The Indian Journal of Commerce
A Quarterly Refereed Journal & UGC - CARE Listed Journal

Aims and Objectives : The Indian Journal of Commerce started in 1947, is the quarterly publication of the All India Commerce, Association to disseminate knowledge and information in the area of trade, commerce, business and management practices. The Journal focusses on theoretical, applied and interdisciplinary research in commerce, business studies and management. It provides a forum for bebate and deliberations of academics, Industries and practitioners.

The Indian Journal of Commerece is published four times in a year i.e., March, June, September and December. The Indian Journal of Commerce is an open acess Journal.

All mauscripts should be submitted through online www.icaindia.info only.

Correspondence : All the correspondence regarding publications should be addressed to Sr.Prof.D.Chennappa, Department of Commerce, Osmania University, Hyderabad, Telangana - 500 007. E-mail : ica.indianjournalofcommerce@gmail.com

Notes for Contributors

Papers based on application oriented research or field studies in the areas of industry, commerce, business studies and management are invited. The length of a paper including tables, diagrams, illustrations etc., should not exceed 15 double space pages. Short communications (not more than 5 double spaced pages) relating to review articles, reports of conferences, summary/views on various governments reports, debatable issues etc., are also published, Book reviews and summary of Ph.D. dissertations not exceeding two double spaced pages are welcome. Manuscripts sent for publication in this journal should not have been published or sent for published or sent for publications elsewhere. All correspondence will be held with the senior (first) author only.

Two copies of the manuscript typed in double space on A4 size bond paper should be submitted Electronically.

All contributions submitted will be subjected to peer review. The decision of the Editorial Committee will be the final.

First page should consist of title of the paper, name(s), of author (s) with all details and abstract not exceeding 150 words. Second page should start with the title of the paper again, followed by the text.

In captions for tables, figures, and columns heading in tables, the first letter of the first world should be capitalised and all other words should be in lower case (except proper nouns). For example Table 5. Price ratios between edible groundnut kernel and other edible nut kernels. **Footnotes** in the text should be numbered consecutively in plain Arabic superscripts. All the footnotes, if any should be typed under the heading 'Footnotes : at the end of the paper immediately after conclusion'.

Follow the Author-date in-text reference : eg. Honda (1997) observed that... A study (Grover et. AI. 1998) found that.. When it is necessary to refer to a specific page (s), cite in the text as : Hooda (1997 P.105) Observed that... A study Hooda 1997a, Hooda 1997b, Hooda 1997c, so on.

Only cited works should be included in the **'References'** which should appear alphabetically at the end of the paper. Follow the reference citation strictly in accordance to the APA Referencing style.

For Example :

Book : Narasimham, N.V. (1994) *A model for the commodity price system analysis,* New Delhi : Himalaya Publications.

Journal Article : Alagh, Y.K. (1997). Agriculture trade and policies. *The Indian Journal of Commerce* L (192) : 1-11.

Government Publication : Government of India Ministry of Communications, Department of Telecommunications (1995). Annual report 1994-95. New Delhi : Government of India, Ministry of Communications, Department of Telecommunications.

Chapter in a Book : Gilberto Mendoza, (1995). A premier on marketing channels and margins. Pages 257-276 in Prices, products and People (Gregory J. Scott, ed.) London, Lynne Rienner Publishers.

All copyrights will be with the Indian Commerce Association and authors. The authors are responsible for copyright clearance for any part of the content of their articles. The Opinions expressed in the articles of this journal are those of the authors, and do not reflect the objectives or opinion of the Association. The author's must follow the plagiarism policy prescribed by the UGC. Accordingly, he/she must check plagiarism before submitting the paper to the Journal. The author will be solely responsible for any plagiarism. It is the ethical duty of the author to submit only original paper. The author will submit the declaration regarding plagiarism and originality while submitting the paper to IJC.

All manuscripts should be submitted through online www.icaindia.info only. For any queries contact: **The Managing Editor, The Indian Journal of Commerce, Prof. D.Chennappa, Department of Commerce, Osmania University, Hyderabad, Telangana State-500 007 through E-mail : ica.indianjournalofcommerce@gmail.com**

© **The Indian Commerce Association**

Printed by : Sri Sai Bhavani Enterprises, New Nallakunta, Hyderabad - 500 044.

Published by Sr. Prof. D.Chennappa on behalf of the Indian Commerce Association.

Benchmarking the Performance of Indian Public Sector Banks

Tamara R. Marak and Santa Kar

Abstract : *The Banking sector has become an essential contributor to the advancement of the economy. This paper tries to analyze the performance of public banks in India using Data Envelopment Analysis (DEA) from 2017 to 2023. Four outputs namely, Investment, Government securities, Interest Income and net NPAs and three inputs namely, Capital, number of employees, operating expenses and deposits were applied to estimate the bank's efficiency. The findings of the study show that the State Bank of India, Bank of Baroda, Bank of Maharashtra, Indian Bank, Punjab and Sind Bank, Punjab National Bank, UCO Bank and Union Bank of India were found to be the highest rank whereas Syndicate bank has been ranked as the least ranking bank. The study reveals that the TE score of 2023 reflects the highest, indicating the success of the strong Regulatory mechanism imposed by RBI and that the efficiency of Public sector banks is improving.*

Keywords : Banks, Efficiency, Data Envelopment Analysis, India.

1. Introduction

A productive financial sector is essential for the smooth working of any economy, leading towards augmentation and amplification of the economic sector (Guru & Mahalik, 2020). The banking sector has become an essential contributor to the advancement of the economy. Generally, banking is portrayed as the monetary business development of handling and protecting cash guaranteed by others and advancing out this money to open up to monetary activities like making a profit or taking care of working expenses. It also additionally performs a strong supporting role to other sectors of the economy like agriculture, small-scale industries, exports, and so forth. Banks control and direct other business concerns

Tamara R. Marak, Department of Commerce, University of Science & Technology, Meghalaya, India.
Dr. Santa Kar, Department of Commerce, University of Science & Technology, Meghalaya, India.

regarding monetary supply. The Indian banking system is one of the most diversified banking systems, consisting of commercial banks, cooperative banks and Development banks. Under commercial banks it takes in Scheduled and non-scheduled commercial banks. Scheduled commercial banks comprise private banks, public banks, foreign banks and Regional Rural Banks. The Public Sector Bank is significantly an overwhelmed portion of all the monetary area. The Public Sector Bank is prominent for every population, especially in rural areas, for its facilities, such as extending and providing loans with low interest, collecting deposits, etc. They expand their branches into unattainable areas.

Public Sector Banks constantly need help with adequate guarantees from the borrowers, especially from huge organizations. Most public sector banks repeatedly faced losses from 2015 to 2018, which affected the Indian economy immensely. The Indian economy suffered a loss due to COVID-19 in almost all sectors including banking. The Banking sector still faces several issues regarding the liquidity-reduced REPO rate by RBI (Bobade & Alex, 2020). Panchal (2021) also stated that a high rate of NPA and high demand of credit is being witnessed due to the ongoing pandemic. Further, Kumar and Kar (2021) stated that public banks have more bad loans than private and foreign banks. Therefore, this situation demands an alarming call to examine the efficiency of the public banks. Owing to the added responsibilities vested upon public banks, the study aims to benchmark the performance about efficiency of public banks operating in the country.

The efficiency of financial institutions has been widely studied in the last few decades. A study conducted by Wu et al., (2006) and Staub et al., (2010) highlighted that the development of society and economy depends on the efficiency and quality of the banking services. For financial institutions, efficiency implies improved profitability, greater amount of funds channelled in, better prices, service quality for consumers and greater safety in terms of improved capital buffer in absorbing risk (Berger et al., 1993). Besides, efficiency in the banking sector significantly increases credit growth which leads to economic development (Ivanoviæ, 2016 & Lakiæ et al., 2016). Tabak et al., (2005) emphasize that banks having a low rate of efficiency might become insolvent, which would result in damage to depositors as well as to the strength of the financial system. According to Chong et al., (2006), banks maximize the profit of shareholders' value or wealth. However, a major problem that contributes to lower profit efficiency comes from revenue inefficiency (Sufian & Kamarudin, 2013). The concept of efficiency is related towards measuring output for a given level of

input, and this concept can be applied to banking operations (Saha & Ravisankar, 2000). In this sense, an efficient bank obtains maximum levels of output for a given level of input or one that can minimize the inputs used for a given level of output (Hasan et al., 2012).

A good number of studies have been conducted on gauging the performance of public banks in India but very few studies attempted to benchmark the ideal performance of such banks. The present study employs the Data Envelopment Analysis (DEA) approach to estimate the efficiency of the public sector banks from the year 2017 to 2021.

Studies on benchmarking financial institutions have captured academic interest since the 1990s. The banking literature has been flooded with studies about efficiency and financial performance. Soterious & Zenios (1997) measured the efficiency, profitability and quality of banking services using Data Envelopment Analysis (DEA) model. They found that superior insights can be obtained by analyzing operations, service quality and profitability. Bhattacharyya et al., (1997) looked at the productivity of 70 commercial banks in India from 1986-1991. They used DEA to get radial technical efficiency scores and SFA (stochastic frontier analysis) to figure out that changes in the scores were due to three things: ownership, time and random noise. According to the study, public banks were the most effective, followed by foreign banks and private banks. Similarly, Das (1997) estimated the technical, allocative and scale efficiency concerning the public banks. The result shows that the State Bank and its associates generally improved overall efficiency. Canhoto & Dermine (2002) compared the performance of new and older Portuguese banks using Non-Parametric DEA to evaluate technical efficiency, from 1990 to 1995. The study finds that the efficiency of new banks is superior to the old banks. Subsequently, Sinha (2007) tries to make an asset quality-based ranking of 28 Indian commercial banks using the DEA model. The author finds that public banks exhibit higher scale efficiency compared to private sector banks. Sinha (2008) also compared the performance of 27 public banks from 2000-01 to 2004-05 using DEA. The study found that public banks have much more room for expanding their off-balance sheet activities than traditional fund-based activities. On evaluating the efficiency of 28 Pakistani commercial banks, Nazir & Alam (2010) found that privatization cannot help banks improve their operating income, and further robustness to the findings of the DEA approach of measuring efficiency shows that public banks are better able to cover their interest and non-interest expenses from their corresponding revenues. In one of his most important papers, Avkiran (2011)

found that a slacks-based measure of DEA with an ungenerous profitability efficiency model was the most significant combination, explaining the variation in the two industry ratios, post-tax profit/average total assets and return on average equity. The result also found poor credit quality with Chinese banks during 2007–2008. Akeem & Moses (2014) used the DEA model to investigate ten Nigerian Banks. The result shows that the Nigerian banking sector needs managerial attention. In the context of Indian banks, Mukta (2016) confirmed that very large size and very small size banks are more efficient compared with medium-sized banks by adopting the DEA method. In a recent study, Guru & Mahalik (2021) benchmarked the performance of public banks in India using Sensitivity analysis in DEA from 2015-16. They confirmed that State Bank of Patiala was the most efficient bank.

