performance measured in terms of return on assets and return on capital employed. The *eighth paper* investigates the significant relationship between corporate social responsibility (CSR) score and types of industrial sector to which sample companies belong, and also tries to assess how this relationship tends to change with the size of the firm. It is observed that CSR disclosure of all industrial sectors do vary and such differences in CSR scores among several sectors is highly apparent in small firms.

The *ninth paper* attempts to explore the application of the balanced scorecard to assess and differentiate the performance of select Indian public and private banks. This research concludes that Indian commercial banks' performance from a financial perspective is good and needs to improve the performance of the banks related to the innovation and growth perspective of the balanced scorecard. The *next paper* aims to identify how heuristic biases impact the individual investor's investment decision those have invested in the financial market. The results show the significant positive impact of heuristic biases on the irrational investment decision-making of individual investors. Risk perception partially mediates the relationship. The *last paper* attempts to propose a model for better understanding the role of customer experience and its impact on customer outcome in the banking sector. The test results proved that the two mediators i.e. relationship quality and customer trust had partial mediation effects in the model. For the study, sample respondents have been chosen from twin cities of Hyderabad and Secunderabad.

The readers will find this Issue in a different look with further enhanced quality and intellectual diversity.

Hope the readers will enjoy reading this Issue and encourage us to stride forward.

Dr. Malay Kumar Mohanty
(Managing Editor)

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Editorial Article

Dichotomy of Infrastructure Projects in India: Improved Performance amid Persistent Overhangs

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Keywords
Infrastructure, Investment, Capital expenditure, Time overrun, Cost overrun, India

JEL Classification
H54, H61, L74, R42, O32

Abstract: Infrastructure development is a critical factor in boosting the economy. An increase in investment in infrastructure opens-up employment opportunities because of its backward and forward linkages. The changing demographics and environment will need the converged development of various infrastructure facilities in India. The government has promoted railways, roadways, ports, and civil aviation in recent decades, as evident from policy and programs. Even with the accelerated growth in infra projects in India, most of the infrastructure projects are delayed, primarily owing to regulatory approvals, land acquisition issues, shortage of skilled resources, ineffective dispute resolution mechanisms, and geological challenges. This paper highlights the prospects and progress of infrastructure projects along with issues and challenges.

1. Introduction

Infrastructure development is critical for boosting the economy and in providing better growth prospects. Investment in infrastructure through its multiplier effect generates further investments and creates employment opportunities because of its backward and forward linkages with other sectors. In order to improve India's global competitiveness, creating new and upgrading existing infrastructure will be critical. It is estimated that India would need to spend $4.5 trillion on infrastructure by 2030 to realise the vision of a $5 trillion economy by 2025 and continue on the escalated trajectory until 2030. India needs to spend about $1.4 trillion over these years on infrastructure. The government has raised the Capex (Capital Expenditure) by 24.3 per cent from the estimated Rs. 6 trillion in 2021-22 to Rs. 7.50

trillion in 2022-23. The Capex allocated for 2022-23 is 2.9 per cent of GDP. In FY 2023, 19 per cent of the total expenditure was to be spent on building infrastructure, which was 16 per cent in FY 2022. The envisaged economic growth will be accompanied by a shift in the underlying demographics of the country – an increase in urbanization levels, a growing workable population, and an increase in the share of employed individuals in the services sector in urban areas.

1.1. Increasing Urbanisation

According to World Bank data, India's population has increased at a CAGR of 1.2 per cent during 2011-2017 and is expected to reach 1.52 billion by 2030. In the last decade, the urban population in India has increased at an annual rate of 2.4 per cent. By 2030, it is estimated that around 42 per cent of India's population would be urbanised in comparison to 31 per cent in 2011. Also, the number of metropolitan cities in India is estimated to increase from 46 as per Census 2011 to 68 by 2030. Plugging the infrastructure deficiency will smoothen urbanization by promoting ease of living and facilitating economic activities. It will thus help in realizing the full potential of a growing urban economy and raise its contribution to GDP.

1.2. Demography and Environment

Various studies have forecasted the working-age population of India to grow by 1.2 times during 2015-2030. India is expected to have the world's largest working-age population of 1.03 billion (68% of the population) by 2030, compared with 0.97 billion in China and 0.22 billion in the US. By 2030, India will have a median age of 31 years versus 43 years in China and 40 years in US. This rich demographic dividend will be an essential growth booster. Resilient infrastructure is critical for peoples' well-being, quality of life, and economic prospects.

Meanwhile, recent disasters indicate that up to 66 per cent of total public sector losses in weather and climate-related extreme events are related to infrastructure damage. There is a clear need to ensure that all new and existing infrastructure systems are climate and disaster-resilient. The changing demographics and environment will need the converged development of various infrastructure facilities. From providing housing to water and sanitation services to digital and transportation needs, there is a compelling demand for increased and improved delivery across the entire infrastructure spectrum. Delivering the full spectrum of required infrastructure will ensure economic growth, ease of living, and improved competitiveness across sectors.

2. Sectoral Growth of Infrastructure in India

2.1. Road Transport

The importance of road infrastructure is widely recognized as a crucial parameter of socio-economic integration and is vital for the country's economic development. Road transport is one of India's most cost-effective and convenient modes of transportation for freight and passengers. The road network of the country consists of National Highways, State-Highways, District Roads, Rural Roads, Urban Roads and Project Roads of over 63.72 lakh kms (kilometres) of roads as of 31 March 2019, which is the second-largest in the world, after US. There has been a consistent increase in the construction of National Highways/roads since 2013-14, with 13,327 kms of roads constructed in 2020-21 as compared

to 10,237 kms in 2019-20, indicating an increase of 30.2 per cent over the previous year. The extent of road construction per day increased substantially to 36.5 kms per day in 2020-21 from 28 kms per day in 2019-20, a y-o-y rise of 30.4 per cent. The significant rise in road construction in 2020-21 was due to the 29.5 per cent y-o-y increase in public expenditure - a reflection of the impetus given to a critical sector that generates employment and supports infrastructure during a pandemic year. Another ambitious program of the central government, the Bharatmala Pariyojana project aims to bring smoother connectivity across the nation with improved roads and infrastructure by constructing elevated corridors, bypasses, ring roads, lane expansion, and Logistics Park. The project is divided into 7 Phases and Phase-I is currently under progress. Out of the total length of 83,677 km, Phase-I is 24,800 km long with an addition of 10,000 km of ongoing National Highway Development Program (NHDP) project, so a total of 34,800 km with a total budget of Rs. 5.35 lakh crore is in progress.

2.2. Railways

Indian Railways (IR) with over 68,102 route kms is the third-largest network under single management. It strives to provide a safe, efficient, competitive, and world-class transport system. During 2014-2021, an average of 1835 track kms per year of new track length has been added through new-line and multi-tracking projects compared to the average of 720 track kms per year during 2009-14. IR is also adopting indigenous new technology such as KAVACH for safety, Vande Bharat trains and redevelopment of stations to have safe and better journey experience. During FY21, IR carried 1.23 billion tonnes of freight and 1.25 billion passengers.

The Capex increased substantially for IR from an average annual Capex during 2013-14 of Rs. 45,980 crores to Rs. 2, 15,058 crores during 2021-22, which is more than five times. Despite facing unprecedented COVID-related challenges, IR has been able to move millions of people and keep the national supply-chain running. IR is targeting 100 percent electrification of its network by December 2023. The National Rail Plan lays down the road map for capacity expansion of the railway network by 2030 to cater to the growth up to 2050. It envisages the creation of a future-ready railway system that not only meet the passenger demand but also increase the modal share of railways in freight to 40-45 per cent from the present level of 26-27 per cent. To give further fillip, the railway capacity enhancing projects have been categorized as supercritical and critical, 58 projects have been identified as Super Critical and are targeted for completion by December 2022. Similarly, 68 projects have been identified as Critical and targeted for completion by March 2024. These projects are focused on increasing capacity on routes that serve primary mineral and industrial hubs along with ports and major consumption centers.

2.3. Ports

Port performance is crucial for the trade competitiveness of an economy. Expansion of port capacity has been accorded the highest priority through implementing well-conceived infrastructure development projects. The capacity of 13 major ports which was 871.52 million tonnes per annum (MTPA) at the end of March 2014, has increased by 79 per cent to 1,560.61 MTPA by the end of March 2021. Sagarmala is a National Programme aimed at accelerating economic development in the country by harnessing the potential of India's 7,500 km long coastline and 14,500 km of potentially navigable waterways. The Sagarmala projects include port modernization & development of a new port, enhancement of port connectivity, port-led industrialization, coastal community development, coastal shipping and Inland water

transport. Currently, under the Sagarmala Programme, there are 802 projects worth investment of Rs. 5.54 lakh crore for implementation by 2035. Out of which 181 projects worth Rs. 94,712 crore have been completed and 223 projects worth Rs. 2.11 lakh crore is under implementation. Further, 398 projects worth Rs. 2.48 Lakh crore are under various stages of development.

To propel India to the forefront of the Global Maritime Sector, the Maritime India Vision 2030 (MIV 2030), a blueprint, was released on March 2021 to ensure coordinated and accelerated growth of India's maritime sector in the next decade. The objective is to develop world-class mega ports, and transshipment hubs and ensure infrastructure modernization. MIV 2030 estimates that developing Indian ports will drive cost savings of Rs. 6,000-7,000 crore per annum for EXIM clients. Further, the augmented operations are estimated to create an additional 700,000-1,000,000 jobs. It also estimates the investment requirement for capacity augmentation and development of world-class infrastructure at Indian Ports to be to the tune of Rs. 1,00,000- 1,25,000 crore.

2.4. Civil Aviation

India has emerged as one of the fastest-growing aviation markets in the world. The domestic traffic in India has more than doubled from around 61 million in 2013-14 to around 137 million in 2019-20, registering a growth of over 14 percent per annum. Under the Regional Connectivity Scheme (RCS), also known as UDAN scheme, till February 2021, 54 airports have been opened up, and 317 routes have been operationalized under the RCS. About 5.5 million passengers have benefited from the scheme. During 2019-24, 100 airports are planned to be developed under the RCS, including water aerodromes and heliports.

3. Policy Initiatives for Infrastructure Development

3.1. National Infrastructure Pipeline

Good quality infrastructure is vital for faster economic growth, ensuring an improved human development index and broad-based participation in development with equitable distribution of benefits. Keeping these objectives in mind, a dedicated National Infrastructure Pipeline (NIP) program was launched a few years ago. The total capital expenditure in infrastructure sectors in India during fiscals 2020 to 2025 is projected at Rs. 111 lakh crore, of which sectors such as energy (24%), roads (19%), urban (16%), and railways (13%) amount to around 70 per cent of the projected capital expenditure in infrastructure in India (Table 1). With the Centre and States expected to have an equal share of capital

Table 1: NIP - Sector-wise Annual Capital Expenditure in Infrastructure (Rs. Crore)

Sector	*FY 20*	*FY 21*	*FY 22*	*FY 23*	*FY 24*	*FY 25*	*No phasing*	*FY 20–FY 25*
Energy	233,607	441,522	442,372	468,134	497,768	466,821	139,778	2,690,003
Roads	332,559	383,283	356,966	252,780	240,761	332,659	134,815	2,033,823
Railways	133,387	262,465	308,800	273,831	221,209	167,870	-	1,367,563
Ports	13,357	18,104	20,649	15,863	7,724	10,002	35,495	121,194
Airports	18,667	21,655	24,820	21,334	25,386	5,141	26,445	143,448
Urban Infrastructure	298,174	462,208	404,134	234,858	217,164	159,862	142,867	1,919,267

Source: National Infrastructure Pipeline, Vol. I (GoI)

expenditure at 39 per cent each to be undertaken in the infrastructure sector, the private sector is expected to contribute 22 per cent. Out of the total allocation in NIP, Rs. 44 lakh crore (40%) worth of projects are under implementation, Rs. 34 lakh crore (30%) of projects are at the conceptualization stage, and Rs. 22 lakh crore (20%) are under development.

3.2. PM Gati Shakti - National Master Plan

The PM Gati Shakti is a digital platform that will bring together 16 Ministries, including Railways and Roadways, for integrated planning and coordinated implementation of infrastructure connectivity projects. It aims at developing world-class modern infrastructure and logistics synergy among different modes of movement both people and goods; and the location of projects. This will help raise productivity and accelerate economic growth and development. The data exchange among all modes of operations will be brought on a Unified Logistics Interface Platform (ULIP), designed for Application Programming Interface (API).

4. Major Issues and Challenges of Infrastructure Projects

Amid such policy priority on infrastructure development and much-improved speed of execution of infra projects, there continue to remain several persistent overhangs.

4.1. Time Overrun and Cost Overrun

The success or failure mostly depends on the timely delivery of the project to the client. A project delivered on time is likely to have fewer cost overruns and no loss on account of opportunity cost (Mahamid *et al*, 2012). Delays in construction projects are a universal phenomenon across large and small projects and in developed and developing nations. The delays in project execution result in extra costs and a reduction in financial returns. Delays in any form lead to a loss of revenue for clients and excess cost of overheads for the contractors. Thus, time and cost overruns are a major problem affecting the project implementation globally. Researchers across the globe have given considerable attention to this problem and identified the factors causing delays in projects. The factors causing delays can be country specific, project-specific and location-specific.

Regarding key segments, railways have witnessed the maximum delayed projects mostly due to land acquisition and design approvals. Many large projects have been ongoing for over a decade and costs have increased manifold. On the other hand, road and highways projects have done relatively better (Table 2 & 3). According to the Ministry of Statistics and Programme Implementation (MOSPI) data, out of 1579 projects as on April 2022, only 6 projects are ahead of schedule, 295 projects are on schedule, 664 projects are delayed.

The percentage of projects with time overrun over the years with respect to the original schedule indicate that the percentage of projects running behind schedule has increased from 29.44 per cent in March 2014 to 42.05 per cent in March 2022. The percentage of cost overrun over the years with respect to the approved initial costs shows that the cost overrun has increased from 19.4 per cent in March 2014 to 22.01 per cent in March 2022 (Fig. 1).

4.2. Possible Reasons of Time Overrun and Cost Overrun

Some of the possible reasons of time overrun and cost overrun for the infrastructure projects in the Indian context are listed in Box 1 as follows (MOSPI 2022):

Table 2: Sector-wise Analysis of Cost Overrun in Infrastructure Projects

Sector	*Total Projects*	*Cost Original (Rs. Crore)*	*Cost Anticipated (Rs. Crore)*	*Cost Overrun w.r.t. Original (%)*
Power	79	198,648,02	258,669,52	30.22
Road Transport	835	496,769.50	546,394.56	9.99
Railways	211	408,405.75	666,542.74	63.21
Civil Aviation	24	15,443.94	16,984.22	9.97
Coal	118	166,313.91	170,665.88	2.62
Petroleum	135	368,598.63	388,067.00	5.28
Urban Development	27	284,108.54	304,523.01	7.19

Source: 120th Project Implementation: An Overview – April 2022; Ministry of Statistics and Programme Implementation, Infrastructure and Project Monitoring Division, (GoI)

Table 3: Status of Infrastructure Projects Showing Time and Cost Overrun

Sector	*Total Projects*	*Time Overrun*		*Cost Overrun*	
		w.r.t. Original Schedule	*w.r.t. Revised Schedule*	*w.r.t. Original Schedule*	*w.r.t. Revised Schedule*
Power	79	46	34	26	19
Road Transport	835	243	204	156	139
Railways	211	126	121	158	144
Civil Aviation	24	21	5	4	4
Coal	118	37	36	10	7
Petroleum	135	79	50	27	10
Urban Development	27	15	9	8	8

Source: 120th Project Implementation: An Overview – April 2022; Ministry of Statistics and Programme Implementation, Infrastructure and Project Monitoring Division, (GoI)

Box 1: Possible Reasons for Time Overrun and Cost Overrun for the Infrastructure Projects

Reasons for Time Overrun	**Causes of Cost Escalation**
• Delay in land acquisition, and obtaining forest/ environment clearances • Lack of infrastructure support and linkages • Delay in tie-up of project financing • Delay in finalization of detailed engineering • Changes in scope, and contractual issues • Delay in tendering, ordering and equipment supply • Inadequate skilled manpower • Delay in technical approval. • Due to COVID-19 pandemic • Delay in getting clearance from local authorities.	• Under-estimation of original cost • Changes in rates of foreign exchange and statutory duties • High cost of environmental safeguards and rehabilitation measures Spiraling land acquisition costs • Changes in the scope of projects • Monopolistic pricing by vendors of equipment services • General price rise/inflation • Time Overrun

4.3. Actions Taken to Minimise Time and Cost Overruns in Projects

In order to reduce the delays and cost overruns in the projects, the Government has taken several steps which include:

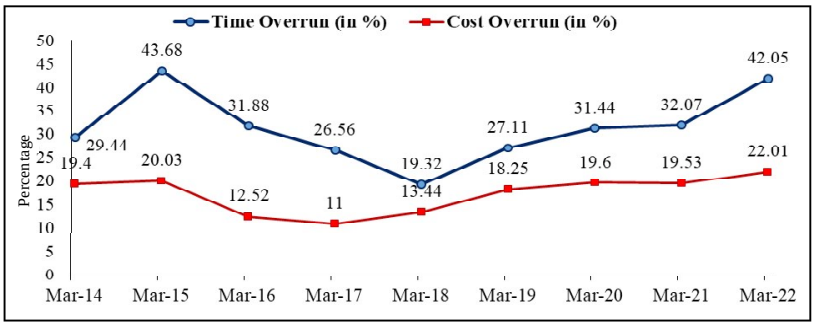

Figure 1: Trends of Projects - Time Overrun & Cost Overrun (in %)

Source: Ministry of Statistics and Programme Implementation, (GoI)

- Rigorous project appraisal;
- On-line Computerized Monitoring System (OCMS) for better monitoring;
- Setting up of Revised Cost Committees in the Ministries for fixation of responsibility for time and cost overruns;
- Regular review of the infrastructure projects by the concerned administrative Ministries;
- Setting up of Central Sector Projects Coordination Committees (CSPs) in the States under the Chief Secretaries to remove bottlenecks and facilitate the speedy implementation of major projects;
- Project review under Pro-Active Governance and Timely Implementation (PRAGATI).

5. Way Forward

5.1. Augmenting Shortage of Skilled Manpower

KPMG report for the National Skill Development Corporation (NSDC) highlights that the industry currently absorbs roughly 68 million people, of whom more than 90 per cent are deployed in building construction. Over 80 per cent of those employed in building and construction are minimally skilled. The Infrastructure Equipment Skill Council estimates that roughly 1 million existing and 1 million additional operators and mechanics need to be skilled and certified. India has roughly 0.35 million skilled but uncertified plumbers. The Indian Plumbing Skills Council aims at skilling and certifying 1.2 million technicians by 2022. The current shortage of 1.2 million welders may increase to 1.35 million by 2023. Under the Pradhan Mantri Kaushal Vikas Yojana (PMKVY), CREDAI has taken up the Recognition of Prior Learning Mode of skilling workers. It identifies skill gaps in workers and bridges them through job-role-specific short-term training. The Construction Skill Development Council of India (CSDCI), Infrastructure Equipment Skill Council (IESC) etc. are also trying to fill the gap of skilled manpower for the sector.

5.2. Use of Advanced Technology

For faster delivery of projects, technology will continue to play a major role in the conceptualization, design and execution of projects. To ensure proper planning, manpower management, procurement, safety and risk assessment, quality control, cash-flow analysis etc., technology solutions like BIM (Building Information Modelling) can transform the entire construction process. BIM with block-chain technology is used for contractual claims and dispute resolution. When integrated with IoTs, it

can benefit construction and facility management activities. Similarly, other technologies like Drone for physical monitoring of the large and critical projects, artificial intelligence (AI), augmented reality (AR) & virtual reality (VR) may help the construction of infrastructure projects in a significant way.

Overall technology-driven construction brings efficiencies across the lifecycle from design to build. About 35-50 per cent cost savings and 50 percent time savings over conventional construction due to the adoption of advanced technology. The prime Minister's declaration of 2019-20 as the "Year of Construction Technology" has pushed the large-scale adoption of cutting-edge technology for the execution of commercial real estate as well as infrastructure projects.

5.3. Private Participation

Private investment into physical and social infrastructure is key to putting India on a high growth trajectory. However, attracting private investment has always been challenging for several construction and infrastructure projects. The government support and policy push are critical to reviving private investment. The measures such as; further improvement in ease of doing business, homogeneous regulations at state levels, early resolution of land and labour issues, transparent regulations with lesser scope for shocks, diversification and deepening infrastructure financing landscape etc. will help in attracting more private players to invest and participate in the infrastructure development initiatives.

6. Conclusion

The increased spending in the infrastructure sector acts as a stimulant for economic growth and development. World over, most infrastructure projects are delayed, primarily owing to regulatory approvals, issues of land acquisition, shortage of skilled resources, ineffective dispute resolution mechanisms and geological challenges. In India, the 'Capex Cycle' has been shrinking across sectors, exerting pressure on the construction industry to evolve with new ideas and radical thinking. Moreover, environmental, social and governance (ESG) concerns, supply-chain disruptions, and skilled labour shortages add to the current complexity in medium to large-scale projects. Thus, executing the proposed recommendation may result in the decongestion of infrastructure projects by gradually tackling the primary reasons of time and cost overruns. Since India's infrastructure sector is poised to grow to cater to increased demands, it is, therefore, crucial to identify existing challenges & hindrances and overcome them by adopting appropriate strategies to achieve the vision of sustained infrastructure development.

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FII Flows and Indian Capital Market: A Periodically Comparative Study on NSE Nifty Sectoral Indices

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Keywords

Stock market return, Nifty, NSE index, Foreign investors, Granger causality test

JEL Classification

B17, B26, F21, P45

Abstract: Stock market plays a vital role in growth and development of a country and also acts as a most important pillar of an economy. This research attempts to investigate the relationship and influence of FII on the National Stock Exchange's sectoral market indexes. To check the stationarity of the series ADF is used while regression is used to find out the impact of FIIs on the sectors of NSE. To measure the causality between the two, Granger causality test is applied. A comparative analysis of monthly and quarterly data has been done from 2006 to 2020. The paper concluded that FIIs is having significant relationship with sectoral indices. The Granger causality test found that FIIs have unidirectional causality relationship with energy, financial services, Infrastructure and MNC and no causal relationship with Bank, India consumption, Metal, PSE, and service sector using quarterly data.

1. Introduction

After 1991 economic reforms, across the global India becomes the target destination for the foreign investments. Since 1992, the investment has been growing steadily in the Indian market by FIIs. The investors have created their interest in the emerging markets (Nguyen and Bellalah, 2008) and Foreign Institutional Investors (FIIs) participation has grown in Indianstock market leads to wealth creation, risk and portfolio diversification, higher returns atlower risk, Global savings etc. (Rastogi and Husain, 2015; Saxena and Bhadauriya, 2011; Goudarzi and Ramanarayanan, 2011; Chakrabarti, 2001). A large number of FII is being attracted by the developing country India. The FIIs as noteworthy players in the Indian stock market and it provides financial services which have added contribution in the stock markets growth and development. A substantial part of the foreign portfolio investments is formed by foreign flows in the Indian markets since 1996-1997. Foreign Portfolio Investors/Foreign Institutional

Investors have been a major driver, in the calendar year 2021 investing Rs 50,089 crores (US$ 7.06 billion) of India's financial markets, and the country has attracted FIIs/FPIs. The Nifty ended FY22 with 19% year-on-year (YoY) gain, marking another year of strong returns despite the multitude of challenges. Meanwhile, FIIs and DIIs posted flows of -$13.5 billion and +$11.5 billion, respectively, in Q4 FY22. FIIs typically invest in overseas financial markets and have stock stakes. As a result of the healthy inflow of cash, the companies invested in by FIIs often have enhanced capital structures. As a result, FIIs aid financial innovation and capital market expansion. In this study, the relationship between FIIs and returns of several NSE Indian stock market indices has been investigated.

2. Review of Literature

Parab and Reddy (2020) examined the cause and effect relationship between FIIs, DIIs and stock market returns of various sectoral indices. The study is based on using Nifty 50 index and other sectoral indices like pre and post demonetization concept. They used regression analysis and concluded that there is no evidence of demonetization significant impact on DIIs and FIIs while the most severely affected sector is Nifty realty. Bansal (2020) examined the impact of FIIs on various NSE sectors includes auto, bank, financial services, FMCG, IT, Media, Pharma, Private bank, PSU bank and Realty based on twelve years from 2007-2019. Using VECM and Granger causality test, he found that FIIs have positive and significant relationship with the NSE indices. The study concluded that there is unidirectional relationship of FIIS with Bank, Financial services, IT, and realty while bidirectional causality with Media.

Dan (2019) using daily data for 15 years from 2003-2018, analyzed the volatility impact on sectoral indices in respect to BSE-IT and NSE-IT. Using ARCH and Garch model, he concluded that volatility direction for both indexes is same. Ikizlerli (2019) examined institutional investor's impact in Korea stock market on return volatility by using actual trading data from 4 January 2000 to 15 September 2017. He found that the market level of in Korea's equity market is increased by the net purchase of institutions over sample period for 2000-2017 using Garch Model. Shabbir and Muhammad (2019) evaluated the dynamic impact of FPI on KSE-100 stock index using ARDL method for the period of 1984-2016. The study also includes other variables as gross domestic product, exchange rate, money market interest rate, and consumer price index and they concluded that increase in GDP and FPI has impact on DSP (domestic stock price).Tule *et al.* (2018) studied the mechanism of stock market returns volatility and used Varma-Garch model between the foreign exchange market and Nigerian stock market. The evidence suggested that Portfolio capital inflows and outflows are linked to the ups and downs of the Nigerian exchange, with far-reaching implications for the naira dollar exchange rate. FPI determines the exchange rate of a market economy.

Das and Mahapatra (2017) analyzed the stock market behavior by taking different BSE indices such as capital Goods, Consumer Durable, FMCG and IT Index and their relation with FIIs for the period of 2000-01 to 2013-14 using yearly data. After applying regression techniques he found that FIIs have positive impact on BSE Sensex and BSE indices also. Lakshmy (2014) attempted to know about the relationship and the impact of FIIs with different sectoral indices of BSE and used correlation and Granger causality test. The indices selected for the study are Sensex, Auto Index, Capital Goods

Index, Consumer Durables Index, Healthcare Index, IT Index, Metal Index, Oil and Gas Index, FMCG Index and Bankex. The study period taken was 2001-2014 and the study found that FIIs have significant impact on some sectoral indices including Capital Goods Index, Consumer Durables Index, Healthcare Index, FMCG Index and Oil and Gas Index. FII being attracted in to Indian stock market and influencing the returns generated from it. Wang (2014) observed the interaction of FIIs trading in Chinese A-share market using quarterly data from 2005-2011. The VAR model is used to analyze the variables and concluded that in the Chinese A-share market. FII causes the local equity returns but not the reverse. Garg and Dua (2014) analyzed the various determinants that affect foreign portfolio flows in India. Using ARDL and Granger causality test, lower exchange rate volatility is found by them and greater risk diversification are major factor that attract foreign portfolios whereas higher equity returns discourage the portfolio flows of other emerging countries.

Ahmed (2014) examined the trading behavior of investors in Qatar stock exchange suing daily data. The trading patterns are investigated by using VAR model for the period January 2008 up to March 2012. He concluded that positive feedback trader is institutional investors and individual investors are negative feedback traders. Individual and institutional investor types' respective contemporaneous NIF are influenced by all previous Net Investment flows. Bhatia and Kishor (2013) observed the impact of FIIs on stock market movements and foreign exchange reserves in context of BSE Sensex. To check the causal relationship between variables Granger causality is used for the period from April 1992 to March 2012 using monthly data. There is bidirectional relationship is found by them between BSE Sensex and FII flows; FERS and FII flows while there is unidirectional relationship between Sensex and FERs. Chandra (2012) examined the causality relationship between FII trading volume and S&P CNX returns using daily data for January 2003 to February 2011. The causality test of granger results observed that it has bidirectional causality between NFII and stock market return.

Hong and Lee (2011) investigated the dynamic relation between returns and investment flows for the period 1992-2010 using Korean daily data. They found that Korean equity market is tend to be driven by foreigners and institutional investors, and their trades seem to be information-driven, whereas if the Korean equity market do not driven by individual investors and it seems that no information is driven by their trades. Net Government flows, individual flows, Institutional flows and Foreign Flows causes market returns. Net Individual Investors flow does not cause market returns as opposed to foreigners, institutional and government flows.

G and Kumar (2011) observed the feedback strategy of FIIs on fifteen indices of NSE using daily data for 2000-2009. They used VAR and regression for the analysis and found that there is bi directional causality of NFII with CNX Midcap, CNX Nifty Junior, S&P CNX 500 and S&P CNX Nifty also found that in Bank Nifty, CNX Midcap, CNX Nifty Junior, and S&P CNX 500, there is positive feedback trading. NFIIP is strongly dependent on previous day return and current day return in the case of Bank Nifty and S&P CNX Nifty, but solely on previous day return in the case of CNX Midcap out of fifteen indices,. Bae *et al.* (2008) examined the investor interaction and market volatility using weekly data. Different trading patterns of individual investors, institutional investors and foreign investors with respect to Tokyo Stock Price Index (TOPIX) are studied. He found that fluctuations in the market volatility significantly depend on the participation by the types of investors in trade.

On the basis of extensive literature review, it is has been observed that a lot of work have already been done to find out the impact outcome of FIIs on the stock market of India. But no work so far has been done to assess the impact of FIIs in the growth and development of the Indian capital market using NSE indices on the basis of monthly and quarterly data set. The present work is an endeavor by the researcher to bridge this gap. This work would also lead to better understanding of the Indian capital market and the role of FIIs in its development. This current study will perform sector-wise analysis by taking references from National Stock Exchange.

3. Objectives and Hypotheses of the Study

3.1. Objectives of the Study

The main objectives of the study are:

- To analyze the relationship between NFIIs and NSE sectoral indices.
- To examine the impact of NFIIs on the sectoral indices of NSE.
- To measure the causality exists between NFIIs and sectoral indices of NSE.

3.2. Hypotheses of the Study

The hypotheses are:

H_{01}: There is significant correlation between NFIIs and sectoral indices of NSE.

H_{02}: There is significant impact of NFIIs on sectoral indices of NSE.

4. Research Methodology

The present study makes an attempt to find the relationship and impact of FII on sectoral indices of NSE using different statistical features. The aggregate monthly and quarterly Net FIIs have been taken from 1 April 2006 to 31 March 2020 from SEBI website. The closing prices of indices are taken from renowned software known as CMIE Prowess. The NSE indices taken for the study includes Nifty Bank, Energy, Financial Services, India Consumption, Infrastructure, Metal, MNC, PSE, PSU Bank and Nifty Services Sector. For the purpose of this study 10 sectors have been selected. This selection is based on trading volume of all sectors of NSE as on December 2019. The FIIs are taken as independent variable while all NSE indices are considered as dependent variable. To carry out the analysis of the given data on monthly and quarterly basis, Descriptive statistics, ADF unit root test, Correlation, regression and Granger causality test are used. The data was initially evaluated for normalcy using descriptive analysis, and then the link between the various variables was checked using correlation. The stationarity of data is checked by unit root ADF test.

5. Results and Discussions

5.1. Descriptive Statistics

The descriptive statistics of monthly and quarterly data of NSE nifty sectors and NFII (Net Foreign Institutional Investments) are given in Table 1 and Table 2 respectively

Table 1: Descriptive Statistics (Monthly)

Variables	*NFII*	*Bank*	*Energy*	*Financial Services*	*India Consum-ption*	*Infra-struc-ture*	*Metal*	*MNC*	*PSE*	*PSU Bank*	*Services Sector*
Mean	3987.6	18725.2	10500.9	7843.5	3525.6	2880.0	2724.9	9551.2	3292.3	3063.1	10806.6
Median	3841.3	18251.3	9097.9	7429.4	3502.7	2959.5	2710.8	9659.6	3229.7	3120.0	10623.9
Maximum	33781.9	32161.6	16560.3	14557.4	5379.3	3637.5	4065.8	15066.9	4414.6	4274.8	17452.8
Minimum	-62433.5	7968.6	6968.1	3367.6	1709.5	1957.3	1585.9	4517.4	2214.1	1324.8	5600.9
Std. Dev.	13163.8	6971.7	3047.0	3083.2	1101.9	411.9	572.7	3356.8	502.7	519.3	3439.2
Skewness	-1.101	0.259	0.674	0.439	-0.051	-0.245	0.099	0.020	0.147	-0.386	0.238
Kurtosis	8.03	1.83	1.91	2.08	1.7	1.95	2.55	1.61	2.26	3.47	1.90

Source: Authors' Own Compilation

The average net FIIs were Rs. 3987.656 million during 2006-2020 while median is Rs. 3841.365 millions. The range highest and lowest value of Net FIIs lies from Rs. 33781.93 millions to negative Rs. 62433.51 millions. The negative value represents the selling by Net FIIs. The value of standard deviation is 13163.84 which states that there is huge variability by Net FIIs during the study period. Kurtosis represents the peakedness of the series and the kurtosis value of Net FIIs is 8.03 which mean that series is relatively peaked distribution series. Negative skewness values of Net FIIs shows that series having more negative values.

Nifty Metal has lowest average closing price and Nifty Bank has highest average closing price that is Rs. 2724.9 and Rs. 18752.2 respectively. The maximum and minimum range is highest for the Banking sector that is Rs, 24193 followed by service sector that is Rs. 11851.9. On other side, the maximum and minimum range is lowest for the infrastructure sector that is Rs. 1680.2 followed by PSE sector that is Rs. 2200.5. The sectors like India consumption, Infrastructure and PSU bank have negative skewness while remaining sectors have positive skewness. The kurtosis of PSU Bank is 3.47, it means series is Mesokurtic; while other sectors having value less than three, which means the series are leptokurtic.

The average net FIIs were Rs. 12060.78 million during 2006-2020 while median is Rs. 14264.8 millions. The range highest and lowest value of Net FIIs lies from Rs. 55456.8 millions to negative Rs. 54235.3 millions. The negative value represents the selling by Net FIIs. The value of standard deviation is 27063.18 which states that there is huge variability by Net FIIs during the study period. Kurtosis represents the peakedness of the series and the kurtosis value of Net FIIs is 2.42 which mean that series is platy kurtic series. Negative skewness values of Net FIIs shows that series having more negative values.

Nifty Metal has lowest average closing price and Nifty Bank has highest average closing price that is Rs. 2699.414 and Rs. 18551.25 respectively. The maximum and minimum range is highest for the Banking sector that is Rs, 24193 followed by service sector that is Rs. 11851.9. On other side, the maximum and minimum range is lowest for the infrastructure sector that is Rs. 1512.6 followed by PSE sector that is Rs. 2089.1.

Table 2: Descriptive Statistics (Quarterly)

Variables	*NFII*	*Nifty Bank*	*Nifty Energy*	*Nifty Financial Services*	*Nifty India Consumption*	*Nifty Infra-structure*	*Nifty Metal*	*Nifty MNC*	*Nifty PSE*	*Nifty PSU Bank*	*Nifty Services Sector*
Mean	12060.78	18551.25	10442.83	7788.897	3517.509	2858.676	2699.414	9541.421	3267.593	3024.126	10738.18
Median	14264.80	18177.20	8892.950	7407.050	3517.200	2845.700	2768.400	9580.150	3243.700	3088.000	10646.25
Maximum	55456.80	32161.65	16484.00	14557.40	5104.400	3637.500	3940.150	14801.90	4303.250	4269.300	17452.85
Minimum	-54235.33	7968.650	6968.100	3367.670	1709.580	2124.900	1585.900	4517.450	2214.150	1324.850	5600.950
Std. Dev.	27063.18	6927.155	3057.423	3057.486	1094.006	407.1823	570.5169	3333.101	486.9688	540.3369	3405.344
Skewness	-0.367748	0.345444	0.749882	0.488520	-0.087418	-0.181922	-0.034796	-0.008821	-0.019604	-0.582493	0.277599
Kurtosis	2.428868	2.043926	2.085027	2.269122	1.738006	1.937566	2.448931	1.643592	2.369373	4.619177	2.072652

Source: Authors' Own Compilation

5.2. Augmented Dickey Fuller Test

Table 3 states the result of stationarity using ADF test. Using monthly data, the test shows that existence of unit root in all sectors of nifty. The NFII series is stationary at level and rest variables are stationary at first difference.

Table 3: Unit Root test: ADF (Monthly)

Variables	*Level*		*At first difference*	
	t-statistics	*p value*	*t-statistics*	*p value*
NFII	-7.927708	0.0000*	-	-
Nifty Bank	-1.348555	0.6062	-8.550421	0.0000*
Nifty Energy	-1.95935	0.6744	-8.671242	0.0000*
Nifty Financial Services	-1.348321	0.6046	-5.379946	0.0000*
Nifty India Consumption	-0.791293	0.8186	-10.05883	0.0000*
Nifty Infrastructure	-2.652385	0.0847	-1194973	0.0000*
Nifty Metal	-2.244600	0.1915	-12.33857	0.0000*
Nifty MNC	-7.11354	0.8399	-10.62879	0.0000*
Nifty PSE	-2.657042	0.0838	-13.35212	0.0000*
Nifty PSU Bank	-2.403777	0.1422	-11.49357	0.0000*
Nifty Services Sector	-1.198279	0.6748	-9.065969	0.0000*

Source: Authors' Own Compilation

Note: *indicates significance at 0.05 level

Table 4 shows the result of ADF unit root test using quarterly data; NFII, Nifty Infrastructure and Nifty PSE are stationary at the level and other variables includes Nifty Bank, Nifty Energy, Nifty Financial Services, Nifty India Consumption, Nifty Metal, Nifty MNC, Nifty PSU Bank and Nifty Services Sector are stationary at first level.

Table 4: Unit Root test: ADF (Quarterly)

Variables	*Level*		*At first difference*	
	t-statistics	*p value*	*t-statistics*	*p value*
NFII	-6.808383	0.0000*	-	-
Nifty Bank	-1.402170	0.5753	-6.849253	0.0000*
Nifty Energy	-1.223691	0.6535	-5.842297	0.0000*
Nifty Financial Services	-0.774497	0.68132	-5.953343	0.0000*

contd. table 4

Variables	*Level*		*At first difference*	
	t-statistics	*p value*	*t-statistics*	*p value*
Nifty India Consumption	-0.759095	0.8226	-7.839221	0.0000*
Nifty Infrastructure	-3.332980	0.0177*	-	-
Nifty Metal	-2.726085	0.0757	-6.338454	0.0000*
Nifty MNC	-0.940895	0.7682	-6.36779	0.0000*
Nifty PSE	-3.000142	0.0407*	-	-
Nifty PSU Bank	-2.683551	0.0829	-8.205987	0.0000*
Nifty Services Sector	-1.1337769	0.6063	-6.039056	0.0000*

Source: Authors' Own Compilation

Note: *indicates significance at 0.05 level

5.3. Correlation Analysis

Table 5 indicates the result of correlation. Correlation analysis, using monthly and quarterly data, concluded that there is positive relation between NFII with Nifty Infrastructure, Nifty Metal, Nifty PSE and Nifty PSU Bank.