2. Objectives of the Study

The present study is framed to address the following objectives:

1.   To estimate the efficiency of public sector banks operating in India from 2017 to 2023.

2.   To rank the banks based on their efficiency score.

3. Research Methodology

The study is empirical and descriptive. The study is conducted over 7 years. Data from the fiscal year 2017 till the fiscal year 2023 is considered for the study, using the census survey method, where the entire population is considered for the study. The population of the study is highlighted in Table-1.

Table 1: Population of the study

Year	No. of Public Sector Banks
2017	21
2018	21
2019	20
2020	18
2021	12
2022	12
2023	12

Source: https://www.rbi.org.in/Scripts/Statistics.aspx

Data for the proposed study have been collected from secondary sources. Various financial reports such as Balance Sheets and Income Statements are proposed to be collected from various published sources. To estimate the efficiency of the banks, a Non-Parametric DEA model is used.

The study uses the **Banker Charnes** and **Cooper** (BCC) Model for estimating efficiency and the Undesirable Measure Model. Toloo & Nalchigar (2009) stated that the BCC model is most suitable in the case of variable returns to scale (VRS). In the BCC model, VRS is assumed, and the convex hull of the existing DMUs forms the efficient frontier.

4. Results and Discussion

4.1. Descriptive Statistics of Public Sector Banks operating in India

Table-2 depicts the descriptive statistics of the variables selected for the input and output of Public banks based on different ratios. From the table, it can be observed that in the case of the input variables, the banks reported an average worth of capital of Rs.54606.8 Lakhs, Rs.193605.2 Operating Expenses, Rs.9457349.5 Deposits and 803967 Number of Employees. In the case of the output variables, the banks reported an average Investment worth of Rs.3114721.8 Lakhs, Rs.2544203 Government Securities, Rs.258189.8 Non-Performing Assets and Rs.260233 Interest Income for Output variables. Compound Annual Growth Rate (CAGR) reported a positive figure for almost all the variables throughout the study period except in the case of the Number of Employees as the banks computed a negative 1.88 per cent and Non-Performing Assets computed a negative 20.66 per cent, which indicates that the banks are now in a better position regarding managing their loans. In the case of the Number of Employees and Non-Performing Assets, it could be observed that the values continuously declined from the year 2018 to 2023.

4.2. Efficiency of Public Banks

Table-3 highlights that the average technical efficiency (TE) score accounted for 98 per cent which is primarily attributed to scale efficiency (99 per cent). CAGR also reflects a positive growth of 0.4 percent indicating a healthy growth in the TE score throughout the study period. It can be observed from the table that there was a sharp decline in TE score in the year 2018 which can be attributed to the ill financial health of the Public sector banks followed by the merger of SBI with five of its associates and one other bank in the same year. A sharp rise in the TE score of 2019 indicates the success of the bank mergers. TE score of 2023 reflects the highest, 100 per cent which can be an indication of the success of the

Table-2 : Descriptive Statistics of Input and Output Variables

Year	INPUT					OUTPUT		
	Capital	Operating Expenses	Deposits	No. of employees	Investment	Govt. Securities	NPA	Interest Income
2017	24312.5	155185.6	8076782.0	857500.0	2554783.3	2094619.4	383088.8	200418.1
2018	33154.3	164206.5	8262321.8	844163.0	2791857.9	2289821.7	454472.7	205140.1
2019	51059.9	175114.3	8486214.5	807577.0	2702033.2	2167070.2	285122.2	230961.9
2020	72040.2	192720.2	9048419.8	790659.0	2940636.3	2371782.5	230917.6	248197.8
2021	59327.9	203854.8	9900765.5	784258.0	3400894.7	2770642.6	196450.8	275574.3
2022	71176.4	220090.7	10717361.9	776276.0	3595646.8	2950409.2	154745.4	297950.4
2023	71176.4	244064.1	11709580.8	767336.0	3817200.5	3165075.5	102531.6	363388.1
Mean	54606.8	193605.2	9457349.5	803967.0	3114721.8	2544203.0	258189.8	260233.0
Minimum	24312.5	155185.6	8076782.0	767336.0	2554783.4	2094619.4	102531.6	200418.1
Maximum	72040.2	244064.1	11709580.8	857500.0	3817200.5	3165075.5	454472.7	363388.1
Range	47727.7	88878.5	3632798.8	90164.0	1262417.2	1070456.1	351941.1	162970.0
Std. Dev.	377642026.5	1005946851.1	1883529851699.0	1194783632.0	23750832638.7	173425723491.9	15722962820.2	3318939213.6
CAGR	19.13	7.77	6.60	-1.88	7.18	7.37	-20.66	10.16

Source: https://www.rbi.org.in/Scripts/Statistics.aspx

strong Regulatory mechanism imposed by RBI and that the efficiency of Public sector banks is improving.

Table-3 : TE Score with Decomposition of Efficiency Scores

Year	PTE	TE	SE
2017	0.98	0.98	1.00
2018	0.94	0.97	0.97
2019	0.99	1.00	0.99
2020	0.97	0.98	0.99
2021	0.97	0.98	0.98
2022	0.98	0.99	1.00
2023	1.00	1.00	1.00
Average	0.97	0.98	0.99
CAGR	0.12	0.04	0.08

Source: Own computation using DEAP.

4.3. Scale of Operation of Public Banks Operating in India.

Chart-1 depicts that the majority of the banks operated on constant returns to scale (CRS) during the study period. The Chart also highlights that no bank operated in Decreasing Return to scale (DRS) in the years 2021 and 2023.

Chart-1 : Scale of Operation
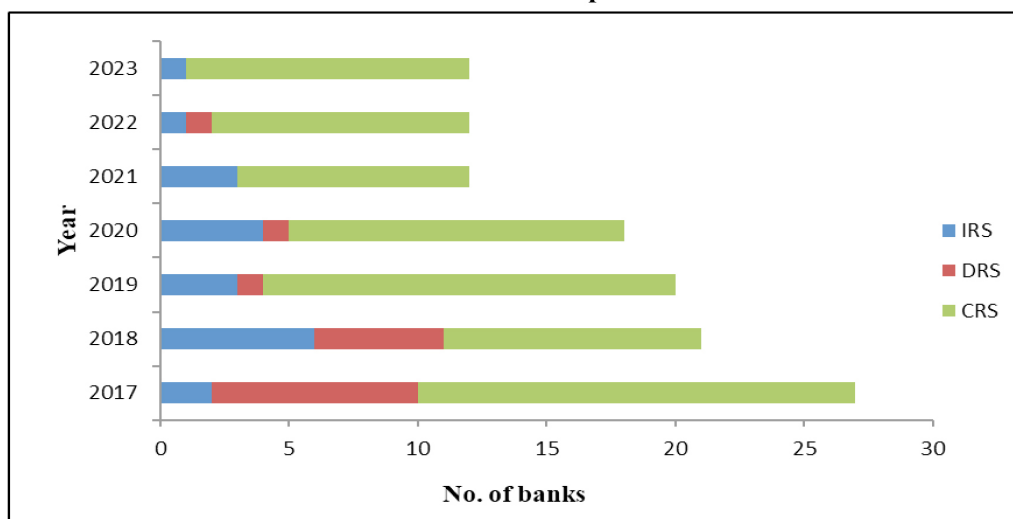
Source: Own interpretation

4.4. Ranking of the Banks

It can be seen from Table-4 that the State Bank of India and its group, Bank of Baroda, Bank of Maharashtra, Indian Bank, Punjab and Sind Bank, Punjab National Bank, UCO Bank and Union Bank of India were found to be the highest rank whereas Syndicate bank has been ranked as the least ranking bank. It was observed that most of the underperforming banks were merged with high-ranking banks. Only UCO Bank, Bank of Maharashtra, Central Bank of India, Indian Overseas Bank and Punjab and Sind Bank remained as independent entities in the study period. The least-performing banks are being merged with the higher-performing banks reducing the risk of bankruptcy which will ultimately improve the Indian banking system.

Table-4 : Ranking of the Banks

BANKS	Average TE Score	Rank
STATE BANK OF BIKANER AND JAIPUR	1	1
STATE BANK OF HYDERABAD	1	1
STATE BANK OF INDIA	1	1
STATE BANK OF MYSORE	1	1
STATE BANK OF PATIALA	1	1
STATE BANK OF TRAVANCORE	1	1
ALLAHABAD BANK	0.9745	22
ANDHRA BANK	1	1
BANK OF BARODA	1	1
BANK OF INDIA	0.947286	25
BANK OF MAHARASHTRA	0.993429	18
BHARATIYA MAHILA BANK LTD.	1	1
CANARA BANK	0.943857	26
CENTRAL BANK OF INDIA	0.964	23
CORPORATION BANK	0.99425	17
DENA BANK	0.995	16
IDBI BANK LIMITED	1	1
INDIAN BANK	1	1
INDIAN OVERSEAS BANK	0.989857	20
ORIENTAL BANK OF COMMERCE	0.963	24

PUNJAB AND SIND BANK	1	1
PUNJAB NATIONAL BANK	1	1
SYNDICATE BANK	0.8895	27
UCO BANK	1	1
UNION BANK OF INDIA	0.993143	19
UNITED BANK OF INDIA	1	1
VIJAYA BANK	0.975333	21

Source: Own computation using MS Excel

5. Conclusion

The banking sector has the power to control and direct other business concerns in terms of monetary supply. Public Sector Bank is prominent for every population, especially in the rural area for its facilities such as extending and providing loans with low interest and collecting deposits, etc. The study analyzed the efficiency of public sector banks. State Bank of India, Bank of Baroda, Bank of Maharashtra, Indian Bank, Punjab and Sind Bank, Punjab National Bank, UCO Bank and Union Bank of India were found to be the highest rank whereas Syndicate Bank has been ranked as the least ranking bank. It was observed that most of the underperforming banks were merged with high-ranking banks. Only UCO Bank, Bank of Maharashtra, Central Bank of India, Indian Overseas Bank and Punjab and Sind Bank remained as independent entities in the study period. The least-performing banks are being merged with the higher-performing banks reducing the risk of bankruptcy which will ultimately improve the Indian banking system. Further, the study shows that most banks operated on constant returns to scale (CRS) during the study period. No banks were found operating in Decreasing Return to scale (DRS) in the years 2021 and 2023. As per the decomposition of Efficiency Scores under Output Oriented for the Banks, the study finds a positive growth of 0.4 per cent indicating a healthy growth in the TE score throughout the study period. It can be observed from the table that the TE score of 2023 reflects the highest, 100 per cent which can be an indication of the success of the strong Regulatory mechanism imposed by RBI and that the efficiency of Public sector banks is improving.

6. References

Berger, A. N., Hunter, W. C., & Timme, S. G. (1993). The efficiency of financial institutions: A review and preview of research past, present and future. *Journal of Banking and Finance, 17*, 221-249.

Bhattacharyya , A., Lovell , C., & Sahay, P. (1997). The impact of liberalization on the productive efficiency of Indian Commercial banks. *European Journal of Operational Research*, 332-345.

Bobade, P., & Alex, A. (2020). Study the Effect of Covid-19 in Indian Banking Sector. *Novateur Publication's JournalINX-A Multidisciplinary Peer Reviewed Journal*, 179-184.

Canhoto A and Dermine J. (2002). A note on Banking Efficiency in Portugal, New vs Old Banks. *Forthcoming Journal of Banking & Finance*, 1-16.

Chong, B. S., Liu, M. H., & Tan, K. H. (2006). The wealth effect of forced bank mergers and cronyism. *Journal of Banking & Finance, 30*(10), 3215–3233.

Das, A. (1997). Technical, allocative and scale efficiency of public sector banks in India. *Reserve Bank of India Occasional Papers, 18*, 279-301.

Guru and Mahalik. (2020). Measuring, Benchmarking and ranking the Performance of Indian Public Sector Banks. *SSRN Electronic Journal*, 1-20.

Hadad, M. D., Hall, M. J., Kenjegalieva, K. A., Santoso, W., Satria, R., & Simper, R. (2008). Efficiency and Malmquist Indices of Productivity Change in Indonesian Banking. *Discussion Paper Series*, 1-28.

Hasan, M. Z., Kamil, A. A., Mustafa, A., & Baten, M. A. (2012). Estimating Stock Market Technical Efficiency for Truncated Normal Distribution: Evidence from Dhaka Stock Exchange. *Trends in Applied Sciences Research, 7*(7), 532-540.

Ivanovic, M. (2016). Determinants of Credit Growth: The case of Montenegro. *Journal of Central Banking Theory and Practice, 5*(2), 101-118.

Kumar and Kar. (2021). Measuring Efficiency of Selected Indian Commercial Banks: A DEA Based MPI Approach. *Indian Journal of Finance*, 44-60.

Lakic, S., Sehovic, D., & Draskovic, M. (2016). Relevance of Low Inflation in the Southeastern European Countries. *Journal of Central banking Theory and Practice, 2*, 41-63.

Panchal, N. (2021). Impact of Covid-19 on Banking in India: An Empirical Analysis. *An indexed referred & peer reviewed journal of higher education, 13*(2), 446-459.

Percin, S., & Ayan, T. Y. (2006). Measuring Efficiency of Commercial Banks in a Developing Economy: The Case of Turkey. *Investment Management and Financial innovations, 3*(2), 217-231.

Saha, A., & Ravisankar, T. S. (2000). Ratings of Indian Commercial Banks: A DEA Approach. *European Journal of Operational Research, 124*(1), 187-203.

Sinha, R. P. (2007). Asset Quality Based Ranking of Indian Commercial Banks-A Non-Parametric Approach. *Asis Pacific Business Review, 3*(2), 27-37.

Sinha, R. P., & Chatterjee, B. (2008). Asset Based Ranking of Indian Commercial Banks: A Super efficiency Approach. *Artha Vijnana, 1*, 79-92.

Soteriou, A., & Zenios, S. A. (1997). Efficiency, Profitability and Quality of Banking Services. *The Wharton Financial Institutions center*, 1-28.

Staub, R. B., Souza, G. d., & Tabak, B. M. (2010). Evolution of Bank Efficiency in Brazil: A DEA Approach. *European Journal of Operational Research, 202*(1), 204-213.

Sufian, F. (2008). The Efficiency of Non-Bank Financial Intermediaries: Empirical Evidence from Malaysia. *International Journal of Banking and Finance, 5*(2), 149-167.

Sufian, F., & Kamarudin, F. (2013). Efficiency of the Bangladesh Banking Sector: Evidence from the Profit Function. *Jindal Journal of Business Research, 2*(1), 43-57.

Tabak, B. M. (2005). An International Comparison of Banking Sectors: A DEA Approach. *Global Economic Review, 34*(3), 291-307.

Worthington, A. C. (1998). The determinants of non-bank financial institution efficiency: A stochastic cost frontier approach. *Applied FInancial Economics, 8*(3), 279-289.

Wu, F., Yeniyurt, S., Kim, D., & Cavusgii, S. T. (2006). The impact of information technology on supply chain capabilities and firm performance: A resource-based view. *Industrial Marketing Management, 35*(4), 493-504.

Annexure-1 : Efficiency of the Banks

BANKS	2017	2018	2019	2020	2021	2022	2023
STATE BANK OF BIKANER & JAIPUR	1.00						
STATE BANK OF HYDERABAD	1.00						
STATE BANK OF INDIA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
STATE BANK OF MYSORE	1.00						
STATE BANK OF PATIALA	1.00						
STATE BANK OF TRAVANCORE	1.00						
ALLAHABAD BANK	0.98	0.91	1.00	1.00			
ANDHRA BANK	1.00	1.00	1.00	1.00			
BANK OF BARODA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
BANK OF INDIA	0.95	0.89	0.97	0.96	0.96	0.90	1.00
BANK OF MAHARASHTRA	0.96	1.00	1.00	1.00	1.00	1.00	1.00
BHARATIYA MAHILA BANK LTD.	1.00						
CANARA BANK	1.00	0.97	1.00	0.93	0.85	0.91	0.95
CENTRAL BANK OF INDIA	0.85	0.90	1.00	1.00	1.00	1.00	1.00
CORPORATION BANK	1.00	1.00	1.00	0.98			
DENA BANK	0.99	1.00	1.00				
IDBI BANK LIMITED	1.00	1.00					
INDIAN BANK	1.00	1.00	1.00	1.00	1.00	1.00	1.00
INDIAN OVERSEAS BANK	1.00	0.99	1.00	0.94	1.00	1.00	1.00
ORIENTAL BANK OF COMMERCE	1.00	0.91	1.00	0.94			
PUNJAB AND SIND BANK	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PUNJAB NATIONAL BANK	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SYNDICATE BANK	0.84	0.87	1.00	0.85			
UCO BANK	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UNION BANK OF INDIA	0.95	1.00	1.00	1.00	1.00	1.00	1.00
UNITED BANK OF INDIA	1.00	1.00	1.00	1.00			
VIJAYA BANK	0.97	0.98	0.98				
AVERAGE	**0.98**	**0.97**	**1.00**	**0.98**	**0.98**	**0.98**	**1.00**

Source : Own computation using MS Excel.

External Business Environment and its Impact on Organizational Performance of Ethiopian Coffee Industry : A PESTEL Analysis

Fikeresiyon Fekede Umema and Gurudutta Pradeep Japee

Abstract : *Due to fierce competition and a challenging environment, every firm today is in an extremely inconvenient situation. Nevertheless, every business strives for success by concentrating on essential success elements and embracing the idea of business excellence. This study intends to investigate how the external business environment affects the Ethiopian coffee industry's organizational performance with special reference to exports. Using a straightforward random sampling technique, the data was collected from 290 survey participants. Both primary and secondary sources of data were employed in the study. Descriptive and inferential statistical data analysis techniques are also used for data analysis. Six hypotheses were created and tested considering the literature study and conceptual framework. Organizational performance was the dependent variable, and the six independent variables were political, economic, social, technological, environmental, and legal aspects (PESTEL analysis). The results were presented in the form of mean, standard deviation, Pearson's correlation, ANOVA (Analysis of Variance), and regression analysis. According to the survey's findings, respondents agreed that there is a significant relationship between external business environmental factors and industry performance in the study area. The results of the inferential analysis reveal that the value of $r^2 = 0.777$, indicating that the models explain 77.7% of the variance in the dependent variable (organizational performance). The outcome indicates that companies need frequent environmental scanning, which helps them monitor their organization's external environments to get a sustainable competitive advantage.*

Keywords : External Environment, PESTEL Analysis, Organizational Performance, Exports.