Table 5: Correlation

Sectors	*Monthly*		*Quarterly*	
Nifty Bank	*-0.07*	*Negative*	*-0.13*	*Negative*
Nifty Energy	-0.05	Negative	-0.12	Negative
Nifty Financial Services	-0.1	Negative	-0.16	Negative
Nifty India Consumption	-0.15	Negative	-0.25	Negative
Nifty Infrastructure	0.03	Positive	0.04	Positive
Nifty Metal	0.12	Positive	0.2	Positive
Nifty MNC	-0.16	Negative	-0.27	Negative
Nifty PSE	0.06	Positive	0.08	Positive
Nifty PSU Bank	-0.37	Negative	0.51	Positive
Nifty Services Sector	-0.11	Negative	-0.17	Negative

Source: Authors' Own Compilation

5.4. Regression Analysis

Table 6 shows the results of regression analysis using monthly data conclude that NFIIs is found to have negative relation with Nifty bank, energy, financial services, India consumption, MNC, and service

sector. This states that arrival of foreign institutional investors has reduced the prices of these sectors significantly. On the other hand NFIIs is found to have positive relation with Nifty infrastructure, Metal, PSE and PSU bank. It means arrival of foreign institutional investors has increased the prices of these sectors significantly.

Using p value, it can be concluded that NFIIs have no impact on Nifty bank, energy, financial services, India consumption, Infrastructure, MNC and service sector Whereas NFIIs have impact on metal, PSE and PSU bank.

Table 6: Regression Analysis (Monthly)

Sectors		*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
Bank	Intercept	14537.42	641.1675	22.67336	0.0000
	NFIIs	-0.008	0.051529	-0.15526	0.8768
Energy	Intercept	10435.56	296.1091	35.24227	0.0000
	NFIIs	-0.010611	0.022201	-0.47797	0.6336
Financial Services	Intercept	7941.045	315.8406	25.14257	0.0000
	NFIIs	-0.024449	0.023064	-1.06004	0.2916
India Consumption	Intercept	2771.713	108.8503	25.46353	0.0000
	NFIIs	-0.007486	0.008748	-0.85578	0.3934
Infrastructure	Intercept	3056.897	52.551	58.1701	0.0000
	NFIIs	0.0052	0.004223	1.231163	0.22
Metal	Intercept	2884.749	71.71892	40.22298	0.0000
	NFIIs	0.013326	0.005764	2.311983	0.022*
MNC	Intercept	7473.888	315.3301	23.70179	0.0000
	NFIIs	-0.024655	0.025342	-0.9729	0.332
PSE	Intercept	3209.544	45.99409	69.78166	0.0000
	NFIIs	0.009156	0.003696	2.477027	0.0142*
PSU Bank	Intercept	2850.476	59.19413	48.15471	0.0000
	NFIIs	0.021355	0.004757	4.488937	0.0000*
Service Sector	Intercept	8831.19	310.9988	28.39622	0.0000
	NFIIs	-0.011039	0.024994	-0.44168	0.6593

Source: Authors' Own Compilation

Note: *indicates significance at 0.05 levels

The regression equation that is Y (Sector) = **á** (Constant) + â (beta) * NFII; of all sectors is as given in Table 7.

Table 7: Regression equation of Nifty Sectors (Monthly)

Sector	*Regression Equation*
Nifty Bank	Y=14537.42-0.0080 x
Nifty Energy	Y=10435.56- 0.010611 x
Nifty Financial Services	Y=7941.045- 0.024449 x
Nifty India Consumption	Y=2771.713- 0.007486 x
Nifty Infrastructure	Y=3056.897+ 0.005200 x
Nifty Metal	Y=2884.749 + 0.013326 x
Nifty MNC	Y=7473.888 – 0.024655 x
Nifty PSE	Y=3209.544 + 0.009156 x
Nifty PSU Bank	Y=2850.476 + 0.021355x
Nifty Services Sector	Y=8831.190– 0.011039 x

Source: Authors' Own Compilation

Table 8 shows the results of regression analysis using quarterly data conclude that NFIIs is found to have negative relation with Nifty bank, energy, financial services, India consumption, MNC, and service sector. This states that arrival of foreign institutional investors has reduced the prices of these sectors significantly. On the other hand NFIIs is found to have positive relation with Nifty infrastructure, Metal, PSE and PSU bank. It means arrival of foreign institutional investors has increased the prices of these sectors significantly. Using p value, it can be concluded that NFIIs have no impact on Nifty bank, energy, financial services, India consumption, Infrastructure, MNC and service sector Whereas NFIIs have impact on metal, PSE and PSU bank.

Table 8: Regression Analysis (Quarterly)

Sectors		*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
Bank	Intercept	13892.35	1157.383	12.00324	0.0000
	NFIIs	-0.005536	0.043767	-0.12648	0.8998
Energy	Intercept	10515.25	541.012	19.43626	0.0000
	NFIIs	-0.012898	0.018991	-0.67919	0.5015
Financial Services	Intercept	8013.908	567.81	14.11371	0.0000
	NFIIs	-0.018656	0.019397	-0.96184	0.3431
India Consumption	Intercept	2802.804	197.3834	14.1998	0.0000
	NFIIs	-0.005962	0.007312	-0.81542	0.4183
Infrastructure	Intercept	2947.673	101.1395	29.14464	0.0000
	NFIIs	0.00443	0.003825	1.158332	0.2515

contd. table 8

Sectors		*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
Metal	Intercept	2692.048	139.0336	19.36258	0.0000
	NFIIs	0.011106	0.005258	2.112301	0.039*
MNC	Intercept	7310.726	569.1695	12.84455	0.0000
	NFIIs	-0.017783	0.021523	-0.82622	0.4121
PSE	Intercept	3088.497	89.28292	34.59225	0.0000
	NFIIs	0.006699	0.003376	1.984145	0.052*
PSU Bank	Intercept	2644.828	107.7957	24.53556	0.0000
	NFIIs	0.015977	0.004076	3.91942	0.0002*
Service Sector	Intercept	8523.951	565.8389	15.06427	0.0000
	NFIIs	-0.00648	0.021397	-0.30286	0.7631

Source: Authors' Own Compilation

Note: *indicates significance at 0.05 levels

The regression equation that is Y (Sector) = **á** (Constant) + **â (beta) * NFII;** of all sectors is as given in Table 9.

Table 9: Regression equation of Nifty Sectors (Quarterly)

Sector	*Regression Equation*
Nifty Bank	Y=13892.35-0.005536 x
Nifty Energy	Y=10515.25- 0.501485 x
Nifty Financial Services	Y=8013.908- 0.18656 x
Nifty India Consumption	Y=2802.80- 0.005962 x
Nifty Infrastructure	Y=2974.673+ 0.004430 x
Nifty Metal	Y=2692.048 + 0.011106 x
Nifty MNC	Y=7310.726 – 0.017783 x
Nifty PSE	Y=3088.497 + 0.0067 x
Nifty PSU Bank	Y=2644.828 + 0.0159x
Nifty Services Sector	Y=8523.951– 0.0064 x

Source: Authors' Own Compilation

5.5. Granger Causality Test

The Table 10 depicted the result of granger causality test using monthly data. the test confirms that there is bi-directional causality between energy and NFII; while there is unidirectional causality exist between bank and NFII, financial services and NFII , India consumption and NFII, MNC and NFII, service sector and NFII; there is no causal relationship exist between NFII and Metal, NFII and infrastructure, NFII and PSE, NFII and PSU bank.

Table 10: Granger Causality Test (Monthly)

Null Hypotheses	*F-Statistic*	*Prob.*
NIFTY_BANK does not Granger Cause NFII	5.99957	0.0031*
NFII does not Granger Cause NIFTY_BANK	0.27780	0.7578
NFII does not Granger Cause NIFTY_ENERGY	3.29408	0.0410*
NIFTY_ENERGY does not Granger Cause NFII	3.77576	0.0261*
NFII does not Granger Cause NIFTY_FINANCIAL_SERVICES	0.46936	0.6268
NIFTY_FINANCIAL_SERVICES does not Granger Cause NFII	6.55615	0.0021*
NFII does not Granger Cause NIFTY_INDIA_CONSUMPTION	0.55122	0.5773
NIFTY_INDIA_CONSUMPTION does not Granger Cause NFII	3.72855	0.0261*
NFII does not Granger Cause NIFTY_INFRASTRUCTURE	0.01313	0.9870
NIFTY_INFRASTRUCTURE does not Granger Cause NFII	2.33326	0.1003
NFII does not Granger Cause NIFTY_METAL	0.37655	0.6868
NIFTY_METAL does not Granger Cause NFII	0.24129	0.7859
NFII does not Granger Cause NIFTY_MNC	0.48958	0.6138
NIFTY_MNC does not Granger Cause NFII	4.17678	0.017*
NFII does not Granger Cause NIFTY_PSE	0.33232	0.7177
NIFTY_PSE does not Granger Cause NFII	0.76254	0.4682
NFII does not Granger Cause NIFTY_PSU_BANK	0.16062	0.8518
NIFTY_PSU_BANK does not Granger Cause NFII	2.85814	0.0603
NFII does not Granger Cause NIFTY_SERVICES_SECTOR	0.02358	0.9767
NIFTY_SERVICES_SECTOR does not Granger Cause NFII	3.38316	0.0364*

Source: Authors' Own Compilation

Note: *indicates significance at 0.05 level

The Table 11 shows the result of granger causality test using quarterly data. The test confirms that FIIs have unidirectional causality relationship with energy, financial services, Infrastructure and MNC. NFIIs have no causal relationship with bank, India consumption, Metal, PSE, PSU bank and service sector.

Table 11: Granger Causality Test (Quarterly)

Null Hypotheses	*F-Statistic*	*Prob.*
NIFTY_BANK does not Granger Cause NFII	1.91335	0.1576
NFII does not Granger Cause NIFTY_BANK	1.24838	0.2953
NFII does not Granger Cause NIFTY_ENERGY	3.34961	0.0486*
NIFTY_ENERGY does not Granger Cause NFII	1.61747	0.2152

contd. table 11

Null Hypotheses	*F-Statistic*	*Prob.*
NFII does not Granger Cause NIFTY_FINANCIAL_SERVICES	0.89805	0.4188
NIFTY_FINANCIAL_SERVICES does not Granger Cause NFII	4.43303	0.0213*
NFII does not Granger Cause NIFTY_INDIA_CONSUMPTION	1.03189	0.3638
NIFTY_INDIA_CONSUMPTION does not Granger Cause NFII	2.54857	0.0883
NFII does not Granger Cause NIFTY_INFRASTRUCTURE	0.48827	0.6164
NIFTY_INFRASTRUCTURE does not Granger Cause NFII	2.75562	0.0727*
NFII does not Granger Cause NIFTY_METAL	0.58807	0.5590
NIFTY_METAL does not Granger Cause NFII	0.26908	0.7651
NFII does not Granger Cause NIFTY_MNC	2.99538	0.0586*
NIFTY_MNC does not Granger Cause NFII	1.54991	0.2217
NFII does not Granger Cause NIFTY_PSE	0.46944	0.6279
NIFTY_PSE does not Granger Cause NFII	1.26515	0.2906
NFII does not Granger Cause NIFTY_PSU_BANK	0.54912	0.5807
NIFTY_PSU_BANK does not Granger Cause NFII	1.80227	0.1749
NFII does not Granger Cause NIFTY_SERVICES_SECTOR	2.54235	0.0882
NIFTY_SERVICES_SECTOR does not Granger Cause NFII	2.38005	0.1024

Source: Authors' Own Compilation

Note: *indicates significance at 0.05 levels

Table 12: Comparative Analysis

Sectors	*Relationship*		*Impact*		*Causality with FII*	
	Monthly	*Quarterly*	*Monthly*	*Quarterly*	*Monthly*	*Quarterly*
Nifty Bank	Negative	Negative	No	No	Uni	No
Nifty Energy	Negative	Negative	No	No	Bi	Uni
Nifty Financial Services	Negative	Negative	No	No	Uni	Uni
Nifty India Consumption	Negative	Negative	No	No	Uni	No
Nifty Infrastructure	Positive	Positive	No	No	No	Uni
Nifty Metal	Positive	Positive	Yes	Yes	No	No
Nifty MNC	Negative	Negative	No	No	Uni	Uni
Nifty PSE	Positive	Positive	Yes	Yes	No	No
Nifty PSU Bank	Positive	Positive	Yes	Yes	No	No
Nifty Services Sector	Negative	Negative	No	No	Uni	No

Source: Authors' Own Compilation

6. Findings and Conclusion

In the nutshell after reviewing the literature and analysis being done, it has been concluded that FIIs play a very crucial role in Indian stock market. The scope of the study is limited to the behavior and integration of FIIs towards NSE indices of Indian stock market. The major objective of the paper is to find out the relationship between Nifty indices stock prices and the flow of foreign institutional investment in the Indian context. More specifically, the focus of this paper is to examine the extent to FII flow influences the Nifty indices. In addition, the paper also makes an attempt to verify whether there is any causality relationship hold between the foreign flows and Nifty indices. Analyzing the Quarterly and Monthly data from April 2006 to March 2020, the paper arrives at the following findings:

- Using monthly data, it can be conclude that NFIIs is found to have negative relation with Nifty Bank, energy, financial services, India consumption, MNC, and service sector. This states that arrival of foreign institutional investors has reduced the prices of these sectors significantly. On the other hand NFIIs is found to have positive relation with Nifty infrastructure, Metal, PSE and PSU bank. It means arrival of foreign institutional investors has increased the prices of these sectors significantly.
- It can be concluded that NFIIs have no impact on Nifty bank, energy, financial services, India consumption, Infrastructure, MNC and service sector Whereas NFIIs have impact on metal, PSE and PSU bank.
- Using quarterly data, it is conclude that NFIIs is found to have negative relation with Nifty bank, energy, financial services, India consumption, MNC, and service sector. This states that arrival of foreign institutional investors has reduced the prices of these sectors significantly. On the other hand NFIIs is found to have positive relation with Nifty infrastructure, Metal, PSE and PSU bank. It means arrival of foreign institutional investors has increased the prices of these sectors significantly.
- NFIIs have no impact on Nifty bank, energy, financial services, India consumption, Infrastructure, MNC and service sector Whereas NFIIs have impact on metal, PSE and PS bank is found.
- The granger causality test using monthly data confirms that bi-directional causality is found between energy and NFII; while there is unidirectional causality exist between bank and NFII, financial services and NFII, India consumption and NFII, MNC and NFII, service sector and NFII; there is no causal relationship exist between NFII and Metal, NFII and infrastructure, NFII and PSE, NFII and PSU bank.
- FIIs have unidirectional causality relationship with energy, financial services, Infrastructure and MNC. NFIIs have no causal relationship with bank, India consumption, Metal, PSE, PSU bank and service sector is found using quarterly data.

The findings of the current study does not support Lakshmy (2014) who concluded that there is unidirectional causality of FII towards specific BSE indices like Capital goods , Metal , Oil and Gas index and Bankex. The study concluded that there is positive relationship between FII flows and Bankex. In this present study, the static relationship was analyzed between net FII flows and returns of

various indices in context to India. The present research concluded that FIIs are having significant relationship with few sectoral indices. The positive linkage is shown by correlation between FIIs investment pattern and the value. For investors these outcomes are more important due to FII inflows quantum have been changed substantially due to liberalization in the last decade and the stock market was also influenced. The present research aims to understand the impact of FII on the sectoral stock market indices. It was found out that the markets are influenced by FIIs. Most of the sectoral indices move according to the practice of FII pattern received in the country has a strong bearing on the returns of companies concerned. This analysis will be helpful to investors in creating s portfolio and also to policy makers in the light of policy implementations.

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Determinants of Equity Share Prices in National Stock Exchange of India: A Panel Data Approach

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Share price, Panel data, Fixed effect, Random effect model, India

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E44, E31, E27, E52, E43

Abstract: The movement of share price depends upon some indicators that investors consider while making investment decisions. The study aims to analyse the determinants of share prices in National Stock Exchange of India. It covered a period of five years and used panel data approach on twenty-five Nifty representative stocks to establish the determinants of share prices. The data were analysed with the help of MS Excel 2013, stata-13 and SPSS-2 software. The study reveals that 58% of the fluctuations of share prices in India is affected due to the variables like Earnings per Share, Price to Earnings Ratio, Price to Book Ratio, Return on Net Worth, Dividend Per Share, Price to Net Profit Ratio, Profit Before Dividend, Interest and Tax and Gross Domestic Product. The study suggests that investors can make profitable decision by considering the determinants that have a significant bearing on share prices.

1. Introduction

A sound financial system plays a very important role for the development of economy of any country. The growth and performance of business entities determines the soundness of the financial system. Financial system is a broader term that comprises of financial instruments, institutions, services and other support system. Financial instruments constitute majority of the dealings in the financial system. A financial system's primary job is to mobilise savings and invest them in productive projects and the free flow of capital to more productive companies is aided by a well-functioning financial system. Investors purchase financial instruments of companies in the form of shares, debentures and bonds.

Stock market is also a part of a financial system where second-hand shares of companies are bought and sold. Again, financial performance and other economic indicators affect the price of a

company's share. Investment in shares is made for earning some return on investment in future. Investors make stock selections based on a variety of financial and economic indicators. They always try to avoid risk and volatility in investment. Investors want to minimize loss due to fluctuations in price and maximize returns on their investments.

However, it is necessary to consider the factors that determine the prices of shares while making investment decisions. There are several fundamental factors both internal as well as external that exists in the system which have a significant bearing on the stock price (Kevin , 2012). The internal factors are firm's specific financial indicators while the external factors are economic indicators. Theories suggest that share price of a company changes with a change in its fundamental variables like market interest rates, price-earnings ratio, gross domestic product, earnings per share, dividend per share, book value, dividend pay-out ratio, financial leverage, inflation and size (Oyama, 1997; Enow and Brijlal, 2016; Almumani , 2014; Arshad *et al*., 2015).

Again, there are two approaches to be considered at the time of investing in shares, namely; fundamental approach and technical approach (Sharma, 2011). Fundamental approach predicts share prices for long term on the basis of past performance indicators whereas the latter predicts the share price on the basis of charts, trends and patterns for short span of time(Adebiyi and Adewumi, 2017). The study used fundamental approach to determine its impact on share prices, while ignoring the technical approach as it is used for predictiong share prices for short period of time. Fundamentals analysis involves depth analysis of company's profile, performance and profitability to determine its intrinsic value. Fundamental analyst believes that share prices move towards its intrinsic value. If share price is below its intrinsic value, the investors will buy share and vice versa. Therefore investors should consider the fundamental variables to safeguard their investment of getting negative returns on investment. In respect of this, the present study tried to analyse few fundamental factors that have a substantial impact on future prices of shares. They may predict share price to certain extent by considering the established factors. So, the study investigated the impact of ten fundamental variables related to share prices in National Stock Exchange of India (NSE).

2. Review of Literature

A lot of research has been examined in order to determine the elements that influence the market price of shares in various markets across the globe.

Oyama (1997) studied the relationship between fundamental variables and market price of share in Zimbabwe stock market and established a link between stock prices and some macroeconomic indicators. The study used dividend discount model, regression model and concluded that the monetary policy and market interest rates are the major determinants of share prices in Zimbabwe. Enow and Brijlal (2016) used a multivariate regression model to know the determinants that affects share prices. They used 14 businesses listed on the Johannesburg Stock Exchange over a period of five years from 2009 to 2013. Only micro variables were evaluated as determining variables or factors in the study and it was discovered that the price-earnings ratio, earnings per share, and DPS had a substantial impact, accounting for roughly 57.80% of share price change. EPS and PE, on the other hand, were favourably correlated, whereas dividend per share was negatively correlated in their study. The study concluded

that business finance managers can increase shareholder value by boosting earnings per share (EPS), price-earnings (P/E) ratio and dividend per share.

Almumani (2014) used statistical techniques such as ratio, correlation and multiple regression for a set of independent and dependent variables on some of listed banks in Stock Exchange of Amman for a period of eight years. It was attempted to identify financial (quantitative) factors that had a significant bearing on the share prices of a company. Dividend Per Share, EPS, Book Value, Dividend Pay-out Ratio, PE Ratio, and business size were the quantitative factors included as independent variables. The study concluded that EPS, Book Value, PE and the firm's size all have a substantial effect on the market price of shares.

Arshad *et al.* (2015) examined the detrmining factors of banking shares in Karachi Stock Exchange from 2007-2013. The study attempted to reveal both internal as well as external factors that have an impact on share price. By using linear regression model for the analysis, Book to Market, Price to Earnings Ratio, DPS leverage, earnings per share, GDP and interest rates were considered as internal and external factors (independent variable) and market price of 22 banking sector companies were considered as dependent variable. The result indicates that EPS have more impact on share prices compared to other variables. From the study it is revealed that DPS and leverage have no relationship with share prices.

Arkan (2016) investigated the relationship between financial ratios to estimate share price in stock market by using twelve financial ratios depending on data of fifteen across three sectors over a period of 2005-2014 in the Kuwaiti Stock Exchange. The method used in the study was multiple regression model and concluded that the most effective ratio to be considered in the industrial sector to forecast share price are ROA, ROE and Net Profit Ratio. Again, the most effective ratio to be considered in service and investment sector to forecast share price are ROA, ROE, P/E and EPS ratio. The study concluded that investors can rely upon these ratios while making investment decision based on sector to sector. Sharma (2011) reveals the impact of micro variables such as DPS, EPS, P/E Ratio, BV, net worth and size of the firm (in terms of sale) on share prices in listed scripts of BSE for the period 1993-2008. The study used secondary sources like CMIE, SEBI annual reports, BSE annual reports and Equity Master etc. for collecting data of 115 sample companies divided into six industries. To establish the relationship between the variables, correlation and multiple regression model have been used to test the significance. The result reveals that revealed that EPS, DPS and BV have significant influence on the price of shares.

Irfan and Nishat (2002) examined the joint effect of fundamental factors that that have impact upon share prices in the long run by taking all the firms of KSI of Pakistan for a period of twenty years. The study utilised cross-sectional least squares regression to test the stock volatility in relation to fundamental variables. The fundamental variables namely dividend yield, pay-out ratio, leverage, asset growth, size of the firm and change in earnings were taken into consideration. The findings of the study implied that earning volatility and asset growth are not significant to influence price. Zadeha *et al.* (2013) studied relationship between fundamentals (financial ratios and economic variables) and stock return using panel data (econometric methods) for twenty-two pharma stocks listed in Tehran Stock Exchange for a period of seven years. The nine fundamental variables include current ratio, inflation

rate, market share, total asset, exchange rate and other variables were considered into the study and it concluded that those nine fundamental variables have 80 per cent of influence on pharmaceutical stock returns. Alam and Karim (2016) analysed the factors that affect stock prices in cement companies by using a panel data set of seven cement companies of Dhaka Stock Exchange for the period of ten years i.e., 2006-2015 and investigated OLS regression with fixed effect model and random effect model. They have considered six fundamental factors, which are Earning Per Share, Net Asset Value Per Share, Consumer Price Index, Gross Domestic Product, Price Earnings and Interest Rate Spread. It was found that EPS, NAVPS, P/E and CPI have significant impact on the cement stock in Bangladesh while other variables were insignificant. With a moderate r square value of 0.4567 in both fixed and random effect models, the study recommends that investors should consider the significant factors before making any investment decision in cement industry in Dhaka Stock Exchange.

Srinivasan (2012) attempted to explain the fundamental factors determining share prices by using panel data for a period of 2006-2011 across six major sectors of Indian Market, namely, Energy, IT, Pharmaceutical, Infrastructure, manufacturing and banking. The fundamental variables take into consideration were BV, DPS, EPS, PE and size of the firm. Both fixed and random effect model have been used to analyse the data and the results showed negative relation of DPS on share prices. The study concluded that company fundamental ratios are very important to consider while assessing stocks for investment. Sharif and Pillai (2015) used panel dataset of 41 firms for a period five years to establish relationship between share prices and other financial indicators of companies in Bahrain stock market. The study considered panel dataset of 41 firms for a period five years i.e. 2006-2010 for their analysis. The method is based on Fixed effect and Random effect models and used the variables namely BV, ROE, DPS, PE firm size and debt to assets to get the knowledge of the impact of these variables on market price of a share. The study revealed that the most of the variables have an impact on stock prices of Bahrain financial market. With a high r square of 0.80, the study concluded that people can make investment by considering the determinants and may get fair return. Singh (2017) analysed the determinants of share price of twenty-six non-financial firms listed in Muscat Stock Exchange, Oman. The study used panel data using random effect model and analysed the independent variables namely, price-earnings ratio, debt-equity ratio, earning per share, dividend pay-out, and firm size against closing value of share price at the end of a year as dependent variable for a period of five years i.e. from 2011 to 2016. The analysis revealed that earning per share, debt equity ratio are significant determinants of stock price.

Adebiyi and Adewumi (2017) predicted stock price for short term by applying Auto Regressive Integrated Moving Average (ARIMA). They used E-views software version 5 and the study covers the period from 1995-2011 having a total of 3990 numbers of observation. Their result revealed that the ARIMA model can predict price for short term and can be used by investors as a tool of stock price prediction. The study suggested that ARIMA model can help investors to take investment decision. Malhotra (2013) analysed the determinants of share prices by several ratios as independent variable by using multiple regression model for the period 2007-12. The findings revealed that firms' Book Value, EPS and PE have a bearing on share prices.

In existing literature, there is a composite view on the determinants of share prices and the variables. After reviewing the available literature, it has been observed that few numbers of studies

have been undertaken in India in this field. There exists a mixed opinion on positive and negative impact of factors determining market price of shares. However, no study considered both internal as well as external factors at the same time to investigate the impact of variables and its affect in share prices on NSE. The study will fill this gap and contribute in the field of literature by analysing the internal as well as external factors at the same time that have a significant bearing on share prices in Indian capital market context. This will encourage further researchers to investigate the phenomenon after considering limitations of the present study.

3. Objectives of the Study

The study attempts to achieve the following objectives:

- To analyse the determinants of fundamental variables that affect equity share prices of company.
- To suggest factors that should be taken into consideration while making investment in company shares.

4. Research Methodology

The study has been undertaken to analyse the determinants of fundamental variables that have significant bearing on stock prices. As the objective of the study is to establish the relationship between share prices and fundamental variables, the researcher has identified both internal and external variables such as earnings per share (EPS), price to earnings ratio (P/E), price to book ratio (P/B), return on net worth (ROE), dividend per share (DPS), price to net profit ratio (PNR), profit before dividend interest & tax (PBIT), interest rate (Int.R), inflation rate (Inf.R) and gross domestic product (GDP) (Alam *et al*, 2016; Sharif *et al*, 2015; Srinivasan, 2012; Singh, 2017). The study has been conducted on select Nifty representative stocks and it is explanatory in nature. It has covered a period of five years i.e., from April, 2012 to March, 2017 i.e. 01-04-2012 to 31-03-2017. As Nifty accounts for a substantial share in corporate sector in India in terms of turnover, growth, market capitalisation and profitability etc., it has been chosen for study. NSE is considered as one of the barometers of Indian economy across world. Out of many listed stocks in NSE, only five major sectors from Nifty50 have been identified and each sector comprises of top five companies having highest market capitalisation as it is very difficult to find determinants of all indices and companies of NSE. Hence, the sample size of the study is limited to 25 (twenty-five) number of stocks that represent NIFTY index. These sectors are; IT, Automobile, Banking, Pharma and other Sector. Other sector includes major companies listed in NSE like Asian Paints, HUL, Reliance, ITC and Tata Steel. These are depicted in Table 1.

4.1. Sources of Information

The research study is based on secondary data which were collected from Yahoofinance.com, Moneycontrol.com and NSE website. Price movement and different financial indicators of the select Nifty representative companies are collected from Yahoofinance, Moneycontrol and NSE website for the period of five years i.e., from April, 2012 to March, 2017. Microsoft Excel-2013, Stata-13 and IBM SPSS Statistics-21 have been used to make all the necessary calculations.

Table 1: Sample Distribution by Sector Classification

Sl. No.	*Industry*	*Number of Companies*	*Companies Covered*
1.	Software	5	Tata Consultancy Services (TCS), Tech Mahindra, WIPRO, Infosys and HCL Technologies
2.	Automobile	5	Maruti, Mahindra & Mahindra, Bajaj-Auto, Hero Motors and Tata Motors
3.	Banking and Finance	5	HDFC, Axis Bank, State Bank of India, ICICI Bank and Kotak Mahindra Bank
4.	Pharmaceuticals	5	Dr Reddy's Lab, Aurobindo Pharmaceutics, CIPLA, Lupin and Sun Pharma
5.	Miscellaneous	5	Reliance, ITC, Hindustan Unilever, Tata Steel, Asian Paints

Source: Authors' Own Compilation

4.2. Panel Data Analysis

For the analysis of data to know the determinants of share prices, panel data analysis has been used. This data analysis is also known as cross-sectional or longitudinal time series data. However, Panel data has advantage over cross sectional and time series data. It is a cross sectional time series dataset which have repetitions in number of variables. It helps researchers to get relatively higher level of statistical validity then using cross-sectional data as it reduces the interaction between variables that result in more reliable parameters (Sharif *et al.*, 2015). This technique is considered more efficient in the field of finance as it reduces the co-linearity of the predictor variables. The study uses both panel data methods i.e. fixed effect model as well as random effect model to find out the determinants of share prices in NSE, India. As the fixed effect model considers the firm's specific effect and the random effect considers the firm's time effect. So, the general model of fixed effect is written as:

$$MPS_{it} = \alpha_i + \beta X_{it} + \mu_{it} \quad i = 1,\ldots..,\ N;\ t = 1,\ldots, T \qquad (i)$$

Where, MPS_{it} is the yearly average share price, X_{it} is the determinant k for i^{th} stock in period 't', bis the parameter to be estimated and m_{it} represents error. With the help of vector parameterb, the individual coefficients are estimated together. In order to validate the fixed effect model, F-test is required to be performed Singh (2017). The random effect model is defined as:

$$MPS_{it} = \alpha_i + \beta X_{it} + \mu_{it} \quad i = 1,\ldots..,\ N;\ \ t = 1,\ldots, T \qquad (ii)$$

In random effect, other than fixed constants, α_i is considered as random variable. The a_i are considered to be independent of the errors μ_{it}. X_{it} is determinant k for i^{th} stock in t^{th} period. Finally, Hausman test is being conducted to compare between these two. A FE considers differences in intercepts through the study period or groups, where a RE model shows differences in error variations. The general specification of the parameters of the model is as follows:

$$MPS_{it} = \alpha_i + \beta_1 EPS_{it} + \beta_2 PE_{it} + \beta_3 PB_{it} + \beta_4 ROE_{it} + \beta_5 DPS_{it} + \beta_6 PNR_{it} + \beta_7 PBIT_{it} + \beta_8 INT_{it} + \beta_9 INF_{it} + \beta_{10} GDP_{it} + \mu_{it} \quad \text{(iii)}$$

In the above specification, MPS represents Market Price of Share and the explanatory variables EPS, PE, PB, ROE, PNR, DPS, PBIT, INT, INF, GDP denotes earnings per share, price to earnings ratio, price to book ratio, return on net worth, price to net profit ratio, dividend per share, profit before dividend interest & tax, interest rate, inflation rate and gross domestic product. A description of the variables that have been used in the study is exhibited in Table 2.

Table 2: Summary of Variables Involved in the Study

Variable	*Type*	*Symbol*	*Equation*
Market Price (Yearly Average)	Dependent	MPS	$\frac{\text{Highest MP in a Year + Lowest MP in a Year}}{2}$
Earnings per Share (Diluted)	Independent	EPS	$\frac{\text{Net Profit - Preferred Dividends}}{\text{Outstanding Shares + Diluted Shares}}$
Price / Earnings	Independent	P/E	$\frac{\text{Market Price of Share}}{\text{Earning Per Share}}$
Price/Book Value	Independent	P/B	$\frac{\text{Market Value per Share}}{\text{Book Value per Share}}$
Return on Net worth/ Equity (%)	Independent	ROE	$\frac{\text{Equity Earning}}{\text{Networth}} \times 100$
Dividend per share (rs)	Independent	DPS	$\frac{\text{Dividend paid to equity shareholders}}{\text{Number of Equity Shares}}$
Price to Net Operating Revenue	Independent	PNR	$\frac{\text{Net Operating Revenue}}{\text{Book Value per Share}}$
PBDIT Margin (%).	Independent	PBIT	$\frac{\text{Profit before Interest \& Tax}}{\text{Net Sales}} \times 100$
Interest Rate	Independent	Int.R	Repo Rate by RBI
Inflation Rate	Independent	Inf.R	Consumer Price Index (CPI)
Gross Domestic Product	Independent	GDP	$\frac{\text{Current GDP - Previous GDP}}{\text{Previous GDP}} \times 100$

Source: Authors' Own Compilation

The present study uses panel data comprises of annualised time series data for the period 2013-2017 and cross section data of five sectors listed in NSE namely software, automobile, banking and finance, pharmaceuticals and miscellaneous.

5. Data Analysis

This section is segregated into three sections namely, diagnostic analysis, descriptive analysis and regression model analysis of the data considered in the study.

5.1. Diagnostic Analysis

The study uses multicollinearity tests to determine whether the dataset in the study has any econometric impact (Baltagi, 2010). Pearson correlation test is used to find the relationship between variables which is considered as first indicator while Variance Inflation Factor (VIF) and the Inverse VIF are considered as second indicator of multicollinearity. Table 3 depicts the Pearson Correlation Coefficients among the independent variables. Gujarati and Porter (2009) stated that if the coefficient of correlation between two variables is more than 0.8, there will be multicollinearity among variables. However, the correlation coefficient values among the variables in Table 3 is below 0.8, which indicates that the study does not suffer the problem of multicollinearity.

Table 3: Pearson Correlation Matrix for Variables

	MPS	*EPS*	*P/E*	*P/B*	*ROE*	*DPS*	*PNR*	*PBIT*	*Int.R*	*GDP*	*Inf.R*
MPS	1										
EPS	.596	1									
P/E	.034	-.031	1								
P/B	.014	-.208	.059	1							
ROE	.077	.133	.129	.737	1						
DPS	.562	.739	-.020	.042	.298	1					
PNR	-.044	-.317	-.243	.240	-.177	-.145	1				
PBIT	.010	.146	.101	-.002	.301	.173	-.004	1			
Int.R	-.129	.054	.087	.079	.085	-.015	-.009	.015	1		
GDP	.145	-.081	-.106	.041	-.054	-.017	.061	-.001	.072	1	
Inf.R	-.233	.063	.082	.023	.127	-.012	-.064	-.011	.291	-.510	1

Source: Authors' Own Compilation

Table 4 shows the values of Variance Inflation Factor (VIF) and Inverse VIF for the independent variables. The result of the variables shows that there is no multicollinearity as the VIF and Inverse VIF values for all independent variables are less than 5 and 20 per cent respectively (Baltagi, 2008).

Table 4: VIF and Inverse VIF for Multicollinearity

Variable	*VIF*	*Inverse VIF*
EPS	3.987	.251
P/E	1.139	.878
P/B	4.694	.213
ROE	4.754	.212
DPS	3.653	.274
PNR	1.883	.531
PBIT	1.434	.697
Int.R	1.219	.820
GDP	1.488	.672
Inf.R	1.624	.616
Mean VIF	2.587	

Source: Authors' Own Compilation

5.2. Descriptive Analysis

Descriptive statistics of the independent variables that are considered in the study are depicted in Table 5. Table 5 shows the summary statistics of yearly data consisting twenty-five companies from 2013 to 2017. The mean, standard deviation, maximum-minimum values of independent variable are exhibited in the said table.

Table 5: Summary Statistics of Independent Variable

Variable	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
EPS	55.3492	49.24215	-14.7	243.3
P/E	17.07296	53.66383	-180.23	381.13
P/B	6.62864	7.44190	.44	50.71
ROE	21.94552	21.66487	-38.2	142
DPS	16.6744	19.40287	0	85
PNR	4.7576	6.33739	-10.9	41.98
PBIT	22.12496	10.77129	-4.32	48.31
Int.R	7.66	.67680	6.90	8.90
GDP	7.42	.67313	6.39	8.26
Inf.R	6.112	2.7543	2.49	10.91

Source: Authors' Own Compilation

In Table 5, a fluctuation of minimum and maximum for PE is min=-180.23, max= 381.123. That means investors are ready to pay high premium for well performing companies and they are hesitant to

buy underperforming shares. It is noticed in mentioned table that dividend policy which is expressed as dividend per share has a significant difference between the minimum and maximum values (Min= 0, Max= 85) due to the fact that there are companies which have zero pay-out ratio again there are companies having full pay-out. The variables that have highest standard deviation is PE followed by EPS and ROE. However, the minimum value of PBIT is negative, that represents some firms suffered loss during certain point of time in the study period.

5.3. Regression Model Analysis

Table 6 depicted the estimation results of fixed effect model (FE) and random effect model (RE)

Table 6: Results of Fixed Effect and Random Effect Regression

Independent Variable	*Fixed Effect Model*			*Random Effect Model*		
	Coefficient	*t*	*p-value*	*Coefficient*	*Z*	*p-value*
Constant	988.66181**	2.00	0.048	968.07288*	1.88	0.060
EPS	3.169489*	1.92	0.059	4.4534016***	2.72	0.007
P/E	.72469297	1.11	0.271	.93677353	1.43	0.153
P/B	36.782249**	2.45	0.016	24.73687*	1.87	0.062
ROE	.20978648	0.05	0.960	-1.6691754	-0.41	0.684
DPS	13.49425***	2.70	0.008	12.563715***	2.62	0.009
PNR	10.184058	0.77	0.444	9.4473488	0.80	0.426
PBIT	.36703873	0.04	0.969	-3.4826548	-0.46	0.645
Int.R	-151.96594***	-3.24	0.002	-145.8356***	-3.00	0.003
GDP	92.45478*	1.81	0.074	107.59144**	2.01	0.044
Inf.R	-58.337637***	-4.40	0.000	-56.38950***	-4.10	0.000
F Statistics	12.43***			—		
Hausman Test	17.60***					
(p-value)	(0.000)					
Wald x^2	—			129.62***		
R-sq: within	0.5801			0.5695		
R-sq: between	0.2684			0.4228		
R-sq: overall	0.3319			0.4393		

Note: *, **, *** denotes 10%, 5% and 1% level of significance.

Source: Authors' Own Compilation

It shows the estimate of fixed effect and random effect models of twenty-five firms over a period of five years. As Hausman test supports the model fixed effect, the analysis is done on the basis of that supported model. R^2 value of 0.5801 within the sector reveals that 58% of the fluctuations in share

prices in India is affected due to the variables that have been taken into consideration. The p value of F-test is significant at 1% level of significance. The table 6depicted that interest rate has an inverse relationship with the market price of shares at 1% level of significance. The inflation rate also has negative relationship like interest rate which is also significant at 1% level. However, the analysis reveals that the independent variables price to earnings ratio, earnings per share, price to book ratio, return on net worth, dividend per share, price to net profit ratio, profit before dividend interest & tax and gross domestic product have a positive relationship with share price. Some of the variables shows similar impact in the research study by Enow and Brijlal (2016) & Almumani (2014).Amongst them, earnings per share, gross domestic product, price to book ratio and dividend per share are significant at ten, five and one per cent level of significance. The coefficients (p-value) for EPS, PB, DPS, INT, INF, GDP were 3.169489 (0.059), 36.782249 (0.016), 13.49425 (0.008), -151.96594 (0.002), -4.40 (0.000), 92.45478 (0.074) respectively. The study suggests that earnings per share, gross domestic product, price to book ratio, dividend per share, interest rate and inflation rate are the most important factors affecting share prices. The upward movement of these variables will result increase in the market price of share and vice versa.

6. Results and Discussion

The findings of the study revealed both positive and significant relationship among EPS, PB, DPS, INT, INF and GDP suggested these factors are crucial determining factors in creating the market price of shares in India. Whereas, a significant negative impact was found between interest rate and inflation rate. So, it is suggested that when there is hike in interest rate, loans from bank will be costlier for firms and as a result, there might be reduction in profit which directly affects market price of shares. Again, negative impact of inflation indicates that when inflation rate remains high, it negatively affects the market price of share. Investors should take into consideration these aspects at the time of investment. It is recommended that potential investors should closely monitor the earnings per share, gross domestic product, price to book ratio and dividend per share prior to their investment and expansion of their portfolio. The study has also provided few recommendations to those listed firms in India to give attention on the significant variables involved in the study. It also recommends that investors should take into consideration the dividend decision of companies as it significantly affects the performance of market price of shares. This study may be used as a guide for the small investors in India to provide attention on the above-mentioned factors discussed in detail while taking decision in capital market investment.

7. Conclusion

The study attempted to analyse the factors that affect stock prices that are listed in NSE. For the purpose of the study, panel data of twenty-five companies over a period of five years yielding a total of 125 observations have been retrieved from Yahoo finance and money control website as well and analysed the factors that influence the market price of shares listed on the National Stock Exchange of India (NSE). Fixed effect and random effect models are used to estimate the data. The study attempted to analyse the relationship between market price of shares and some select fundamental variables of a

company. The findings reveal a positive significant relationship between earnings per share, gross domestic product, price to book ratio, dividend per share, interest rate and inflation rate that are active determinants share prices. However, a negative relationship was found between interest and inflation rate which was statistically significant. The result may be generalised as it has included major industries and companies of high market capitalisation which are listed in NSE.

Small investors in India may consider the variables for making investment in shares. As the study considers only ten variables but there are other variables exists in the market that might affect share prices been ignored. Also, the period of the study is limited to five years only on twenty-five number of companies. Any generalisation can't be done based on the number of units. Again, the data which has been collected from various websites, the validity and reliability will depend upon the websites that publishes those data. This gives an area for further research to consider more variables and more companies with a long time series data.

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Stock Liquidity and Capital Structure: Evidence from NSE Listed Top 100 Non-Finance Indian Firms

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Keywords

Liquidity, Illiquidity, Book leverage, Market leverage, Asset tangibility

JEL Classification

G10, G11, G12, G30, G32

Abstract: This study has investigated the influence of the stock liquidity (measured by Amihud's illiquidity) of a company on its capital structure using the top 100 non-finance firms listed in the NSE from 2010-11 to 2019-20. Using the fixed-effect panel regression model, the study has established that illiquidity has a significant affirmative influence on the book and market leverage. Furthermore, the findings reveal that turnover representing the business size and return on assets have adverse associations with both book and market leverage. Moreover, asset tangibility bears a positive influence on book leverage. The results endorse the usefulness of the notion of Pecking-order in the context of Indian companies.

1. Introduction

Capital structure (Nirajini and Priya, 2013) denotes the amount of equity and long-term debt in the financial structure of a company (Abor, 2005). Several studies (Ozkan, 2001; Titman and Wessels, 1988; Shleifer and Vishny, 1997) have identified firm size, asset tangibility, firm profitability, and growth potential as key firm-specific variables that define a firm's capital structure. However, the significance of market liquidity in driving capital structure choice is not addressed in these studies. Frieder and Martell (2006), Lipson and Mortal (2009), and Hovakimian *et al.* (2004) in their studies emphasized liquidity in the stock market as being a critical predictor of capital structure choices. Liquidity in the stock market is greatly affected by transaction costs and adverse selection costs (Damodaran, 2005). In this context, to describe a company's capital structure, the terms "trade-off" and "pecking order" have been employed by Frank and Goyal (2008). The "Trade-off" concept states that in the case of highly liquid stocks, companies choose equity financing over debt financing, because such stocks have lower transaction costs of issuing shares, making funding through equity more appealing than debt financing

(Frieder and Martell, 2006; Lipson and Mortal, 2009). In contrast, the notion of "Pecking order" diverges from the "Trade-off" notion of capital structure in its argument for a link between liquidity in the stock market and leverage. In agreement with the notion of the "Pecking Order", debt financing is preferable for illiquid stocks (Lesmond *et al.,* 2008), implying an inverse association between the two i.e. liquidity in the stock market and leverage. This is due to debt financing being less sensitive to adverse selection problems (Jensen, 1986). Information asymmetry plays a pivotal role to establish the association between the two.

When one delves into the past literature concerning the association between market liquidity and leverage, mixed pieces of evidence are found. According to certain studies, market liquidity has an affirmative linkage with a company's leverage strategy (Sibilkov, 2009; Akinola, 2011; Myers and Rajan, 1995; Morellec, 2001). Other studies, on the contrary, show that the opposite is true (Ahmed *et al.*, 2010; Stulz *et al.*, 2013; Hovakimian *et al.*, 2001; Rajendran and Achchuthan, 2013; Hovakimian *et al.*, 2006).However, Sharma and Paul (2015) observe no empirical association between the stock liquidity and capital structure.

Consistent with the market microstructure approach, a stock's liquidity is determined by adverse selection costs and information asymmetry. In the opinion of Bagehot (1971), when market makers think they may face such investors who enjoy superior information about the security's true value it creates a probability of definite losses for them. They recover through the liquidity premium. If the asset price does not reflect its true value, agents may take unfair economic advantage of insider information. Conversely, the others trade for liquidity only using information that is publically available (Abad and Rubia, 2005). As mentioned, agency conflicts between insiders and outsiders may arise due to such information asymmetry, which lessens the volume as well as the number of transactions in the stock market ultimately leading to a fall in stock market liquidity (Akerlof, 1970). According to Jensen (1986) debt financing is substantially less information-sensitive than equity financing whereas equity financing is the most susceptible to the adverse selection problem. Accordingly, equity investors demand a higher risk premium from their investments. Indeed, lower stock liquidity may lead to more adverse selection problems or higher agency costs, resulting in less equity and more debt. In line with this, Lesmond *et al.* (2008) observe a favourable association between illiquidity and leverage through information asymmetry which is consistent with the pecking order hypothesis. However, this issue has not been given due consideration in the context of the Indian stock market. In this backdrop present study investigates the existence and extent of a liquidity-capital structure relationship in the Indian stock market.

2. Review of Literature

2.1. Theoretical Underpinning

After the seminal work on a firm's financial decisions by Modigliani and Miller (1958, 1963), (Serrasqueiro *et al.*, 2011), in dealing with challenges that create departures from the efficient market hypothesis, two pragmatic theories, in particular, are considered the most important (Newman *et al.*, 2011).The notion of Pecking-Order Theory comes after the Static Trade-off. The following is a summary of these two theories:

2.1.1. Static Trade-off Theory

In accordance with the notion of Static Trade-off, every enterprise strives to get the debt-to-equity ratio at an optimal level (Adair and Adaskou, 2015) that maximizes its market value by balancing the benefits and costs of its financing decisions (Thippayana, 2014; Jarallah *et al*., 2018). Companies frequently prefer debt to equity since interest payments are tax-deductible and preserve personal savings (Miller, 1977). Simultaneously, more employment of debt in the financial structure raises the risk that the firm has to face in meeting fixed-payment obligations (Banerjee, 2015), increasing the bankruptcy costs, indirect costs, and internal costs emanating from the conflicts of interests between agent and principal as a result of the greater likelihood of financial distress (Ross *et al*., 2012). In the process, as previously stated, distress-related costs begin to outweigh debt-related tax advantages (Brigham and Houston, 2015), gradually making the marginal benefit of a tax rebate of a company identical to the marginal costs of bankruptcy (Stiglitz, 1969).

Finally, the Static Trade-off Theory is primarily concerned with long-term financial objectives or strategies, focusing mostly on tax shields and financial distress (Ross *et al.,* 2012). By this theory, firms assess the tax advantages of debt financing in opposition to the danger of going bankrupt. (Brigham and Huston, 2015).

2.1.2. Pecking-Order Theory

Myers and Majluf (1984) are the pioneers of the Pecking-order Theory which is a substitute for the notion of Static Trade-off (Ross *et al.,* 2012).The concept of asymmetric information, which asserts that managers possess additional information about a company's prospects than investors, lies at the heart of this theory (Brigham and Huston, 2015; Brealey *et al*., 2014). Such a notion presumes the absence of a target or optimal debt-equity ratio (Agyei *et al*., 2020). As discussed, 'information asymmetry' affects decisions about internal and external finance, as well as new debt and common stock issuance (Brealey *et al*., 2014). As a result, there is a hierarchy in which retained earnings investments come first, then new debt issues, and finally new common stock issuing as the last choice (Brigham and Huston, 2015).

As opposed to the notion of Static Trade-off, the Pecking-order concentrates on the short-term, tactical issue of raising outside capital to finance investments. (Ross *et al*., 2012), and this illustrates the order in which companies want to raise capital: internal funds first, debts second, and new common stock third (Brigham and Huston, 2015).

2.2. Hypothesis Development

Though the concept of liquidity is applied numerous times in the market microstructure framework because of its significant role in the market microstructure approach, such a concept has limited use in corporate finance. More recently, we find some empirical studies to connect liquidity to capital structure as firms' capital structure decisions are guided by the liquidity of stock (Rashid *et al*., 2017).

Main stream research in this field has been piloted in developed economies. The cost of issuing shares for US companies is reduced as the equity market becomes more liquid, making equity financing more enticing than financing through debt (Lipson and Mortal, 2009). In the same vein, in the opinion

of Frieder and Martell (2006), firms resort to debt financing in the case of illiquid stocks as they involve higher transaction costs of issuing equity, again signifying an adverse association between liquidity and leverage in the case of NYSE stock Exchange. Dang *et al.*(2019) witness that there exists an adverse association between liquidity in the stock market and leverage as the equity cost depresses when stock liquidity amplifies thereby investing in equity as a more viable option compared to debt. All such studies (Lipson and Mortal, 2009; Frieder and Martell, 2006; Dang *et al*; 2019) are guided by the trade-off theory which presumes that firms with more liquid stocks should have lower issuance costs of equity and be less leveraged. Liquidity-capital structure link can also be explained by the pecking-order theory as given by Myers and Majluf (1984).Debt financing, according to their views, is substantially less information-sensitive than equity financing (Jensen,1986), but equity financing is the most susceptible to the adverse selection problem.

Accordingly, equity investors demand a higher risk premium from their investments. Indeed, lower stock liquidity may lead to more adverse selection problems or higher agency costs, resulting in less equity and more debt. In line with this, Lesmond *et al.* (2008) also report a positive relationship between illiquidity and leverage through information asymmetry which is consistent with the pecking order hypothesis. On the flip side, Andres *et al.* (2014) in their study on US-listed firms suggest that a higher debt ratio is an indication of firms' profitability and highly liquid stocks lessen information asymmetry between managers and investors leading to more use of equity financing as compared to debt financing, thereby signifying again inverse association between liquidity in stock and leverage. When it comes to more liquid stocks, the cost of issuing equity is lower, making equity financing a more profitable option than debt financing, demonstrating an adverse association between equity liquidity and leverage (Butler *et al.,* 2005). Information asymmetry has a major influence on a stock's liquidity. The cost of issuing a particular stock grows as a result of greater informational asymmetry, leading to the adoption of debt financing as an appropriate mode of financing rather than equity financing thereby again supporting the notion of pecking order (Kyle, 1985).

In the context of an emerging economy, Thailand, Udomsirikul *et al.* (2011) attempt to establish a link between liquidity and leverage. They discover an adverse linkage between liquidity and leverage. Based on the study of Udomsirikul *et al.* (2011) for Thailand listed firms, Leelakasemsant (2015) aims to explore the joint effect of liquidity of equity and concentrated ownership on the capital structure of organizations. They establish that enterprises having more liquid stocks and lower ownership concentration opt for financing through equity as compared to debt financing to finance their requirements of capital, thereby again signifying an inverse association between equity liquidity and leverage. ElBannan (2017), on the other hand, finds no significant link between stock liquidity and leverage in his examination of the combined influence of liquidity in the stock market and family ownership on capital structure in a developing economy like Egypt. Using data from Australian companies, Nadarajah *et al.* (2018) aim to figure out how stock liquidity and governance quality interact to affect the capital structure. They claim a significant adverse association between stock liquidity and companies' leverage policies. Furthermore, they discover that the corporate governance quality has a greater impingement on highly liquid stocks. Likewise, Khediri and Daadaa (2011) explore a negative linkage between trading activity (a measure of stock liquidity) and leverage.

Andrade and Kaplan (1998) in their study indicate an inverse association between liquidity and leverage considering a greater degree of leverage as the genesis of financial distress. Sidhu (2018) in his study examines the linkage between stock liquidity and leverage in the Indian context. He concludes that there exists an inverse association between stock liquidity and leverage which is at par with the studies conducted in the context of advanced economies (Frieder and Martell, 2006; Lipson and Mortal, 2009). Contrary to popular belief, no indication of a link between stock liquidity and leverage is observed by Sharma and Paul (2015). Similarly, Haddad (2012) in the context of the Amman Stock Exchange exhibits that there exists an insignificant association between liquidity and leverage.

More recently, taking Chinese companies as a sample Chen *et al.* (2020) in their study determine the association between stock liquidity and excess leverage. In their study, they exhibit an inverse association between stock liquidity and excess leverage because more liquid stocks weaken information asymmetry thereby leading to a negative (positive) association between liquidity (illiquidity) and leverage which is in line with Lesmond *et al.*(2008). Rashid *et al.* (2017) look at the linkage between stock liquidity and leverage across all companies categorized as non-financial and which are registered on the Pakistan Stock Exchange. They discover an inverse association between the liquidity of stock and leverage, which is similar to those (Udomsirikul *et al.*, 2011; Frieder and Martell, 2006; Lipson and Mortal, 2009). Nai-Kang (2009) in his study observes an adverse and robust significant influence of liquidity on leverage.

A study by Umar and Sun (2016) looks at the association between leverage and stock liquidity. The study reveals two different sets of results. First, for large banks liquidity and leverage move in the same direction which is contradictory (Frieder and Martell, 2006; Lipson and Mortal, 2009). However, their research explores the inverse association between liquidity and leverage in respect of small firms.

Incorporating present circumstances, there remains a dearth of studies in the Indian context to determine the influence of liquidity (illiquidity) of stock on the capital structure. Second, it is mostly observed that studies related to liquidity and capital structure have been conducted so far in advanced countries, indicating a lack of studies addressing the issue in the context of an emerging economy. Third, there remains a dearth of studies in panel frameworks addressing the issue as most of the studies are concentrated on either cross-sectional relationships or time-series relationships. Hence, all these can be considered research gaps. Importantly, in practical terms, the findings of this study would be beneficial for the stock market regulators and corporate managers in devising plans and policies and other future courses of action.

3. Objective and Hypothesis of the Study

3.1. Objective of the Study

The main objective of the study is:

- To examine the association between stock liquidity (illiquidity) and leverage in the Indian stock market.

3.2. Hypothesis of the Study

The following hypothesis is formulated based on the above objective:

H_{01}: Stock liquidity (illiquidity) has a negative (positive) association with leverage.

4. Research Methodology

4.1. Data and Sample

The source of this study's database is the "Capitaline" database, which is a secondary source. To perform the study, the top 100 non-financial companies listed in the National Stock Exchanges of India (NSE) have been chosen as a sample. The research spans ten years, from April 1, 2010, to March 31, 2020, and the study period has been taken after the global financial crisis which ends in June 2009 but before the inception of COVID-19 and it is based on a uniformly arranged panel data organized by financial years. Top 100 companies have been taken as stocks belonging to such firms are regularly traded in the Indian stock market and such companies have been taken in terms of market capitalization and these companies have been grouped to minimize sectoral bias. Three companies are omitted as their financial years are different. Finally, our sample includes 97 companies. The cut-off date for selecting the sample is March 31, 2020.

4.2. Research Variables

4.2.1. Dependent Variable

The study's dependent variable is leverage. Leverage is measured by dividing the total book value of debt by the total book value of assets, a book value measure, according to previous research. (Pham *et al.*, 2020; ElBannan, 2017; Bonaime, 2014).

4.2.2. Independent Variable

Stock liquidity, measured by Amihud (2002) 'illiquidity' (ILL) is the independent variable in the present study. The reciprocal of stock liquidity, Amihud's illiquidity is interpreted as the average ratio of the weekly return in the absolute figure to the volume for that week:

$$|R_{iyw}| \ / \ VOLW_{iyw}$$

The return of stock i on week w of year t is denoted by R_{iyw} and $VOLW$ is the weekly volume. This measure provides the change in price in absolute figure (percentage) per rupee of weekly trading volume or the weekly impingement on the price of the order flow.

Hence, Illiquidity $(ILLIQ_{iy}) = 1/W_{iy}\ \Sigma_{t=1}^{Wiy} |R_{iyw}| / VOLW_{iyw}$

In the above equation, W (iy) denotes the week(s) for which data for stock I in year y are available. To get a meaningful result of Illiquidity the above figure is multiplied by 10^7.

4.2.3. Control Variables

Business size (SIZE) represented by the natural logarithm of the firm's total sales, asset tangibility (TAN), and profit earning capability of the firm as metered by return on assets (ROA) are among the control variables. Firm size has been considered as a control variable because of the persistence of an

adverse association between firm size and leverage (Titman and Wessels, 1988) as suggested by pecking-order theory as when compared to outside financing, large companies rely more on financing from their sources of capital. Controlling for asset tangibility is justified by the fact that tangible assets can be used as collateral or security for a loan and thus might have a positive impact on leverage (ElBannan, 2017; Rajan and Zingales, 1995); the same has been justified by some major studies (Sharma and Paul, 2015., Andres *et al*., 2014). Finally, this study controls for profitability following Sharma and Paul (2015), Haddad (2012), and Udomsirikul *et al.,* (2011). By the Pecking-order theory, an adverse association between return on assets or operating profitability and leverage is noticed, because more profitable

Table 1: Research Variables: Definition and Measurement

	Variables	*Definition and Measurement*
1.	Dependent Variable:	
	a) Capital Structure	Book Leverage (BLEV) = $\frac{Total\ Debts}{Total\ Assets}$ (Pham *et al.,* 2020; ElBannan, 2017; Bonaime, 2014)
2.	Independent Variable:	
	a) Stock Liquidity	Amihud (2002)'s'illiquidity'(ILL) = 1/ $W_{iy}\Sigma_{t=1}^{Wiy} \mid R_{iyw} \mid / VOLW_{iyw}$ where W (iy) denotes the weeks for which data for stock I in year y are available.
3.	Control Variable(s):	
	a) Firm Size	SIZE = Natural logarithm of the annual sales figure of each company during different financial years. (Sidhu, 2018; Rajanand and Zingales, 1995; Ozkan, 2001; Titman and Wessels, 1988).
	b) Asset Tangibility	Tangibility (TAN) = $\frac{Net\ Fixed\ Assets}{Total\ Assets}$ (Rajanand and Zingales, 1995; Abdullaand and Ebrahim, 2020; Pandey *et al*.; 2021).
	c) Profitability	Return on Asset (ROA) = $\frac{EBIT}{Total\ Assets}$ (Udomsirikul *et al*., 2011; Sharma and Paul, 2015; Haddad, 2012).

Source: Authors' Own Compilation

enterprises rely heavily on internal sources of finance, resulting in less debt use (ElBannan, 2017, Rajan and Zingales, 1995). Contrary to this, the notion of Static Trade-off speaks in favor of an affirmative association between profitability and leverage as such profitable firms enjoy a greater degree of leverage due to the advantage of the tax shield.

4.3. Model Specification

This research looks into the influence of stock market liquidity, as defined by Amihud's illiquidity, on a company's capital structure. To test and validate the research hypothesis, the following empirical model is developed:

$$BLEV_{it} = \beta_1 + \beta_2 ILL_{it} + \beta_3 SIZE_{it} + \beta_4 TAN_{it} + \beta_5 ROA_{it} + \mu_{it} \qquad \text{(Model 1)}$$

Where *i* (company) = 1, 2...97 and *t* (time) = 1, 2,3,4,..,10. The above equation is written as per the pooled OLS model. Accordingly, the regressors are assumed to be non-stochastic. Furthermore, if the regressors are found to be stochastic, they are uncorrelated with the error term (μ_{it}).

To examine the aforementioned econometric model, the research utilizes a static panel data technique (balanced), as the sample comprises data across firms and overtime. This technique, as argued, allows for individual heterogeneity control, alleviates the multicollinearity issue, amplifies the degree of freedom and data variability, and yields more efficient and unbiased estimates (Dimitropoulos, 2020; Khaki and Akin, 2020).

To proceed with, three classical panel data regression models, viz. pooled OLS model, random-effect model, and fixed-effect model are available within the framework and can be used. To examine the choices of panel data, viz. random-effect model and fixed-effect model against the pooled OLS model, the Breusch Pagan test and F test have been conducted, respectively. The estimates for both these tests, namely the BP test and F test are found significant (unreported), suggesting the use of panel data models, viz. random-effect model and fixed-effect model. At this stage, the Hausman test has been performed to determine the best model among the random-effect and fixed-effect models. The fixed-effect model wins the Hausman test, thus it's kept for investigation purposes.

5. Data Analysis

5.1. Summary Statistics

Table 2 reports the summary statistics of variables used in this study. The total number of firm-year observations is 970 for each variable. The statistics for BLEV (mean value = 0.2326; Std. Dev. = 0.2033) suggest that on average, 23 percent of the assets of the sample firms' have been financed by employing borrowed capital. The ILL varies from .0001 to 1573.2110with a mean value of 6.8671. The mean value of SIZE is 8.6231 with a minimum and a maximum value of 5.0661 and 13.1829, respectively. TAN has a mean of 0.4017, which suggests that fixed assets account for 40% of the resources held by the sample firms. The mean value of ROA is 0.2493, highlighting that the sample firms' managed to generate profit of around 25 percent by utilizing their resources.

Table 2: Descriptive Statistics

	BLEV	*ILL*	*SIZE*	*TAN*	*ROA*
Mean	.2326	6.8671	8.6231	.4017	.2493
Std. Dev.	.2033	60.9258	1.5510	.2094	.2107
Minimum	0	.0001	5.0661	.0010	.0002
Maximum	.7821	1573.2110	13.1829	1.0234	1.8245
Observation	970	970	970	970	970

Source: Authors' Own Compilation

5.2. Panel Unit-Root Test

The stationarity of panel data and the order of integration should be investigated to mitigate the spurious regression problem (Żltaţ and Demirgüneţ, 2020).To examine whether our data series are stationary at a level, more specifically, following Khan *et al.* (2021) & Paul and Mitra (2018), we apply Levin *et al.* (2002) testa conventional approach. The results of these tests are reported in Table 3. The LLC (2002) test results show that all the employed variables are stationary at their levels

Table 3 shows the results of the Levin *et al.* (2002) unit root test for the variables used in the regression. At the 1% level, the Adj.t-statistics for all variables are notable. This means that at level or I, all variables are stationary (0).

Table 3: Unit-Root Test Results

Variables	*Adj. t-statistics*
BLEV	-19.8942*
ILL	-83.3761*
SIZE	-14.0339*
TAN	-7.4513*
ROA	-13.5792*

Source: Authors' Own Compilation

*indicates a 1% level of significance

5.3. Correlation Analysis

Table 4 presents the Pearson's correlation matrix showing the degree of associations between the target variable, viz. leverage (BLEV), explanatory variable, viz. illiquidity (ILL), and the control variables, namely business size (SIZE), asset tangibility (TAN), and return on assets (ROA). The results show that there is an affirmative correlation between illiquidity and leverage. Concerning control variables, firm size, as measured by sales turnover and asset tangibility seem to have a positive correlation with leverage, while profitability measured by ROA and leverage are negatively correlated. Asset tangibility appears to have a positive association with leverage. Table 4 also shows that each pair of predictors has

a correlation coefficient of less than 0.80 (Gujarati, 1995), suggesting that there is no multicollinearity issue in our dataset. This means that in our data collection, multi-collinearity isn't an issue. Moreover, the VIF values of the independent and control variables range from 1.0100 to 1.0300, that is, within the threshold of 10 (Hair *et al.*, 1995), and also the tolerance level of the variables ranges from .9703 to .9889, which is, within the threshold limit of 2 (Hair *et al.*, 1995). This allows us to rule out the possibility of multi-collinearity between variables in the examined model.

Table 4: Correlation Matrix

Variables	*BLEV*	*ILL*	*SIZE*	*TAN*	*ROA*	*VIF*	*I/VIF*
BLEV	1						
ILL	0.0972*	1				1.0300	.9703
SIZE	0.0456	-0.1435*	1			1.0200	.9765
TAN	0.3239*	0.0822*	0.0409	1		1.0200	.9805
ROA	-0.3239*	-0.0303	0.0170	0.0976*	1	1.0100	.9889

Source: Authors' Tabulation

Notes: * indicates a 1% level of significance.

5.4. Regression Results

Table 5 presents the estimates for our baseline model, model (1). Applying the fixed-effects regression model (as suggested by the Hausman test), the results show that the illiquidity of stock maintains a significant and positive relationship with leverage (coefficient = 0.0001; t-value = 1.9200), indicating that along with an increase in the illiquidity of stock, leverage increases. This result validates the Pecking-order Theory as suggested by Lesmond *et al.* (2008) and Jensen (1986) and also the studies by Lipson and Mortal (2006), Udomsirikul et al. (2011), and Sidhu (2018), who have shown that due to the illiquidity of stock, the cost of issuing equity enhances, suggesting that debt financing is better as compared to equity financing plan. Concerning the control variable, asset tangibility has an affirmative and significant influence on book leverage. On the contrary, firm size and profitability, as measured by turnover and return on assets, respectively are associated with leverage negatively. The adverse influence of these two on leverage again supports the application of the notion of Peking-order in this context (Titman and Wessels, 1988; ElBannan, 2017; Rajan and Zingales, 1995).

5.5. Model Robustness

To validate the estimates of our baseline model as reported in Table 5, we re-run the model using market leverage (MLEV) as a proxy for the dependent variable. Following prior studies market leverage is calculated by total debts to the market value of asset ratio (Udomsirikul *et al.*, 2011; ElBannan, 2017), where the market value of assets equalling total assets minus the book value of equity plus market capitalization. Based on the above discussion, the following empirical model is developed:

Table 5: Estimates of Fixed-Effects Regression Model (Model 1)

Variables	*Coefficient*	*t-value*
ILL	.0001**	1.9200
SIZE	-.0843*	-11.0700
TAN	.0793*	2.7800
ROA	-.2768*	-10.1300
Constant	.9963*	14.8000
R^2 : Within	.2025	
Between	.0065	
Overall	.0170	
F-Statistic	33.7500*	
Hausman Test (Chi-Square)	101.4500*	
N	970	

Source: Authors' Own Compilation

Notes: The baseline model's estimates are shown in this table.* indicates a 1% level of significance, whereas ** indicates a 5 % level of significance.

$$MLEV_{it} = \beta_1 + \beta_2 ILL_{it} + \beta_3 SIZE_{it} + \beta_4 TAN_{it} + \beta_5 ROA_{it} + \mu_{it} \quad \text{(Model 2)}$$

Where *i* (company) = 1, 2...97 and *t* (time) = 1, 2, 3, 4,.., 10. The above equation is written as per the pooled OLS model. Accordingly, the regressors are assumed to be non-stochastic. Furthermore, if the regressors are found to be stochastic, they are not associated with the error term (μ_{it}).

Table 6: Estimates of Fixed-Effects Regression Model (Model 2)

Variables	*Coefficient*	*t-value*
ILL	.0002*	5.8100
SIZE	-.0621*	-10.4600
TAN	.0210	.9400
ROA	-.2061*	-9.6800
Constant	.6950*	13.2500
R^2 : Within	0.2141	
Between	0.0040	
Overall	0.0166	
F-Statistic	24.8100*	
Hausman Test (Chi-Square)	99.5700*	
N	970	

Source: Authors' Own Compilation

Notes: This table presents the estimates for the robustness check.* indicates a 1% level of significance.

Table 6 shows the estimates for model 2 (i.e., robustness check). Applying the fixed-effect regression approach (as suggested by the Hausman test), the results reveal that everything is in line with the findings of our baseline model as reported in Table 5. The only exception is that asset tangibility has an insignificant association with market leverage. Nevertheless, most of the findings of this study are robust.

6. Results and Discussion

Table 5 shows that there is a considerable affirmative association between illiquidity (ILL) and book leverage (BLEV). The finding strongly accepts H_{01}. Since the present study finds a positive association between illiquidity (ILL) and book leverage (BLEV), it can be concluded that book leverage tends to increase along with the upward movement of illiquidity of stock. The result is in line with the findings of (Lemond *et al.*, 2008; Jensen, 1986). Contrasting this, the above table highlights a notable adverse association between business size (SIZE) and book leverage (BLEV) which is contrary (ElBannan, 2017; Rajan and Zingales, 1995). Similarly, an adverse association between ROA and book leverage (BLEV) is observed which states that profitability denoted by ROA is a crucial factor in influencing capital structure proxied by book leverage (BLEV) and it is compatible with (Titman and Wessels, 1988). However, a positive and significant association exists between asset tangibility (TAN) and book leverage (BLEV) representing capital structure thereby supporting (Sharma and Paul, 2015; Andres *et al.*, 2014; ElBannan, 2017; Rajan and Zingales, 1995).

7. Conclusion

This study starts with the quest of determining the nature of the association between the Liquidity of a stock measured by Illiquidity and the capital structure where the latter is proxied by the Book Leverage. It is hypothesized that the illiquidity of stock results in higher adverse selection costs of equity, thereby making debt financing a better plan than equity financing, indicating a positive association between the illiquidity of stock and leverage (Lesmond *et al.*, 2008; Jensen, 1986).

The findings depict an affirmative and significant association between Illiquidity and Capital Structure (Book Leverage or Market Leverage) thereby rejecting the null hypothesis and accepting the H_{01}. Hence, in the Indian context, the Pecking-order theory dominates over the Trade-off Theory. Moreover, Business size has an adverse and significant bearing on both Book Leverage and Market Leverage signalling that with the increase in firm size, leverage tends to diminish and such findings are contradictory (ElBannan, 2017; Rajan and Zingales, 1995). However, Asset Tangibility has an affirmative and significant association with Book Leverage thereby supporting (Sharma and Paul, 2015; Andres *et al.*, 2014; ElBannan, 2017; Rajan and Zingales, 1995). Contrasting, Asset Tangibility has no relationship with Market Leverage. Finally, Return on Assets (ROA) has an adverse and significant impact on the Capital Structure, whether measured by any of the two leverage ratios, thereby confirming the Pecking-order theory's application and that such findings are compatible with (Titman and Wessels, 1988).

This study has strong theoretical as well as practical implications. In the case of illiquid stocks, businesses should rely more on debt financing. Further, this study is beneficial to investment analysts

and firm managers for proper financing policy formulation and its' implication. The empirical findings of this study would immensely assist different kinds of investors and firm managers in undertaking long-term investment decisions and designing the most appropriate strategic policy for a firm.

Though transaction cost is considered an important factor influencing capital structure decisions (Li *et al.*, 2011) the transaction cost channel has not been considered owing to the scarcity of data on transaction cost in the Indian context. Moreover, in an 'operationally efficient' market due to competition among the brokers, transaction cost also becomes competitive and may not be a decisive factor. This study opens up new areas for further research. A study may be undertaken considering the joint impact of ownership concentration and illiquidity of stock on the leverage policy of a firm in the context of a developing economy.

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Testing Weak Form Information Memory: A Study of Indian Futures Market

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Abstract: The greatness and simplicity of EMH (Efficient Market Hypothesis) has surprised investors from time to time regarding the correct pricing and efficient strategies for investment. Applying the same logic to Indian Derivative market, the present paper makes an effort to examine the market efficiency of index futures. The study has undertaken tests of market efficiency of Nifty Index Futures contract from 1st January, 2018 to 1st January, 2021 Random walk theory is tried to be tested in this context and Ljung- Box test is applied to check the fluctuations in future contract prices. The background thought is kept like if market is inefficient at its weak-form that leads to the proof that market does have memory and future prices do not stick to random walk. Findings of the study reveals that past prices of future contracts cannot be used as base to forecast the terminal prices and abnormal profit can be made as they are random in nature.

1. Introduction

Fama (2010), in response to numerous criticisms of EMH, defended its role in the financial crisis (2007-2010) by claiming that it has few believers. As a result, it may be stated that this empirical prediction has already proven to be correct in the vast majority of real-world situations. EMH is the most studied as well as the most contentious topic in the financial sector and among finance stalwarts. However, EMH has the most significant benefit in its favour, which is its simplicity, and it has repeatedly demonstrated its robustness through implementation. Despite technological advancements in the stock trading process, no one can guarantee 100 percent market efficiency today because of the many components that make up a financial market, the most important is human emotions cannot be ignored in all these phenomena. Interestingly the belief that the financial market is not efficient and can be

beaten insists the market functioning efficiently. If the underlying principle of Efficient Market Hypothesis would be carefully studied then it can be assertively said that the term "Efficient Market" does not necessarily cent percent efficient always as it seems quite impossible that stock prices will respond almost immediately to new information. (Fama, 1998) So, the strict definition may not hold true in case of market efficiency and the role of random events cannot be discarded as they are always acceptable while the prices need to move back to its true value (fair value). Another unexplored area under EMH is whether it allows environmental eventualities and random occurrences as the implications strongly support this component.

Keeping the above logic in thought the aim of the present paper is to test the weak form of EMH of Nifty Index Futures contract from 1st January, 2018 to 1st January, 2021. The study is to examine and analyze the index future price volatility and its randomness so as to interpret the same.

2. Review of Literature

Many a times Finance theories proved themselves more subjective because of lack of proven laws in the subject. However it provides ample ideas that can be used by the practitioners. Similar logic can be applied in case of Efficient Market Hypothesis (Fama 1965, 1970). Though it has certain limitations in explaining the behavior of stock prices yet many a times its accuracy has proved in modern investment world by investors and practitioners (Fama, 1991). A lot of research work has been done in this regard and tried to address various questions raised by the deficiencies of this hypothesis.

Assuming there exists no human emotion and technically advanced trading atmosphere many a times EMH has proved its durability. If the causality of stock prices can be divided into two segments (short run and long run) then weak form of the study provides more accurate result in short run causality than the long run (Mustafa and Ahmed, 2020). The logic holds true in Spanish Derivative Market (Angles and Jesus, 1998) and the result of the test achieves the efficient market state. In Indian market, Badla transactions were studied considering the effect of successive reintroduction and suspension (Berkman and Eleswarapu, 1998) where the result supported the market efficiency and concludes impact of Badla was to enhance the volatility as well as activity that influences the trend (noise on the market).

A compared study (Shah and Thomas, 1996) between Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) considered commencement of trading in NSE and initiation of trading through D-Mat Account in both the exchanges found that they cause enhancement of both liquidity as well as market efficiency in these two major stock exchanges in India. Information Dissemination Efficiency in Indian Future Market segment considering the equity futures is also proved (Choudhury, 2007) in terms of comparing the daily returns (log return) of all indices with that of specific equity future contracts in the market. The result administers to be abnormal and reacting asymmetrically to the new information (information shock). The study concludes in case of price discovery, Indian Derivative Market may not be an efficient one. Many a times use of leverage by firms put effect on traders in the stock market and they react more to the bad news, hence giving more importance to it. On the other hand good news or information makes them move cautiously in trading.

Further studies (Ahmed *et al.*, 2005) in these area states retail traders in Indian Equity Future market behave more carefully while dealing with leveraged securities in their portfolios as in a highly

volatile market the above strategy helps them to make non-normal profit. The study also discovers a fact that designing a structure to trade in market in order to make abnormal profit may make sense for big players (institutions or big brokers). But, for individual uninformed investors it may not cater suitable returns. Another inter market segment comparison (Vipul, 2008) covers both the futures and options segment of NSE tested weak form of market efficiency using various model free tests. The result is quite surprising as it presents enormous opportunities to traders for arbitrage profit in option contracts (European Nifty Index Options) by examining various call-put parities. The result also indicated put options are being more overpriced than call option, the situation of mispricing leads to a particular pattern in timing, moneyness and time to expiry on a trading day.

Many recent studies (Gupta and Basu, 2007) favor presence of return (basically long term) anomalies in financial markets all over the world. These proclaim suggest that market efficiency cannot be abandoned. A number of studies (Agarwal and Singh, 2002) found in financial market and stock trading process long run return anomalies are so fragile that they disappear when necessary changes are introduced in their respective ways of measurement.

3. Objective and Hypothesis of the Study

3.1. Objective of the Study

All the above research studies lead to a research gap of lack of randomness study in Indian Index Futures market. Though few research works (Ahmed *et al.*, 2005; Choudhury, 2007) focused on testing semi-strong form of market yet works on weak form test or random walk test of market are limited. The scope is narrowed again when it comes to derivative market. So, the main objective of the study is:

- To check the weak form of market efficiency (Random Walk Theory) of Indian Futures Market.

3.2. Hypothesis of the Study

The framed hypothesis considering the objectives of the study is:

H_0: The price trend and lags of the sample future contracts are not significant individually.

4. Research Methodology

4.1. Data and Sample

Keeping the above objectives in mind, for the present study Nifty Index Futures is used as sample. All the future contracts traded from 1st January 2018 to 1st January 2021 have been used for the study. The background thought behind considering the above time period is to test the market efficiency post demonetization (October, 2016) period. The announcement caused lots of mental turmoil among the investors and a strong impact on Capital market (Bantwa, 2017). It is assumed that three year is quite a long period to test the randomness of the market and it can test towards the robustness of the study. The source of secondary data used in the study is National Stock Exchange and for this reason

(nseindia.com, old website) data can be assumed as completely authentic. On each trading day there are three future contracts traded which mature in three consecutive months. So the whole data has been segregated into three series: The ones maturing in the same month henceforth referred to as the same month contract, the ones maturing in the next month henceforth referred to as the near month contract and the ones maturing in the last month henceforth referred to as the far month contracts. As the study period covers 3 years, the total data set consists of 36 different time series for each year (three for each month) i.e 108 in total, analyzed for stationary.

4.2. Tools of the Study

The analysis is prepared assuming weak form market efficiency on information of the EMH. The study employs the Ljung-Box test statistics (Ljung and Box, 1978; Dicky and Fuller, 1979) to probe the randomness of index futures price fluctuation. This statistics measures the stationary of a time series by looking at the Auto Correlation Coefficients (ACF) of it. It employ the following step by step approach to test for efficiency:

To test the randomness of daily returns the Serial Correlation Function has been primarily used. Auto correlation is a technique for determining whether or not successive numbers in a time series are related. If the successive numbers in a given time series are nonrandom, there may be some dependence between them. In general, the serial correlation coefficient measures the link between the value of a random variable at time t and its value at time *k*. In other words, it will show whether price changes at time 't' are influenced by price changes at time '*k*'. The Auto Correlation Function determines the serial correlation of a time series (ACF).