Fikeresiyon Fekede Umema, Lecturer, School of Business and Economics, Department of Management, Dilla University, Ethiopia, Research Scholar, School of Commerce, Gujarat University, Ahmedabad, India. E-mail: fikeresiyon2015@gmail.com, ORCID: https://orcid.org/0009-0004-3457-1618

Dr. Gurudutta Pradeep Japee, Professor, School of Commerce, Gujarat University, Ahmedabad, India. ORCID: https://orcid.org/0000-0002-0341-6015

Introduction

The external environment is defined as the collection of external forces that can potentially affect an organization's performance (Murgor, 2014). It is a collection of external organizational factors (Njoroge et al., 2016). No matter the sector in which an organization competes, the external environment has an impact on businesses as they strive to maintain strategic competitiveness (Hitt et al., 2011). The external environment of an organization is a dynamically expanding characteristic that consists of a complex of social, technological, economic, political, and legal variables that are outside the control of business and impose their limitations on the actions of the company.

PESTEL refers to the political, economic, social, technological, environmental and legal considerations that need to be examined when creating a plan. Therefore, a PESTEL analysis is a review of the six environmental or exogenous elements that influence strategy (Schmieder-Ramirez et al., 2015). The organization tries to find a strategic fit within its environment in a way that maximizes operational efficiency and performance even though it has no direct influence or control over the six factors (Carr and Nanni Jr, 2009).

The PESTEL model entails the gathering and description of data regarding external factors that could or might not have an impact on your business (Nandonde, 2019). Additionally, it is a quick and efficient method for locating outside factors (at the level of the macro environment) that can have an impact on an organization (Yatsenko & Dmytriyeva, 2018). These influences can present an organization with both an opportunity and a threat. The PESTLE analysis is the most generalized PEST variation ever developed. It is a particularly flexible tool since new elements can be quickly added to concentrate on one or more important forces affecting an organization (Yek, 2014). PESTEL offers a framework for in-depth examination of the environment in which an organization operates and the formulation of potential business plans. PESTEL analysis is employed in research, new product or service creation, marketing planning, and strategic planning (Vasileva, 2018). Given the continually evolving global business landscape, it is crucial from a strategic standpoint to better understand the elements affecting export performance.

Many businesses' success or failure depends on the variables that have an impact on their operations. Planning a sound strategy or running a successful firm is impossible without considering the effects of environmental conditions. The factors outside of the organization's sphere of influence and control are the focus

of the external environment analysis (Beal, 2000). To help managers plan through action, scanning the external environment in which the firm works entails seeking, gathering, and using information regarding events, trends, correlations between variables, and learning processes (Voros, 2001). Therefore, companies conduct environmental analyses to identify and comprehend the external influences that have an impact on them and to respond with the necessary activities to maintain a competitive position (Nistorescu and Barbu, 2006).

Prior research has been done on the relationship between performance and the external environment. For instance, according to Ebabu Engidaw, A. (2021), in his study in Lalibela, Ethiopia, revealed a positive and significant association between external influences and industrial performance in the research area. In particular, the performance of businesses is positively impacted by marketing elements, financial aspects, infrastructure, workplace factors, trade-fair considerations, and political and legal issues. The external operational environment has a significant impact on how well businesses perform due to changes in technology, the market, competition, and customer demand as outlined in Banda, G. (2020).

There are extremely few prior investigations, particularly in Ethiopia. The restrictions include the breadth and sectors, in addition to the number of studies. Constant environmental scanning is required for businesses to get a competitive edge in this dynamic world. Additionally, Ethiopia's economy is based on the production of coffee. For these reasons, the researchers would like to fill the gap in this study by investigating external business factors that affect organizational performance. This study is extremely helpful for coffee exporters, policymakers, government officials, and other stakeholders beyond its contribution to the nation's growth. Therefore, this study was examined the external business environment and its impact on organizational performance of coffee industry in Ethiopia with special reference to exports.

Literature Review

Concepts of Environment

The term "environment" refers to the totality of the external forces that have an impact on individuals, businesses, and communities (Oginni & Faseyiku, 2012). According to Adebayo et al. (2005), the definition of "environment" is simply the surroundings of an event that occasionally determines and shapes the course of business. Business organizations function within the context in which goods

and services are produced and distributed; they do not operate in a vacuum. The environment has been defined as the entirety of the elements that influence, affect, or decide how a firm operates or performs (Oginni & Faseyiku, 2012).

Concepts of External Business Environment

The idea of the external business environment is an effort to comprehend the external influences on corporate boundaries Sahu, S. (2011). It consists of all external factors that are present and that could potentially have an impact on the organization. They are important to how businesses operate and need to be closely watched. According to Fermando (2011), the business environment is made up of institutions, pressures, and other variables that are external to the company and have an impact on how it operates. They include things like clients, competitors, suppliers, and the government, as well as social, political, legal, and technological factors.

PESTEL Analysis

A review of the literature revealed that many methods and techniques were used to analyze the macro environment (Lynch, 2009). The PESTEL (Political, Economic, Sociocultural, Technological, Environmental, and Legal) analysis is the model that was looked at in this study.

Political Factors

The political environment refers to influences and issues resulting from governmental political actions that have the potential to change the value and expected outcome of a particular economic action by influencing the likelihood that corporate objectives will be met (Mark & Nwaiwu, 2015). Through antitrust laws, fair trade regulations, minimum wage regulations, tax programs, pollution and pricing policies, and other means, political restrictions may be placed on businesses. While these measures may be seen as protecting workers, consumers, and the environment, they would impede an organization's ability to be profitable and perform well. On the other hand, legislation and political activities may safeguard businesses or even increase their profitability through patent rules, product research grants, government subsidiaries, and other similar mechanisms (Pearce & Robinson, 2005).

Economic Factors

Economic factors are concerned with the economy's overall prospects, according to Robert et al. (2013). GDP/GNP, inflation rates, interest rates, exchange rates,

unemployment rates, wage and price restrictions, fiscal and monetary policy, and exchange rates are among the important metrics. Other factors to consider are the availability of energy and raw materials, the state of the infrastructure and distribution networks, and the evolving nature of international competition.

Social Environment

Social factors are a part of the company's external environment and include people's views, values, attitudes, opinions, and lifestyles (Wheelen & Hunger, 1990). As a result of people's efforts to regulate and address external environmental elements and meet their needs and desires, social forces are dynamic and always changing (Kume, 2010). Social conditions are crucial factors in any analysis of the business environment since they provide the backdrop for all individual and commercial actions (Nandonde, 2019).

Technological Factors

The organization's ability to adapt and exploit new sciences and ideas that are emerging in diverse sectors of knowledge is supported by technological aspects. Spending on research and development, concentrating on technological advancement in the industry, innovation, technology transfer, life cycle, and rate of technological change are examples of technological variables (Epstein & Roy, 2001).

Environmental Factors

The natural environment includes geographical and ecological factors that influence business operations. The availability of natural resources, the weather and climatic conditions, locational considerations, topographical considerations, etc. are some of these elements. The nature of the natural environment has a significant impact on business. For instance, only areas where sugarcane can be farmed have sugar mills built there. It is always seen as preferable to locate a manufacturing facility close to the sources of input. Also, the government's policies maintain ecological balance and conserve resources in the business sector (Sahu, S., 2011).

Legal Factors

According to Adeoye (2012), the legal environment is made up of rules and regulations, and an improvement in this enabling environment encourages more private sector investment, wealth development, job creation, and eventually a reduction in poverty. The government imposes rules on various sectors of the

economy, which have a significant impact. These regulations are put in place to protect the public from corporate practices.

Concepts of Organizational Performance

Organizational performance, also known as enterprise performance or firm performance, relates to the organization's real output. Organizational success, according to Richard et al. (2009), consists of three components: financial performance, product market performance, and shareholder return.

Conceptual Model

To examine the situation, create guidelines and directions for improving and building a development strategy, any organization must use PESTEL analysis, one of the most crucial and inevitable instruments for assessing external impacts (Shtal et al., 2018). Due to the way the components that emerge in this approach are conceptualized, this strategy is best suited for application to the total business environment rather than to each specific corporation inside a business environment (Mack & Putzschel, 2014).

A conceptual model based on the theoretical framework is built to explore the impact of PESTLE elements on organizational performance. PESTLE is used because it is a thorough framework and a useful tool for understanding, analyzing, and classifying several factors in the macro environment (Ansah et al., 2016). The study seeks to supply conceptual clarifications to these important environmental variables from the analysis of the PESTLE Model discussed above to gain a thorough understanding of the literature on the surrounding external environmental variables of organizations and how they affect the performance of businesses.

Research Hypotheses

The researchers developed six basic research hypotheses to test the external business environment and its impact on organizational performance of the coffee industry in Ethiopia.

H1. There is a significant positive relationship between political factors and organizational performance of coffee industry in Ethiopia.

H2. There is a significant positive relationship between economic factors and organizational performance of coffee industry in Ethiopia.

H3. There is a significant positive relationship between social factors and organizational performance of coffee industry in Ethiopia.

H4. There is a significant positive relationship between technological factors and organizational performance of coffee industry in Ethiopia.

H5. There is a significant positive relationship between legal factors and organizational performance of coffee industry in Ethiopia.

H6. There is a significant positive relationship between environmental factors and organizational performance of coffee industry in Ethiopia.

Methodology

In this study used a cross-sectional survey design with an explanatory study type, adhering to a quantitative research methodology. It is recommended to utilize this design to describe the relationship between the variables under the study. For this study's purpose, both primary and secondary sources of data were used to fulfill to meet the research objectives. Cronbach's alpha was used to check the construct's internal consistency. In this instance, the Cronbach's alpha value was higher than 0.7 for all variables. As a result, all variables are accepted and supported by the assumptions. The method developed by Taro Yamane in 1967 was used to calculate the study's sample size. This technique was utilized since it is one of the best for figuring out the sample size in probability sampling. We assume a 5% accepted error (true value) using this formula and a 95% confidence level. The sample size was calculated using the formula : $n = N/ (1+N*(e)^2)$. Thus, from the total of 1524 coffee exporters, 318 people make up the sample size. Simple random sampling procedures were used by the researchers to get the data. Additionally, multiple linear regression analysis and correlation were also used to examine the acquired data.