Following is the mathematical expression of ACF (ρ_k)

ρ_k^2 = Covariance at lag k / Variance

Where, co-variance: $Ck = \frac{1}{n}\sum_{t=i}^{n-k}(X_t - \bar{X})(X_{t+k} - \bar{X})$ and

Variance = $\Sigma\ (Xt - X)^2 / n$

n = sample size

X = sample Mean

This study uses lag value up to 10 to calculate the ACFs. The standard error of calculated coefficients is required for statistical testing of serial correlation coefficients.

$$\text{S. E. of } r_k = \frac{1}{\sqrt{n-k}}$$

If the calculated standard error exceeds three times the value of r_k, it will be considered significant. Hence the randomness hypothesis would be rejected. If calculated coefficient does not exceed three times the standard error, randomness hypothesis will be accepted.

As an additional measure of robustness, a test of joint hypotheses that all the ACFs (Auto Correlation Coefficients) are at the same time equal to 0 (indicating complete randomness), the LB-statistics developed by Ljung Box has been used, which is defined as (Ljung and Box, 1978)

$$Q_{lb} = n\,(n+2)\,\Sigma\,(\rho_k^{\,2} / n - k)$$

$\rho_k^{\,2}$ = Auto correlation function (ACF) at lag 'k'

In comparatively larger samples, Q statistics follows a Chi- Square distribution with "m" degree of freedom. Since Q statistics is a portmanteau test, it has less effect against alternatives that contain intermittent spikes in ACF (Ljung and Box 1978).

5. Results and Discussion

If the ACFs are not statistically different from zero, it is an indication that the returns and subsequently the prices are independent of each other and have no analytical value whatsoever in predicting the future prices or returns. Following three tables present the number of significant ACF values for the year of 2018-19, 2019-20 and 2020-21 respectively. In each month there are three types of contracts: the ones maturing in the same month, the ones maturing in the next month and the ones maturing two months later. Since the ACFs are calculated for lags of 1-10, there are 30 values reported in each month.

Table 1: ACF for the year 2018-19

Month	*No. of non-significant values*	*% of non-significant values*	*Number of Significant values*	*% of Significant values*
January	25	83.33	5	16.67
February	30	100	0	0
March	28	93.333	2	6.667
April	27	90	3	10
May	27	90	3	10
June	22	73.33	8	26.67
July	20	66.67	10	33.33
August	20	66.67	10	33.33
September	18	60	12	40
October	19	63.33	11	36.67
November	22	73.33	8	26.67
December	18	60	12	40

Source: Authors' Own Compilation

2018-19: A perusal of table 1 indicates that in the year 2018-19, for the month of February not a single The correlation coefficient is greater than three times the standard error calculated. Hence all values conform to randomness hypothesis. On the other hand, in rest of the months the maximum ACF values are significant. However, if the number is viewed from the perspective of percentage it amounts to 83.33% in the month of January, 93.33% in the month of March, 90% in the months of April and May, 73.33% in the month of June, 66.67% in the months of July and August, 60% in the

month of September, 63.33% in the month of October, 73.33% in the month of November and 60% in the month December-18 of values are conforming to randomness. If we look at the broader picture, out of a total of 360 coefficients 84 coefficients do not conform to randomness. That is a percentage of only 23.33% values are significant and the remaining is non-significant. Hence we can safely accept the randomness hypothesis.

Table 2: ACF for the year 2019-20

Month	*No. of non-significant values*	*% of non-significant values*	*Number of Significant values*	*% of Significant values*
January	20	66.66	10	33.33
February	22	73.33	8	26.67
March	24	80	6	20
April	22	73.33	8	26.67
May	22	73.33	8	26.67
June	23	76.66	7	23.34
July	20	66.66	10	33.33
August	19	63.33	11	36.67
September	22	73.33	8	26.67
October	24	80	6	20
November	21	70	9	30
December	21	70	9	30

Source: Authors' Own Compilation

2019-20: Table 2 shows the calculated values for the year 2019-20. Here, in the month of January 66.66% values are confirming randomness. In the month of February and March 73.33% and 80% values respectively are not significant, where as for the months of April and May 73.33% values are confirming randomness. 76.66% values in the month of June , 66.66% values in the month of July , 63.33% values in the month of August , 73.33% values in the month of September , 80% values in the month of October, 70% values for the months of November and December (each) are confirming randomness. In a broader picture , in the year 2019-20 out of 360 values 100 ACF values i.e.27.77% values are significant while rest are non-significant , thus we can safely accept the randomness hypothesis.

2020-21: For the year 2020-21, the table 3 shows all the calculated ACF values. In a broader view out of 360 values 64 values are significant. So, here also maximum values i.e 296 values are non-significant and only 64 values are significant, thus accepting the randomness hypothesis.

For robustness, we have also used the Ljung-Box LB statistics which tests the combined hypothesis that all the calculated ACFs are at the same time equal to zero. The LB statistics approximates the chi-square distribution. So, if the computed LB value is greater than critical LB value, then null hypothesis would be rejected. Here the critical LB value is the chi square value at 5 % level of significance having

Table 3: ACF for the year 2020-21

Month	*No. of non-significant values*	*% of non-significant values*	*Number of Significant values*	*% of Significant values*
January	30	100	0	0
February	26	86.66	4	13.34
March	22	73.33	8	26.67
April	27	90	3	10
May	24	80	6	20
June	23	76.66	7	23.34
July	25	83.33	5	16.67
August	25	83.33	5	16.67
September	25	83.33	5	16.67
October	27	90	3	10
November	21	70	9	30
December	21	70	9	30

Source: Authors' Own Compilation

10 degrees of freedom (K=10) which is 18.307. Following tables are showing the LB values for all lags taken together for three years.

Table 4: Calculated Values of LB Statistics for the year 2018-19

Months	*Q1 values*	*Q2 values*	*Q3 values*
January	4.034	7.023	6.473
February	4.245	7.114	7.333
March	5.225	7.241	7.854
April	5.778	7.633	8.201
May	5.892	7.778	8.766
June	6.023	8.032	9.406
July	6.345	7.895	10.455
August	7.345	8.333	10.787
September	7.564	8.799	11.234
October	7.987	9.402	11.788
November	7.402	8.802	11.564
December	8.021	8.116	11.432

Source: Authors' Own Compilation

Table 5: Calculated Values of LB Statistics for the year 2019-20

Months	*Q1 values*	*Q2 values*	*Q3 values*
January	4.029	5.627	7.897
February	3.985	5.013	8.564
March	3.023	5.678	9.765
April	4.225	6.023	9.452
May	5.628	6.734	9.234
June	6.893	5.013	10.567
July	6.982	6.845	8.674
August	5.241	7.013	8.665
September	5.234	6.876	8.674
October	3.453	5.341	9.234
November	4.556	6.876	9.786
December	2.345	6.980	9.975

Source: Authors' Own Compilation

Table 6: Calculated Values of LB Statistics for the year 2020-21

January	3.002	4.287	6.397
February	2.014	4.287	9.212
March	3.002	6.676	9.054
April	4.117	3.802	8.052
May	6.423	5.605	7.033
June	2.014	4.287	7.033
July	2.014	4.287	6.241
August	4.117	2.854	8.052
September	2.014	3.802	7.033
October	3.002	5.675	8.052
November	4.261	6.247	9.607
December	4.256	6.252	9.712

Source: Authors' Own Compilation

A look at table 4, 5 & 6 i.e. for the year 2018-19, 2019-20 and 2020-21 reveal that all the computed LB values are less than that of the critical values, indicating randomness. Hence the null hypothesis that all the correlation coefficients at different lags (Lag1 – Lag10) are jointly not different from zero and hence are non-significant can be accepted. So, the evidence generated from all the above tables point to the stationarity of the time series under study. Hence the market can be categorized as one showing weak form efficiency.

6. Conclusion

To find out the state of efficiency in Indian Index Future market in the weak form, all the future contracts traded from 1st January, 2018 to 1st January, 2021 have been used for the study. The time period of the study is post financial crisis period. The index futures are chosen as they share the largest volume of derivative instruments traded in India. So, the test of efficiency would give us a general idea of market as a whole. After calculating the daily returns Auto Correlation Function (ACF) has been primarily used at lags 1 to 10. In order to test both the hypotheses (all the ACFs are simultaneously equal to 0, indicating complete randomness 0), we have used the LB- statistics developed by Ljung Box. While testing the significance level individually, we found maximum values are non-significant and thus the hypothesis of randomness is accepted. In the second phase when joint hypothesis was tested using LB statistics, all the computed values are less than critical values. So, here also null hypothesis of randomness was accepted.

In sum, after conducting all the above statistical tests we can safely conclude that Index futures are random in nature. It also indicates the series is a stationary one. We may implement the result to whole market condition and can say that the evidence produced by serial correlation test indicates that the future prices should not be a measurement tool to forecast the future price of the sample index future contracts. Hence, the Indian derivative market may be termed as weakly efficient in pricing of index futures.

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Determinants and Impact of Corporate Research & Development Investments on Firm Performance: Evidence from India

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G10, O30, L10, L25, L60

Abstract: Research & Development (R&D) investments have gained momentum in companies worldwide; it strengthens a firm's competitiveness and enhances its long-run performance. However, they vary among companies due to the inherent risk in generating returns. This paper explores the factors that determine the level of R&D investments in a panel data of 368 Indian listed companies over eleven years from 2011 to 2021, and examines the immediate as well as lagged effect of R&D intensity on firm performance using a dynamic GMM estimator. The results found a positive impact of firm's age on its R&D intensity but the firm's size and its debt ratio are the negative determinants of R&D investments. The findings show a higher level of R&D investments as a potential source of insecurity among investors; evident by positive impact of R&D intensity on firm's current financial performance (ROE) and negative impact on its market value (Tobin's Q). Based on the evidence obtained in the context of developing countries, the study provides useful implications for facilitating R&D investments in emerging markets.

1. Introduction

Innovation is gaining attention globally due to its significance in enhancing a company's competitiveness and sustainability in the long run. Companies are continuously evolving in the current era of competition by taking initiatives to beat the traditional way of doing things with their new ideas. For instance, Apple has changed consumer electronics; Uber has innovated the taxi business; Airbnb has evolved a new paradigm in the accommodation industry; Amazon has changed the retail segment. Companies' alertness to society's changing demands through innovation enabled them to tap the potential consumer base, thereby enhancing their performance. Innovation thus strengthens a company's position in the market; however, it is not a straightforward process. Companies innovate by undertaking research and development (R&D) expenditures; these are the building block of innovation (Becker-Blease, 2011). But, due to the long-term commitment of funds and unpredictability in outcomes, these investments

vary among companies. Companies may decide to either reduce or increase their R&D investments depending upon various internal and external factors. The study is undertaken to identify the factors determining the level of R&D investments and how these investments impact the performance of listed companies in India.

The second decade of the 21st century in India began with the buzzword 'innovation' when the President of India declared the period 2011-20 as the 'Decade of Innovation'. Since then, India has adopted policies to encourage innovative activities, such as setting up the National Innovation Council (NInC) in 2010, which exclusively focuses on innovation in every sphere of economic activity. India celebrates 11th May as 'The National Technology Day' every year to mark India's excellence in the field of technology and innovation, after it successfully tested nuclear bombs in Pokhran on 11th May 1998. ASSOCHAM, India's Apex Chamber for Commerce and Industry, organized the Third Innovation Summit cum Excellence Awards with the theme "Innovative India @ 2020" on 11th May 2015. The government has established R&D centers in different parts to foster research and achieve India's growth target under the Make in India program.

India's position in the Global Innovation Index (GII) list, 2021, has moved up two places to the 46th rank, making it the third most innovative economy among lower-middle-income countries in the world. Besides, five Indian companies, namely Hindustan Unilever, Larsen & Toubro, Bharti Airtel, Sun Pharmaceuticals, and Maruti Suzuki, made it to the Forbes' list of The World's Most Innovative Companies, 2018 which includes 100 names from across sectors and countries. The transformation in business processes powered by innovation provides India the technological edge to be at the forefront in the fiercely competitive international market.

The entry of multinational companies with large R&D centers and foreign investments has boosted India's innovative activities exponentially. The extent of R&D investments in a company however depends upon certain firm-specific and external factors, and these investments impact a company's performance too. Therefore, the study uses a sample of 368 companies listed on the Bombay Stock Exchange in India to contribute to the existing literature in several ways. Researchers have generally examined the relationship between R&D investment and firm performance in developed countries; this study will provide insight into the effect of R&D investment on companies' performance in the developing Indian economy. It would also benefit management through the identification of R&D determinants in developing strategies for allocating resources toward building the company's innovativeness.

The remainder of the paper is structured by first presenting the theoretical and literature review; after that, it develops the hypotheses followed by the research methodology used in the study. It then presents the results obtained after statistical estimations, and finally the discussion and conclusion.

2. Review of Literature

Innovation is the backbone of a company; according to Webster's dictionary, it introduces something new, a new idea, method, or device. Innovation is often also viewed as applying better solutions that meet new requirements, unarticulated needs, or existing market needs (Maranville, 1992). From airlines offering reclining seats to its high-end customers, cars equipped with airbags for safety, polarized

glasses available to protect eyes from ultraviolet (UV) rays, automation of medical processes and operations at hospitals to the transformation of cinemas and multiplexes, innovation is pervasive. According to Dalziel *et al.* (2011), "innovation is central in today's rapidly changing business environment to enhance firms' performance". Suarez and Lanzolla (2005) provided evidence on innovation's vital role in endowing a firm with a first-mover advantage that aids it in outperforming the competitors.

Companies need to think and act differently to face future challenges and embrace the change to avoid being a 'Corporate Dinosaur'. For instance, the giant company KODAK failed to foresee competition and upcoming opportunities in the digital market and ultimately disappeared despite inventing the first digital camera in 1975. Had the company acted positively to tap the potential digital market, it would have been the top company today. Similarly, Nokia, having a leading position in the smartphone market, also went out of business due to its resistance to switching to Android. Another is Xerox (who invented the first Personal Computer (PC)), who thought that the digital market was expensive and did not pay attention to demands for technological change. Blackberry failed to adopt change when more extensive touchscreen displays became a fascination in the market and so on. Innovation has thus become indispensable for companies to survive in today's competitive and constantly changing scenario.

The Investment Report of "United Nations Conference on Trade and Development (UNCTAD's Investment Report), 2005 has considered R&D as a most developed, widely available, and internationally comparable statistical indicator of industrial innovation activities." According to Griliches (1990), "R&D expenditures are considered as inputs in the process of innovation". Bhattacharya and Lal (2008) stated that organizations such as World Bank and World Economic Forum use the R&D spending of a country to measure its competitiveness.

2.1. Determinants of Research and Development Investment

R&D investments are the initial driving force in innovation, but they require the commitment of funds for an extended period with no guarantee of producing returns. Therefore, companies differ in their level of R&D investments depending upon various internal and external factors. Companies' experience and knowledge enable them to reap the benefits of innovative activities; thus, the firm's age may also relate to innovation. Firm size also determines its innovativeness; it is found to have a positive relation with R&D expenditures incurred by the company (Link, 1980; Meisel and Lin, 1983). The big-sized firms have high R&D investments (Wang, 2005), mainly due to their technical efficiency (Choi and Lee, 2018). The inherent characteristics of R&D investments make it difficult for small firms to block their limited resources in innovation activities, while it is valuable for companies with large market shares to invest in R&D (Chiang and Mensah, 2004). The company's past performance also determines the expenditure on R&D; the firm will be able to invest in R&D in the current year with more confidence if it has good performance in the previous year.

Debt is another factor that may affect R&D investments; companies with high leverage may forgo or reduce R&D investment to increase the available cash flows required to meet debt obligations (Barker and Muller, 2002). Since R&D investments carry high risk and uncertainty in generating future cash flows, companies have to curb these investments to avoid the risk of default in servicing their

debts. The debt financing thus creates pressure on sustaining profits (Myers, 1977), and is thus found to hurt R&D investments (Filatotchev and Piesse, 2009; Cumming and Macintosh, 2000; Ren, 2015). In contrast, Lee, 2012 found higher R&D investment with debt financing; hence, the empirical evidence on the impact of debt on the level of R&D investments is mixed.

2.2. Research and Development Investment and Firm Performance

The literature has well established the linkage between R&D activities and a firm's performance theoretically and empirically. Cortez *et al.* (2015) found an increase in the product portfolio of a company on account of high R&D, which enhances sales, thereby augmenting the company's financial performance. The study conducted by Bowen *et al.* (2010) proved the importance of a product or service's newness in increasing organizational performance. Zahra *et al.* (2000) found these investments to improve the company's financial performance by providing differentiated products. Grand (1991) and Izabela *et al.* (2014) are among several researchers who have confirmed that R&D investments facilitate companies in gaining market share, which boosts their sales and ultimately increases financial performance. Cockburn and Griliches (1990) and Megna and Klock (1993) found a positive impact of R&D investment on Tobin's q in the US. "R&D investments lead to increases in sales, market share, and/or profit", as reported by Ettlie (1998) & Tsai and Wang (2004). While examining whether R&D efforts are associated with future firm performance, Parcharidis and Varsakelis (2010) found positive market perceptions for firms pursuing R&D.

On the other hand, Baysinger *et al.* (1991) stated that R&D investments involve a significant likelihood of failure and found that the returns may only occur after many years or even not at all. Considering their long-term nature, Falk (2012) studied the impact of R&D intensity on companies' sales growth in Austria and found a significant positive impact over the subsequent two years. Similarly, Xu and Jin (2016) found lagged effects of R&D investment on profit margin and Tobin's Q, respectively. R&D investments are long-term investments that carry enormous risk and uncertainty. Driver and Guedes (2012) found R&D investments to reduce short-term earnings, which depresses performance in the near future (Wang and Thornhill, 2010), & Hoskisson *et al.* (1993) also reported that the investments might impact immediate performance negatively.

3. Objective and Hypothesis of the Study

3.1. Objective

- To identify the determinants of R&D intensity in a company and to examine the relationship between R&D intensity and firm performance.

3.2. Hypotheses

Based on the above objective, the following testable hypotheses are formulated:

H_{01}: Firm size has a positive impact on R&D intensity.

H_{02}: High leverage has a negative impact on R&D intensity.

H_{03}: Firm age has a positive impact on R&D intensity.

H_{04}: Past performance has a positive impact on R&D intensity.
H_{05}: R&D intensity has a positive impact on firm performance.
H_{06}: R&D intensity has a positive lagged effect on firm performance.

Figure 1 depicts the research model used in this study, and the above-mentioned hypotheses to investigate the relationship between R&D intensity and firm performance using ROE and Tobin's Q:

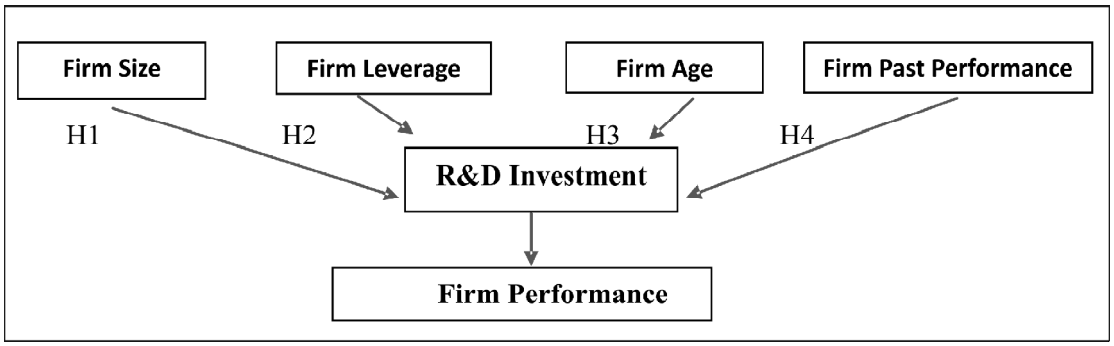

Figure 1: Research Model

Source: Author's Compilation

4. Research Methodology

4.1. Sample

The study draws a sample from 5477 companies listed on the Bombay Stock Exchange in India as of 31st March 2019. The study covers the period from 2011 to 2021 as the data for the year 2022 is yet to be uploaded by sample companies. It excludes companies that did not invest in R&D continuously during the study period and those listed after 2011 to obtain a final sample of 368 companies across 18 industries. The level of R&D investments in companies representing the pharmaceutical industry is highest with automobiles securing the second position among all. The sample companies had incurred R&D expenditure in all years and had data available on all variables of interest during the study period.

4.2. Variables and Model Specification

Consistent with previous studies (Jin *et al.*, 2018; Nivoix and Nguyen, 2012), the study employs R&D intensity as the ratio of R&D expenditure during the year divided by the company's total sales in all the models.

$$R\&D_{it} = \beta_0 + \beta_a LEV_{it} + \beta_b SIZE_{it} + +\beta_c AGE_{it} + \beta_d ROA_{it-1} + YEAR + INDUSTRY + v_{it} \quad (1)$$

$$Y_{it} = \beta_0 + \beta_a R\&D_{it} + \beta_b LEV_{it} + \beta_c SIZE_{it} + \beta_d AGE_{it} + \beta_e ROA_{it} + YEAR + INDUSTRY + v_{it} \quad (2)$$

$$Y_{it} = \beta_0 + \beta_a R\&D_{it-n} + \beta_b LEV_{it} + \beta_c SIZE_{it} + \beta_d AGE_{it} + \beta_e ROA_{it} + YEAR + INDUSTRY + v_{it} \quad (3)$$

Model 1 in equation (1) finds the determinants of R&D investment using leverage, firm size, firm age and past performance as explanatory variables. These variables are then used as control variables in

other two equations along with industry and year dummies. A series of year dummies are included to control the time effect because R&D investment levels in companies may change over time depending on general market and economic conditions (Katila and Ahuja, 2002). The dummy variables for each industry account for unobserved heterogeneity in R&D spending across industries (Breschi *et al.*, 2000; Malerba, 2002; Shapiro *et al.*, 2015).

Models in equation (2) and (3) tests the immediate and lagged effect of R&D investment on firm performance (Y_{it}) respectively. Firm performance is measured through two indicators, namely financial performance Return on Equity (ROE) and firm value (Tobin's Q). ROE measures management's efficiency in utilizing shareholders' funds to maximize their returns, and Tobin's Q is a long-term measure of performance that indicates the firm's future growth potential. Besides, 'n' in equation (3) takes the value of 1 and 2 for one-year lag and two-year lag respectively, i and t represent the firm and year respectively, and v_{it} denotes theerror term. The data for variables is extracted from Prowess IQ, the corporate database maintained by the Centre for Monitoring of the Indian Economy (CMIE). The measurement of variables is described in detail in Table 1.

Table 1: Description of Variables

S. No	*Variable*	*Description*	*Symbol*
1.	R&D intensity	Ratio of R&D expenditure incurred during the year to total sales.	R&D Intensity
2.	Return on Equity	Logarithm of {Ratio of (Profits after Tax (PAT)-Dividend to Preference shareholders) to (Paid-up equity capital Reserves and Funds – Revaluation Reserve)}	ROE
3.	Tobin's Q	Logarithm of {Ratio of (Market Value of common stock + Book Value (BV) of preference stock + BV of borrowings + BV of Current Liabilities) to the BV of assets denoted by (Fixed Assets + Investments + Current Assets)}	TBQ
4.	Size	Logarithm of total assets	SIZE
5.	Leverage	Ratio of the total book value of debts to total assets	LEV
6.	Age	Number of years since the company was incorporated	AGE
7.	Past Performance	Logarithm of (Ratio of profit before interest and tax to average total assets)	Lag ROA
8.	Year Dummies	Dummy variable 1 for test year, otherwise 0	YEAR
9.	Industry Dummies	Dummy variable 1 for test industry, otherwise 0	INDUSTRY

Source: Author's Compilation

4.3. Data Diagnostics and Techniques

The multicollinearity in all the regression models used in the study is detected by computing the correlation between variables and the variance inflation factor (VIF). The consistency of estimation

results with fixed effects and random effects models in panel data estimation assessed through the Hausman test gave statistically significant chi-square (Probability> chi2 = 0.000), and therefore fixed-effect method (FEM) is employed for all the models. Although this method acts as a powerful tool to address the problem of endogeneity, the dynamic Generalized Method of Moments (GMM) estimator is used to ensure consistent regression estimates for Model 2 by taking the lag of the performance indicator as an explanatory variable. Also, there may be simultaneity bias between R&D and performance variables; it is resolved by taking ROA lagged by one year in Model 1.It ensures that the direction of causality runs from independent variable to dependent variable when impact of performance on R&D is examined. Similarly, Model 3 and 4 takes lagged values of R&D while examining the impact of R&D investments on performance indicators. Due to heteroscedasticity and autocorrelation present in the data, clustering is applied to obtain robust standard errors (Wooldridge, 2010) as regression estimates in all models. The study thus overcomes the issues of heteroscedasticity, autocorrelation, endogeneity, and simultaneity to ensure the highest precision in estimations.

5. Data Analysis

The R&D expenditure incurred by sample companies is analyzed over 11 years from 2011 to 2021 through a graphical representation of data before identifying the factors affecting the investment decisions. Finally, it investigates the impact of R&D intensity on firm performance in panel data through the fixed regression method.

Figure 2 visualizes the R&D expenditure undertaken by 368 R&D intensive companies listed in India from 2011 to 2021 in a bar diagram, along with the change in performance indicators (ROE and

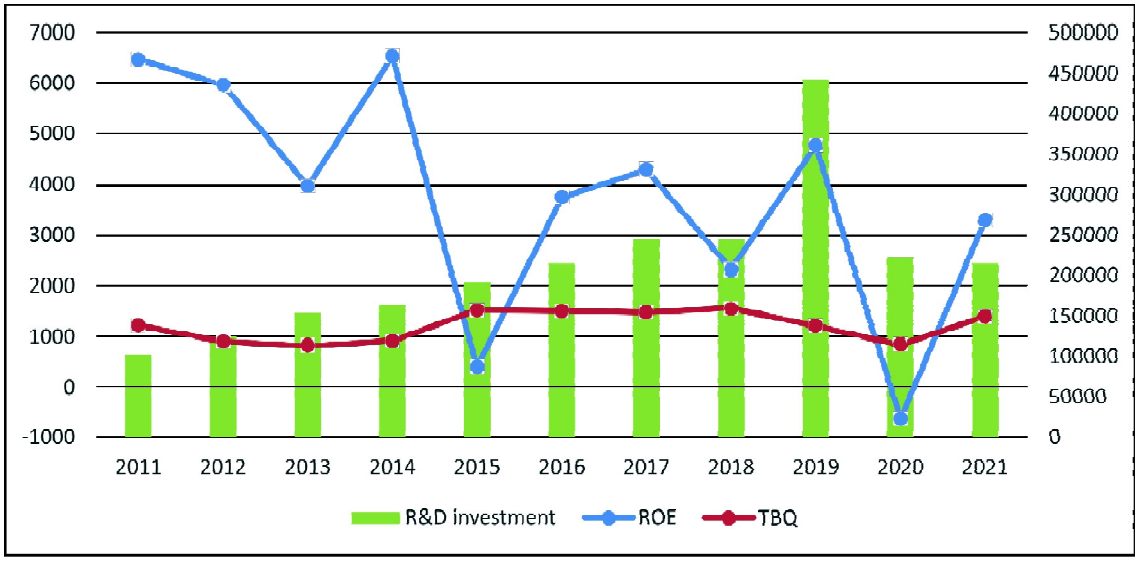

Figure 2: R&D expenditure and Performance Indicators for Sample Companies from 2011- 2021

Source: Author's Compilation (based on data obtained from PROWESS)

Tobin's Q). It shows a steady increase in R&D investments from 2011 to 2021; the investments have more than doubled by 2016, but there is little change until 2018. The year 2019 observed a significant jump in investments with a 181.11 percent increase over last year, which dropped by 48.50 percent in 2021. Regarding firm performance, both ROE and Tobin's Q have declined in the initial years signifying pressure on company's returns.

However, a difference in the movement of these indicators is observed in recent years. Tobin's Q came down by 22.13 percent despite a considerable spike in R&D investments in 2019, while ROE gained more than 200 percent in the same year. Interestingly, in 2020, the decline in R&D investments is accompanied by a steep fall in both performance indicators. However, it soon got corrected with the maintenance of steady R&D levels in companies. Thus, there exists a relationship between R&D investments and the performance of companies that need to be further examined.

Out of 368 companies, Table 2 lists the names of the top 10 companies that have incurred the highest aggregate expenditure on R&D investments in the last 11 years. The percentage increase in the R&D spending of companies in 2021 over the amount spent in 2011 shows a multifold increase in the R&D expenditure at all companies. While Tata Motors Ltd. has incurred the highest expenditure on R&D during 2011-2021, Sun pharmaceuticals Industries Ltd. had made a huge jump with a 667 percent rise towards its investments in R&D in Financial Year (FY) 21 over FY11. The data shows vast variation in the level of R&D investments undertaken by companies over time, as well as in the allocation of resources amongst them.

Table 2: List of Top 10 Companies in India Based on their R&D Spending During 2011-2021

Rank	*Name of the Company*	*Percent increase in R&D investments over the last 11 years*
1.	Tata Motors Ltd.	235%
2.	I T C Ltd.	114%
3.	Mahindra & Mahindra Ltd.	115%
4.	Reliance Industries Ltd.	224%
5.	Lupin Ltd.	206%
6.	Dr. Reddy's Laboratories Ltd.	200%
7.	Bharat Heavy Electricals Ltd.	73%
8.	Cipla Ltd.	335%
9.	Sun Pharmaceutical Industries. Ltd.	667%
10.	Bharat Electronics Ltd.	232%

Source: Author's Compilation (based on data obtained from PROWESS)

5.1. Descriptive Statistics and Correlation Analysis

Table 3 provides the descriptive statistics and correlation analysis for the sample before conducting regression. The mean and standard deviation values reveal a huge difference in the R&D intensity and

ROE of companies. The average size and age show that the sample constitutes big and experienced companies; it appears that companies prefer the debt component in their capital structure, with average leverage of 0.868.

Table 3: Descriptive Statistics and Correlation Analysis

Variables	*Mean*	*Std. Dev.*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
1. R&D Intensity	61.22	704.21	1.000						
2. TBQ	3.39	7.41	-0.075*	1.000					
3. ROE	10.39	101.78	0.0002	0.0273	1.000				
4. LEV	.86	4.14	-0.0037	0.0645*	-0.161*	1.000			
5. SIZE	64082.34	312601	-0.054*	-0.0144	-0.0002	-0.0036	1.000		
6. AGE	44.261	21.066	0.0611*	0.0054	0.0295	-0.032*	0.055*	1.000	
7. Lagged ROA	6.170	9.105	0.0047	0.1074*	0.2639*	-0.213*	0.0051	0.0067	1.000
VIF			1.67	1.02	1.13	1.06	1.02	1.01	1.15

* shows significance at the .05 level

Source: Author's Compilation (STATA output)

The correlation matrix reports a negative correlation between firm size and R&D intensity, while the firm's age has a positive correlation with the level of R&D investments. The higher R&D expenditures tend to decrease the firm value, indicated by a weak negative correlation (-0.075*) between Tobin's Q and R&D intensity. The correlations among independent variables are less than 0.70, and variance inflation factors (VIFs) are less than 10; hence, multicollinearity is not an issue in the study's data. The opposite signs for a firm's size and age with R&D intensity in the correlation matrix and the significant negative correlation between Tobin's Q and R&D intensity are further examined by regression analysis.

5.2. Determinants of Research and Development Investment

The relationship between R&D intensity and individual explanatory variables is examined through Model 1 presented in Table 4.

The value of the R^2 statistic shows that the model is statistically significant in explaining the relationship between the variables; the explanatory variable explains approximately 76 percent variation in R&D intensity. The results show a significant negative impact of firm size on R&D intensity in contrast to hypothesis H_{01}, while the significant negative impact of the financing variable, leverage, supports H_{02}. With the positive impact of firm age on the level of R&D investments undertaken by companies, the third hypothesis H_{03} is also validated. Finally, H_{04} is rejected because of the insignificant impact of the company's past performance on R&D investments. Thus, R&D expenditures largely depend upon firm size (ASSETS), its age, and leverage (debt-equity ratio) in the capital structure.

Table 4: Regression Results for Determinants of R&D Intensity

Variables	*R&D Intensity (Model 1)*
LEV	-99.93**
	(71.91)
SIZE	-165.08***
	(29.90)
AGE	21.89***
	(5.07)
Lagged ROA	-2.28
	(7.96)
Constant	551.29***
	(235.77)
Observations	3172
R-squared	.76
Adj R^2	.77
F-stat	8.011
Industry Dummies	Yes
Year Dummies	Yes

Robust Standard errors are in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's Compilation (STATA output)

5.3. Impact of Research and Development Investment on Firm Performance

Table 5 presents the regression results of Model 2 (immediate effect), Model 3 (one-year lagged effect), and Model 4 (two-year lagged effect) where Model 2A, 3A, and 4A examine the impact of R&D investments on Tobin's Q and Model 2B, 3B and 4B examines the relationship of R&D investments with ROE.

The value of R^2 statistics in all models proves their statistical significance in explaining the relationship between variables. The explanatory variable, R&D intensity, explains approximately 75 percent variation in Tobin's Q and about 93 percent variation in ROE. Model 2 examines the immediate impact of R&D intensity on two performance indicators; and found a significant positive impact on a firm's financial performance measure, ROE, but a negative impact on the company's market value, Tobin's Q. The results confirm the presence of a dynamic model by rejecting the null hypothesis of AR (1) when GMM is used in Model 2. Also, it does not reject the null hypothesis of AR (2) and the Sargan Test confirming the existence of no further autocorrelation after introducing the lag of the dependent variable and validity of instruments used in each model respectively. Model 3 and 4 test the lagged effect of R&D intensity on firm performance with one-year and two-year lag periods respectively; and reports a significant negative impact of R&D intensity on Tobin's Q. The results thus, supports

both hypotheses, H5 and H6, partially. Besides, the company's past performance and age act as contributors to the improvement of ROE in R&D intensive companies, while leverage and firm size have adverse effects on Tobin's Q.

Table 5: Regression Results for Effect of R&D Intensity on Firm Performance

Variables	*Model 2A*		*Model 3A*	*Model 4A*	*Model 2B*		*Model 3B*	*Model 4B*
	TBQ		*TBQ*	*TBQ*	*ROE*		*ROE*	*ROE*
	No lag		*One year lag*	*Two-year lag*	*No lag*		*One year lag*	*Two-year lag*
	FEM	GMM	FEM	FEM	FEM	GMM	FEM	FEM
$R\&D_{(t-1)}$		.0873				.3584		
		(.011)				(.047)		
R&D	-.0005*	-.0002***	-.0007**	-.0003*	4.674*	5.341*	6.254	5.742
	(.0002)	(.0001)	(.0002)	(.0001)	(6.325)	(2.634)	(4.043)	(3.211)
LEV	-.0546***	-.0280**	-.044***	-.032***	-0.213	-0.213	-.206	-.192
	(.030)	(.012)	(.035)	(.047)	(.027)	(.052)	(.028)	(.036)
SIZE	-.0958**	-.0193***	-.100***	-.108**	-.002	-.012	-.003	-.003
	(.014)	(.003)	(.014)	(.014)	(.004)	(.017)	(.004)	(.007)
AGE	-.0412	-.0023	-.042	-.034	.0185***	.001**	.020***	.023***
	(.002)	(.007)	(.003)	(.004)	(.0012)	(.0029)	(.0014)	(.0017)
Lagged ROA	.251	1.015	.236	.222	0.976***	.167**	.973***	.976***
	(.017)	(.011)	(.018)	(.020)	(.0049)	(.0490)	(.0050)	(.0060)
Constant	2.686	.750	-.680	-.1697	1.476	.239	1.580	1.702
	(2.195)	(.042)	(.215)	(.251)	(0.083)	(.1679)	(0.085)	(0.098)
Observations	3456	3105	3116	2806	3473	2971	3130	2818
AR (1)		9.21				-9.05		
		(0.00)				(0.01)		
AR (2)		-1.89				-6.68		
		(0.58)				(0.34)		
Sargan Test		40.17				41.41		
		(0.418)				(0.825)		
R-squared	.78		.78	.79	.92		.97	.98
Adj R^2	.75		.75	.76	.93		.97	.97
F-stat	93.25		82.29	58.53	8.542		7.89	8.142
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust Standard errors are in parenthesis. AR(1) and AR(2) show the statistics for first and second-order serial correlation in the residuals under the null of no serial correlation obtained through the GMM estimator. The Sargan tests for over-identifying restrictions under the null of instrument validity.

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's Compilation (STATA output)

6. Results and Discussion

The empirical analysis of determinants of R&D intensity of a company and investigation into the relationship between R&D intensity and firm performance using a panel dataset of 368 Indian listed firms actively involved in R&D over 11 years provides intriguing observations. First, firm size has a significant negative impact on the R&D intensity of listed companies in India, indicating the active involvement of small and medium firms. It appears that large firms prefer to maintain stability rather than making investments in high-risk uncertain R&D activities. Conversely, small-sized firms consider investment in R&D as an opportunity to help them gain market share through the development of new products. Moreover, intense competition in the market builds pressure upon small companies to engage in R&D activities for survival in the long term. In this direction, India's favorable policies to boost R&D investments have been a prominent source in contributing to the overall economy's development.

Second, the R&D intensity of a firm increases with its age; it signifies greater confidence among experienced firms to undertake R&D investment decisions. Younger firms are relatively hesitant to take these investments to avoid an impact on their immediate returns. The company's capital structure also determines the R&D expenditures; more precisely, high debt hurts the R&D intensity of companies. The results indicate a lower level of R&D investments in companies mainly due to the liquidity crunch created by debt, especially short-term debt, which may require payment of the entire amount at short notice. To avoid the challenges of meeting debt obligations, it is better to employ equity capital for financing R&D investments (Giudici and Paleari, 2000; Müller and Zimmermann, 2009). The commitment to pay timely interest and principal thus plays a significant role in deciding the allocation of funds towards R&D investments.

Regarding the effect of R&D intensity on firm performance, it has a positive impact on a firm's financial performance, measured by ROE but a negative immediate as well as the time-lag effect on the firm's market value, i.e., Tobin's Q in both the first as well as second lag phase. It indicates insecurity among investors due to firms' higher exposure to R&D investments. Since returns from R&D investments are neither immediate nor certain, long-term commitment of funds in R&D investments enhances investors' risk. Thus, information asymmetry and sensitivity associated with R&D investments affect a firm's market valuation adversely. Moreover, the non-significant impact of lagged R&D intensity on ROE suggests the difficulties in sustaining success in hyper-competitive markets. Hence, the high risks and uncertainties associated with generating returns from R&D investments are confirmed by the empirical analysis.

7. Conclusion

The analysis of determinants of R&D intensity and examination of whether R&D intensity affects firm performance in panel data of 368 R&D intensive companies listed in India gives exciting results. Age is the positive determinant of R&D intensity, while leverage and firm size restrict the level of R&D investments in companies. Regarding the effect of R&D intensity on firm performance, the results show a positive impact of R&D investment on a company's financial performance but not with the lag period. Thus, a company can be successful with its thoughtful business strategy; however,

maintaining it is difficult. Additionally, the negative immediate, as well as the time-lag effect of R&D investment on the firm's market value, signifies investors' failure to recognize the economic effectiveness of R&D investments in the long run due to their preference for immediate returns. Therefore, strict vigilance and feasibility tests before making investments in R&D projects become crucial for successful innovation. Thus, a well-planned R&D investment strategy that mitigates the associated high risks is necessary to enhance long-term firm performance.