Results and Discussions

Of the total of 318 questionnaires distributed, 290 (91.19%) were completed and returned during the data collection. Every completed questionnaire was considered suitable for the study. Since this is adequate to make the analysis, all the discussions were conducted with n = 290 as the effective number of respondents.

Descriptive Analysis

In this study, descriptive analysis was performed to figure out the level of agreement with the found variables; mean and standard deviation were

employed to assess how many of the responses varied from the arithmetic mean. The grand mean of the descriptive statistics results for the factors of political, economic, social, technological, environmental, and legal factors is 2.5683, 2.8055, 4.0055, 3.1414, 2.6731, and 2.8083, with standard deviations of 0.78768, 0.81828, 0.99213, 0.88900, 1.03042, and 0.85466, respectively. This demonstrates unequivocally that the respondents' degree of agreement falls within the medium range, except for social factors, which fall into the high range. Furthermore, the standard deviation result shows how widely the respondents' views on the claims concerning outside influences and performance varied.

Correlational Analysis

The correlation r values showed a significant r-value for the correlation between the independent and dependent variables. According to Mooi and Sarstedt (2011) absolute correlation coefficients below 0.30 indicates a weak effect, coefficients between 0.30 and 0.49 indicate a moderate effect, and values of 0.50 and higher indicate a strong effect.

Therefore, the correlation r values showed that there was a strong, positive relationship between the independent variables; political, economic, social, technological, environmental, and legal variables; and the dependent variable; organizational performance, with correlation coefficients of 0.756, 0.717, 0.263, 0.439, 0.701, and 0.741 with $p<0.1$ for each variable, respectively. As a result, the correlation results show that all independent factors have a strong association with the dependent variable organizational performance, apart from SOF and TEF, which have weak and moderate relationships, respectively.

Regression Analysis

Multiple regression analysis was used to analyze how the independent variables affected the dependent variable. The main goal is to evaluate how external environmental influences affect organizational performance. The findings are presented below in tables : 1, 2, and 3.

The study has six independent variables and one dependent variable.

The independent variables are: Political Factors (POF), Economic Factors (ECF), Social Factors (SOF), Technological Factors (TEF), Environmental Factors (ENF), and Legal Factors (LEF).

The dependent variable is Organizational Performance (ORP).

Table-1 : Significance of the Regression Result Coefficients[a]

Model	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1 (Constant)	-.961	.144		-6.654	.000					
POF	.384	.046	.330	8.341	.000	.756	.444	.234	.503	1.989
ECF	.207	.063	.185	3.290	.001	.717	.192	.092	.249	4.018
SOF	.106	.027	.115	3.989	.000	.263	.231	.112	.946	1.057
TEF	.112	.033	.109	3.413	.001	.439	.199	.096	.776	1.289
ENF	.280	.033	.315	8.472	.000	.701	.450	.238	.570	1.755
LEF	.140	.064	.131	2.200	.029	.741	.130	.062	.223	4.493

a. Dependent Variable: ORP

Source : SPSS Version 24 Output

By replacing the X values with the variables, the equation will be:

$$ORP = b_0 + b_1 POF + b_2 ECF + b_3 SOF + b_4 TEF + b_5 ENF + b_6 LEF + e$$

$$ORP = -0.961 + 0.330 POF + 0.185 ECF + 0.115 SOF + 0.109 TEF + 0.315 ENF + 0.131 LEF$$

Therefore, the regression results, the mathematical expressions of all independent variables which have a significant positive relationship with the dependent variable; POF with coefficient of b=0.330 with a significant value of p=0.000, ECF with coefficient of b=0.185 with a significant value of p=0.001, SOF with coefficient of b=0.115 with a significant value of p=0.000. TEF with coefficient of b=0.109 with a significant value of p=0.001, ENF with coefficient of b=0.315 with a significant value of p=0.000, and LEF with coefficient of b=0.131 with a significant value of p=0.029.

The statistics for collinearity in the table of regression coefficients were examined to evaluate the collinearity issue. VIF (Variance Inflation Factor) and Tolerance values are the benchmarks used to evaluate collinearity issues. According to Table-1 above, the tolerance value ranges from 0.223 to 0.946, and the VIF value is between 1.057 and 4.493. Pallant (2010) asserts that the tolerance cutoff is less than 0.1b and that multi-collinearity issues can arise when the VIF value is more than 10. There is no multi-collinearity issue in this instance.

Table-2 : Model Summary Result

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.882^a	.777	.773	.43663	1.860

a. Predictors: (Constant), LEF, SOF, TEF, ENF, POF, ECF

b. Dependent Variable: ORP

Source: SPSS Version 24 Output

The six independent variables were included in the model for this study, and the adjusted R-square shows how much of the variance in the dependent variable (organizational performance) is explained by the model. R^2, which measures how strongly an independent variable has an impact on the dependent variable, has a value of 0.777 in this instance. This suggests that fluctuations in external environmental factors (political factors, economic factors, social factors, technological factors, environmental factors, and legal factors) account for 77.7% of the variation in organizational performance. Adjusted R^2 provided evidence in favor of this. This had a value of 0.773, or 77.3%.

Table-3 : ANOVA Result

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	188.339	6	31.390	164.653	.000^b
	Residual	53.952	283	.191		
	Total	242.291	289			

a. Dependent Variable: ORP

b. Predictors: (Constant), LEF, SOF, TEF, ENF, POF, ECF

Source: SPSS Version 24 Output

The predictor variables in Table-3 above significantly contribute to the model. Additionally, the significance of the multiple regression coefficients was assessed using the ANOVA (Analysis of Variance) table. The F-test is employed to evaluate the model's overall significance. When determining the overall importance of an estimated model, the F-statistic is crucial. In this case, the dependent variable is significantly impacted by the independent variables, as indicated by the F-statistics value of 164.653 with the p-value of 0.000. This demonstrates that political factors, economic factors, social factors, technological factors, environmental factors, and legal factors can explain the variances in organizational performance. This implies that external business environmental factors have a considerable favorable impact on organizational performance.

Test of Hypotheses

Multiple regression analysis was performed to investigate the six hypotheses that were developed earlier in this study. Table 1 below displays the results.

The six hypotheses (H1 through H6), political factors, economic factors, social factors, technological factors, environmental factors, and legal factors have a beta coefficient of 0.330, 0.185, 0.115, 0.109, 0.315, and 0.131 respectively with indicating that they have a positive impact on organizational performance with a p-value of 0.000, 0.001, 0.000, 0.001, 0.000, and 0.029 respectively. The p-value of all the selected predictor variables is less than the significant level of the study ($p<0.05$). In light of this, all six alternative hypotheses are accepted. Therefore, the six suggested external business environment factors have a significant impact on organizational performance in Ethiopian coffee industry.

Conclusion

This study examined the external business environment and how it affected the Ethiopian coffee industry's organizational performance. The findings demonstrate that all of the hypotheses were valid. The statistical link between each independent variable and the dependent variable was thoroughly explored and reported in the study in accordance with the study questions in order to meet the research objectives. According to this conclusion, the independent variables' political, economic, social, technological, environmental, and legal aspects have a significant influence on organizational performance. The correlation statistics specifically reveals that all independent factors have a strong association with the dependent variable with the exception of technological factors and social factors, which exhibit moderate and weak association, respectively. Finally, we can draw the conclusion that external business environmental factors have a significant impact on organizational performance.

Recommendations

Organizations should regularly scan their external environments, including the political, economic, social, technological, environmental, and legal ones, for early indications that a change may be necessary. They should also make adjustments to account for potential opportunities or threats, as well as to enable the company's strengths to counteract their weaknesses, which is also crucial in order to prepare one for potential future risks brought on by the external environment. To gain a sustained competitive edge, managers must be adaptable and able to adjust the way they make decisions. Moreover, in order to accomplish

their strategic objectives and enhance performance, organizations should develop proper strategies to seize the opportunities and defeat the challenges.

The government ought to devote all of its attention to the coffee industry because it is the cornerstone of the nation's economy. In addition, the government or those in charge of creating policy should make modifications and create an efficient policy for the industry. The government or policymakers should regularly hold awareness-creation events and prepare the company in advance regarding the relevant issues, such as whether they are existing, modified, or new policies, rules, and regulations. This is necessary in order to develop sound and realistic existing or upcoming policies and formulate laws. Moreover, the government should regularly hold open discussions with coffee exporters to learn about the issues that affect their operations and the core causes of such issues in order to jointly come up with solutions that would benefit both the industry and the nation. Finally, for the sake of the country, the government should uphold its responsibility to build a robust economy and offer as much support to business organizations as is practical.

Limitations and Suggestions for Further Studies

There are some gaps in and restrictions on this study. The study is limited to PESTEL analysis; some other characteristics of the external business environment, and also the internal business environment are not incorporated in this study. Additionally, since this study was only conducted in Ethiopia, it looked only at the coffee industry. According to the study's findings, the model that considered external factors could only account for 77.7% of the variation in industry performance; the remaining 22.3 % may have been caused by other variables that were not considered in this study and were therefore left for future research.

Bibliography

Adebayo, I. O., Ogunyomi, P. O. and Ojodu, H.O. (2005). Introduction to Business Management, 2nd ed., Lagos, *AbilejoPrinting Press.*

Adeoye, A. O., & Elegunde, A. F. (2012). Impacts of external business environment on organizational performance in the food and beverage industry in Nigeria. *British Journal of Arts and Social Sciences*, *6*(2), 194-201.

Ansah, R. H., Sorooshian, S., Mustafa, S. B., & Duvvuru, G. (2016). An environmental impact framework for evaluating construction projects delays. In *Proceedings of the International Conference on Industrial Engineering and Operations Management* (pp. 764-772).

Banda, G. (2020). *The Effects Of Environmental Factors On The Performance Of A Company. A Case Study of Patents and Company Registration Agency'-(PACRA)* (Doctoral dissertation).

Beal, R. M. (2000). Competing effectively: environmental scanning, competitive strategy, and organizational performance in small manufacturing firms. *Journal of small business management*, *38*(1), 27.