The growing importance of innovation coupled with associated risks has key implications for companies and policymakers. While R&D activities need to be accelerated to keep pace with other emerging economies, the management should recognize that efficient and optimal R&D investments on a moderate scale would help companies achieve sustainable growth. Management should drive strategic thinking, initiate creative sessions to develop new ideas and embrace experimentation to enhance innovativeness. The results imply using long-term debt in the capital structure to alleviate the burden of debt; the managers are therefore recommended to employ either equity capital or long-term debt for financing the R&D investments. It will reduce the pressure of meeting fixed obligations timely, and enable management to enhance the level of R&D investments in the company. Furthermore, efforts should be made to capitalize the R&D expenditures. This would help in reducing the perceived risk signaling value to investors. Apart from improving the market perception, it will improve the company's net income, which is otherwise burdened by entering R&D expenditures as expenses in the income statement. Companies need to organize management development programs and workshops at regular intervals to upgrade knowledge about tools used for big data analytics, essential for undertaking risk assessment of complex investments.

Policymakers in India have created a cohesive environment for higher innovative activities by providing substantial tax incentives and R&D subsidies to facilitate R&D activities at newly formed companies particularly the small enterprises. The companies should take advantage of these legislative and support mechanisms to develop new innovative products and services. The implementation of the New Education Policy by the government in India is a step in the right direction; it aims to overhaul India's entire education system. Aiming at children's holistic development, its focus on building analytical and reasoning skills among children would produce creative minds. Government should also consider providing higher research grants to educational institutions and encourage collaborative research between academia and industry to produce spillover effects of R&D investments in the economy.

The study has certain limitations; it focused on a few determinants of R&D investment and thus guides future researchers to consider other factors such as liquidity, and sales growth while analyzing the factors affecting the R&D investment strategy of companies. Furthermore, the comparison of determinants of R&D investment in India with those in other emerging countries and that of developed economies would also bring fruitful observations. Besides, industry-wise analysis can also be taken for examining the impact of R&D investments on firm performance to gain insight into characteristics of innovation in emerging markets.

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Human Resource Accounting and Financial Performance of Select Small-Scale Industries of Odisha: An Empirical Analysis

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Human resource accounting, Small-scale industry, Financial performance, Odisha

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Abstract: This study has been aimed at verifying the influence of human resource accounting practices and its impact on the financial performance of 30 select small-scale industries located in Odisha. Financial data for the purpose have been collected from the secondary sources for five years starting from 2016 to 2020 on the 30 small-scale industries, out of which 15 each from the service and manufacturing sector. By using the panel fixed and random effect regression models, the findings of the study confirm that human resource accounting is a very important element of management in the small-scale industries as it has a direct impact on the financial performance measured in terms of ROA and ROCE. Though, the type of business has a strong bearing on the profitability, dependency of any organisation on its human capital cannot be ignored. Therefore, it is recommended that small-scale industries can improve their human capital with proper implementation of human resource accounting where every aspect of cost and benefits associated with human resource should be identified, recorded and reviewed to ensure better performance.

1. Introduction

Because of the fast-paced nature of today's corporate environment, firms are beginning to evaluate the role of intangible assets, particularly human resources, in a company's operating procedures. Human resources (HR) are a must for any firm. HR is critical to a company's success, both in terms of day-to-day operations and attaining its objectives. The ability of human resources to manage other resources

is critical to the company's success (Bassey and Tapang, 2012). This is due to the fact that all corporate strategy and technical execution, such as planning, evaluation, execution, administration, and control, all begin with human resources' thinking and skills (Rao, 2013). In addition, the efficacy and efficiency of a company's management of tangible assets largely determined by the quality of its human resources (Okpako *et al.*, 2014). Human resource benefits include adding value, cutting expenses, enhancing creativity and innovation, besides its increasing competitiveness (Bahrami *et al.*, 2015).

To gain a competitive edge, a firm must be able to make the most of its current human resources by employing appropriate techniques. To produce additional value for the organisation, the corporation should aim to improve its staff through human resource development initiatives for which it require HR information is required. Human resource accounting will offer this information (Avazzadehfath and Raiashekar, 2011). It is critical in the decision-making process and in assessing the company's long-term investment in human resources (Jacob and Farouq, 2013; Avazzadehfath and Raiashekar, 2011). Accounting for human resources can produce valuable data. The long-term influence of Human resource decisions would be apparent in the company's performance and productivity (Avazzadehfath and Raiashekar, 2011). Traditional accounting and financial reports do not include information that depict the worth of a company's human resources. Even if it is included in the financial reports, it simply displays the amount of compensation or cost incurred for training and development of its personnel. All human resource expenditures are considered as operational costs (revenue expenditure, expense approach), rather than capital costs (Ullah and Karim, 2015).

Human resource accounting is not governed under obligatory reporting requirements, hence, most of the small size firms in India are hesitant to provide information about human resources. New advances in accounting, primarily Human Resource Accounting, have evolved in response to increased demands for the quality of the resultant information, particularly for organisations that rely largely on intellectual capital. To give reliable corporate reports as a reference or decision-making tool, human resource accounting must be developed (Widodo *et al.*, 2017; Asika *et al.*, 2017; Amahalu *et al.*, 2017; Pala, 2021). Thus, the present study is an attempt to examine the human resource accounting in the small and medium sized industries located in the province of Odisha to analyse how human resource accounting affects the profitability of the selected industries.

2. Review of Literature

For a long time now, accounting professionals, such as Scott (1925) & Paton (1962) have proposed the notion of Human resource accounting. They claim that humans are viewed like assets with a documentation of their worth (Flamholtz *et al.*, 2002). Rensis Likert, an organisational psychologist, developed the notion of leadership effectiveness and a human resource viewpoint based on the assumption that people are a valuable resource for an organisation. So, it can be said that Rensis Likert pioneered studying human resource accounting in 1960 (Flamholtz *et al.*, 2002; Mamun, 2009). In external financial reporting, Roger Hermanson (1964, 1986) proposed a method for estimating the value of human resources (Flamholtz *et al.*, 2002). HR is a human worker who may assist businesses in the manufacturing process by providing work/services (Islam *et al.*, 2013). This underlines the level of effort put up by an individual in the production of products or services. These attributes can take the

shape of energy, skills, abilities, and specific observations that can be used in the manufacturing process or utilised to give valuable services (Mamun, 2009). The notion of human resource accounting does not come out of nothing. The genesis of the Human resource accounting concept is based on a number of factors (Islam *et al.* 2013). The first premise is that human resources is a valuable corporate resource that can assist the organisation both today and in the comming days. The second point is that the value of human resource changes depending on how each business is run. The third point is that the data provided by Human resource accounting is quite beneficial in a variety of ways (Islam *et al.*, 2013).

Accounting for human resources is not a new concept in business but it is a pretty new notion for an emerging economy like India. In India, there hasn't been a lot of research on human resource accounting. A study by Mamun (2009) looked at the practices of HR accounting disclosure and the impact of business performance on financial and non-financial firms. The study claimed that there is a significant relationship between human resource accounting practices and the financial performance of the selected industries.

With the use of Human resource accounting, reliable and relevant HR information can be generated. Human resource accounting may also offer a management with quantitative and qualitative information, particularly useful for HRM objectives (Islam *et al.*, 2013). This Human resource data can be used both by the internal and external parties. Mamun (2009) in their study employed proxies for firm characteristics such as size, profitability, and company age to investigate the role of human resource account on the firm's performance. This study, has proxied the company attributes like size, profitability, age, and company business type. Investors often look into a company's age while considering to invest. A company's age shows that it has survived and that it can compete and reap the benefits of commercial possibilities in the market (Kaur *et al.*, 2016). In general, organizations that have been established for a long period, enjoy more consistent revenue than enterprises that have been recently established or have a short life time. A firm, which has been in existence for a long time, will enhance its profit due to its previous expertise involved in managing its operations. Similarly, other parameters like size of a firm and type of business have a significant impact on a firm's profitability and the human resource accounting practices.

Kaplan and Norton (2004) argue that human capital is a leading indicator and the primary source of value generation for businesses, using balanced scorecard language. Improvements in human capital performance will have a favourable impact on internal processes, customer satisfaction, and financial results (Khan, 2021; Gaur *et al.*, 2021; Choudhary *et al.*, 2019).

The major factors of production in economics are land, labour, capital, and entrepreneur (Siddiqui, 1996). The financial statements of an organisation are composed of several assets like land, building, and machinery along with investment in the capital which constitute the major portion of an organization's financial account. On the contrary, intellectual capital, human resource expertise, labour and entrepreneurial potential have been paid too little importance as many of these items cannot be expressed in monetary terms. As a result, they merely act as a cost against the earnings of an organisation (Abubakar, 2006; Glautier, 1974; Sharma and Khatik, 2017). The two major intellectual capitals or resources that organisations must have included are efficient labour force and entrepreneurs.

Human Resource Accounting (HRA) is the technique that recognizes, documents, and reports investments of an organization on such human resources that have largely been ignored both in the human resource management system and a part of traditional accounting processes (Sharma and Khatik, 2017; Pala, 2021; Bhattacharjee *et al*., 2017; Shukuhian, 2018). To put it in a different way, it is just an extension of the current "expense recognition principle" or "Matching Principles" which demand revenue to be matched with costs paid to produce a certain level of revenue, as well as data management to convey important information. This attempt to measure the value of Human Resources aids managers in adapting to changes in their quantity and quality so that a balance may be struck between the resources necessary and the benefits received from them. Human Resource Accounting is described by the American Accounting Association (1973) as "the process of identifying, measuring and communicating information about human resources in order to facilitate effective management within an organization". Human capital is defined as the knowledge that individuals acquire during their lives and use to create goods, services, or ideas in both market and non-market circumstances. Again, HRA is described as the process of identifying and measuring human resources with the purpose of empowering an organization's successful management practices.

Olayinka and Olayiwola (2017), in their empirical research, used data from Nigerian Stock Exchange listed manufacturing firms to analyse human resource costs and financial performances. The results demonstrated that the measure of human resource costs have a positive and significant influence on financial profitability, inferring that capitalisation of human resource investment in annual reports resulted in the potential to boost corporate earnings. Similar, observations were also confirmed by many researchers by claiming that human resource accounting is playing an important role in the performance of any industry sika *et al*., 2017; Amahalu *et al*., 2017; Shukuhian, 2018; Shukuhian and Ashraf, 2019; Khan, 2021; Gaur *et al*., 2021)

Young *et al*., (2019) in their study to investigate the impact of human resources development on operational and financial performance of manufacturing firms collected secondary data collected from 207 manufacturing companies over a period of five-years. The study claimed that investment and managerial support for HRD found to have direct impact on the performance of the business. They, further, suggested that large commercial banks should be fundamentally be advised to include human resource costs of capital in their asset structure, while revenue expenses should be made to improve the quality of information, which would have a favourable influence on the banks' share price.

The concept of total cost of productivity for any organisation can be established through the contribution made by each activity to its net profit. Harvard and Upton (1967), explained profitability in terms of the efficient utilization of different resources such as money which is required to acquire all other resources like man, material, method etc. therefore, efficient and optimum utilization of every resource. Similarly, profitability is not only the outcome of efficient management practices but also an attribute to intangibles like creation of goodwill, trademark, global recognition, etc. As a result, the net profit exhibits a striking balance between the value received and the value expended by the business. According to Riganto (2001), the higher the return on assets, the better will be the performance, since the higher valued and quality assessed is certainly give rise to higher returns on investment.

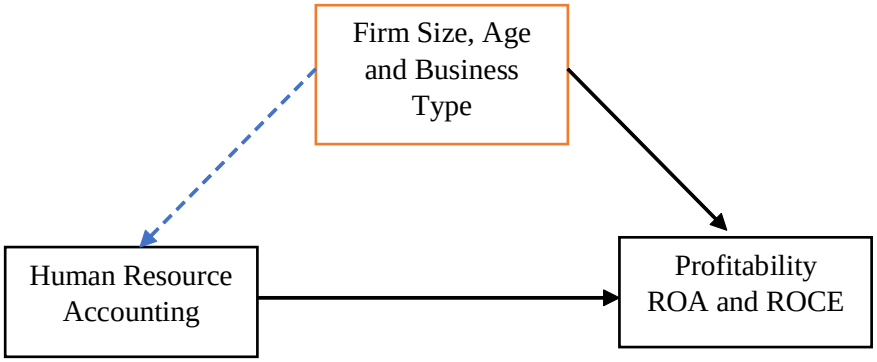

Figure 1: Conceptual Framework of the Study

Source: Authors' Own Compilation

3. Objectives and Hypotheses of the Study

3.1. Objectives of the Study

In light of previous reviewed literature, the purpose of this study is to determine the extent to which human resource accounting influences the profitability of select small-scale enterprises in Odisha. The study's main objectives are as follows:

- To examine the practices of human resource accounting in the small-scale industries in Odisha.
- To verify the impact of human resource accounting on the financial profitability of the selected small-scale industries.
- To investigate how the organisational specific factors like size, age and business type affects the human resource accounting and profitability.

3.2. Hypotheses of the Study

Following are the null hypotheses of the study.

H_{01}: There is no significant impact of HRA on the profitability of the small-scale industries.

H_{02}: There is no significant relationship exists between the type of business and financial performance of the selected firms.

H_{03}: There is no significant impact of the firms age on the financial performance.

H_{04}: There is no significant impact of the size of the small-scale industries on their financial performance.

H_{05}: There is no significant impact of the number of skilled employees on the financial performance of the firms.

4. Research Methodology

This study aims at verifying the influence of human resource accounting practices and its impact on the financial performance of 30 select small-scale industries located in Odisha. This study is quantitative

in nature and secondary financial data has been collected for five years starting from 2016-2020 of the 30 small scale industries out of which 15 each from service and manufacturing sector. The selection of the industries has been done using judgmental and referral sampling method. The measurement of HRA has been done by adopting the cost-based approach which has been widely used by the researchers to access the accounting cost and benefits, along with the opportunity cost i.e., the cost of not recruiting a competent employee associated with human resource (Amahalu *et al.*, 2016; Eze and Chiamaka, 2016). HC, RC and SC are the actual historical costs that can collected from the books of account, whereas, OC is the cost of not recruiting a competent employee for particular job is a proxy variable taken as 'minus one' if no competent employee has been recruited or available in the particular department in the year under study. It is purely based on the response collected from the management of the organisations under study. Measurement of the dependent and independent variables utilised in the research has been provided in Table 1.

Table 1: Variables in the Study

Variable	*Measurement*
Human Resource Accounting (HRA)	Log (HC+RC+SC+OC) (Amahalu *et al.,* 2016)HC=Cost of Recruitment of a personnel RC=Cost of Replacement of personnel, SC= Cost incurred for Training and Development purpose + Compensation paid per year, OC= Cost of not recruiting competent personnel
Return on Asset (ROA)	Net Profit After Taxes/ Total Assets
Return on Capital Employed (ROCE)	Earnings Before Interest and Taxes/ Capital Employee (CE)
Size of the Firm (FS)	Log (Total Asset)
Age of the Firm (FA)	Log (Current Year-Establishment Year)
Type of Business (TB)	Proxy of TB of 1=Service, 2=Manufacturing,
Number of Employees (NE)	Log of number of skilled employees working in the organisation during the study year.

Source: Authors' Own Interpretation

The functional relationship between the dependent and independent variable, with the mathematical representation for the proposed regression models has been provided below:

$$ROA_t = f\ (HRA_{it}, FS_{it}, FA_{it}, TB_{it}, NE_{it})$$

$$ROCE_t = f\ (HRA_{it}, FS_{it}, FA_{it}, TB_{it}, NE_{it})$$

The above functions can be expanded as the following regression equations

$$ROA_t = \beta_{it} + \beta_1(HRA_{it}) + \beta_2(FS_{it}) + \beta_3(FA_{it}) + \beta_4(TB_{it}) + \beta_5(NE_{it}) + \varepsilon_{it} \quad (1)$$

$$ROCE_t = \beta_{it} + \beta_1(HRA_{it}) + \beta_2(FS_{it}) + \beta_3(FA_{it}) + \beta_4(TB_{it}) + \beta_5(NE_{it}) + \varepsilon_{it} \quad (2)$$

Where:

ROA_t = Return on Asset for the year 't'

$ROCE_t$ = Return on Capital Employed for the year 't'
HRA_{it} = Human Resource Accounting for the year the company 'i' and year 't'
FS_{it} = Firm Size for the year the company 'i' and year 't'
FA_{it} = Firm Age for the year the company 'i' and year 't'
TB_{it} = Type of Business for the year the company 'i' and year 't'
NE_{it} = Number of Employees in the organisation for the year the company 'i' and year 't'
β_{it}= the constant or intercept of the regression equation
ε_{it}= is the error term called the standard error of the regression equation

5. Result Analysis and Discussion

The study basically aims at understanding how the cost associated with human resource is affecting the financial performance of the small-scale industries in Odisha. For this purpose, we have selected 30 small scale industries operating in the province of Odisha out of which 15 are in the service sector and 15 are in manufacturing sector. The descriptive statistics of the test variables is provided in Table 2. It can be observed that the financial year for which the financial information has been collected ranges between 2016-2020. The ROA of the selected companies having mean value of 0.143 with standard deviation 0.455 and it ranges between -0.690 and 0.519. Similarly, the ROCE of the selected industries ranges between-0.533 and 0.526 with a mean of 0.114 and SD of 0.126. It can be said that the ROCE is more consistent compared to the ROA of the selected firms. Further, the measure of HRA which has been transferred to its log equivalent shows a mean value of 0.148 and SD of 0.310. Size of the firms in terms of the assets size converted to its logarithm equivalent shows a mean value of 0.213 and SD of 0.206. The age of the selected industries ranges between 9 and 25 years with a mean value of 14.678 and SD of 3.674. As such, the maximum number of employees in the selected industries is 24 and the minimum number of skilled employees working is five. The mean value of the average number of employees working in an organisation is 8.315 with a standard deviation of 2.209.

Table 2: Descriptive Statistics (N=30)

Variables	*Mean*	*SD*	*Minimum*	*Maximum*
FY	2018	1.414	2016	2020
ROA	0.143	0.455	-0.690	0.519
ROCE	0.114	0.126	-0.533	0.526
HRA	0.148	0.310	3.293	3.023
FS	0.213	0.206	0.690	1.640
FA	14.678	3.674	9.000	25.000
TB	1.500	0.500	1.000	2.000
NE	8.315	2.209	5.000	24.000

Source: Authors' Own Compilation

Table 3 given below presents the correlation matrix of the dependent and independent variables in the study. It can be observed that there is a very high correlation between the two dependent variables ROA and ROCE with r = 0.802. Similarly, a high correlation can also be observed between the HRA and NE as with increase in the number of employees the HRA is going to be directly affected. TB is found to be negatively correlated with the other variables. Most importantly there is a significant correlation between the dependent and independent variables but no multi-collinearity issues are observed. To verify the multicollinearity issue among the independent variables we have estimated VIF (Variance Inflation Factor) which indicate that there is no multicollinearity issue among the independent variables as the VIF is below the limit of five (Kutner *et al.,* 2004; Sheather, 2009).

Table 3: Correlation Matrix

	ROA	*ROCE*	*HRA*	*FS*	*EA*	*TB*	*NE*	*VIF*
ROA	1							2.803
ROCE	0.802**	1						2.262
HRA	0.649**	0.562**	1					1.208
FS	0.479**	0.293**	0.415**	1				1.235
FA	0.393**	0.371**	0.346**	0.088*	1			1.176
TB	-0.559**	-0.302**	-0.263**	-0.387**	-0.151**	1		2.262
NE	0.426**	0.460**	0.747**	0.217**	0.112*	0.156**	1	2.803

Source: Authors' Own Compilation

The panel data collected from the 30 companies and for five years lead to a total sample size of 150 company-years. Fixed and random effect regression model has been developed to verify the cause-and-effect relationship between the dependent and independent variables. The random effect model, given in Table 4, indicates the impact of all the five independent variables and its impact on ROA and ROCE shows a significant relationship. However, the impact of TB is negative and indicates an inverse relationship between the type of business and the profitability of the firms where manufacturing firms are making less profit compared to the service-oriented industries. Further, the value of R and R-square is impressive to infer that HRA is a significant factor which has a considerable role in affecting the financial performance of the small-scale industries.

Hausman's test gives in Table 4 is a deciding element for the appropriateness of the models (Hausman, 1978). Houseman's test is based on the null hypothesis that "the random effect model is appropriate". When it gives a significant value ($p<0.05$) for the Housman's Chi-square, the null hypothesis has been rejected and can be confirmed that the fixed effect model is appropriate. Therefore, for the final inference, the fixed effect model has been given in Table 5 is appropriate.

Table 4: Panel Regression: Random Effects Model

	Dependent Variable: ROA				*Dependent Variable: ROCE*			
Variable	*Co ef.*	*S.E.*	*t*	*Prob.*	*Co ef.*	*S.E.*	*t*	*Prob.*
C	0.100	0.113	0.883	0.378	0.125	0.055	2.268	0.024
HRA	0.322	0.057	5.601	0.000	0.206	0.060	3.454	0.001
FS	0.262	0.109	2.402	0.017	0.874	0.230	3.794	0.000
FA	0.048	0.014	3.431	0.001	0.104	0.028	3.635	0.000
TB	-0.057	0.018	-3.079	0.002	-0.066	0.010	-6.935	0.000
NE	0.036	0.082	0.443	0.658	0.122	0.041	2.965	0.003
Effects Specification	S.D.	Rho			S.D.	Rho		
Cross-section random	0.082	0.118			0.054	0.278		
Idiosyncratic random	0.224	0.882			0.088	0.722		
Weighted Statistics								
R^2	0.357				0.422			
Adjusted R^2	0.348				0.178			
S.E.	0.234				0.089			
F	40.211*				11.966*			
Durbin-Watson stat	1.504				1.582			
Correlated Random Effects - Hausman Test								
Chi-Sq. Statistic	50.546				23.157			
Chi-Sq. d.f.	5				5			
Prob.	0.000				0.002			

Source: Authors' Own Compilation

* Significant at p-value 0.001

Table 5: Panel Regression: Fixed Effects Model

	Dependent Variable: ROA				*Dependent Variable: ROCE*				*Hypothesis*
Variable	*Co ef.*	*S.E.*	*T*	*Prob.*	*Co ef.*	*S.E.*	*t*	*Prob.*	
C	0.514	0.204	2.521	0.012	0.296	0.080	3.707	0.000	
HRA	0.366	0.053	6.935	0.000	0.305	0.060	5.124	0.000	H_{01}-Rejected
FS	0.549	0.178	3.086	0.002	0.786	0.375	2.096	0.037	H_{04}-Rejected
FA	0.238	0.060	3.948	0.000	0.069	0.021	3.252	0.001	H_{03}-Rejected
TB	-0.151	0.042	-3.588	0.000	-0.529	0.200	-2.648	0.008	H_{02}-Rejected
NE	0.584	0.171	3.415	0.001	0.292	0.067	4.371	0.000	H_{05}-Rejected
R^2	0.527				0.563				
Adjusted R^2	0.478				0.518				
S.E.	0.224				0.088				
F	10.608*				12.276*				
Durbin-Watson stat	1.655				1.757				

Source: Authors' Own Compilation

* Significant at p-value 0.001

From the fixed effects model, it can be inferred that HRA is a significant predictor of the financial performance of the small-scale industries measured in terms of ROA and ROCE. This finding also supports the earlier studies that claimed a direct relationship between HRA and financial performance (Asika *et al.*, 2017; Amahalu *et al.*, 2017; Shukuhian, 2018; Shukuhian and Ashraf, 2019; Khan, 2021; Gaur *et al.*, 2021). Similarly, the other variable like the firm's size is significantly predicting the ROA with β =0.594 and t-value =3.086 which is statistically significant when p-value is less than 0.01. Also, the Firm Size (FS) is significantly predicting the ROCE of the firms with β=0.786 and p-value 2.096. Further, the age of the firms are found to have a significant bearing on the performance. Several studies on different organisations have also revealed the fact that the firms age and size have a direct relationship with the financial performance (Amahalu *et al.*, 2017; Shukuhian, 2018; Khan, 2021). Again, type of business which has two categories shows an inverse relationship with ROA and ROCE which is only due to the proxy representation of service firms as 'one' and manufacturing firms as 'two'.

Manufacturing firms with large assets size show a low level of profitability compared to the service industries with a large employee base and need more investment in human capital than other tangible assets that make more profit. Thus, interestingly, the entrepreneurs who enter into the service industries have a comparatively higher profit-making potential than the manufacturing industries. However, the additional profit in the service sector is largely due to their huge investment in the intellectual capital and human resource accounting practices that ensure increased profitability. On the other hand, in manufacturing industries the role of intellectual capital though essential but need not be updated regularly and frequently to match the current market needs. Therefore, the investment in human resource accounting is comparatively less in the manufacturing industries. The number of skilled employees working in an organisation is also found to have a significant impact on the profitability which has been confirmed from the regression results with a p-value less than 0.05. More number of skilled employees with regular training and development programmes in the organisation essentially needs more investment in human resource development in absolute terms. Further, retention of skilled employees is also a costly affair for the organisations irrespective of the type of business. Thus, it can be suggested that every firm should not only invest judiciously in the development of human capital but also have regular appraisal of the outcomes received from the investments. Based on the above observations, the entire five-null hypothesis (H_{01}, H_{02}, H_{03}, H_{04}, H_{05}) have been rejected at p-value less than 5%.

6. Implications of the Study

This research entails analysing many indicators of success in an organisation by evaluating the regression model. Whereas some other qualitative and quantitative aspects like the major contributions by the employees towards the organisation, cost and benefits ratio of recognition and reward have been added to the model while evaluating the human resource accounting to further improve the overall efficacy of the model. Furthermore, it would be critical to understand how the suggested framework differs in companies from various contexts. As a result, comparison among companies of different category and across nations might reveal new information about the

various aspects that influence organisational effectiveness through proper management of human resource accounting.

Besides the above theoretical implication on the scope of further development of the model, it also has some practical implications in the industrial setup. From the findings of this study, it is clear that good HRA implementation and practices will result in considerable benefits to the financial performance of the small-scale businesses. This research helps SMEs, particularly the human resource departments, and corporate decision-makers to grasp the concept of Human Resource Accounting better and how it might be helpful them to improve to their financial statements.

7 Conclusion

From the study it is confirmed that human resource accounting is a very important aspect of small-scale industries because it has a direct impact on the financial performance. Though, this type of business has a strong bearing on the profitability the dependency of any organisation on its human capital cannot be ignored. There is no doubt that the accounting bodies such as; the Indian Accounting Standards Board (Ind-AS), the International Accounting Standard Board (I-ASB), the International Federation of Accountants (IFA) along with other national and international bodies should float provisions and guidelines relating to the maintenance and disclosure of Human Resources Accounting practices while preparing the financial statements. At a micro level, i.e., in case of companies that are not listed in the stock exchange or the startups, basically the small-scale industries need to maintain proper human resource accounts to ensure elevated financial performance. Thus, it is recommended to the small-scale industries to invest strategically in improving their human capital with a tap on the outcome from such investments. This is possible only with proper and efficient implementation of human resource accounting where every cost and benefit aspect of human resource should be identified, recorded and reviewed to ensure better performance.

8. Limitations and Future Scope for Research

The study has certain core limitations relating to the data and scope of the research. This paper is a part of the doctoral thesis which is specifically studied the human resource accounting practices in the small-scale industries located in Odisha. Thus, the first limitation of the paper is related to its scope of coverage of industries which only concentrate on the small-scale service and manufacturing industries located in Odisha and ignored the micro and medium sized industries. Secondly, the study managed to collect the financial data for five years because in many small-scale industries rarely have data which is older than five years which restricts the inclusion of many small-scale industries in the survey. Finally, the study provides information base for further studies in the small-scale industries where many industries are suffering due to lack of proper account maintenance and moreover, accounting relating to the maintenance of different components of human resource accounting is poor. Hence, further research can be carried out on the four components (HC, RC, SC, & OC) to analyse which component has a significant impact and need to be looked into on a priority basis.

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Corporate Social Responsibility Initiatives in Different Indian Business Sectors: A Comparative Testing Approach Using Firm Size Metric

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Corporate social responsibility, Industrial sector, Firm size, One-way ANOVA, CSR dimension

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Abstract: The current study aims to detect any significant relationship between corporate social responsibility (CSR) score and type of industrial sector to which sampled companies belong, and to assess how this relationship tends to change with the size of the firm. Application of One-way ANOVA for the six-year time period, i.e. from 2014-15 and 2019-20, has reported that CSR disclosure of all industrial sectors does vary and such differences in CSR scores are highly apparent in small firms with one sector reported significantly higher disclosure than the other. In fact, such sectoral CSR dissimilarities have been gauged size-wise as well in the contextual spheres of environmental, community development, and employee relations categories, for example, CSR disclosure of power and electricity generation is significantly greater than that of minerals, metals & mining in case of environment and sustainability dimension. Overall, small companies need to put greater focus on carrying out and reporting of CSR activities keeping in mind the expectations of all stakeholders.

1. Introduction

CSR ensures to upgrade the well-being and social upliftment of the community as a whole by emphasizing upon the triple bottom line covering 3Ps as Profit, People and Planet. The pyramid of CSR essentially embraces ethical considerations in building product responsibility, legal accountability towards environment and labour relations, philanthropic outlook in the direction of human rights and society along with reflection on economic aspects. To construe corporate social responsibility in a philanthropic sense is not recommended at all as it constitutes the essential business technique of the companies which aims to bring alignment between financial, ecological and social objectives under the umbrella of its strategic policy framework (Kakade, 2019). To be more specific, corporate social responsibility (CSR) refers to strategies that companies put into action as part of corporate governance

that are designed to ensure the company's operations are ethical and beneficial for society. A mandated CSR policy has recently been framed in Indian context too by way of incorporated in Companies Act 2013 which was effective from the year 2014-15 with the intendment that such policy should strengthen the national agenda of developing nations (Mitra, 2021).

As per the notice released by Ministry of Corporate Affairs (MCA), Section 135 under Schedule VII of Companies Act (2013) furnishes that each organization in India with a total asset holding exceeding or equals to five hundred crore rupees or an annual sales of exceeding or equals to Rs 1000 crores rupees or a net profit of more than or equals to Rs 5 crore rupees for any one financial year is required to establish a Corporate Social Responsibility Committee. This committee maintains that the said company shall, for each financial year, spends minimum two percent of its average net profits belonging to the three immediately preceding financial years, in the furtherance of its Corporate Social Responsibility Policy. CSR activities presently spread across a wide scope of zones including environmental protection and biological protection. A noteworthy test before business houses in the corporate region is to advance CSR systems that help in accomplishing the ideal yield in terms of expanded social credibility (Fakay and Buragohain, 2015).

CSR is mainly driven by several triggers including streamlining economic esteem, developing brand image, conformance with governing laws and regulations, hostile labor markets, charity and welfare, need of designing vigorous social strategies, growing moral consumerism, market integration and globalization, increasing social cognizance, association between the partners etc (Kakade, 2019). To describe in a broader sense, CSR reporting exhibits companies' endeavors towards their operations in host and other countries in order to be viewed as responsible corporate citizens therein and thereby promote their expelling reputation (Marfo *et al.*, 2015).

2. Review of Literature

CSR disclosure deals with supplying information by the firms on environmental and social performance criterions (Gamerschlag *et al.*, 2011).Numerous investigations have been initiated to compare CSR practices, for example, a study by Kakade (2019) reported that ITC and HUL are perceived to be the most responsible companies among the group. HUL s Project Shakti and ITC s e-choupal programs had the highest top of the mind recollection, with a sizeable percentage of respondents being able to recall the name of the program. Further, Ranjan and Tiwary (2017) had suggested in their work and revealed that there has been shift in the focus from profit making to societal service in the Indian corporate world. Social responsibility initiatives are important for a company as commitment to social responsibility enhances the goodwill of the company, the investors' confidence and a favorable corporate image. In fact, the company's brand is not only contingent on the product's quality rather upon the overall effect posed by the company's activities towards society, environment, and the economy (Dhawan and Samantara, 2020).

Adding to the above, it denotes the essence of corporate social responsibility. Findings revealed that CSR spending on human resources promotes employee satisfaction, reduces labour turnover and enhances quality production but the current CSR activities are restricted to education, health and rural development only with little focus on sports, talent search and other socially desirable phenomenon.

While reporting the outcomes from KPMG survey 2018, it is the energy and power whose CSR spending is maximum (in crores) followed by BFSI, IT consulting sector and mining and metal (Kakade, 2019). In addition, Kulkarni and Rao (2014) conducted comparison of the CSR practices across India and Africa by classifying the practices through coding in content analysis for locating the key practices in the context of Automobile industry by referring the disclosures contained in Global Reporting Initiative (GRI) reports. It observed that CSR activities were nearly similar on the economic and philanthropic grounds, which are lying on the lower area of Carroll's CSR pyramid. However, the legal and ethical frameworks (on the upper area of Carroll's pyramid) had appeared to be somewhat varied in these selected countries. While examining the CSR perspectives in pre and post Companies Act period, Saha (2017) has ferret out that in the pre-Companies Act, an industry-specific outcome can be noticed for IT sector only pertaining to CSR disclosure in all dimensions except the area of product responsibility. However, when it comes to the analysis of post-Companies Act era, several industry-oriented outputs had been generated with regard to CSR disclosure by companies. It is interesting to note that an industry-specific result in IT has been yielded across CSR parameters of labour practice, human rights and product responsibility whilst an industry-specific output obtained in pharmaceutical is related to the aspects of environmental disclosure. Furthermore, pharmaceutical, IT and energy industry-oriented results have also been found for human rights disclosure. Contrary to it, Marfo *et al.* (2015) observed no difference in the extent of CSR reporting between the various industry groupings using 5 percent significance level which includes distribution and transport, banking and finance, main investments market segment, mining and manufacturing, agro processing and food and beverages and alternative investment market segment.

Supplementing the above discussion, Bala and Singh (2014) has laid emphasis on identifying and studying CSR practices being followed in private sector Indian corporates, public sector companies and multinational corporates. It viewed that private sector companies highly prefer to focus on employee satisfaction practices along with implementing measures for ensuring product safety and maintaining quality standards. However, MNCs tend to pay greater attention on operate its functioning under the ambit of legal compliance regulations and standards like labour laws. Further, the focus of public sector companies is much observed towards employee welfare programs. In fact, as regards conservation of natural resources and implementing pollution control measures, all the companies were found to be involved in it. Moreover, it was inferred that there is no significant mean differences of public sector companies, private sector companies and multinational corporations for practicing CSR practices.

However, the core variation exists in assigning priorities to various CSR initiatives. In this light, Ranjan and Tiwary (2017) stated that with the advent of globalization there is change in social obligation philosophy of a business with private ownerships, multinational companies and public domain companies operating simultaneously in the economy. In addition, in an attempt to match corporate social responsibility (CSR) initiatives by the Indian corporate sector with the Sustainable Development Goals (SDGs), Podder *et al.* (2019) realized that more CSR investments are warranted in the direction of biodiversity, climatic variations, ensuring sustainable consumption and production, protection of flora and fauna and sustaining marine life. Further, it suggests the requirement of more CSR expenditure in seven north-eastern states, Jammu and Kashmir and Union Territories. Among the corporate groups

analyzed in India, it can be highlighted that Tata group has occupied first rank in dynamically undertaking CSR practices in India (Kakade, 2019).

In addition, Sharma and Kundu (2014) highlighted the current trends in social spending by specific business houses on the selected parameters like development of infrastructure, ecological conservation, promotion of education, health education etc. The study found that almost all the companies have initiated the corporate social obligations and sustainable development efforts but it has been discovered that the spending of private sector companies has been erratic i.e. more in few areas of their choice and less in the majority area that should otherwise be prioritized. It concluded that CSR spending should be in line with the national economic needs like the development of backward areas. Moreover, it is important to realize that not all the industries generate similar quantum of pollution, following equal severity of environmental regulations and carry same risks relating to environmental liability (Banerjee *et al.*, 2003). In fact, some of the industrial sectors possessing higher environmental influence making them distinct from the others (Wang *et al.*, 2016).In fact, these companies lay more importance on undertaking CSR initiatives (Podder *et al.*, 2019).

Further, Dabic *et al.* (2016) is of the view that there is lesser amount of research focus on industry-specific CSR practices and highlights the future scope of CSR studies in this direction, especially in the spheres of electricity provisioning and automotive industries. In light of COVID-19 pandemic, companies are moving forward to facilitate assistance in excess of their targeted CSR budgets, and adoption of new measures like modifying their logos, tagline or broadcasting advertisements to create awareness about the precautionary measures to combat this virus (Upadhyay and Rathee, 2021). Drawing upon the loopholes extracted from the above literature, the current research investigates the position of Indian companies in relation to corporate social responsibility with the aim to analyze whether CSR is an integral element of fundamental business structure of selected industry-specific sectors operating in India.

3. Objectives and Hypothesis of the Study

3.1. Objectives of the Study

In particular, the core intendment of the study is to achieve the following research objectives:

- To conduct the comparative analysis of corporate social responsibility scores of sampled corporates across selected sectors in India.

The above objective can be achieved by analyzing the following sub-objectives of the study:

- To identify major components of CSR initiatives reported by sampled companies and
- To judge the significant dissimilarities or uniqueness in undertaking CSR practices between selected sectors (with special attention to their size).

3.2. Hypothesis of the Study

The core hypothesis of the present study states whether the corporate social responsibility scores of sampled corporates vary across selected sectors in India.

4. Research Methodology

4.1. Sample Selection Criterion

The current sampling structure adopts two-fold criterion. Firstly, the sample of the study must correspond to six selected sectors namely, Information Technology (IT), Minerals, Metals and Mining (MM&M), Chemicals and Fertilizers (C&F), Oil and Petroleum (O&P), Power and Electricity Generation (P&EG) and Automobile (AM) sector. Secondly, the companies selected must be top Bombay Stock Exchange listed companies derived on the basis of market capitalization as on 31st March, 2020 after ranking them by sorting into descending order.

Relying on the above two criterions, the sample has been extracted in the manner that top BSE companies must belong to 6 selected sectors in the study. While selecting the sampled companies, banks, insurance companies and companies representing other sectors have also been excluded.

4.2. Population and Sample Size

Since the entire sample set represents the population of all BSE-listed companies, a total of top 118 companies have been finally included in the sample. This sample ultimately represents 708 (118*6) observations covering time span of six financial years ranging from 2014-15 to 2019-20.

4.3. Size-based Sample Classification

Where the number of total selected firms representing one sector in the overall sample is even, then top half has been termed as large firm sample and other half represents the small firm sample. However, if this number turns out to be odd (such as in MM&M (21), O&P (23), C&F (19) and AM (15)), then the respective number is split into half and the additional decimal proportion of the number has been adjusted into the lower half (i.e. small firm sample) (For example, in MM&M $N/2 = 21/2 = 10.5$ firms, wherein 10 has been covered under large firm category and remaining 11 will be constituted as part of small firm sample).