Carr, L. P., & Nanni, A. J. (2009). *Delivering results: managing what matters* (pp. 83-101). New York: Springer.

Fermando, A. C. (2011). Business Environment. *Darling Kindersley Publications*. India.

Ebabu Engidaw, A. (2021). The effect of external factors on industry performance: the case of Lalibela City micro and small enterprises, Ethiopia. *Journal of Innovation and Entrepreneurship*, *10*(1), 1-14.

Epstein, M. J., & Roy, M. J. (2001). Sustainability in action: Identifying and measuring the key performance drivers. *Long range planning*, *34*(5), 585-604. https://doi.org/10.1016/S0024-6301(01)00084-X

Hitt, M. A., Ireland, R. D., Sirmon, D. G., & Trahms, C. A. (2011). Strategic entrepreneurship: creating value for individuals, organizations, and society. *Academy of management perspectives*, *25*(2), 57-75. https://doi.org/10.5465/amp.25.2.57

Kume, V. (2010). Menaxhimi strategjik. *Teori, koncepte, zbatime.(ed. i tretë)(Strategic management. Theory, concepts, implementations, 3rd ed). Pegi. Tiranë*.

Lynch, R. (2009). Strategic management. England: Pearson Education Limited.

Mark, J., & Nwaiwu, J. N. (2015). Impact of political environment on business performance of multinational companies in Nigeria. *African Research Review*, *9*(3), 1-10. DOI: 10.4314/afrrev.v9i3.1

Mack, J., & Pützschel, J. (2014). The Influence of Contextual Factors on the Entrepreneurial Process: A Multiple-Case Study of Sustainability-oriented and Commercial Entrepreneurship in Central America.

Mooi, E. A., & Sarstedt, M. (2011). A Concise Guide to Market Research: The Process, Data, and Methods Using IBM SPSS Statistics. Berlin, Heidelberg: Springer.

https://doi.org/10.1007/978-3-642-12541-6

Murgor, P. K. (2014). *External environment, firm capabilities, strategic responses and performance of large scale manufacturing firms in Kenya* (Doctoral dissertation, University of Nairobi).

Nandonde, F. A. (2019). A PESTLE analysis of international retailing in the East African Community. *Global Business and Organizational Excellence*, *38*(4), 54-61.

Navarro, A., Losada, F., Ruzo, E., & Díez, J. A. (2010). Implications of perceived competitive advantages, adaptation of marketing tactics and export commitment on export performance. *Journal of world business*, *45*(1), 49-58. https://doi.org/10.1016/j.jwb.2009.04.004

Nistorescu, T., & Barbu, C. M. (2006). A model for enterprises' environmental scanning. *Management & Marketing*, *4*(1), 57-62.

Njeru, W. G. (2013). Market orientation, marketing practices, firm characteristics, external environment and performance of tour firms in Kenya, University of Nairobi.

Njoroge, J. K., Ongeti, W. J., Kinuu, D., & Kasomi, F. M. (2016). Does external environment influence organizational performance? The case of Kenyan State Corporations. *Management and Organizational Studies*, *3*(3), 41-51.

Oginni, B. O., & Faseyiku, I. O. (2012). Fundamentals of human capital management: A process approach. *Somolu–Lagos: Mankore Print Ltd*.

Pallant, J. 2010. SPSS survival manual. 4th ed. New York, NY: McGraw-Hill

Pearce II, J.A. and Robinson, R.B. (2005) Strategic Management. A.J.T.B.S. Publishers, Delhi.

Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring organizational performance: Towards methodological best practice. *Journal of management*, *35*(3), 718-804.

Robert M Grant, Judith Jordan, John Wiley. (2013). Carrying Out a PEST Analysis Checklist 196. Chartered Management Institute. https://doi.org/10.1177/0340035206066410

Sahu, S. (2011). *Business Environment: For Universities and Autonomous Colleges of Odisha*. Pearson Education India.

Schmieder-Ramirez, J., Mallette, L., & Carmo, M. (2015). Using the SPELIT analysis technique for organizational transitions. *Education applications & developments advances in education and educational trends*, 291-300.

Shtal, T. V., BURIAK, M. M., AMIRBEKULY, Y., UKUBASSOVA, G. S., KASKIN, T. T., & TOIBOLDINOVA, Z. G. (2018). Methods of analysis of the external environment of business activities. *Revista espacios*, *39*(12).

Vasileva, E. (2018). "Application of the Pest Analysis for Strategic Planning of Regional Development." *49th International Scientific Conference Quantitative and Qualitative Analysis in Economics*, Economic Faculty in Nis, 223-229.

Voros, J. (2001). Reframing environmental scanning: an integral approach. *foresight*.

Wheelen, T. L., & Hunger, J. D. (1990). *Cases in strategic management* (Vol. 1). Addison Wesley Publishing Company.

Yatsenko, O. M., & Dmytriyeva, N. O. (2018). Determinants of formation and development of international e-commerce. *Actual problems of international relations*, (135), 82-100.

Yek, H. K. (2014). The Effects of Macro environment and Sociocultural Factors on the Marketing Strategy of Retailers-A Case Study on AS Watson Pharmaceutical Stores in Malaysia and Taiwan.

Impact of Heuristics, Overconfidence, Herding, and Gambler's Fallacy on Investment Decisions of Knowledge Workers

K.Jayalakshmamma and Shobha N S

Abstract

Purpose: *The objective of the study is to comprehend the behavioural determinants that impact investing choices among knowledge workers in Bangalore. The current study focuses on four elements of interest: heuristics, overconfidence, herding, and the gambler's fallacy.*

Design / Methodology: *The present study is a quantitative research that utilizes primary data obtained from Knowledge workers, notably Doctors, Academicians, Engineers, and BFSI personnel who engage in investments in the Indian stock markets. A sample size of 100 respondents was determined using the Kregcie-Morgan table, with a margin of error of 7.5%. To accommodate for participants who did not respond, a total of 120 questionnaires were handed out, and out of these, 99 replies were considered appropriate for the study (N=99). The sample was conducted using convenience sampling methodology. The questionnaire's validity and reliability were assessed using the Gaskins master validity table. The average variance extracted (AVE) for all four components was above 0.500, while both the Cronbach alpha and composite reliability were higher than 0.70. The discriminate validity was confirmed by observing that the square root of the average variance extracted (AVE) is higher than the interitem correlations. The data was analyzed using factor analysis in SPSS and confirmatory factor analysis in AMOS software.*

Findings: *The study's findings indicate that Heuristics, Overconfidence, Herding, and Gamblers fallacy have a substantial influence on investing decisions. Representativeness had a significant impact on investment decisions. However, investors needed to consider other factors such as risk tolerance and market research to make well-informed and sensible choices.*

Dr.K.Jayalakshmamma, Associate Professor, Government RC College of Commerce and Management, Race Course Road, Bengaluru - 560001.

Dr. Shobha N S, Associate Professor, Government RC College of Commerce and Management, Race Course Road, Bengaluru - 560001.

Originality: *The study's originality is in its analysis of the behavioral factors that influence investment decisions, particularly focusing on knowledge workers living in Bangalore. Previous studies have mostly focused on analyzing investment decision-making among the general public or certain professional cohorts. This study aims to fill the current research vacuum by examining the particular behavioral factors that influence investment decisions among knowledge workers in Bangalore, while considering their unique characteristics and preferences.*

Introduction

The basis on which people choose to invest is very complex and needs very precise consideration. It involves taking into account a combination of various factors with some of them besides the expected return, requiring discussion of the risk, liquidity, and other relevant issues (Ramiah et al., 2016).In addition, investors need to conduct thorough research of various trends specific to the time and the conditions of the economy locally and globally along with the performance of all types of assets before making their choice. It is also very important for investors to consider their individual financial goals, time of the investment, and risk tolerance for a wise decision (Virigineni & Rao, 2017).All these measures enable investors to follow a very inclusive review process allowing making choices that are coherent with individual goals and objectives of the investment. Moreover, investors need to consider the diligent and frequent evaluation of their investment portfolio to adjust it according to the arising needs of the market and goals of the individual. In any case, the process of making such decisions in the area of investment requires study, analysis, and understanding of individual financial situation(Agarwal et al.,2016).

Heuristics refer to the cognitive methods or mental shortcuts that individuals use to improve the efficiency of their decision-making or problem-solving processes (Joo &Durri, 2015). Often, these heuristics rely on experiences and may help make complex situations easier by providing a quick, intuitive solution. However, it is important to note that such methods may introduce biases and inaccuracies into the decision-making process, thereby reducing its overall

accuracy and effectiveness(Fong, 2021). One such example of a cognitive bias that may result from the use of heuristics is overconfidence when making financial decisions (Lakshmi & Minimol, 2016). When investors rely too much on their previous successes when investing, they may develop an exaggeratedly high opinion of their skills. This, in turn, may lead to reckless or uninformed decision-making, which results in financial losses and the investor's inability to effectively assess the potential risks(Sahi, Arora, & Dhameja, 2013).. It is important for individuals to understand that using heuristics may cause biases and be able to examine and evaluate their decision-making critically to ensure better, more accurate, and ideal results (Deccax & Campani, 2019). Representative heuristic is, therefore, the cognitive shortcut that leads to cognitive biases. In the example of representative heuristic, individuals may make judgments or decisions based on the extent to which a given object resembles a template or stereotype. Once again, such an approach may ignore important aspects of the problem or create unfounded assumptions (Bhattacharya, 2012). However, once individuals understand such biases, they can consider a variety of perspectives and more information to reduce the potential negative effects of heuristics and make more informed and impartial decisions (Vijaya, 2016).. The gambler's fallacy is another such cognitive bias. It is the mistaken belief that the results of a stochastic event can be influenced by previous occurrences, while in reality; each element of the sequence is statistically independent from the others(Deshmukh & Joseph, 2016).For instance, if a person flips a coin and obtains five heads in a row, they may assume that the probability of the next flip is more likely to be tails. In reality, however, the probability of obtaining heads or tails during every flip remains the same, 50/50. Understanding the gambler's fallacy can help individuals correct their decision-making in a more reasoned and logical manner, at least when dealing with games of chance and probabilities (Kandpal & Mehrotra, 2018).