4.4. Period of Analysis

The current data analysis has covered the testing of CSR practices for six-year time period i.e. from 2014-15 and 2019-20. The major reason of selecting 2014-15 as the starting time point is that it denotes the financial year which marks the year immediately after the enactment of Companies Act, 2013. Further, it is important to have an in-depth comprehension of the data to make it capable for drawing future inferences. In this light, since larger data sets help in generating deeper insights, therefore six-year span has been considered sufficient which results into a set of 708 observations.

4.5. Data Sources

In order to draw empirical inferences pertaining to CSR initiatives among different industrial spheres, secondary data sources have been referred to. These sources primarily include the following:

- Annual reports of the companies (CSR data)
- Corporate social responsibility reports of companies.

- Corporate social responsibility initiatives reported in company websites.

The above reports have been gathered from Prowess Database (CMIE), company websites (company-specific information).

4.6. Construction of CSR Index

The present study has developed CSR index comprising of 33 items which have been classified into four heads (no. of items in each head), i.e. 'Environment and Sustainability' (8), 'Community Engagement and Development' (10), 'Employee Relations' (9)and 'Consumer and Products' (6).

4.7. Statistical Technique Employed

For the purpose of data testing, One-Way ANOVA has been employed. This technique is used to determine whether there are any statistically significant differences between the means of two or more independent (unrelated) groups (although you tend to only see it used when there are a minimum of three, rather than two groups). It is important to realize that the one-way ANOVA is an omnibus test statistic and is unable to explain which specific groups were statistically significantly different from each other. Since there are six (or two- firm size) industry-based groupings in the study design, it becomes imperative to analyze which of these selected groups are significantly different from each other, for which Posthoc testing has been applied (see below).The null hypothesis framed under One-way ANOVA is:

There is no difference in the population means of the different levels of factor A (i.e. industry groups). Herein,

H0: $\mu 1 = \_ \_ \_ = \mu 6$ (which states that all of the population means are equal)

For one-way ANOVA,the alternative hypothesis reflects that at least one of the k population means is different from all of the others. Herein,

HA: $\mu 1 \neq \mu 6$(which indicates that the population means are not equal, i.e. there is statistically significant difference between the industry groups.

It is important to mention that the entire data testing has been performed by employing PASW Statistics Software Package using Version 18.

4.7.1. Testing of Assumptions: Levene Statistic

The study utilized the Levene statistic measure in order to test the assumption in one-way ANOVA, the null hypothesis of which states that the variances are homogeneous in nature. However, where the null hypothesis has been rejected at 5 percent significance level, Welch ANOVA has been applied which is also labeled as 'Robust Tests of Equality of Means'.

4.7.2. Application of Posthoc Test

Since one-way ANOVA reports overall significant results, therefore Posthoc follow up testing has been performed to judge which of the groups under statistical testing are turned out to be significantly different. For this purpose, Tukey's Honest Significant Difference (HSD) test (a multiple comparison

test) has been employed to compare the group means which are significantly different from the other (in pairs) by controlling the error rate (on experimental basis) and is used in situation where variances are assumed to be homogenous. However, where this assumption has not been met, second level testing has been made with the help of Games-Howell test measure.

4.8. Specification of Variables

The dependent variable in one-way ANOVA is CSR score of item/variable contained in developed CSR index whilst six industrial sectors represent independent variable under the data analysis. Under dimension-based analysis, dependent variable represents CSR scores of four selected dimensions, i.e. Environment and Sustainability', 'Community Engagement and Development', 'Employee Relations 'and 'Consumer and Products' which are analyzed one by one and again six sectors are taken as independent variable. It has been ensured that the dependent variable is a continuous variable and the independent variable in ANOVA must be categorical in nature. Under overall CSR testing, overall CSR score is used as dependent variable and sectors is taken as an independent variable. Similarly, in size-based testing, firm size/sectors used as independent variable and overall CSR score/dimension-wise CSR score are dependent variables.

5. Data Analysis

Following results have been yielded from the statistical analysis:

5.1. Item-wise CSR Disclosure Testing

The core research outcomes have reported that with the application of One-way ANOVA significant differences at 5 percent level are revealed for four items in the category of 'Environment and sustainability' dimension namely- 'ISO-based certification', 'Utilization of renewable energy resources', 'Preservation of water and electricity resources', 'Tree plantation practice'. Items such as 'Recycling and management of wastes' and 'Decline in greenhouse effect' have come out to be significant just at ten percent level meaning thereby the variation in mean scores of these two items is weak across six sectors. Outcomes have also reported that mean CSR score is statistically different (at weak i.e. 10 percent significance level) for CSR practices namely 'Vocational Guidance' 'Road Construction and Infrastructure' in the 'Community Engagement and Development' category. One CSR practice i.e. 'Contribution towards charity and donation' under this dimension has very closely brushed the limit of statistical significance. The significance level improved from 10 to 5 percent for items such as 'Women Empowerment Initiatives', 'Providing assistance in natural disasters' and 'Education to Poor and Under-privileged' and from 5 percent to 1 percent level in case of drinking Water and Sanitation Practice'. As regards Employee Relations category, the analysis is able to achieve one percent significance level for three items as 'Health and Security to the Employees', 'Medical facilities to the family of employees', and 'Adoption of Gender Equality and no Discrimination Policies'. The significant level found to be reduced at 5 percent level for CSR practice namely 'Leadership programmes for employees' and further at 10 percent level for 'Organizing training and development programmes'.

However, for 'consumer and products' category, no significant relationship has been observed for four out of six items (Designing Green and Eco-Friendly Products, Provisioning of After Sale Services, Product Safety and Quality Enhancement, Enhancing Customer Satisfaction) meaning thereby that all the six sectors have implemented nearly similar CSR practices with almost similar CSR scores, thus failed to indicate the statistically significant relationship. Even for remaining two items (Product Innovation and Redressing Consumer Queries) in this category, only weak evidences have been observed.

Table 1: Comparative Analysis of CSR Practices between Selected Sectors- Results of One-way ANOVA

Variable		*Df*	*F*	*Sig.*
ISO based certification	BG	5	3.67	0.037
	WG	702		
	Total	707		
Recycling and management of wastes	BG	5	2.85	0.062
	WG	702		
	Total	707		
Utilization of renewable energy resources	BG	5	3.42	0.039
	WG	702		
	Total	707		
Adoption of e-conferencing modes for conducting meetings	BG	5	1.56	0.192
	WG	702		
	Total	707		
Preservation of water and electricity resources	BG	5	3.27	0.047
	WG	702		
	Total	707		
Implementation of pollution control practices	BG	5	1.69	0.182
	WG	702		
	Total	707		
Tree plantation practice	BG	5	4.01	0.021
	WG	702		
	Total	707		
Decline in greenhouse effect	BG	5	2.65	0.072
	WG	702		
	Total	707		
Women empowerment initiatives	BG	5	4.88	0.011
	WG	702		
	Total	707		

contd. table 1

Variable		*Df*	*F*	*Sig.*
Provisioning of health and medical services	BG	5	1.49	0.291
	WG	702		
	Total	707		
Vocational Guidance	BG	5	2.51	0.085
	WG	702		
	Total	707		
Drinking water and sanitation practice	BG	5	5.71	0.005
	WG	702		
	Total	707		
Road construction and Infrastructure	BG	5	2.99	0.081
	WG	702		
	Total	707		
Social awareness events	BG	5	0.88	0.341
	WG	702		
	Total	707		
Providing assistance in natural disasters	BG	5	3.11	0.049
	WG	702		
	Total	707		
Contribution towards charity and donation	BG	5	3.02	0.057
	WG	702		
	Total	707		
Financial support to non-governmental organizations	BG	5	1.28	0.310
	WG	702		
	Total	707		
Education to poor and under-privileged	BG	5	4.07	0.019
	WG	702		
	Total	707		
Application of Welch ANOVA:				
Variable(s)	Statistic value	df1	df2	Sig.
Health and security to the employees	5.62	5	113.33	0.004
Organizing training and development programmes	2.68	5	109.22	0.062
Provisioning of employees' accommodation or housing	1.86	5	90.13	0.178
Improved working environment	0.84	5	111.51	0.111
Medical facilities to the family of employees	9.63	5	114.96	0.000
Adoption of gender equality and no discrimination policies	6.14	5	111.55	0.003

contd. table 1

Variable		*Df*	*F*	*Sig.*
Staff welfare practices	0.79	5	76.77	0.231
Leadership programmes for employees	3.99	5	98.42	0.022
Facility of online learning	1.79	5	80.29	0.166
Designing green and eco-friendly products	0.84	5	116.66	0.111
Provisioning of after Sale services	1.86	5	129.55	0.178
Product innovation	2.73	5	111.73	0.083
Product safety and quality enhancement	1.95	5	127.98	0.132
Enhancing customer satisfaction	0.61	5	133.59	0.538
Redressing consumer queries	2.71	5	110.53	0.063

Source: PASW Statistics 18 (N= 108, 126, 138, 114, 132 and 90 for six sectors respectively)

BG = Between Group and WG = Within Group

5.2. Group-wise CSR Disclosure: Dimension-based Analysis

In additional testing, group-wise CSR score has been compared between selected sectors wherein groups represent the dimensions of Environment and Sustainability (E&S), community engagement and development (C&D), employee relations (ER), Products and Consumer (P&C) etc. Results of CSR differences among six sectors have been analyzed on the basis of four dimensions which are presented in two tables whereby table 2exhibits results of one-way ANOVA for first two dimensions (i.e. where the assumption of homogenous variances have been satisfied) and Welch ANOVA depicts findings for last two dimensions (wherein this assumption could not be met). Findings of one-way and Welch ANOVA indicates that the CSR scores across six sectors appears to be significantly different for three out of four dimensions only, including Environment and Sustainability, Community Engagement and Development and Employee relations and such significant results are obtained at 5 percent conventional significance level. However, no significant difference has been observed for last dimension, i.e. 'Consumer and Products' as its p-value could not appear to be significant. In-depth analysis showed that insignificant CSR score for 'Consumer and Products' dimension can also be evidenced from item-wise analysis wherein just two out of six items were turn out to be significant and that too be able to capture only weak significance level.

The close scrutiny of data reveals that the power and electricity generation and oil and petroleum appear to have disclosed at a higher level in the environmental direction, however this is not in case of minerals, metals and mining and automobile industry. However, minerals, metals and mining reports CSR practices mainly in the area of community involvement. The CSR disclosure of chemicals and fertilizers and automobile industries is at relatively low in all the four dimensions. As regards Information technology sector, CSR initiatives and reporting is much concentrated in the areas of 'environment and sustainability' and 'employee relations'. It is the power and electricity generation whose CSR disclosure is at balanced as well as higher level among all the dimensions. Further, the CSR reporting in 'consumer and products' dimension is almost similar in all sectors, yet it is quite low in terms of its average value relative to other dimensions.

Table 2: Results of One-Way and Welch ANOVA: Dimension-based CSR Score

Application of One-way ANOVA:

Variable(s)	*Group(s)*		*Df*	*F value*	*Sig.*
Environment and Sustainability	IT MM&M O&P C&F P&EG AM	Between Groups Within Groups Total	5 702 707	4.27	0.019
Community Engagement and Development	IT MM&M O&P C&F P&EG AM	Between Groups Within Groups Total	5 702 707	4.58	0.011

Application of Welch ANOVA:

Variable(s)	*Group(s)*	*Statistic value*	*df1*	*df2*	*Sig.*
Employee Relations	IT MM&M O&P C&F P&EG AM	5.03	5	106.55	0.014
Consumer and Products	IT MM&M O&P C&F P&EG AM	0.86	5	17.12	0.214

Source: PASW Statistics 18 (N= 108, 126, 138, 114, 132 and 90 for six sectors respectively

5.3. Additional Testing: Overall CSR Score Findings

5.3.1. Results of ANOVA

As can be depicted from table 3 below, overall CSR score has been found to be significantly different between six industrial sectors at 5 percent significance level (with p-value = 0.036). This finding

demonstrates the rejection of null hypothesis that all group population means are equal or it can be stated that alternative hypothesis has been accepted at 5 percent level of significance. It implies that the corporate social responsibility scores of sampled corporates do vary across selected sectors in India. Thus, the orientation of companies towards CSR practices differs from sector to sector, hence proving the base of the present research work.

Table 3: Results of One-Way ANOVA: Overall CSR Score

Variable	*Group(s)*	*Mean*		*Df*	*F value*	*Sig.*
Overall CSR score	IT	21.28	Between Groups	5	5.46	0.036
	MM&M	22.41				
	O&P	17.27	Within Groups	702		
	C&F	13.59				
	P&EG	26.63	Total	707		
	AM	14.69				

Source: PASW Statistics 18 (N= 108, 126, 138, 114, 132 and 90 for six sectors respectively)

5.3.2. Results of Posthoc Testing

After the application of One-way ANOVA, the adjusted p-value of Posthoc testing revealed statistical difference in CSR scores between Chemicals & Fertilizers and Information Technology, Chemical & Fertilizers and Oil & Petroleum, Power & Electricity Generation and Oil & Petroleum, Minerals, Metals & Mining and Power & electricity generation, Chemicals & fertilizers and Minerals, Metals & Mining and lastly between Automobile and Information Technology. The close inspection of data analysis reports that the mean overall CSR value is significantly higher in information technology sector relative to the chemical and fertilizers. Similarly, the analysis also provides explanation of significantly higher mean overall CSR score in power and electricity generation sector than that of mineral, metals & mining sector and oil &petroleum too. This finding affirms the results of Kakade (2019) which too reports the higher CSR spending in energy and power sector/Information technology sector relative to mineral, metals & mining/chemicals and fertilizers. Moreover, the mean values of chemicals & fertilizers (automobiles) are found to be significantly low than the values belonging to minerals, metals & mining (information technology).These significant differences support the rejection of null hypothesis in one-way ANOVA. In other words, the alternative hypothesis has been accepted using conventional levels of significance and thus, leads to the testing of another research question as to whether the firm size has any influence on the CSR-based sectoral differences generated herein.

5.4. Additional Statistical Analysis

The testing has further been extended by incorporating the effect of size and size as well as industry sector on CSR disclosure.

5.4.1. Size-based Testing

Additional size-wise testing has highlighted some interested findings wherein size of the firm has been analyzed as an influential factor in causing its impact on the sector-oriented CSR outcomes. Table 4 clearly indicates the presence of significant difference of CSR scores between large and small firms at 5 percent level (with p-value = 0.010) wherein higher mean scores are associated with large firms and vice-versa. Utilizing this ground, the data analysis has been extended to test dimension based and overall CSR sectoral differences separately for large and small firm samples.

Table 4: Results of One-Way ANOVA: Overall CSR Score and Firm Size

Variable	*Group(s)*	*Mean*		*Df*	*F value*	*Sig.*
Overall CSR score	Large Firms	24.57	Between Groups	5	4.68	0.010
	Small Firms	18.79	Within Groups	702		
			Total	707		

Source: PASW Statistics 18 (N= 342 (large), 366 (small))

Table 5: Results of One-Way ANOVA (for large firms): Dimension-based CSR Score

Application of One-Way ANOVA:

Variable	*Group(s)*		*Df*	*F value*	*Sig.*
Environment and Sustainability	IT MM&M O&P C&F P&EG AM	Between Groups Within Groups Total	5 336 341	2.09	0.122
Community Engagement and Development	IT MM&M O&P C&F P&EG AM	Between Groups Within Groups Total	5 336 341	2.79	0.092

Application of Welch ANOVA:

Variable(s)	*Group(s)*	*Statistic value*	*df1*	*df2*	*Sig.*
Employee Relations	IT MM&M O&P C&F P&EG AM	2.77	5	36.98	0.081

Consumer and Products	IT MM&M O&P C&F P&EG AM	2.18	5	22.19	0.076

Source: PASW Statistics (N= 54, 60, 66, 54, 66 and 42 for six sectors respectively)

Table 6: Results of One-Way ANOVA (for Small firms): Dimension-based CSR Score

Variable	*Group(s)*		*Df*	*F value*	*Sig.*
Environment and Sustainability	IT MM&M O&P C&F P&EG AM	Between Groups	5	8.82	0.001
		Within Groups	360		
		Total	365		
Community Engagement and Development	IT MM&M O&P C&F P&EG AM	Between Groups	5	4.94	0.012
		Within Groups	360		
		Total	365		
Variable(s)	*Group(s)*	*Statistic value*	*df1*	*df2*	*Sig.*
Employee Relations	IT MM&M O&P C&F P&EG AM	3.97	5	16.82	0.037
Consumer and Products	IT MM&M O&P C&F P&EG AM	1.69	5	28.48	0.287

Source: PASW Statistics (N= 54, 66, 72, 60, 66 and 48 for six sectors respectively)

Tables 5 and 6 explain that 'environment and sustainability' dimension could not yield statistically significant CSR differences in large firm sample, however the opposite was observed for small-firm

sample. This might be due to the fact that mostly large firms lay emphasis on reporting CSR in the context of environmental performance. In 'community engagement and development' and 'employee relations' dimension, weakly significant results are found for large firms. Contrary to it, significantly different CSR variations have emerged in small firm sample. Apart from it, 'consumer and products' is the only dimension which could attain significance in large firms only, that too at an extremely weak level.

Table 7: One-Way ANOVA (for large firms): Overall CSR Score

Variable	*Group(s)*	*Mean*		*Df*	*F value*	*Sig.*
Overall CSR score	IT	20.42	Between Groups	5	3.08	0.078
	MM&M	25.11				
	O&P	19.45	Within Groups	336		
	C&F	15.98				
	P&EG	28.95	Total	341		
	AM	17.66				

Source: PASW Statistics (N= 54, 60, 66, 54, 66 and 42 for six sectors respectively)

Table 8: Results of One-Way ANOVA (for small firms): Overall CSR Score

Variable	*Group(s)*	*Mean*		*Df*	*F value*	*Sig.*
Overall CSR score	IT	22.14	Between Groups	5	6.83	0.047
	MM&M	19.71				
	O&P	15.09	Within Groups	360		
	C&F	11.20				
	P&EG	24.31	Total	365		
	AM	11.72				

Source: PASW Statistics (N= 54, 66, 72, 60, 66 and 48 for six sectors respectively)

Supporting the above findings, ANOVA results of tables 7 and 8 witnesses the existence of sectoral CSR score differences in case of small firms at 5 percent acceptable level of significance. Although the difference is visible too for large firms, but in a highly weaker state.

6. Discussion and Managerial Implications

The findings reported herein offer suitable inferences for the corporate sector in general and for the six industrial sectors in particular, to which the current sample companies belong to. Analyzing the comparison of item-wise and group-wise CSR disclosure across selected sectors has divulged that group-wise disclosure indicates better research outcomes relative to-item-wise disclosure. It overall demonstrates the relevance of each dimension which a firm is required to pay greater attention while framing its CSR agenda.

6.1. Dimension-based Implications

The dimension-oriented CSR outcomes explains that firms are not disclosing CSR practices in the environmental, community based and employee relations' direction at the similar level in IT, MM&M, O&P, C&F, P&EG and AM sectors. For example, in case of environment and sustainability dimension, the close examination of the data has revealed that CSR disclosure of power and electricity generation is significantly greater than that of minerals, metals & mining. This observation has also been noted by Singal (2021) by highlighting that firms belonging to mining and extractive sector undertake CSR activities mainly in the social development direction by putting lesser attention on environmental sustainability. In fact, industries generating energy-based resources are found to have more overall CSR disclosure, thereby supports Gamerschlag *et al.* (2011). Continuing with the same, automobile industry could not appear to have disclosed much in the environmental direction which causes significant differences among the sectors concerned. However, this observation refutes with the argument made by Sweeney and Coughlan (2008) which expresses that automobile industry tend to have more CSR on environmental performance. It further supports Sweeney and Coughlan (2008) on the ground that oil and petroleum industry primarily focuses on environmental performance. Overall, the significant difference w.r.t. CSR commitment on environment and other allied natural issues signifies the importance of this dimension which needs to be more focused upon, the observation which has also been affirmed by Bala and Singh (2014). Further, the extreme focus of Mineral, metals and mining on community development areas also conforms to the argument addressed by Marfo *et al.* (2015).

6.2. Sectoral CSR Implications

The outcomes of significant CSR score differences among several sectoral pairs have indicated that sectors are not reporting CSR initiatives at similar level, hence the CSR disclosure of some sectors is made at quite higher level whilst some sectors are reporting at lower level, causing statistical mean differences between two. By way of additional posthoc evidences of differences in overall CSR scores between several sectoral pairs (i.e. IT and C&F, O&P and C&F, P&EG and O&P, MM&M and P&EG, C&F and MM&M, AM&IT), it is also realized that offering an ideal set of CSR activities for all listed companies cannot be an overall business solution. This finding is although in pure contrast to the study by Marfo *et al.* (2015) research's outcome which noted no significant differences between several industry groups, but supports main literature including Brammer and Millington (2003), Sweeney and Coughlan (2008), Wanderley *et al.* (2008) etc. This implies that it is the unique set of activities operating in each sector which trigger the demand of undertaking CSR initiatives that are governed by their respective CSR policy frameworks. Moreover, it is the extent of priorities which companies assign to CSR activities varies in each industrial sector while fulfilling their CSR agenda which in turn leads to significant differences between the sectoral CSR scores.

6.3. Size-oriented CSR Implications

With an increase in size from small to large, the evidence of significantly greater CSR scores have been observed. It is thereby noticed that more CSR initiatives have been disclosed in the annual reports of large companies as compared to the small firms. This argument has also been supported by many

empirical studies (Alotaibi and Hussainey, 2016; Orbaningsih, *et al.*, 2021) that there is significant positive relationship between CSR disclosure (in quantity terms) and firm size whereby increase in one will lead to increase in other. Hence, larger the size of the firm, greater will be CRS activities carried out and disclosed by the firm. It corroborates with the theory of the firm which suggests that firms need to manage their resources so as to fulfill the community-level interests by undertaking CSR activities. This study also supports previous research that stated that the larger the size of the company, the greater the pressure from the community for the activities carried out by the company (Darwis, 2009; Orbaningsih *et al.*, 2021).

The reason behind the statistically different CSR sores among selected sectors in small firm sample pointed to the fact that there is greater variation of CSR score amongst the smaller companies of different sectors with one group reported significantly higher disclosure than the other. This finding infers that small companies need to put greater focus on carrying out and reporting of CSR activities keeping in mind the expectations of all stakeholders. In fact, the finding of significant difference between CSR scores of large and small firms wherein greater CSR scores are associated with larger firms, also explain and endorse the above stated reason. In similar sense, the evidence of weakly significant (or insignificant at 5 percent level) CSR disclosure between various sectors is primarily owing to their larger size whereby large firms generally report greater disclosure on CSR activities initiated by them, due to which the analysis could not be able to capture any significant difference among the sectors in large firm group.

Overall, the present study has observed greater extent of refinement in the presentation of environmental and other social disclosure, yet the study found an evidence of substantial variations in the maturity level of CSR reporting from the lens of both content and styles adopted by the sampled firms analyzed (Jenkins and Yakovleva, 2006).

7. Conclusion

The present research facilitates the understanding of core CSR practices which can be undertaken and adopted in similar manner by Indian companies while making investments in these selected sectors. Apart from the main focus of the study, i.e. to detect any significant relationship between CSR score and type of industrial sector, it is also important to determine how this relationship tends to vary with the size of the firm. It is observed that CSR disclosure of all industrial sectors do vary and such differences in CSR scores among several sectors is highly apparent in small firms. Ultimately, the size has emerged as a crucial factor in predicting sectoral differences in disclosing CSR activities. Thus, these sectoral CSR dissimilarities have been noticed size-wise as well in the contextual areas of environmental, community development and employee relations. It can be concluded that overall CSR differences in sectors is much on the account and governed by variation in environmental, community development and employee related dimensions. In this light, it is suggested that small sized companies are required to increase disclosure in environmental, community development and employee relations background. Overall, the results inferred that in light of varying CSR disclosures, the sectoral differences must be considered by the management of the companies while diversifying their investment portfolio to other industrial sectors.

Any piece of research inquiry is not an end in itself, rather it paves the way towards exploring and achieving new research directions. As regards the present study, the sample groupings can be extended to large, medium and small-sized firms to gain better insights from the analytical CSR dataset. Further the outcomes generated are conditioned only on size-based variable, advanced level inferences can be yielded on the basis of other independent variables including, age, profitability, leverage (gearing), ownership structure etc. Moreover, the empirical investigation on six sectors can be expanded to a different set of industrial sectors to explore improved insights on the contextual settings. The inclusion of more CSR practices in the CSR index, more particularly in the 'consumer and products category' can be an incremental research direction which future CSR researchers can pursue in their academic works.

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A Comparative Performance Measurement of Select Indian Commercial Banks: Application of Balanced Scorecard Model

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Abstract: A balanced scorecard is a holistic tool of measurement which includes both tangible and intangible values of the organization for performance evaluation. The present study attempts to explore the application of the balanced scorecard to assess and differentiate the performance of select Indian public and private banks. To achieve these objectives, banks' performance is measured on the identified twenty financial and non-financial key performance indicators and has been assigned scores based on performance scales. Further, statistical tools are exerted to test the hypotheses of this study. The t-test reveals the operation of public and private banks is significantly different given customer perspectives among all perspectives of the Balanced Scorecard approach over the period. This research concludes that Indian commercial banks' performance from a financial perspective is good and needs to improve the performance of the banks related to the innovation and growth perspective of the balanced scorecard.

1. Introduction

Commercial banks are performing a pivotal role in the development of any nation. The Indian banking sector has been facing an extensive transmutation over the last few decades, like the digitalization of banking operations through mobile banking, net banking, digital wallets, online payments, transfers, etc. The banking sector also has competitive challenges such as a change in customer preference, complying with stringent regulatory compliances, increasing non -performing assets level, increasing number of private and foreign banks, losses in rural banks, etc. To overcome these challenges over competitors and meet the customer's expectations, banks must regularly measure their performance for long and short periods. The performance measurement enables the banks to develop strategies, put them into action, and predict future hurdles in their operations to face the competition.

Performance measurement has been acknowledged as an essential aspect of improving organizational performance (Taticchi *et al.*, 2010). Performance measurement evaluates in an organization how successfully the operations are monitored and managed to attain their ultimate aim(Moullin, 2007). Before 1990, the performance measurement involves traditional performance evaluation, i.e., analyzing the firm's financial indicators. But later in 1985, the authors argued some limitations of financial analysis and stated that an organization should be measured in the context of financial along with non-financial parameters. Financial parameters are celestial for evaluating organizational performance, informing the stakeholders about how much a firm has potential for value creation. But the authors argued some limitations of the financial indicators are that it is historical and reflects only the results of managerial decisions (Dixon *et al.,* 1990); not furnish adequate prediction for the function of subsequent time (Kennerley and Neely, 2003); Hayes and Abernathy (1980) argued financial performance-focused only on interim objectives; Neely *et al.* (1995) found it focused more on internal parameters than external; Skinner (1974) vindicated financial indicators neglected to strategic measures; Richardson *et al.* (1980) evinced financial indicators repressed learning and innovation. From the above literature, it is evident that financial analysis only reflects the firm's past operations. In contrast, the non-financial performance measurement can indicate future competition prospects and help identify the strategic objectives to overcome future business conflicts. Measuring financial performance is not enough because non-financial indicators affect performance enormously.

1.1. Balanced Scorecard (BSC)

After many discussions by theorists and researchers regarding modern management accounting in multiple research papers, articles, and other documents during the 1980s. The Balanced Scorecard (BSC) theory was introduced by Kaplan and Norton in 1992. The BSC is a strategic management and measurement concept that transmutes both the financial and non-financial facts into an action plan that assists the business in measuring its performance and meeting long-term and short-term goals (Kaplan and Norton, 1992). BSC measures four critical perspectives of an organization: Finance, Consumers, Internal Processes, and Learning & Growth. The BSC puts the organization's strategy and vision into action by placing them at the center of financial along-with the non-financial measurements (Kaplan and Norton, 1992). These financial and operational measures have been fixed to achieve the long-term strategic objectives. The BSC has transmogrified into a comprehensive tool for measuring and managing the performance that embraced and measured financial along-with the non-financial parameters of the banks' strategic areas for achieving the long-term objectives (Gupta *et al.*, 2020). The BSC focused on balancing the financial parameters along-with three non-financial parameters of consumers, internal processes, and learning and growth(Yahaya, 2009).

2. Review of Literature

2.1. Performance Measurement

Neely (1994) defined the Performance Measurement System (PMS)as an assortment of metrics exercised to appraise both efficacy and efficaciousness of actions. It measures the performance by considering financial or the non-financial, economic or non-economical, intrinsic or extrinsic, quantitative or qualitative, and leading or lagging indicators of the organization, which should be associated with past

strategy guiding future progress (Muravu and Service, 2021; Neely, 2005; Neely *et al.*, 1995). Performance Measurement System comprises mainly three main steps, i.e., design, implementation, and application of measures, followed by review and learning from that measurement (Bourne *et al.*, 2000). PMS is referred to as multidimensional, which embraces the course of action through which the organization's performance is observed and assessed to figure out whether the company is getting successful in attaining its goals concerning customers and other stakeholders of the firm (Ibrahim, 2015). After a thorough literature study of several articles and documents connected with the performance measurement, different PMS models are proposed by various authors such as Keegan *et al.* (1989) developed the Performance Measurement Matrix; Lynch and Cross (1991) constructed the SMART-Performance Pyramid; Kaplan and Norton (1992) developed the Balanced Scorecard Model; Neely *et al.* (2001) developed the Integrated Performance Measurement System, Performance Prism.

2.2. Empirical Application of Balanced Scorecard

Al-Najjar and Kalaf (2012) constructed a Balanced Scorecard for assessing the efficiency of a local bank in Iraq in their research paper. Their study found that the Banks' performance is feeble, and the Banks' performance on internal business processes and customer perspective is not satisfactory. Performance score on financial and learning & growth perspective is better than other two perspectives. Ibrahim (2015)investigated how the BSC was applied as a performance measurement tool in Nigeria's banking industry. The researcher adopted 11 banks as sample banks, and the Kruskal-Wallis test was performed, and the study figured out customer perspective was getting more attention among all four perspectives of the BSC model for measuring the banks' performance.

Annapurna and Manchala (2017) applied ANOVA to analyze the divergence in the functioning of the select private banks in India by developing a BSC framework. They found significant variation in their performance under all perspectives of the BSC system except capital adequacy ratio and number of ATMs of the financial and learning & growth perspectives. A Survey research method has followed for managing the performance of select banks in Ghana by applying the BSC as a tool of performance measurement and found that the financial perspective adopted maximum for performance measurement of banks followed by the other three perspectives of the BSC framework (Agyeman *et al.*, 2017).

An empirical investigation of the causal relationships among the four perspectives of BSC has employed by identifying thirteen measures under the four perspectives by applying the Structural equation model for testing the hypothesis of the study that figured out a positive relationship between learning & growth and the internal business process, which ultimately affected the customer perspective. Finally, the customer perspective significantly influenced the financial perspectives (Zahoor and Sahaf, 2018). Osunsanwo and Dada (2019) assessed the operations of 37 quantity surveying firms (QSFs) by using the BSC model in Lagos State, Nigeria, and revealed that the performance of the firms is not satisfactory on financial measures, whereas the firms are performing very impressive in the non-financial parameters. All the perspectives except the customer perspective of BSC have a significant effect on the financial operation of the banks and recommend adopting the BSC model as an integrated system to evaluate the bank's performance in Palestine (Turshan and Karim, 2019). Benková *et al.* (2020) identified the factors affecting the adoption of the BSC method to measure the performance in the engineering sector in Slovakia and

vindicated the worth of the non-financial indicators under the BSC framework. Researchers verified the dependence between the human and financial capital of the company by using the Chi-square test. The study found a substantial association between the companies regarding the non-financial parameters and the application of the BSC method by using standard deviation and Chi-square test.

Raut and Sahasrabuddhe (2021) identified in their study that ROA was correlated with net interest margin and number of branches while ROE did not correlate with a single variable amongst 12 variables selected by the researchers for their study. They also observed that the operation of public and private banks has significant differences in the BSC framework. Algerian banks should adopt modern methods of performance measures such as the Balanced Scorecard that is propitious to present developments in the banking industry and provide regular financial and non-financial information. Banks need to magnify their overall performances by considering each perspective of the BSC framework to obtain financial stability in a dynamic environment (Bourdima, 2021). Rezaee *et al.* (2022) measured the mediating role of managerial tools, namely innovation and knowledge management association of four perspectives of BSC on banks' effectiveness in using the outcomes of structural equation layout. Ngure (2022) measured and monitored a road map of a non-profit organization by taking four parameters of the BSC model and ended with a conclusion that a balanced scorecard is a useful tool for assessing and monitoring the action plan of an organization.

3. Research Gap, Objectives and Hypotheses

3.1. Research Gap

It has appeared over the years, that the performance measurement of banks generally focused on financial parameters which do not reflect the actual position of the firm. From the above literature survey, it observed that the banks in foreign countries had taken financial along withthe non-financial indicators of the BSC model to appraise their banks' performance, and in India, only a few studies made on the BSC model with the inter-sector comparison of banking performance. It revealed in some studies that authors have taken only one or two perspectives of BSC, and either public or private banks have taken individually for performance evaluation using the BSC model.

Sometimes banks have impressive performance based on financial parameters but have not performed well towards other non-financial parameters like the customers, employees, internal business processes, learning and growth processes, etc. Hence, researchers are trying to use financial along-with the nonfinancial perspectives to evaluate commercial banks in India. The Balanced Scorecard of each sample bank has been drawn by taking measures from both financial and non-financial indicators. Analysis has been done to figure out the variation in the performance of select banks by using the BSC model.

3.2. Objectives of the Study

The present study tries to focus on the issue of the performance measurement of the banking sector in terms of financial as-well-as non-financial parameters. The objective of the present research has been determined from the above-discussed research gap and problems.

- To develop the Balanced Scorecard for each select bank.

- To measure and compare the banks' performance in consideration of each financial and non-financial perspective of the developed Balanced Scorecard model.
- To make an inter-sector comparison of the overall performance score of the Balanced Scorecard Model of select banks.

3.3. Hypotheses Development

Few studies have been done by different authors and researchers, namely Gupta *et al.* (2020) observed there is an impactful variation in the operation of public and private banks based on the consumer perspectives of the BSC model. The performance of SBI and HDFC banks is divergent from the financial parameters of the BSC model (Gupta *et al.*, 2019). Raut and Sahasrabuddhe (2021) observed that the operation of public and private banks has significantly different from each other on the BSC framework, and private-owned banks performed better than public banks. Researchers are unsure about the findings of the past studies every time. For that reason, the following hypotheses have been formulated to fulfill the above objectives:

H_{01}: The performance of select Indian public banks is not significantly divergent from that of private banks' given each financial as well as the non-financial perspective of the BSC model.

H_{02}: The performance of select Indian public banks is not significantly divergent from that of private banks as measured by using the overall performance score based on the BSC model.

4. Research Methodology

4.1. Sources of Data

Researchers used secondary data for this study which was mainly collected from Annual Reports, Business Responsibility Reports of sample banks, RBI reports, articles from different journals, and different organizational reports.This study covers seven consecutive financial years, i.e., 2014-15 to 2020-21.

4.2. Data Sampling

The Indian banking sector is the population of this study. It has evinced from the literature that authors have taken either public or private banks individually for performance evaluation using the BSC model, and very few studies made on the sample banks taken in this present study (Gupta *et al.*, 2018, 2019; Panicker and Seshadri, 2013; Singh, 2018; Annapurna and Manchala, 2017). Hence, out of a total of 12 public sector banks (PSBs), two banks, i.e., Bank of Baroda (BOB), Union Bank of India (UBI), and out of 21 private sector banks (PVBs), two banks, i.e., HDFC Bank, Kotak Mahindra Bank (KMB) have been taken as sample bankson account of market capitalization for this study. Hence, the sample size is four, and these banks took as a sample unit using convenient sampling.

4.3. Data Analysis Process, Tools &Techniques

The study aims to measure the selected banks' performance and make a contrastive study between Public and Private Sector Banks based on constructed BSC of sample banks. Applying the concept of a Strategic map developed by Kaplan and Norton (1996), strategic objectives for each perspective of BSC have been identified for sample banks. Five performance indicators have been taken for the

performance measurement of banks under each perspective. In the constructed BSC, the Maximum score assigned for each perspective was 250 (i.e., 50 Scores*5 Measures). The total maximum score in the developed BSC for performance scale is 1000 (i.e., 250 Scores*4 Perspectives).

This research study analysis has used the following statistical tool analysis:

I. Shapiro-Wilk Test is used to test the normality distribution.
II. To test the hypotheses, an independent sample t-test has exerted in this study.

4.4. Research Variables

Following research, variables have been taken for this present study.

Table 1: Research Variables

Perspectives of A Balanced Scorecard	*Strategic Objective Measures (Variables of the Study)*
Financial	Capital Adequacy Ratio (CAR), Net NPA to Net Advances Ratio (NNPANA), Return on Average Assets (ROAA), Net Interest Margin (NIM), Credit-Deposit Ratio (C/D Ratio)
Customer	Deposit Growth (%), Credit Growth (%), CASA Deposit Growth (%), CASA Ratio (%), Complaints Redressed Ratio (%)
Internal Business Process	Growth in Total Business (%), Cost to Income Ratio (%), Business Per Employee (BPE), Profit Per Employee (PPE), Cost of Deposit (%)
Learning & Growth	Growth in No. of Employees (%), Change in Expenditure On Employees (%), Employees Trained (%), Growth in No. of Branches (%), Growth in No. of ATMs (%)

Source: Authors' Collection from Literature

5. Balanced Scorecard Development and Data Analysis

This part has two sections which include the development of the Balanced Scorecard of each sample bank based on secondary data and statistical analysis of t-test results for testing the hypotheses of this study based on the balanced scorecard performance score.

5.1. Section I: Development of Balanced Scorecard of Sample Banks

The following stages were adopted for developing the Balanced Scorecard of the sample banks.

i) Twenty key performance indicators have been picked out from the data accessible during 2014-21 about the operations of sample banks and clustering these into four perspectives of BSC. BSC's strategic objectives, measures, and scores on a scale for the four perspectives show in Table 2.
ii) A performance scale was marked for every single measure of four perspectives, and 50 score points were distributed into the units of each scale. The maximum score assigned for each perspective was 250 (i.e., 50 Scores*5 Measures)(Al-Najjar and Kalaf, 2012). The total maximum score in the developed BSC for the performance scale is 1000 (20 measures*50 points).

Table 2: Balanced Scorecard Perspectives, Objectives, Quantitative Measures, Scores

Perspectives of The BSC Model	*Strategic Objectives*	*Measures*	*Scores on Scale*				
			10	*20*	*30*	*40*	*50*
					SCALE		
Financial	Capital Adequacy	CAR %	0-4	4-8	8-12	12-16	16-20
	Improving Asset Quality	NNPANA (%)	8-10	6-8	4-6	2-4	0-2
	Management Efficiency	ROAA (%)	0-0.45	0.45-0.90	0.90-1.35	1.35-1.80	1.80-2.25
	Improving Earning Quality	NIM (%)	0-1	1-2	2-3	3-4	4-5
	Maintaining Liquidity	Credit-Deposit Ratio (%)	94-100	88-94	82-88	76-82	70-76
Customer	Business Growth	Deposit Growth (%)	0-10	10-20	20-30	30-40	40-100
		Credit Growth (%)	0-10	10-20	20-30	30-40	40-100
		CASA Deposit Growth (%)	0-10	10-20	20-30	30-40	40-100
	Customer Growth	CASA Ratio (%)	0-12	12-24	24-36	36-48	48-60
	Providing After Sales Services	Complaints Redressed Ratio (%)	90-92	92-94	94-96	96-98	98-100
Internal Business Process	Improve Operational Capabilities	Growth in Total Business (%)	0-10	10-20	20-30	30-40	40-100
		Cost to Income Ratio (%)	55-60	50-55	45-50	40-45	35-40
	Improve Managerial & Operational Efficiency	BPE(Cr.)	0-5	5-10	10-15	15-20	20-25
		PPE(Lakhs)	0-5	5-10	10-15	15-20	20-25
		Cost of Deposit (%)	8-9	7-8	6-7	5-6	4-5
Learning & Growth	Improve Employees' Training & Development	Growth in No. of Employees (%)	0-10	10-20	20-30	30-40	40-100
		Change in Expenditure on Employees (%)	0-10	10-20	20-30	30-40	40-100
		% of Employees Trained	0-20	20-40	40-60	60-80	80-100
	Growth in Digitalization of Products and Services	Growth in No. of Branches (%)	0-10	10-20	20-30	30-40	40-110
		Growth in No. of ATMs (%)	0-12	12-24	24-36	36-48	48-60

Source: Authors' Own Compilation

The performance score of selected banks on each measure of four perspectives of BSC has been quantified for every single year individually. Scores of every year have been enumerated for each respective measure.

Table 2 represents the BSC's strategic objectives, measures, scale, and score breakdown for each measure under BSC's four perspectives.

5.1.1. Performance Measurement of Banks on the BSC Model

Performance Scores of each year for 20 measures of financial and the non-financial parameters of the BSC model and scores for each perspective for all seven years have been figured up and intended for statistical analysis. The mean score of every individual bank for the last seven years of the BSC approach has been put to use for statistical analysis to make an inter-sector comparison.

5.1.2. Performance Measurement of PSBs

Table 3: Performance Score of BOB and UBI on the BSC Model

Perspectives of The BSC Model	*Financial*		*Customer*		*Internal Business*		*Learning & Growth*		*Total Scores/ Year*	
	BOB	*UBI*	*BOB*	*UBI*	*BOB*	*UBI*	*BOB*	*UBI*	*BOB*	*UBI*
2014-15	170	150	120	120	150	100	90	100	530	470
2015-16	140	130	80	120	100	100	100	50	420	400
2016-17	160	130	120	130	140	120	50	70	470	450
2017-18	140	110	110	110	130	120	60	70	440	410
2018-19	160	120	110	110	140	120	60	40	470	390
2019-20	160	140	230	110	180	130	230	70	800	450
2020-21	150	160	130	230	180	190	70	200	530	780
Total Scores of 7 Years	1080	780	770	700	840	690	590	400	3660	3350

Source: Authors' Own Compilation

Table 3 highlights the performance score of both Public Sector Banks, i.e., BOB and UBI. The overall performance score of BOB was not stable in the first four years of the study period, but it increased during the years 2018-19 and 2019-20. Again the performance score of the bank was decreased in the last financial year 2020-21. The performance score of the Union Bank of India increased during the last two years of the study. The performance score in the learning and growth perspective of BOB and UBI was 590, and 400 respectively was low in almost all years. The low growth rate in the number of employees, low rate of growth in-branch and ATM expansion, and less cost incurred for employees' training and development might have resulted in low performance in the learning and growth perspective.

5.1.3. Performance Measurement of Private Sector Banks

Table 4: HDFC Bank's &KMB'sPerformance Scores on the BSC Model

Perspectives of The BSC Model	*Financial*		*Customer*		*Internal Business*		*Learning & Growth*		*Total Scores/ Year*	
	HDFC	KMB	HDFC	KMB	HDFC	KMB	HDFC	KMB	HDFC	KMB
2014-15	240	220	180	200	170	120	100	170	690	710
2015-16	220	210	170	220	180	130	80	210	650	770
2016-17	220	220	180	160	180	130	40	80	620	590
2017-18	220	210	160	210	210	150	40	70	630	640
2018-19	220	210	160	180	220	140	110	90	710	620
2019-20	230	230	170	160	220	140	130	90	750	620
2020-21	200	210	100	130	80	150	10	60	390	550
Total Scores of 7 Years	1350	1300	1020	1130	1180	810	500	710	4440	4500

Source: Authors' Own Compilation

Table 4 highlights the overall performance score of two private sector banks, i.e., HDFC and KMB. The performance score of HDFC Bank gradually decreased in the first three years, but the performance score increased during the next three years of the study, and again it was decreased in the last financial year 2020-21, whereas the overall performance score of KMB is not significant throughout the study. The performance score in the learning and growth perspective of HDFC and Kotak Mahindra Bank was 500 and 710 respectively which was low in almost all years. The low growth rate in the number of employees, low rate of growth in-branch and ATM expansion, and less cost incurred for employees' training and development might have resulted in low performance in the learning and growth perspective.

5.2. Section II: Statistical Analysis for Inter-sector Comparison of Commercial Banks

For this study, four Balanced Scorecards have been prepared for each select bank. The performance score of each perspective has been calculated based on selected banks' financial and non-financial performance indicators and produced in Tables 3 & 4.

A statistical test, namely the independent sample t-test (two-tailed), was adapted to figure out the variation in the performance of PSBs and PVBs. But, to confirm the independent sample t-test, the normality distribution of data is to be tested. If the data is normally distributed, a t-test can be used as a parametric test. The Shapiro-Wilk (S-W) test is the most accepted tool used for normality check of data as the sample size is < 50. As the sample size of this study is less than 50, the Shapiro-Wilk test was exercised for normality check of data.

Table 5: Results of the Shapiro-Wilk Test

Tests of Normality			
	Statistic	*df*	*Sig.*
BSC Performance Score	.863	4	.271
a. Lilliefors Significance Correction			

Source: Authors' Own Compilation

The outcome of the (S-W) test in Table 5shows a P-value (0.271)> 0.05, which represents the normal distribution of all data. As the data is normally distributed, it is confirmed to apply an independent t-test for further analysis.

The following hypotheses have been drafted to measure and compare the banks' performance consideration of each financial and the non-financial perspective of the Balanced Scorecard Model.

H_{01}: The performances of select PSBs are not significantly divergent from that of PVBs given each financial and non-financial perspective of the BSC model.

Four sub-hypotheses have been formulated to test the primary hypothesis:

H_{01A}: There is no significant variation between the performances of select PSBs and PVBs in view of the financial perspectives of the BSC model.

H_{01B}: There is no significant variation between the performances of select PSBs and PVBs in view of customer perspectives of the BSC model.

Table 6: Result of Independent Sample t-Test of PSBs and PVBs on Each Perspective of the BSC Model

Hypotheses	*Name of the Perspectives*		*Values*	*H_0 Accepted or Rejected*
H_{01A}	Financial Perspectives	t- Statistics	-2.598	Accepted
		Degree of freedom	1.056	
		Sig. (2-tailed)	0.223	
H_{01B}	Customer Perspectives	t- Statistics	-5.215	Rejected
		Degree of freedom	1.696	
		Sig. (2-tailed)	0.049	
H_{01C}	Internal Business Process Perspectives	t- Statistics	-1.152	Accepted
		Degree of freedom	1.320	
		Sig. (2-tailed)	0.416	
H_{01D}	Learning & Growth Perspectives	t- Statistics	-0.777	Accepted
		Degree of freedom	1.980	
		Sig. (2-tailed)	0.519	

Source: Authors' Own Compilation

H_{01C}: There is no significant variation between the performances of select PSBs and PVBs in view of the internal business process perspectives of the BSC model.

H_{01D}: There is no significant variation between the performances of select PSBs and PVBsin view of the learning and growth perspectives of the BSC model.

According to the Shapiro-Wilk test (Table 5), data is normally distributed, and the sample size is less than 30, considering that the Independent sample t-test was adapted to figure out the variation in the performance of PSBs and PVBs based on the individual perspective of BSC model and to compare the overall performance score of PSBs and PVBs.

Table 6 shows the outcome of the independent sample t-test that represents the P-value of each sub-hypothesis.

H_{01A}: The H_{01A} is accepted as the P-value (0.223)> 0.05. Hence, the operation of select public and private banks is not significantly different based on the financial perspectives of the BSC model.

H_{01B}: The H_{01B} is rejected as the P-value (0.049)< 0.05. Hence, the operation of select PSBs and PVBs is significantly different from the customer perspectives of the BSC model.

H_{01C}: The H_{01C} is accepted as the P-value (0.416)> 0.05. Thus, the operation of select public and private banks is not significantly different based on internal business process perspectives of the BSC model.

H_{01D}: The H_{01D} is accepted as the P-value (0.519)> 0.05. Thus, the operation of select public and private sector banks is not significantly different based on the learning and growth perspectives of the BSC model.

The results of the t-test depict that the P-value > 0.05 for all perspectives except the customer perspective, which represents that the performance of PSBs and PVBs is significantly different only in view of the customer perspective of the BSC model.

The following hypothesis has been formulated to make an inter-sector comparison of the overall performance score of the Balanced Scorecard Model of selected banks:

H_{02}: The performances of select PSBs are not significantly divergent from that of PVBs as measured by using the overall performance score based on the BSC model.

In Table 7, an Independent t-test has been exerted to make an inter-sector comparison of the overall BSC performance score.

Table 7: Result of Statistical t-test

Name of the Perspectives		*Values*	*H_0 Accepted or Rejected*
BSC Performance Score	t- Statistics	-6.112	Accept
	Degree of freedom	1.075	
	Sig. (2-tailed)	0.092	

Source: Authors' Own Compilation

It was clear from Table 7that the P-value (0.092)> 0.05, thus the H_{02} is accepted, and the result of the t-test suggests there are no significant variations between these two samples. It indicates no significant variation between the performances of public banks and private banks as measured by applying the BSC framework.

6. Results and Discussion

The overall performance score of private banks is graded well as compared to public banks. It concluded that the Bank of Baroda has fair performance among both public sector banks as shown in Table 3. Kotak Mahindra Bank has impressive performance not only among PVBs but also among all commercial banks. It was observed from the developed balanced scorecard of both sector banks that the performance score of the learning & growth perspective was not impressive, which indicates the overall poor performance of banks in the learning and growth perspective. The result of statistical analysis in Table 6 exhibited that theperformance of selected public banks is significantly different from that of private banks only from a consumer perspective of the BSC framework. The performances of both the banking sector have equal in terms of finance, internal business process, and learning and growth. But, at the same time, the overall operation of PSBs and PVBs is not significantly different as P-value is more than 0.05, which represents acceptance of the null hypothesis (Table 7).

7. Conclusion

The banking sector always plays a vital role in the development of the Indian economy. Thus, it is essential to measure the performance of the banking sector regularly. This research intends to assess the operation of commercial banks by developing a Balanced Scorecard for each sample bank. It is evident from the study that the operation of Publicly-owned banks and non-public banks is significantly different from the consumer perspective among all perspectives of the Balanced Scorecard approach while analyzing each perspective individually over the period, whereas the overall performance of public and private banks is not significantly divergent. The performance score of selected commercial banks is good on financial parameters compared to non-financial parameters of the Balanced Scorecard. Each selected bank performed very poorly in learning and growth perspectives. The banks' operation on customer and internal business process is entirely satisfied after the financial performance.

It suggested that all banks should focus on improvements in the performance of non-financial parameters as it directly enhances the financial performance of the banks. Banks should strengthen their geographical growth and employees' efficiency by providing regular training and conducting skill development programs for employees to improve the performance of the learning and growth perspective of BSC. Banks should be focused on the innovation of banking products and services, modernization of branches, and acquiring of skilled employees, etc., which will hold new and existing customers and grow in the banking industry. The learning and growth improve internal business processes and customer performance, which ultimately enhances financial performance.

This study has some limitations. The strategic measures selected for the BSC analysis were taken only from secondary sources. The study took only four banks from all commercial banks in India. These limitations can be considered as recommendations for further research.

This research work will help the respective authorities of the concerned sector and policymakers in the financial sectors adopt the BSC as a holistic performance measurement tool. It also gives some information and scope for future research works on applying the BSC approach to other financial and other different sectors.

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Impact of Heuristic-Driven Biases on Investment Decision-Making of Individual Investors: The Mediating Role of Risk Perception

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JEL Classification

D03, D81, G02, G11

Abstract: Investors do not behave rationally as traditional finance suggests, whereas they use mental shortcuts. This research aims to knowhow heuristic biases impact the individual investor's investment decision who invested in the financial market. Also, attempt to check wheatear risk perception mediates the relationship. Cross-sectional research was done by adopting a structured and close-ended questionnaire survey method by obtaining data from 484 individual investors investing in the financial market. The study provides empirical insight into the relationship between second-order heuristic biases of the individual investor and irrational investment decision-making and checks the mediating role of risk perception. The results show the significant positive impact of heuristic bias on the irrational investment decision-making of individual investors. Risk perception partially mediates the relationship. The findings of this study encourage individual investors to understand and identify their biases or sentiments. This study will help create investors' awareness to decide on their financial capacity after assessing all available alternatives.

1. Introduction

As traditional finance suggests, investors process information logically, efficiently, correctly, and neatly (Ricciardi, 2008). According to traditional finance, an investor is rational and decides after processing all available information. But practically needed information may not be available all the time, and it might also be impossible to consider all alternatives because of time constraints and limited cognitive (Evans, 2006; Gao and Schmidt, 2005; Gigerenzer *et al.*, 1999; Tversky and Kahneman, 1974; Ricciardi, 2008).Olsen (2007) suggests having greater insight into individual investor decision-making is a significant concern. Instead of sophisticated probability assessment, individuals made decisions based on readily

available information and estimated outcomes using mental shortcuts known as heuristics. Kaufman *et al.*(1989) say investors guided by heuristics choose the first that satisfies their aspirants instead of checking all alternatives. They have limited knowledge to analyze available options to decide on their experience and perceptions.

Heuristics is a 'cognitive tool' to reduce decision-making time. People have applied the term 'heuristics' to simplify uncertain and complex situations(Busenitz and Barney, 1997). Heuristics are mental shortcuts that enable people to decide based on clues or rules without processing available information, reducing the cost of time in exploring alternatives (Marsh, 2002). It simplifies the complex task of judgment by assessing the probabilities and forecasting the values of that event. Heuristic defines as "a strategy that ignores part of the information, to make decisions more quickly, frugally, and accurately than more complex methods (Gigerenzer and Gaissmaier, 2011).The term heuristic is used in different fields, and in every area, its meaning is different (Gigerenzer and Todd, 1999).

A heuristic is a simple strategy that helps people make effortless decisions(Bornmann & Marewski, 2019). It is also documented in medicine, business, crime, sports, and other domains. Heuristics are helpful when people have limited information (Tversky and Kahneman, 1974) and less time(Waweru *et al.,* 2008). People use selective heuristics to reach the position that leads to the expected conclusion and decide, which may be best or may not be, but more convenient for them(Jonas *et al*., 2001). However, they are pretty helpful, but sometimes it also leads to systematic and severe errors.

When individual investors are susceptible to heuristic biases, they leave behind rational behavior and behave abnormal called 'cognitive biases. Heuristic, also called cognitive biases originating from judgment's reliability, is applied by people to simplify complex and uncertain situations and deviate from systematic decision-making (Tversky and Kahneman, 1974). However, the heuristics and the bias vary in degrees (Busenitz and Barney, 1997), like cognitive biases primarily used when people feel fear and anxiety (Remmerswaal *et al*., 2014). Behavioral finance explains the relationship between the heuristic and investment decision-making. The researchers in behavioral finance argued that the decision-making process is a much more complex task as the financial market is unstable and has high uncertainty. The increased instability and quickly evolving situation in financial markets make decision-making more complicated for investors. Due to this, the investor cannot utilize the available resources and opportunities to make rational decisions. In such a complex situation, the investor gets susceptible to heuristic bias in fear of losing the opportunity. Heuristic bias is a simple way to handle complex problems in risky and uncertain situations that lead people to cognitive error and divert from rationality (Tversky and Kahneman, 1974). In an uncertain situation, people use trial and error methods to solve the problem and thus establish the rule of thumb to deal with these problems. However, the reliance on these rules leads to systematic and judgmental errors. Thus, while investing, investors use these 'rules of thumb' or quick, intuitive shortcuts whenever they face uncertainty, leading to irrational decision-making.

However, many studies have shown that individual investors extensively use simplifying heuristics. Even not individual investors but experienced institutional investors are prone to these biases. They also think intuitively (Tversky and Kahneman, 1974; Barber and Odean, 2001; Waweru *et al*., 2008) and behave similarly (Jaiyeoba *et al*., 2020). Heuristic-driven biases (HDB), namely availability, anchoring,

representative (Tversky and Kahneman, 1974), gambler's fallacy bias, and overconfidence bias (Waweru *et al.,* 2008), influence the irrational decision making of individual investors are studied in this research by using primary data. Also, the bootstrapping method investigates how the risk perception of the individual investor mediates the relationship.

Although some studies are already done, they used two or more biases and were mainly conducted in developed or emerging countries. Further, we also don't find any paper that shows a higher-order heuristic. Hence, these limitations are acknowledged, and this research is conducted to fill the gap that heuristic biases also present in Indian investors and influence their decision-making. Also, how the risk perception of individual investors mediates the relationship, the research will help individual investors to understand, recognize their biases and help to overcome these biases. It also helps financial, investment advisors, and academic and non-academic researchers. However, most importantly, this study adds new thoughts to the ongoing discussion on investors' behavior while making investment decisions.

2. Review of Literature

The literature review describes the previous and current attempts of the different researchers to explain the heuristics. Heuristic biases are a rule of thumb or mental shortcut that investors use whenever they face uncertainty and risky situations. Behavioral finance attempts to explain how heuristic biases deviate from rational finance as suggested in traditional finance. In the early 1970s, lots of work publishes about decision-making under uncertainty. Tversky and Kahneman (1974) are the first who identified the heuristic bias and recognised three heuristics availability heuristic, representative heuristic, and anchoring and adjustment heuristic".

Additionally, (Waweru *et al.*, 2008) list two more heuristic biases named overconfidence heuristic and gambler's fallacy. Most of the literature revealed that whenever investor is susceptible to heuristic bias, they make irrational decisions. Heuristics-driven biases(HDB) have been used and considered by most investors as they help speed up the decision-making process by avoiding all other available information(Shefrin, 2000). Following are the heuristics studied in this research.

2.1. Overconfidence

It's a tendency when people overestimate their skills more than others (Ricciardi and Simon, 2000). When investors feel better than average in analyzing the market, they are susceptible to the overconfidence heuristic (Benartzi and Thaler, 1995; Acker and Duck, 2008). Barber and Oden (2001) found that males are more confident than females, and they trade more aggressively, like 45 percent more than their female counterparts. As a result, they bear the high trading cost and more losses due to overconfidence.

2.2. Representative

Representative heuristic states that people judge the probabilities of an event based on their similarity or resemble another based on formed stereotypes. For example, investors presume that object X belongs to class Y by considering some similarity between X and Y. It affects the judgment of the probability of investors. Representative is a "rule of thumb," People assign a probability to the event based on the similarity and representativeness to its population (Tversky and Kahneman, 1974). Investors

try to fit their new thoughts or circumstances into past events and classify them (Ricciardi and Simon, 2000). Due to the representative heuristic, investors invest in the hot stock and avoid those stocks that recently performed poorly (Waweru *et al.*, 2008). While investing, investors follow the trends analysis and invest in recently good-performed stock in the hope of earning growth (Barberis *et al.*, 2001). Harvey (2007) says people employed the representative heuristic to forecast the value of one variable based on another variable's value that represents the same.

2.3. Anchoring and Adjustment

People estimate the initial value and yield the final results on that belief (Tversky and Kahneman, 1974). Investor susceptible to anchoring heuristic estimates the effects based on some incomplete computation. Investors start giving extraneous importance to informally determined anchors due to anchoring heuristic and irrational investment decisions (Ricciardi and Simon, 2000).

2.4. Availability

It is a phenomenon where People estimate the probability of an event based on how familiar and prevalent that appears in their lives (Pompian, 2012). People susceptible to this bias evaluate the probability of an event based on how easily that instance can be brought to their minds (Tversky and Kahneman, 1974). The availability heuristic is when decision-making is done based on information held in memory (Harvey, 2007). The investor makes their investment decision based on readily available information even without further analysing the authentication of that information. Many people invest in those securities who spend more on advertising than on searching for the best available investment opportunity. Barberis *et al.* (2001) say that investor gives unnecessary weightage to readily available information due to availability bias.

2.5. Gambler's Fallacy

Investors inappropriately predict the reverse trend. Because of this anticipation, they lead to poor market returns (Waweru *et al.*, 2008).

An individual investor uses heuristic bias to simplify the complex situation and uncertainty. Their fundamental and technical knowledge is impaired and leads to judgment errors. As a result, the individual investor made irrational investment decisions and adversely affected their portfolio performance. Through their study in behavioral finance, many researchers argue that heuristic bias influences irrational investment decision making(Abarbanell and Bernard, 1992); (DeBondt and Thaler, 1990) and also influence financial market performance (DeBondt and Thaler,1985). Behavioral finance argues that people never be rational in decision making, and lots of research has already documented how irrational behavior and critical errors influence decision making (Tversky and Kahneman, 1974;Thaler, 1994; Statman, 1995; Waweru *et al.*, 2008).

2.6. Risk Perception and Investment Decision

Risk perception is a function of consequence and subjective uncertainty, whether gain or loss from the transaction (Cox and Rich, 1964). Investors use heuristics to solve complex, uncertain, and risky

situations. In other words, whenever investors perceive risk, they use a heuristic to solve that problem. According to standard finance, people consider objective risk, whereas behavioral finance recognises subjective risk -an individual's perception of risk (Ricciardi, 2004).

Due to lack of information, individuals frequently misperceive the risk associated with specific activity and make incorrect judgments and irrational decisions (Ricciardi, 2004). Risk perception involves the investor's subjective assessment to evaluate the risk and degree of uncertainty. Investors' behavior is mediated by risk perception while decision-making (Ricciardi, 2004). Due to uncertainty, investors perceive risk and end up with irrational investment decisions. There are lots of factors through which investors perceive risk, including lack of knowledge, fear, lack of confidence, and acceptance from a peer group (Deb and Singh, 2018)

3. Objective and Hypotheses of the Study

3.1. Objective of the Study

Investors do not behave rationally as traditional finance suggests, whereas they use mental shortcuts. This research aims to know how heuristic biases impact the individual investor's investment decision who invested in the financial market. Also, attempt to check whether risk perception mediates the relationship.

The following conceptual model (Figure 1) is derived based on gap analysis. The objective is to empirically examine HDB and IID's role with risk perception as a mediating role.

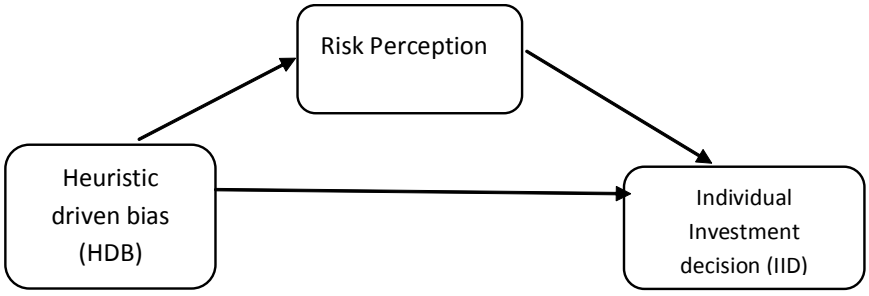

Figure 1: Conceptual model for this research

Sources: Authors' Own Compilation

3.2. Hypotheses of the Study

To achieve the objective of this research, the following hypotheses were developed:

H_{01}: Heuristic bias has a significant positive influence on the irrational investment decision of individual investors in the financial market.

H_{02}: Heuristic is positively associated with the risk perception of individual investors in the financial market.

H_{03}: Risk perception has a significant positive influence on irrational investment decisions.
H_{04}: Risk perceptions mediate the relationship between heuristic-driven biases and irrational investment decisions.

4. Research Methodology

4.1. Sampling and Data Collection

Primary data was conducted through the questionnaire method, as other methods such as interviews, brainstorming, and video conferencing were more time-consuming and expensive (Bell and Bryman, 2007). Another reason for selecting this method over the interview method is that individual investors were the respondents for this study; they might not feel comfortable discussing their financial things according to Indian cultural norms. One more reason that the questionnaire method is also a good way of data collection is that respondents can fill it out whenever they have time.

A total of 600 questionnaires were directly delivered to the respondent after taking their consent in the field survey. Out of this, only 496 completed the questionnaire. Finally, 484 were taken for study. The sample size is enough for the appropriate statistical tool. Hair *et al.* (1998) suggested that even responses from 100 respondents are sufficient for reliable results in Quantitative research through data analysis statistical tools. The judgmental sampling technique was appropriate for data collection in this study. As the list of investors from Delhi is unavailable and people don't want to disclose their financial investments, only those who wished to participate in the study were taken (Wood and Zaichkowsky, 2004).

4.2. Instrumentation Design

Primary data were collected for this research through a five-point Likert scale questionnaire. The target population, individual investors investing in the financial market, were asked closed-ended questions. They were supposed to answer on a five-point Likert scale extended from 1- 'strongly disagree' to 5 – 'strong agree'. The data were collected from January 2019 to March 2020. The questionnaire consists of four sections. In the first section, the respondent was asked about their social–demographic information. In the second section statement related to "heuristic biases, namely overconfidence, anchoring and adjustment, representative, availability, and gambler's fallacy," was asked that taken from existing literature and modified for this study (Waweru *et al.*, 2008; Kudryaytsev *et al.*, 2013; Nada, 2013; Lin, 2011; Baker *et al.*, 2018; Baker and Ricciardi, 2014; Wood and Zaichkowsky, 2004). In the third section, five statements about investment decision-making were asked for irrational investment decision-making. Questions were adapted from Scott and Bruce (1995), and in the last section, four statements were asked to know their risk perception. Questions were adapted from Weber *et al.* (2002).

4.3. Descriptive Statistics of Demographics

The demographic distribution of the research sample shows (Table 2) that 57% of respondents were male and 43% were female investors, with the frequency of 276 and 208, respectively. That represents that now women are also investing in the stock market in India. While assessing the age group, 67.1%

of the respondents describe the age group from 20 years to 35 years, 22.9% represent the age group from 36 years to 50 years, and 6.2% represent the age group above 60. In contrast, only 3.5% of respondents represent the age group above 60. Regarding qualification, only 1.9% were below graduation, 26.9% held graduation degrees, 52.7% had done post-graduation, and 18.6 % of respondents are finance professionals. 42.6% of respondents were married for marital status, whereas 57.4% were single. By occupation, 28.5% of respondents were from the public sector employed, 45.5 % respondents were from the private sector employed, 15.9% respondents were self-employed, whereas only 1.4% were retired from service. The stock market experience of respondents was as follows: 62.6% had less than two-year experience, 17.6% of respondents had two years to five-year experience, 11.4% respondents had five years to ten-year experience, whereas 8.5% of respondents had more than ten-year experience.

Table 1: Statics for Demographic Variable

Category		*Frequency*	*Percentage*
Gender	Male	276	57%
	Female	208	43%
Age	20-35	325	67.1%
	36-50	111	22.9%
	51-60	30	6.2%
	Above 60	17	3.5%
Marital status	Married	206	42.6%
	Single	278	57.4%
Education	Below graduation	9	1.9%
	Graduation	130	26.9%
	Post-graduation	255	52.7%
	Finance professional	90	18.6%
Occupation	Public dec employee	138	28.5%
	Private sec employee	220	45.5%
	Self-employed	77	15.9%
	Retired	7	1.4%
	Others	41	8.5%
Stock market exp.	<2 year	303	62.6%
	2-5	85	17.6%
	5-10	55	11.4%
	>10	41	8.5%

Source: Authors' Own Calculation

4.4. Data Analysis Method

The collected data were sorted and analysed through "Statistical Package for the Social Sciences (SPSS) 22 and AMOS 22 software packages. Firstly, the questionnaire was sent for review to two behavioral finance experts, language experts, four expert investors, and a broker to check the questionnaire's content validity. The reviewer recommended some changes. After making those changes, a pilot study was done to determine the reliability and internal consistency of the scale. Then the model's measurement was checked, and through SEM, the relationship between HDB and IID was analysed. Bootstrapping method is used for checking mediating effect. The reason for selecting the Bootstrapping method is as it provides the most accurate intervals for indirect effect(MacKinnon *et al.*, 2004). "The bootstrapping approach is that the standard error estimates and confidence intervals of indirect effect will usually be imprecise because the indirect effect estimates generally do not follow a normal distribution" (Duan *et al.,* 2020).

5. Data Analysis

5.1. Pilot Study

A pilot study was done on 150 responses from individual investors who invest in the financial market. The main aim of doing the pilot study was to check the internal consistency reliability of the instrument as the scale is reflective (Nunnally and Bernstein, 1967).

5.2. Reliability and Validity Analysis

Reliability of scale provides consistency and accuracy that helps to make the instrument error-free. The instrument's reliability is checked through Cronbach's alpha as the reflective measurement scale was used in this study. Thus, the internal consistency between each construct's items needs to check and which was above 0.7 (Table 3) for all constructs (Nunally and Bernstein,1967; Fornell and Larcker, 1981. Thus, it shows that the items included in the variable are reliable and that data can be used for further analysis. The construct validity of the measurement scale is also checked through confirmatory factor analysis, including convergent validity and discriminate validity. "The convergent validity was checked through the critical ratio (CR) and average variance extracted (AVE)." The value of CR > 0.7, AVE > 0.5and CR> AVE of all constructs (Bagozzi *et al.*, 1988). Hence all constructs show convergent validity. The tool given by Prof. Gakingston was used to check the discriminant validity. The value of AVE (average variance explained) was higher than ASV (average shared variance) as well as MSV (maximum shared variance) (AVE>ASV>MSV) for all seven constructs. All constructs possess discriminant validity (Hair *et al.*, 2006). Various indicators for checking reliability and validity show satisfactory results. So, the developed measurement model can be used for hypothesis testing.

5.3. Common Method Bias

The Common Method Bias (CMB) problem arises primarily whenever the cross-sectional data research affects the results (Podsakoff and Organ, 1986). This study also used cross-sectional data, so checking

Table 2: Reliability and Validity Analysis

Variables		*Estimate*	*CR*	*AVE*	*MSV*	*Cronbach Alpha*
Anchoring	ANC5	.805	.880	.596	.250	0.879
	ANC4	.816				
	ANC3	.699				
	ANC2	.756				
	ANC1	.777				
Over Confidence	OC4	.789	.809	.518	.217	0.781
	OC3	.813				
	OC2	.681				
	OC1	.571				
Gambler Fallac	GF1	.688	.781	.543	.316	0.775
	GF2	.745				
	GF3	.775				
Availability	AV3	.810	.784	.558	.316	0.761
	AV2	.865				
	AV1	.518				
Representative	REP1	.811	.784	.548	.315	0.781
	REP2	.705				
	REP3	.700				
Irrational Investmentdecisions	ID5	.672	.820	.579	.248	0.818
	ID4	.595				
	ID3	.777				
	ID2	.733				
	ID1	.669				
Risk	RP1	.795	.869	.624	.248	0.868
	RP2	.783				
	RP3	.788				
	RP4	.793				

Source: Authors' Tabulation

CMB is advisable. For checking CMB, Harman's one factor-test was applied through SPSS via the "Principal Component Analysis" extraction method and fixed one as a number of factors to extract. The results show seven factors had more than 1 eigen value, and out of this first factor, explain 27.466% variation of total variance explained, which is less than 50%. Hence, the data is free from Common Method Bias and conduct further analysis.

5.4. SEM Analysis

5.4.1. Measurement Model

There are numerous indicators like the goodness of fit and badness of fit to measure the measurement model. This study measures model fitness through CMIN/df=1.888, which lies in the prescribed limit 1-3, which confines model fit. Other indicators like goodness of fit index (GFI)= 0.919, "Comparative fit index (CFI)=0.952", "NFI=0.905", "Tucker- Lewis index (TLI) =0.945", whereas "Root means square error of approximation(RMSEA)= 0.043". Table 4 shows that all the values are under the defined range, which shows the proposed model's goodness and is suitable for further analysis.

Table 3: CFA Model of Fit

Goodness of fitness indices	*"CMIN/Df"*	*"Goodness of fit index (GFI)"*	*"Comparative fit index (CFI)"*	*"NFI"*	*"Tucker-Lewis's index (TLI)"*	*"Root Means Square error of approximation (RMSEA)."*
Measurement Model of first order	1.888	.919	.952	.905	.945	.043
Measurement model of second-order	2.245	.937	.956	.923	.948	.051
Measurement model of path	2.018	.910	.943	.894	.937	.046
Acceptable range	1-3 Acceptable	>.80 Acceptable	>0.90 Acceptable	>0.80 Acceptable	>0.90 Acceptable	<0.08 Acceptable

Source: Authors' Own Calculation

5.4.2. Second-order Measurement Model

In this study, the second-order heuristic is used, second-order measurement model uses two layers of latent constructs and can be applied only when the theory is supported (Hair et al., 2014). "Second-order measurement" model is a statistical method to confirm a first-order model to load onto the principal construct. The same criteria are used to check the convergent validity of the "second-order" heuristic model. The results depict the factor loading of five first-order factors ranging from 0.532 to 0.796, the composite reliability (CR)=0.81, and the second-order construct "Average Variance extracted (AVE)=0.56 calculated by the formula given (MacKenzie *et al.*, 2011), which exceeding the threshold value of 0.5(Fornell and Larcker, 1981)". After applying "second-order CFA", the fitness

of the second-order model is checked, which comes under the acceptable range (Table 4). The results indicate that all five first-order constructs properly load onto the second-order heuristic construct. Hence, all criteria of measurement of model for higher-order achieved allowed us to proceed for further analysis.

5.4.3. Hypothesis Testing through Structural Equation Modelling

After measuring the model, we performed the second part of SEM to check the association between second-order HDB and IID represented by path coefficient to test the hypotheses formally. The structural model of this research presented in Figure-1also indicates the direct and indirect relationship between the variables undertaken in this study. The results show that second-order HDB is significant and positively associated with the IIR of individual investors in the Indian stock market (*B=0.345, p<0.05); and with risk perception (B=0.41, p<0.05).* Risk perception is significant and positively associated with IID (*B=0.36, p<0.05*).It shows that whenever investors use heuristics to deal and cope with uncertain and risky situations, they end up with IID that badly affects their portfolios. Therefore, it's necessary to analyze all available information before making decisions. Hence, the analysis of this study supported all hypotheses H_{01}, H_{02}, and H_{03}. The results are summarized in Table 5.

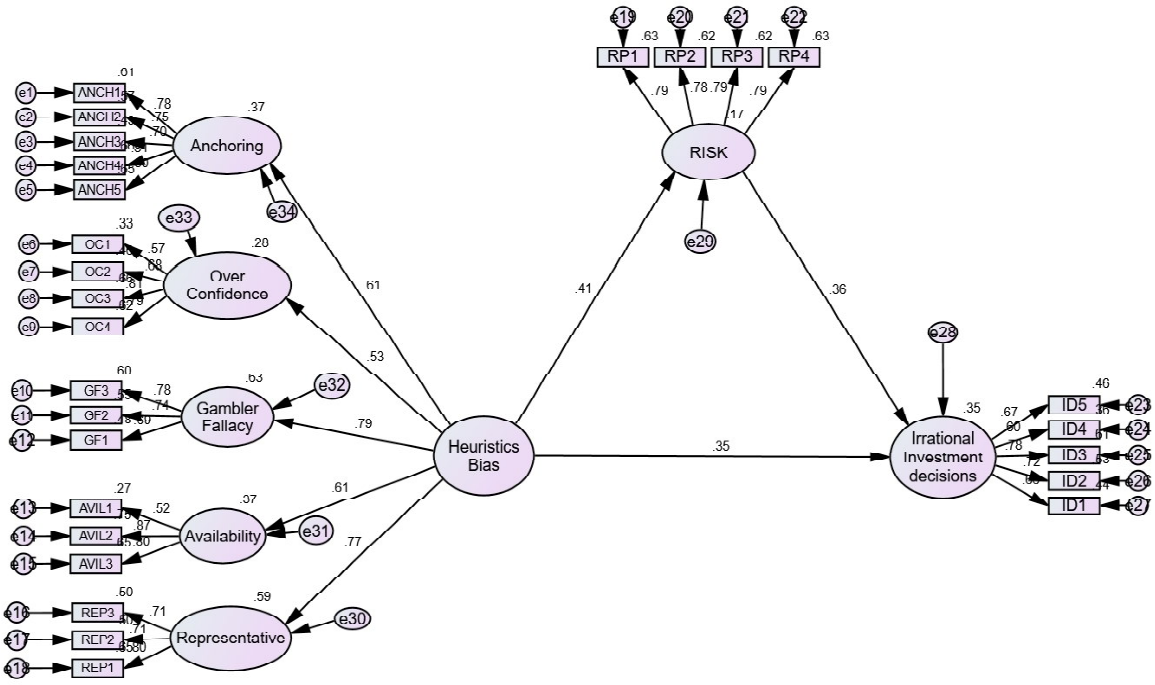

Figure 2: Standardized Direct, Indirect, and Total Effects

Source: Authors' Own Compilation

Table 4: Results of Structural Equation Modelling

Hypotheses	*Endogenous constructs*	*Exogenous constructs*	*Estimation*	*SE*	*CR*	*Results*
	Anchoring	Heuristics Bias	.608	.091	9.220**	
	Overconfidence		.530	.085	8.114**	
	Gambler Fallacy		.795		.085	9.666**
	Availability		.610	.085	8.881**	
	Representative		.768			
H_{01}	Irrational Investment decisions		.345	.059	5.429**	Supported
H_{02}	Risk attitude		.411	.083	6.742**	Supported
H_{03}	Irrational Investment decisions	Risk	.355	.039	6.154**	Supported

Source: Authors' Own Compilation

Notes: ** Significant at 1%

Table 5: Mediation Effect

Type of effect	*Standardised Path Coefficient*	*P value*	*Conclusion*
Total Effect of HBD on IID	0.491	0.011	Significant total effect found
Indirect Effect of Risk perception between HBD and IID	0.146	0.011	Significant total effect found
Direct Effect of HBD on IID	0.345	0.001	Significant total effect found
Variance accounted for (VAF) by risk perception as mediating variable	0.146/0.491 = 29.73%		Weak partial mediation found

Source: Authors' Own Compilation

5.4.4. Mediating Effect

The Mediating effect of risk perception was tested by performing bootstrapping (Preacher and Hayes, 2008) at a 95% confidence interval with 10000 bootstraps to determinethe proposed model's direct, indirect, and total effect in this research. The results of the bootstrap mediation test indicate that the risk perception of individual investors plays a significant partial mediation between the HDB and IID.