A knowledge worker is a person whose work is most of the time focused on the activities related to the generation, appraisal, and use of knowledge. Specialized knowledge and information are what makes the specialists in this field able to solve complicated things and come to well-considered conclusions. Most of the time, these employees do not have to apply physical forces and efforts: their value lies in the possibilities to develop creative ideas and move the company forward within a specific area. Due to the increasing impact of digital technologies on the development of modern society, the role of this category of employees has increased in several sectors such as technology, research, consulting, education, and others. As the driving force, knowledge workers contribute to the achievement of innovative goals and increase the overall

performance of the organizations within these industries. The relationship between knowledge workers and the process of making investment decisions is closely interrelated. In the modern digital age, their role is big in terms of collecting and evaluating the information, providing investors with the tools allowing them to make well-considered choices, reduce the associated risks, and increases the return on the investments. The opportunity to analyze a huge amount of data in a professional way allows such workers to develop original and new types of investment. They are good at spotting the new trends and potential opportunities for investments in various sectors of the business and are able to help contemporary investors to get the best out of their decisions.

Thus, the present study first discusses about the investment behaviour followed in Bangalore and explains the concept of knowledge workers. Further, the present study describes the rationale of being the study focused towards the topic, the review of literature regarding the topic. Subsequently, the present study discusses the methods undertaken in the process of conducting research, the major findings of the research and ultimately leads to a conclusion part with limitations and scopes for future study.

Review of Literature

In the present research, the scholar utilized the systematic literature review methodology to scrutinize previous scholarly articles that were aligned with the queries of the current research. Furthermore, the obtained articles were drawn from recognized scholarly journals to evaluate the quality of each study. With reference to the lists of databases, the learner utilized the Elsevier, Routledge, and CRC Press Taylor & Francis databases. In addition, the databases for the study consisted of the Emerald Group Publishing database, Springer Nature database, and the Sage database. In terms of other additional scholarly articles, the researcher utilized academic databases, such as Wiley, Academia, JSTOR, and Guildford Press.

● **Dangol and Manandhar (2020)** The purpose of this research was to assess the impact of heuristics on investment decision-making, specifically focusing on the impact of the broad category of heuristic biases, including four relevant types, namely representative, availability, anchoring and adjustment, and overconfidence bias, on the rationality of investment decisions. In addition, the research also investigated the moderating influence of the internal locus of control on this relationship. This study utilized a sample of 391 participants acquired through a suitable selection,

applied structured questionnaires via a survey method . The research results, after the four hypotheses were analyzed, evidenced a statistically significant relationship between irrational investing decision-making and all four heuristic biases. In addition, the research results findings also indicated that the locus of control had a significant effect on the impact on investment decisions on three heuristics, including the availability, representative, and anchoring biases. However, the study did not find evidence of the moderating effect in the context of overconfidence bias.

- **Khan, et al., (2021).** The objective of this study is to investigate the effect of heuristic biases; availability bias and representativeness bias; investment decision-making in the stock market of Pakistan along and moderating role of long-term orientation. A developed quantitative research approach was applied to conduct the research and a structured questionnaire was used to collect the data. The required data were collected from a sample of 374 individual investors that were active in trading in Pakistan stock exchange PSX. Partial least squares structural equation model (PLS-SEM) technique using SmartPLS 3.2.2 was applied to analyze the dataset and to test the associations. The results of the study revealed that availability bias has a significant positive impact on investment decision . It was also revealed that the impact of representativeness bias on investment also has positive and significant impact . Moreover, a significant moderating role of long-term orientation on the relationship between representativeness bias and investment was also revealed from the findings of this study. It suggests that long-term orientation can moderate the impact of representativeness bias on investment decision-making. However, presence of availability bias has no significant moderating effect. This study provides new insights on the impact of heuristic driven bias on investment made by individual investors in stock market. It also increases the knowledge of behavioral factors of investment in developing countries.

- **Saeed (2019)** The determination of this study was to evaluate the relationship amongst heuristic biases and investment making a decision about the heftiest change in locus of control. The authors of this study focused on the moderator that has to do with the locus of control. The data gathered for the study were in the form of a structured questionnaire. This was carried out by 250 people, from different backgrounds and who include demographic data in terms of education, employment, and social class. This demonstrates that heuristic biases which are mental accounting, and price anchoring have an impact on the decision being made by investors. This

means that the effect of mental accounting, and price anchoring biases on decision making among individual investors is significant. The source of constraint is that the sample size is very small. This makes the reliability of these findings not to be achieved. In any case, this puts a limit on the extent of research. It is recommended that some operations in the corporate world should be put in action. This will help people or households to reduce the biasedness and make an optimal investment. This article is beneficial to the literature that is in existence concerning infestation. It evaluates the connection among heuristic biases and investment decision locus of control that has a lot to do with the moderator impact of the same.

- **Gupta and Shrivastava (2022)** There are many things that investors must consider before effectively investing their funds. While the relevance of external factors is undisputed, there has been increasing recognition among experts over the last decade regarding the relevant of internal factors in the context of investment. Relatively, this includes behavioral and psychological variables. This particular study focuses on the relevance of the examination of internal variables, which is called behavioral finance. In what extent do behavioral finance plays a crucial role and essentially matters most in the context of investment decision-making? The purpose of the current study is to determine the relevance and the role of anchoring, herding bias, overconfidence, and ethical consideration to investing. A total of 149 questionnaires were distributed to different types of investors for the purpose of determining the effects of behavioral finance to investing. PLS-SEM was used to test the study hypotheses. Based on prior research, the current study concludes that investment decisions are affected by behavioral and psychological biases and tendencies. The study is crucial because the behavior can affect investing, and understanding the behaviors is important because of its potential negative impact of behavior biases and tendencies on the course of investment. Understanding behavioral finance also enables investors to cushion the impact of the behavior biases and fix their prevailing investment mistakes.

- **Madaan and Singh (2019)** make a point that conduct via individual investors is considerably affected by a series of biases which are underscored in the framework of the newly developed field, that of behavioral finance. As such, the given research represents another attempt to trace the impact of behavioral biases on the investment decision of the National Stock Exchange. It is worth noting that 243 participants were involved in the survey. The data was collected in the form of a questionnaire . The procedure was carried

out with the help of both inferential and statistical inferences. There are primarily four biases in the scope of the present research: the investors' overconfidence, anchoring, the disposition effect, and herding behavior. The major discovery is as follows: "overconfidence and herding bias have positive impact . The secondary one is the following: "the study suggests that the individual investors have limited information and are likely to repeat past psychological mistakes". Finally, "the conclusions drawn in this study, the four behavioral biases have an impact on individual investment decision and this will be of great importance to financial intermediaries intending to give the investors better guidance" . The given research opens up further research opportunities. For example, one can involve more phenomena in the context of behavior or focus on different factors.

● **Nareswari et al., (2021)** The primary objective of this study is to examine the influence of many behavioral factors, namely sentiment investor, overconfidence, salience, overreaction, and herd behavior, on the process of investing decision making. In addition, the data analysis technique employed was partial least square structural equation modeling . The sample size of this study was 413 of individual investors. Notably, the findings of this study reveal that mood investors, overconfidence, salience, the overreaction as well as herd behavior have a beneficial impact on investment decision making . Moreover, this discovery is of significant importance to the investors as well as the academicians. This is because the finding of this study are quite relevant to investors in that, it emphasizes the investor's self-awareness.

● **Keswani et al., (2019)** Market anomalies and irrational conduct have been identified as elements that contribute to fluctuations in the stock market. As a result, there has been a growing interest in investigating the influence of different behavioral biases and factors on decision-making processes among the individual investors. The primary goal of this study was to investigate the effect of four distinct aspects, namely heuristic, prospect, market, and herding, on the decision-making process of investors.The data was collected in the questionnaire based on a Likert scale. In response to the internal consistency of the questionnaire, Cronbach alpha coefficient of 0.728 is used. In addition, the implementation of EFA and multiple regression tests have been conducted. "Further, the Cronbach's alpha coefficient was used to test internal consistency of the construct. Similarly, the Cronbach's alpha coefficient was used to test the internal consistency

of each factor: Heuristic, Prospect, Market, Herding, Investment Performance, and Investors' Decisions of the constructs. The levels of consistency were found to be acceptable. The findings in the analysis indicate that the variables having four variables have made a significant impact on the investment choice as well as the return on the investment. There high behavioral variables affecting the decision-making process of investors, thus supporting the adopted assumption in terms of the extent to which the behavioral elements affect the decision-making process of the individual investors.

Hypothesis Development

The influence of heuristics, overconfidence, gambler's fallacy, and representativeness on investment decisions can have substantial effects. Heuristics, also known as cognitive shortcuts, have the potential to prompt investors to make expeditious judgments relying on restricted information, which may not consistently exhibit accuracy or reliability. The phenomenon of overconfidence can lead to a tendency among investors to underestimate the potential dangers associated with their investing decisions, hence making excessively optimistic selections. The phenomenon known as the gambler's fallacy can result in investors developing the erroneous belief that previous outcomes would exert an influence on future outcomes, despite the absence of any causal relationship between the two. The cognitive bias of representativeness might lead investors to excessively depend on the perceived similarities between a prospective venture and a previously successful investment, while neglecting to evaluate other pertinent considerations. In general, cognitive biases have the ability to introduce distortions in investment decision-making processes, which may ultimately result in unfavorable financial results.