The result shows that the p-value of the total effect in the mediating relationship is significant (standardised coefficient = 0.491, p-value <0.05). That indicates the significant impact (as measured using total effect). In addition to this, the indirect effect of risk perception on the relationship between HDB and IIR was significant (standardised coefficient =.146, p-value <0.05). The standardized beta indicates the correlation between the two constructs. In the case of investors' risk perception as the mediating factor, the total effect of HDB on IID is 0.672. The total effect is divided into indirect (0.146) and direct (0.345). The result indicates that both the indirect and the direct effects are significant. Thus, the risk perception had a partial mediation. The VAF is found to be 29.73%, indicating the presence of a weak mediation effect of the risk perception of individual investors. Thus, the risk perception had a partial mediation. The VAF is found to be 29.73%, indicating the presence of a weak mediation effect of the risk perception of individual investors. Hence, hypothesis H4 that risk perceptions mediate the relationship between heuristic-driven biases and irrational investment decisions proved.

6. Results and Discussion

This research aims to know the influence of heuristic bias on individual investor investment decision-making and how individual investors' risk perception attitude mediates this relationship. This study explores this through a structured questionnaire survey method by individual investors investing in the stock market. The empirical results supported those heuristic biases that influence IID in individual investors. Thus, we support this view that the HDB impact the IIR of individual investors and deviates them from rational decision-making. As suggested by psychologists and empirically proven in this study, when investors find the limited capacity to deal with uncertain and complex situations while making investment decisions, they rely on a heuristic to simplify things. The investor needs to understand these biases better and check whether they are not susceptible to them so that they don't end up with poor decision-making. Investors can minimize the chance of susceptibility to heuristic biases by making advanced investment decision rules and sticking with those rules. Further, they can also try to develop long-term investment-oriented behavior by fundamentally analyzing an invested stock, i.e., economy, industry, and company analysis (EIC) or vice versa, and avoid fast and frugal decisions.

Earlier studies(Ahmad and Shah, 2020; Chen *et al.,* 2007; Khan*,* 2020; Massa and Simonov, 2005; Salman *et al.,* 2021) also suggest that people use simple methods or shortcuts like relying on past trends or previous prices while deciding on the uncertain situation instead of complex algorithms. Thus, it leads to judgmental error and poor decision-making but sometimes produces optimal outcomes that are accurate and acceptable(Harvey, 2007). So, we also support this view as market situations are uncertain due to this heuristic now becoming an inherent part of individuals' nature and essential aspect of their decision-making process. Still, if they understood these biases better, they could avoid poor investment decisions. Investors need to understand if something works in the past doesn't mean it will also

7. Conclusion

This research aims to check the influence of heuristic bias on individual investors' decision-making with the mediating role of risk perception. The empirical results supported that heuristic biases influence IID in individual investors' decision.

The study proves that investors decide based on the fast and frugal rules that end up in irrational decisions. The findings of this study encourage the individual investors to understand and identify their biases or sentiments. It will help create awareness among investors to decide on their financial capacity after assessing all available alternatives. In addition, it also supports other financial practitioners like financial and investment advisors to understand and identify their own investment's psychology and help judge their client's behavior. This study helps stock market policymakers and regulators understand the method and role of behavioral elements in investors' decision-making processes. In addition, it also adds new thoughts to an ongoing discussion on investors' behavior while making investment decisions that provide great future research perspectives to academic and non-academic researchers.

We studied heuristic biases, other biases that affect investment decision making like prospect theory-driven biases and herding biases can also be studied in the future. Further, other moderator or mediator variables like financial literacy and locus of control can also be tested for this model. Therefore, future research can be done in this area, and these studies will provide more insight into investors' decision-making psychology. Under this study, only individual investors were taken. Hence, the same analysis can be done for other market players like institutional investors to understand are they also affected by these biases.

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Influence of Customer Experience on Change in Customer Outcome with Mediating Effect of Relationship Quality and Trust in Banking Sector

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Abstract: The main purpose of the study is to propose a model for better understanding role of customer experience and its impact on customer outcome in banking sector. In private banks, retail customer's experience with various banking services, which will highly influence the customer outcomes like brand equity, WOM, Satisfaction. Traditionally various studies tested this hypothesis in an independent manner, in presence of relationship quality and trust. In the present study, along with the direct effect between customer experience and customer outcome, indirect effect is also measured by considering relationship quality and customer trust as mediating constructs. The test results proved that the two mediators had partial mediation effect in the model. For the study, sample respondents have been chosen from twin cities of Hyderabad and Secunderabad. The results of the study indicating that bankers can adopt key strategies to overcome the threat caused by negative face of customer experience.

1. Introduction

This study is a thoughtful initiative of the researchers to study the customer experience in banking industry. However, it is observed that the significance of customer experience especially in service sector is gaining substantial momentum from past decade (Gentile *et al.,* 2007). As the companies in service sector generally offers intangible products (services) to the customers, they need to have special attention towards understanding how the customers perceive the offered services and what the post purchase behavioural intentions are. The customer experience generally benefits the firms in two

dimensions, one is the positive customer experience creates an opportunity for competitive advantage for the firms and the other side, it also results in brand equity, customer satisfaction and word of mouth. This reason made every service firm to go for customer based or customer centric approaches to enhance their image in customer's mind. It can be observed from the market that most of the service firms focusing more on customer experience which became one of the best weapons in competitive warfare. After products, goods and services; experiences acts as fourth economic offering for the organizations (Pine and Gilmore, 1998).The customer experience is acting as predatory element of customer satisfaction (Meyer and Schwager, 2007). The customer decision making or purchase intentions towards service products will be absolutely dependent on customer experience which is purely personal feeling of an individual. This experience affects the person's behaviour towards a product, emotional, rational and other sensory levels.

For over 30 years, researchers and academicians have tried to define what "customer experience" means? Their efforts have improved our knowledge of what customer experience is all about and how it affects our daily lives (Schmitt, 1999). All studies agree that the first customer experience is based on an emotional connection between the client and the business. In the second place, it is totally internal to the consumer. A lot relies on when you first touch with someone. When one think about customer experience, may wonder: What are the components that make up customer experience? Is there a way to assess customer satisfaction? Whether customer's experience has an impact on their satisfaction or not is unclear? As a result of the earlier studies, some customer experience scale had developed. By adopting those scales based on its suitability, the researchers can study the customer experience in the baking industry. For the present study, the researcher adopted customer experience scale from the literature survey (Fernandes and Pinto, 2019).

The study concentrates on how customer experience affects customer outcome. The customer outcome in the study is taken as combination of brand equity, customer satisfaction and word of mouth. The researcher intended to study the mediation effect of relationship quality and customer trust on the direct relationship between customer experience and customer outcome.

This paper is organized into five sections. First, the prior literature that has been carried out in this arena has been reviewed. Second, the factors of customer experience scale which is adopted have been discussed. Third, the measurement and structural model is applied to test the model. In the fourth section, the direct and indirect effect of customer experience on customer outcome is presented. In the last section, results and discussion is presented.

2. Motivation of the Study

There are plenty of studies tested the linkage between customer experience to relationship quality and customer outcome independently. In the same lines relationship quality in the banking sector was tested by many researchers with relation to trust and few studies examined the influence of customer trust on customer outcome. Thus, in the present study, the researchers made an attempt to develop a consolidated model to examine the impact of customer experience on customer outcome in the presence of relationship quality and trust, which are vital elements in banking sector.

3. Review of Literature

Fernandes and Pinto (2019) stated in their works as it's crucial for banks to cultivate long-term connections with their clients. As a result, there have been few attempts to analyse relationship quality (RQ) in the financial services industry. To better understand the influence of customer experience on RQ in retail banking, this study compares consumers with and without a dedicated account manager using data gathered from 227 retail banking clients and analysed using PLS-SEM. The banking industry's goal is to assess customer happiness, brand equity, and word of mouth (Chahal and Dutta, 2015*)*. CAB (cognitive, affective and behavioural) components ranked top among consumers, followed by relationship experiences and sensory experiences. A strong link between customer happiness, brand equity, and word-of-mouth was demonstrated in this study, although caution should be used while generalising, given that the entire model is only moderately fit.

Customer Experience Management (CEM) is a discipline, technique, and/or process used to manage a customer's cross-channel exposure, engagement, and transaction with a company, product, brand, or service in a complete manner across all channels (Sharma and Chaubey, 2014). From a variety of perspectives, this article aims to synthesis the results of a literature research on the customer's experience with bank's services. To examine the connection, factor analysis, mean, ANOVA, and structural equation modeling were used. The study shows a significant correlation between customer experience and overall feeling, trust, and contentment, which is useful in delighting the customer as a result of the study. Customers' happiness is measured by the effect of 14 aspects of customer experience (Garg *et al.,* 2014). When developing psychometric scales, researchers follow a process that includes item production and selection, scale refining (if necessary), and scale validation (if necessary). Fourteen experience variables and demographics of respondents are compared using a one-way ANOVA test to determine their connection. "Convenience" appears to be the most important element on the study's 41-item 14-factor customer experience scale (Van Tonder *et al.,*2018). The purpose of this paper is to explore the proposed relationships between perceived usefulness (a dimension of perceived value), the relationship quality factors (competence trust and continuous commitment) and positive word-of-mouth intentions in an electronic banking setting. A survey was conducted among 511 electronic banking customers. Continuous commitment was found to mediate the relationships between perceived usefulness and competence trust with positive word-of-mouth intention, respectively. The results indicate the role of perceived value and relationship quality in contributing to positive word-of-mouth intention.

4. Objectives and Hypotheses of the Study

This section of the study presents the details of objectives and hypotheses of the study.

4.1. Objectives of the Study

This study has the following objectives:

- To identify the factors of customer experience towards banking services.
- To measure the direct effect of customer experience on customer outcome.
- To assess the effect of customer experience on customer outcome with the mediation effect of relationship quality and customer trust.

4.2. Hypotheses of the Study

H_{01}: Customer experience has no significant and direct effect on customer outcome with respect to banking services.

H_{02}: There is no mediation effect on the relationship between customer experience and customer outcome.

5. Research Methodology

The following section presents a detailed picture of research methodology comprises of sample size, pilot study and statistical tools applied in the study.

5.1. Sample Size

For the study, the sample size is determined as 410. As the study is conducted in Hyderabad and Secunderbad region, the saving bank account customers of AXIS bank and HDFC were considered as population and Chochran's sample formula was used to determine the sample size. By adopting purposive sampling technique, the required sample were drawn from entire population. During the data collection, 556 questionnaires were distributed, out of which 87 questionnaires were incomplete and 59 were not returned by the respondents. A Structured Questionnaire is designed, tested, and adopted as primary data collection instrument to collect the data from the respondents.

5.2. Pilot Study and Reliability Test

In prior to take the prepared questionnaire in the final study, the same was tested with the sample size of 40. To find out reliability of the questionnaire, Cronbach Alpha test was adopted on the collected data i.e., from 40 respondents. As a part of pilot study, the degree to which the items of each construct in the model were consistent. In order to consider the questionnaire as reliable, the Cronbach's Coefficient should meet minimum threshold i.e. 0.7 (Nunnally, 1976; Robinson *et al.,* 1991). The Cronbach value of each construct can be observed in table 1 and the constructs met the criteria.

Table 1: Reliability of the Constructs

S. No	*Major Divisions*	*Type of questions Likert's scale & 5-point scale*	*Cronbach's Alpha*
1	Customer Experience	12	0.937
2	Customer Outcome	11	0.921
3	Relationship Quality	6	0.919
4	Customer Trust	4	0.951
Overall Score		33	0.922

Source: Authors' Own Compilation

5.3. Tools Used for Analysis

The Covariance based structural equation modeling was adopted to analyze the data. This CB based SEM is one of the best tool to test the proposed models which has theoretical evidence (Wong, 2013).

6. Data Analysis

In this section a detailed description of the constructs used in the study with supporting literature and results and discussion of CFA and SEM Models are presented.

6.1. Description of Constructs

To measure the impact of customer experience on customer outcome, the researcher introduced two more new latent construct to the model i.e., Relationship Quality and Customer trust. With the strong theoretical support, the newly taken constructs into the model were considered as mediating constructs. Here, the core intention of the study is to measure the direct and indirect effect of independent construct on dependent construct. In the model, the Customer experience was taken as exogenous construct and customer outcome as endogenous construct (Fernandes and Pinto, 2019; Chahal and Dutta, 2014).

6.1.1. Customer Experience

Customer experience is a critical combination of different experiences which a customer had with a seller or supplier of products / services over a period of time. With the intensive competition in the baking industry, the players of both public sector as well as private sector are offering vide variety of products to the customers in order to provide superior customer experience which leads to customer satisfaction. This further helps the bank to increase its customer base by acquiring new customers. The ever-changing market conditions made 'Customer Experience' as the focal point of all the players in achieving its objectives. The bankers involved in identifying various dimensions of customer experiences in order to have long term success. James Allen of Harvard Business School strongly felt that "3 D's" are most important to offer most exceptional customer experience. First 'D' is about designing of good incentives to customers, second 'D' focuses on ability of banker to concentrate on various functions in the process of delivering proposed customer experience and Third 'D' is developing consistency in execution of all the designed activities (Allen *et al.*, 2005). Building of good brand image and brand reputation will become a nightmare for the players in all industries without providing excellent customer experience (Meenakshi and Chaubey, 2014).

6.1.2. Customer Outcome

The customer outcome is the overall benefits which the customers are getting from the services offered by banks. With respect to banks, desired customers outcomes are customer satisfaction, enhanced brand equity and Positive Word of Mouth (Chahal and Dutta, 2014). In the present study, the researcher had considered three constructs as a barometer to customer outcome. There is strong theoretical support on impact of customer experience on customer outcome. Each element of the customer outcome considered in the present study varies purely based on customer experience.

The customer satisfaction is an outcome of customer attitude which formed based on customer experience (Schmitt, 2003). Satisfaction and dissatisfaction of customers are the cumulative result of series of customer experiences (Meyer and Schwager, 2007). Customer expectations and experiences are the two important predictors of customer satisfaction. The degree of matching between expectations and experience makes an individual to satisfy or dissatisfy (Chen *et al.,* 2008). In few earlier studies, the researchers found that the better experience leads to better satisfaction (Kim *et al.,* 2008). Along with the customer experience, the quality of services also proved its significant impact on customer outcome. This point made the researcher to take the relationship quality as one of the mediators in the study between customer experience and customer outcome.

The customer experience also acts as predator of brand equity. In the process of creating brand equity for service brand the customer experience plays a very vital role. A strong brand equity for a particular brand is the function of satisfaction and loyalty of a customer towards the brand (Keller, 1993). The stronger loyalty leads to stronger brand equity. A service brand will gain more positive and stronger brand equity when the customer favorably and positively reacts to the product or service. On the other hand, the customer negative feelings towards a brand lead to negative customer-based brand equity.

Through the earlier studies noted that the customer experience not only leads to satisfaction and good customer-based brand equity, but also leads to word of mouth (Keiningham *et al.,* 2007). Depends on customer experience the word of mouth may be positive or negative. The service firms should be very cautious towards the word of mouth. The positive word of mouth reflects the favorable behaviour of the customer towards the brand. This positive tendency among the customers will make them to share their positive experiences with their nears and peers. On the other hand, negative publicity comes as a result of bad customer experience towards the brand and leads to brand switching (Arnold *etal.,* 2005).

6.1.3. Relationship Quality

The Relationship quality reflects the nature of relationship between service firm and customer. When a firm succeeded in maintaining strong relationship with its customers, probably will have more chances to have more loyal customers (Hennig-Thurau *et al.,* 2002). The relationship quality is the main element of competitiveness (Vieira, 2013). The quality of relationship indicates how well the firm satisfied its customers (Crosby *et al.,* 1990). This construct will affect the trust among the customers towards the firms.

6.1.4. Customer Trust

The position of trust in company is critical in all marketing divisions. If a customer wishes to buy something, strongly relies on the confidence that staff can deliver this product and service effectively and satisfy all future customer needs. In the selling of resources, this is particularly so. Trust begins with a relationship between customers and companies that depends on many factors. When a service meets and satisfies the standards and requirements, consumer confidence is established. Superior service anticipations, a comparative edge over rivalry, reducing consumer gaps between preferences and experiences, the implementation of connection marketing and early confidence are all examples of techniques to create this trust between a company and its clients. A company is not confined to just those tactics, however.

A strong way to develop trust is when the customer meets for first time,customers want to decide whether or not to buy the service before they leave. Many consumers do their own homework on a brand before attempting to buy the service. A survey by Rapidan Inbound (2015) found that, before considering purchasing a service or good, the average customer makes 57 percent of his or her studies. Beverige (2015) concluded that a company can gain trust by sharing positive customer feedback, sharing relationships and approvals to identify its credibility and reliability.

6.2. Structural Equation Modeling

To find out the relationship between and within the constructs, Structural Equation Modelling was adopted. The researcher also intended to prove the impact of customer experience on customer outcome in presence of two mediating constructs considered in the study. The study tested second order SEM with the mediation analysis. In the study the SEM is executed in two stages, namely, measurement model and structural model (Gerbing and Anderson, 1988).

6.2.1. Measurement Model

As a part of Measurement model, the convergent and discriminant validities were measured and tested. The convergent validity is concern about the relationship between item and its respective construct. Whereas the discriminant validity reflects the relationship between the constructs. Both validities are at most important to confirm the model fit. Before validity concern, the researcher adopted Exploratory Factor Analysis to confirm whether the items are representing the construct or not. As the customer experience scale is adopted, the researcher wishes to confirm whether the scale will be suitable to the selected sample in the study area or not.

A. Exploratory Factor Analysis

This technique was adopted to test whether all the items are loading into the same construct or not as per the standard scale or proposed model (Habing, 2003; Ramanathan and Muyldermans, 2011). During this test, the items with high correlation will be formed as one group and represents a particular construct.

In prior to EFA, the sample adequacy needs to be according to threshold. KMO test and Bartlett test was used to meet the purpose. In order to apply the factor analysis, the KMO's sample adequacy should meet the minimum threshold i.e., KMO value should be more than 0.5 (Kaiser, 1974) and Bartlett test of sphericity must not above 0.05 (Field, 2013).The table 2 is portraying the result of KMO test.

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.910
Bartlett's Test of Sphericity	Approx. Chi-Square	4347.217
	Df	66
	Sig.	.000

Source: Authors' Own Compilation

Table 2 reveals that KMO sampling adequacy meet minimum threshold i.e., greater than 0.5. and Bartlett test is also significant.

Table 3: Represents EFA Output for Constructs in the Model

Rotated Component Matrix				
	Component			
	1	*2*	*3*	*4*
Env3	.904			
Env2	.849			
Env1	.821			
Per2		.849		
Per3		.832		
Per1		.787		
POff2			.833	
POff3			.801	
POff1			.794	
MoT3				.837
MoT2				.788
MoT1				.769

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

Source: Authors' Own Compilation

Based on the Eigen value, four factors had been identified with more than 85.967% of variance. With respect to indicators loadings, the indicators should load more than 0.5 will only be considered for the model (Hair*et al., 2010).*

B. Confirmatory Factor Analysis

CFA is the second step of measurement model. This is adopted to test the internal validity of the constructs to confirm the factors which were extracted. This is the prerequisite to execute SEM. Here in this step, with the help of CFA, the convergent and discriminant validities were measured. In this study, total 4 constructs were considered and used in CFA to test its validity in order to move for further part of analysis. The following is the mixed order CFA with the proposed constructs of the model (Figure-1).

Figure 1 depicting the measurement model with the extracted factors. Through outer loadings or regression weights, the indicator / item reliability can be calculated.

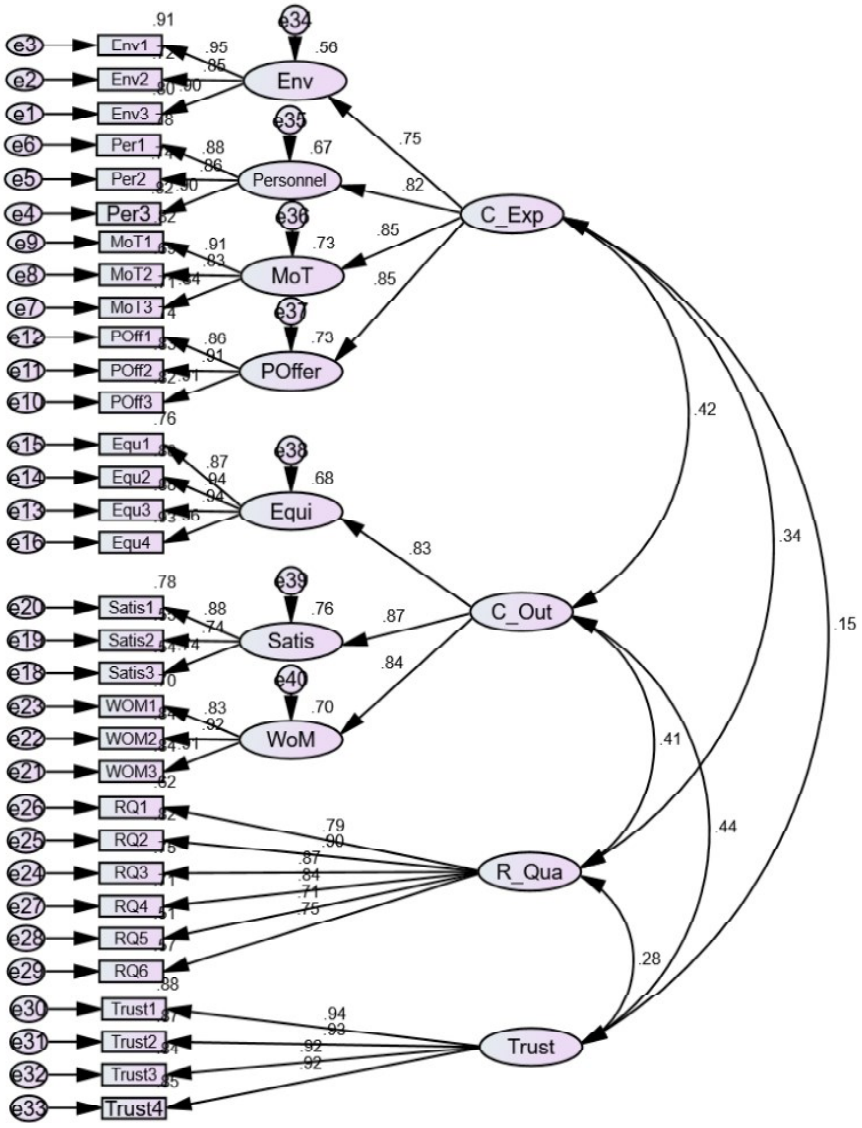

Figure 1: Measurement Model

Source: Authors' Own Compilation

In the above model, the regression weights of all the items and constructs met the threshold i.e., 0.7 (Hulland, 1999). Through the Composite Reliability and Average Variance Extracted, the convergent validity will be tested. The values of CR and AVE were presented in table 4.

Table 4: Convergent Validity through CR & AVE values

S. No	*Constructs*	*Items*	*Std. Regression Weight*	*Composite Reliability (CR)*	*Average Variance Extracted (AVE)*
1	C_Exp	Env	0.75	0.890	0.670
		Personnel	0.82		
		MoT	0.85		
		POffer	0.85		
2	C_Out	Equi	0.83	0.883	0.715
		Satis	0.87		
		WoM	0.84		
3	R_Qua	RQ1	0.79	0.921	0.662
		RQ2	0.90		
		RQ3	0.87		
		RQ4	0.84		
		RQ5	0.71		
		RQ6	0.75		
4	Trust	Trust1	0.94	0.961	0.861
		Trust2	0.93		
		Trust3	0.92		
		Trust4	0.92		

Source: Authors' Own Compilation

Table 4 presents regression results of constructs with CR and AVE of each construct can be observed. The threshold values for CR and AVE are 0.7 (Nunally and Bernstein, 1994) and 0.5 (Bagozziand Yi, 1988) respectively. Through CR and AVE values internal consistency i.e., convergent validity can be measured. From the above table, it is observed that all the values of CR and AVE are above the threshold values. Hence, convergent validity is examined, and no validity issues found. The convergent validity is proved.

The next step is to measure the validity between the constructs i.e., Discriminant Validity. In the form of correlation matrix, the result is presented in the following table. To achieve Discriminant validity, the correlation should be less among the constructs (Campbell and Fiske, 1959).

Table 5: Discriminant Validity

	MSV	*ASV*	*R_Qua*	*C_Exp*	*C_Out*	*Trust*
R_Qua	0.166	0.104	**0.814**			
C_Exp	0.176	0.179	0.341	**0.818**		
C_Out	0.192	0.121	0.408	0.419	**0.846**	
Trust	0.192	0.098	0.276	0.154	0.438	**0.928**

Source: Authors' Own Compilation

To confirm that the model is not suffering with Validity issues, all the diagonal elements in the table 5, should be greater than its respective non-diagonal elements (Fornell and Larcker, 1981). The diagonal values are the square root of its respective AVE. From the table 5, it is observed that the above said criteria is satisfied. Further it is also noted from the statistical result of discriminant validity is that the values which were derived for MSV and ASV are less than AVE (Fornell and Larcker, 1981). Hence, discriminant validity is accepted. The convergent Validity and discriminant validity were successfully achieved.

As it is found that the CFA is not having any validity issues. Then the model fit of all constructs in CFA should be examined. Various model fit indices should be greater than threshold values as per Hair *et al.,* (2006).

In the measurement model, for mix order constructs all the extracted indices through AMOS were presented below.

Table 6: Model Fit Indices for Measurement Model

CMIN/df	*GFI*	*AGFI*	*CFI*	*NFI*	*TLI*	*IFI*	*RMSEA*	*RMR*	*PGFI*	*RFI*
2.122	0.873	0.852	0.959	0.919	0.955	0.959	0.052	0.029	0.746	0.919

Source: Authors' Own Compilation

Table 6 describing values of different model fit indices which were extracted during the analysis. As per the fit indices presented in table 6, GFI and AGFI values are close to 0.9 (threshold Value). Even though they do not exceed 0.9 but still the values are in the acceptable limits (Baumgartner and Homburg, 1996, and Doll *et al.*, 1994). It is observed that all the goodness of fit indices had perfectly satisfied the recommended criteria (Schreiber et al, 2006). Hence, the measurement model is empirically fit (Hair *et al.*, 2006). Theoretically majority of the researchers proved both the constructs viz, customer experience and customer outcome as second order constructs (Fernandes and Pinto, 2019; Chahal and Dutta, 2014). For both of this second order constructs, measurement models were presented in Appendix- I.

6.2.2. Structural Model

As the validity and model fit is proved in CFA, next step is Structural Model. This model need to be tested in order to examine the impact or relationship among four constructs. This is the most reliable tool in a situation when the researcher wants to test the effect among more than one independent variables (Urbach and Ahlemann, 2010). The structural model is presented in figure 2.

The Model fit indices for the above structural model is portrayed in the table 7.

Table 7: Model Fit Indices for Structural Model

CMIN/df	*GFI*	*AGFI*	*CFI*	*NFI*	*TLI*	*IFI*	*RMSEA*	*RMR*	*PGFI*	*RFI*
2.152	0.872	0.850	0.958	0.925	0.954	0.958	0.053	0.035	0.748	0.917

Source: Authors' Own Compilation

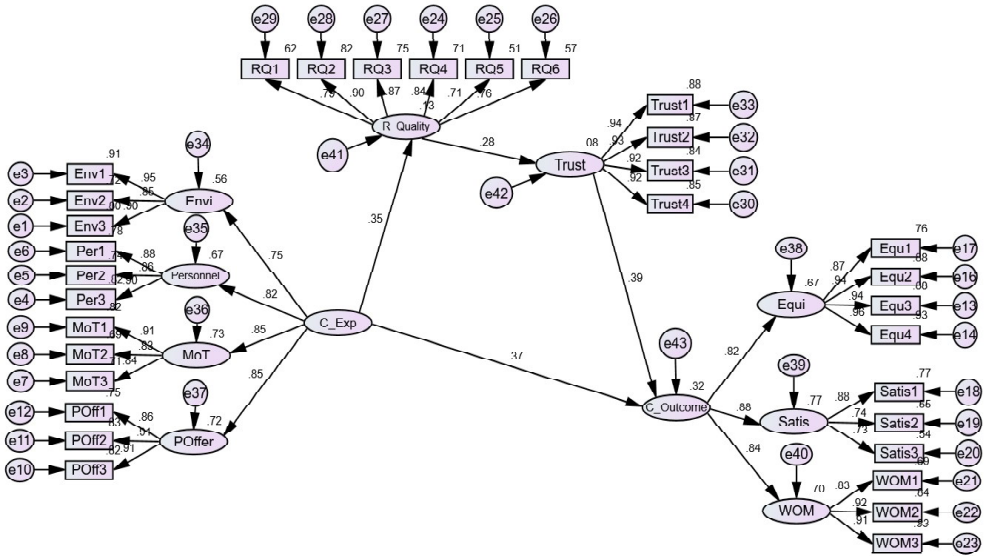

Figure 2: Structural Model

Source: Authors' Own Compilation

The model fit indices for structural equation model shown in the table 7and the indices values were met the suggested and recommended threshold (Hair *et al.,* 2006; Baumgartner and Homburg, 1995; and Doll *et al.,* 1994; Schreiber *et al.,* 2006*)*. Hence, the structural model is considered as a best fit. In the structural model, the independent construct C_exp (Customer Experience) had significant positive effect on R_quality (Relationship Quality) (β = 0.35, P=0.001) and on C_outcome (Customer Outcome) (β = 0.37, P=0.001). R_quality had significant effect on Trust (Customer Trust) (β = 0.28, P=0.001) and Trust had significant impact on C_outcome (Customer Outcome) (β = 0.39,P=0.001). From this model it is clear and proved that the C_outcome significantly influenced by all the constructs considered in the study.

6.2.3. Trust

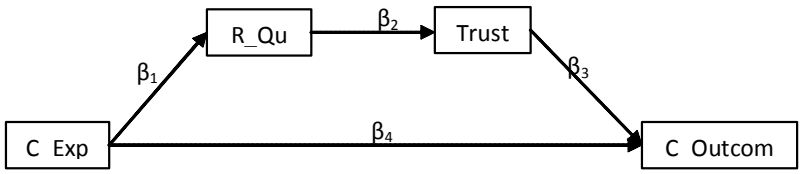

Figure 3: Mediation Analysis: Path Diagram

Source: Authors' Own Compilation

According to Baron and Kenny (1986), through distinct regression equations the effect of mediation was examined. In three levels, the researcher attempted to study whether the model is having partial or full mediation effect or not. In level 1, the impact of C_Exp (X) on C_Outcome (Y) is measured in the absence of mediators and it is noted that X is having significant impact on Y (β=0.48, p<0.001).

Table 8: 'β' Values of Path Analysis

Level 1	*Level 2*			*Level 3*
X → Y	*X → M1 → M2 → Y*			*X → Y(β_4)*
(In the absence of Mediators)				*(In the Presence of Mediators)*
	X → M1 (β_1)	*M1 → M2(β_2)*	*M2 → Y(β_3)*	
0.48***	0.388***	0.298***	0.254***	0.22***
(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	X → M2		M1 → Y	
	0.0476		0.0476	
	(0.3205)		(0.3967)	

Source: Authors' Own Compilation

In level 2, the impact of X on Y is measured in the presence of two mediating variables. To measure the indirect effect, the researcher identified that X (C_Exp) has significant effect on M1 (R_Qua) (β=0.388, p<0.001). The impact of M1 on M2 is also tested and resulted in positive significant effect (β=0.298, p<0.001). Further, the impact of M2 on Y is also proved its significant positive relationship (β=0.254, p<0.001). Hence, through the result of second level, it can be noted that the mediation effect is there on the relationship between X and Y in the model. As the direct effect of X on Y is significant, the mediation effect is considered as Partial Mediation effect. The difference in β coefficient in levels 1 and 3 is portraying the effect of moderating variables M1 (R_Qua) and M2 (Trust).

7. Results and Discussion

Increasing competition and customer knowledge is a big threat to all the players in banking sector. As the customers are having choices, they exhibit their rational behaviour in choosing product or service. As a result of this, the bankers are focusing more on differentiating tool with the competitors. Through earlier studies, it is observed that from last decade the banking industry is in process of enhancing the customer experience with an intention to make this as competitive advantage over other players. Based on these real observations from the market, the researcher taken a thoughtful initiation to study the effect of customer experience on various elements of customer outcome. In this study, total four construct had been taken. The hypotheses which were framed based on objectives were tested using SEM.

Results (H_{01}): In the study, the effect of customer experience on customer outcome is measured. In the process of testing hypothesis, the direct effect of X (Customer Experience) on Y (Customer Outcome) is measured. The standard regression coefficient was 0.48 which is significant at 1% level of significance. As the direct effect is measured and it is found as significant, the null hypothesis (H_{01}) is rejected. Hence, there is a significant effect of customer experience on customer outcome.

The customer experience is proved its significant effect on customer outcome. So, it is noted from the result that the brand equity, customer satisfaction and Word of Mouth will vary based on customer experience. The good customer experience leads to positive customer outcome. Hence, it is suggested to the policy makers of banks that to design policies in such a way to create uniqueness in terms of customer experience which results in effective customer outcome.

Results (H_{02}): The study measured the impact of customer experience on customer outcome both in direct and indirect methods. In case of direct effect, the standardized regression coefficient was 0.48 which is significant at 1% level of significance. Between the same constructs, indirect effect is also found with the standard beta coefficient 0.22 at $P<0.01$ which is also significant. Hence, the model is rejecting H_{02} as there is a significant impact of customer experience on customer outcome (both direct and indirect).

The customer experience is significantly affecting customer outcome in both direct and indirect methods. But if one observes the result of H_{01} which is direct effect, lot of variation in the standardized beta value can be noted. In first instance i.e. direct effect, the standard beta is noted as 0.48 where as it was drastically decreased in presence of two mediating constructs to 0.22.The result is clearly indicating that the mediation effect is there on the model. Even in presence of mediating constructs, the direct effect of customer experience on customer outcome is significant at 1% level of significance. Hence, the mediation effect is partial. The relationship quality and trust play a vital role in enhancing customer outcome. In the model it is noted that the relationship quality is having significant effect on customer trust. These relations between two mediators are proving that the mediation is serial partial mediation. So, the bankers should focus on strategy formulation in order to strengthen customer experience and service quality which intern affects customer trust, because these constructs adversely affecting the customer outcome.

8. Conclusion

In today's dynamic environment, where banking sector transformed to areas like universal banking and Small Finance Banks (SFB), delivering customer experience both in offline and online mode is critical to banking sector. The study findings act as a guide to banking institutions in effectively engaging internet and mobile banking customers. In the banking sector, customer outcome is a function of customer experience, Service quality and relationship quality, trust. The current model focuses on the direct and indirect effect of customer experience on customer outcomes, future research studies could include automated technologies, sensory experiences of the customers as an area of research. The proposed model can be extended to different service sectors to understand its relevance and benefits.

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Appendix – I

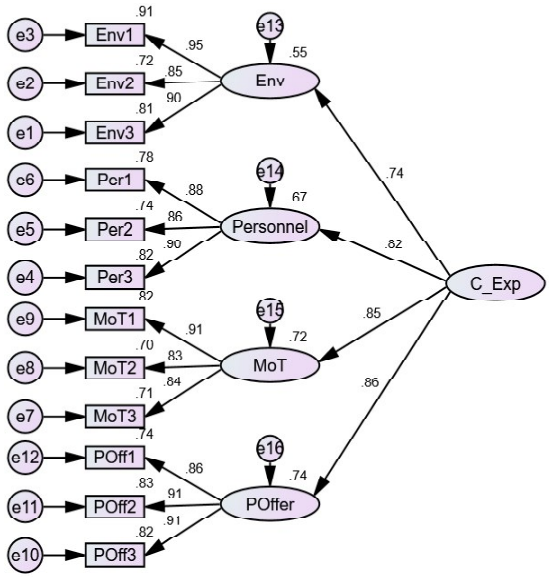

Figure 1: Second Order CFA for Customer Experience

Source: Authors' Own Compilation

Table 1: Convergent Validity for Customer Experience (C_Exp) through CR & AVE values

S. No	*Constructs*	*Items*	*Std. Regression Weight*	*Std. Regression Weight (2nd Order)*	*Composite Reliability (CR)*	*Average Variance Extracted (AVE)*
1	Env	Env1	0.95	0.74	0.89	0.67
		Env2	0.85			
		Env3	0.90			
2	Personnel	Per1	0.88	0.82		
		Per2	0.86			
		Per3	0.90			
3	MoT	MoT1	0.91	0.85		
		MoT2	0.83			
		MoT3	0.84			
4	POffer	POff1	0.86	0.86		
		POff2	0.91			
		POff3	0.91			

Source: Authors'Own Compilation

Table 2: Model Fit Indices for Measurement Model of Customer Experience (C_Exp) Construct

CMIN/df	*GFI*	*AGFI*	*CFI*	*NFI*	*TLI*	*IFI*	*RMSEA*
2.660	0.949	0.921	0.981	0.970	0.975	0.981	0.064

Source: Authors' Own Compilation

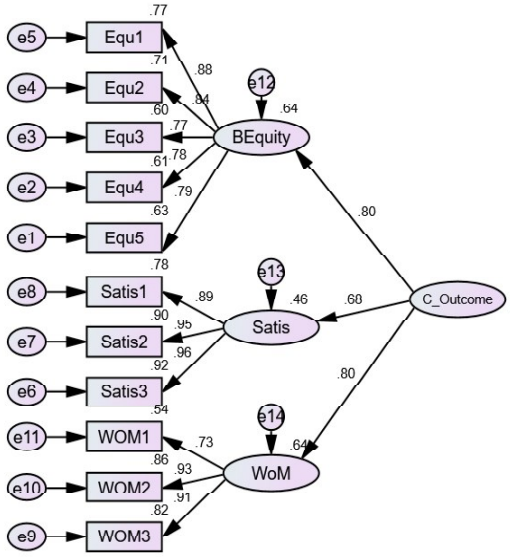

Figure 2: Second order CFA for Customer Outcome

Source: Authors' Own Compilation

Table 3: Convergent Validity for Customer Outcome (C_Outcome) through CR & AVE values

S.No	*Constructs*	*Items*	*Std. Regression Weight*	*Std. Regression Weight (2nd Order)*	*Composite Reliability (CR)*	*Average Variance Extracted (AVE)*
1	BEquity	Equ1	0.88	0.80	0.805	0.58
		Equ2	0.84			
		Equ3	0.77			
		Equ4	0.78			
		Equ5	0.79			

contd. table 3

S.No	*Constructs*	*Items*	*Std. Regression Weight*	*Std. Regression Weight (2nd Order)*	*Composite Reliability (CR)*	*Average Variance Extracted (AVE)*
2	Satis	Satis1	0.89	0.68		
		Satis2	0.95			
		Satis3	0.96			
3	WoM	WOM1	0.73	0.80		
		WOM2	0.93			
		WOM3	0.91			

Source: Authors'OwnCompilation

Table 4: Model Fit Indices for Measurement Model of Customer Outcome (C_Outcome) Construct

CMIN/df	*GFI*	*AGFI*	*CFI*	*NFI*	*TLI*	*IFI*	*RMSEA*
2.230	0.962	0.939	0.986	0.976	0.982	0.986	0.055

Source: Authors' Own Compilation

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Sl. No	Year	Venue	President	Secretary	Managing Editor of Orissa Journal of Commerce	Number of Issues Published
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