Hence, the Hypothesis

H1 - Herding, overconfidence, Representativeness and Gamblers fallacy are behavioural factors influencing Investment decision

Research Methodology

The current study is a quantitative research approach **Bloomfield, J., & Fisher, M. J. (2019),** based on primary data collected from knowledge workers specifically the Doctors, Academicians, Engineers and BFSI employees. Using the Kregcie-Morgan table **Chaokromthong, K., & Sintao, N. (2021)** for the calculation of sample size, a sample of 100 respondents at a 7.5% margin of

error was considered. To account for non-responses, 120 questionnaires were distributed, and N= 99 responses were deemed suitable for the study. The sampling was done using convenience sampling. Convenience sampling **Stratton, S. J. (2021)**was chosen as it allowed for a quick and accessible way to gather data. A well-structured questionnaire was prepared by adapting previous studies and incorporating relevant demographic questions. The questionnaire consisted of various sections that aimed to assess different aspects of behavioral factors . The questions were carefully worded to ensure clarity and avoid bias, allowing participants to provide accurate and meaningful responses. The Gaskins master validity table and the validity and reliability of the whole questionnaire ensured a validity and reliability check by experts the field. Convergent validity was supported as the AVE for all the four constructs was greater than 0.500, and the Cronbach alpha and composite reliability were above 0.70. The discriminate validity was also supported as the square root of AVE is greater than the interitem correlations Shia, T. H.,et al (2023) and Hair Jr, J. F., et al. (2020) .

The Google forms and a survey method were used to collect data. The tool facilitated an easy and convenient distribution of the questionnaire and an efficient data collection. The methods also proved to be effective in data analysis and literature review as the samples are large. The questions asked in the survey were based on participants' preferences in different things, their views on their satisfaction with belongings, and the issues asked in different items. The Data interpretation was therefore conducted using the Factor analysis using the SPSS software and confirmatory factor analysis using the AMOS software as it is known to be more efficient in estimating the parameters of different models used in empirical studies Hair Jr, J. F., et al. (2020). All these methods facilitated a comprehensive collection and analysis of the data, which helped to determine the factors underlying the findings and understand the data patterns between different items, which correspond to each other.

Results and Discussion

Demographic Profile of the Knowledge workers

The integration of demographic information is crucial for analyzing and understanding data accurately. With the help of this methodology, researchers can spot biases or discrepancies in ideas and, based on such aspects age, gender, ethnicity, income, educational level, and geographical location, improve the representation of their results . By taking into interest the demographic information of the selected participants in a research, colleagues will conclude their projects more explicitly.

Table-1 : Demographic Profile of the Investors - Knowledge Workers

Gender	Frequency	Percent
Female	22	22.2
Male	77	77.8
Total	99	100.0
Age		
<= 30 years	62	62.6
>=61 years	1	1.0
31-40 years	27	27.3
41-50 years	7	7.1
51-60 years	2	2.0
Total	99	100.0
Marital status		
Divorced	1	1.0
Married	37	37.4
Single	61	61.6
Total	99	100.0
Qualification		
Above Postgraduation	4	4.0
Below Graduation	9	9.1
Graduation	49	49.5
Post Graduation	37	37.4
Total	99	100.0
Income		
10,00,001 and above	13	13.1
2,50,001-5,00,000	29	29.3
5,00,001-7,50,000	18	18.2
7,50,001-10,00,000	8	8.1
Less than 2,50,000	31	31.3
Total	99	100.0
Occupation		
Doctors	7	7.1
Academicians	12	12.1
Engineers	55	55.6
BFSI employees	25	25.3
Total	99	100.0

Investment experience		
Below 1 year	22	22.2
1-4 years	57	57.6
4-7 years	10	10.1
7-10 years	2	2.0
10 years and above	8	8.1
Total	99	100.0
Income percentage		
<10%	49	49.5
>30%	9	9.1
11-20%	34	34.3
21-30%	7	7.1
Total	99	100.0

Source : Author Created

Item Analysis for Behavioral Factors Influencing Investment Decision

Item analysis is to examine the descriptive data, including measures such as mean, standard deviation, skewness, kurtosis and so on, in order to have a full picture about it. Through item analysis must be carried out to measure the quality as well as reliability of their measurements. With these descriptive statistics, researchers can also determine whether the items included in an instrument survey effectively capture the intended constructs and statistics are satisfactory. In addition, item analysis also makes it possible to detect items revealing unfavorable characteristics. Thus, items in need of revision or deletion from the instrument for ensuring its validity and objectivism will be brought to light, Item analysis is vital to ensure the credibility of research findings and the reliability of measurement instruments adopted.

The current study evaluates behavioral traits using four subscales, specifically Heuristics, Herding, Overconfidence, and Gamblers Fallacy. Table-2 shows that the mean scores of all subscales of behavioral factors are above 2.50. Thus, it may be concluded that the data are within the range of neutrality and agreement. The results of this research reveal that the participants to some moderate extent exhibit a tendency to use heuristics, perform "swarm" behavior, be overconfident, and believe in the gamblers fallacy. The range of neutrality to agreement also indicates that to some degree, people resort to cognitive heuristics, try to conform to social norms, demonstrate overconfidence, and believe that past events might affect the probability in the future. The above

Table-2 : Item Analysis for Behavioural Factors Influencing Investment Decision

	Herding	Over confidence	Representativeness	Gamblers Fallacy
Mean	2.79	3.10	3.53	3.13
Std. Deviation	1.16	1.14	1.05	1.14
Skewness	-0.03	-0.34	-0.94	-0.38
Kurtosis	-1.23	-0.83	0.15	-0.97
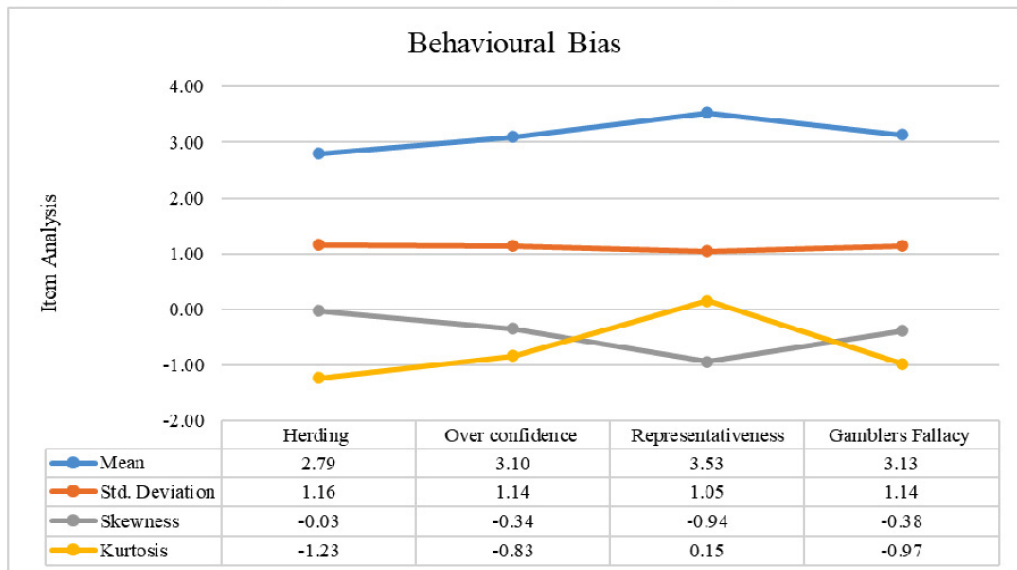
Source- Author created

information provides valuable insights regarding the reactions of the participants and emphasizes that there is a need for further research to determine the role of these aspects in decision-making processes. Moreover, the availability of cognitive heuristics means that people may rush to make judgments and ignore essential facts. Apart from this, following other individuals' actions and opinions as in the case of following the crowd result in groupthink and an inadequate level of critical thinking. The abundance of confidence among the people around may lead to the presence of overconfidence bias when people who overestimate their capabilities underestimate potential risks. Finally, the adoption of the gamblers fallacy demonstrates the lack of understanding of the basics of the probability that can lead to poor decision-making driven by false assumptions. The insight into the nature of these behaviors is critical for sustainable decision-making and the development of effective solutions promoting them.

H1 - Herding, overconfidence, Representativeness and Gamblers fallacy are behavioural factors influencing Investment decision

Exploratory Factor Analysis

The KMO measure of sampling adequacy, which is equal to 0.857, and Barlett's Test of Sphericity, which comes with a significance level of 5%, are statistically

significant. It was found by chi-square analysis that the Chi-square value of the Bartlett test is 1392.875 with the significant value less than 0.05 and 253 degrees of freedom, which shows that correlation matrix, is not an identity matrix and that it looks to be factorable.

Communalities refer to the extraction values for each of the items and should be above 0.300 and the communalities for items under Behavioural factors influencing investment decision were between 0.419 and 0.815

The total of squared loadings that has been removed accumulates to about 64.365% of the original loadings. In social sciences, a cumulative Rotation Sums of Squared Loadings is considered good if it is above 50%. Four components are discovered while applying the approach of Factor Analysis, according to the results of the study.

The rotated component matrix showed that due to the appropriate factor loadings no items were deleted from the study. Herding factor has 6 items, Overconfidence has 8 items, Representativeness has 6 items and Gamblers fallacy has 3 items which is shown in the Table-3.

6 items loading under the herding factor had factor loading between 0.884 to 0.629, Overconfidence has 8 items which had factor loading ranging between 0.781 to 0.533, Representativeness has 6 items with factor loading starting at 0.860 and closing at 0.621 and Gamblers fallacy has 3 item with factor loading ranging between 0.826 and 0.723. This indicates that the items in the study are fit for further analysis. This suggests that the items included in the study possess the necessary qualities to undergo further examination and can be regarded as dependable indicators of their respective constructions. The robust factor loadings indicate a good correlation between the items and their respective latent components, implying that they successfully measure the intended psychological constructs. The results of this investigation instill confidence in the reliability and validity of the measurement instruments employed, hence affirming their appropriateness for subsequent analysis and interpretation.

Model Reliability and Validity

The Table-4 shows the statistics for convergent and discriminate validity. The questionnaire's validity was assessed by many measures. Firstly, the composite reliability (CR) was examined, which needed to exceed a threshold of 0.70. Secondly, the average variance explained (AVE) was considered, which needed to be greater than 0.50. Additionally, the maximum shared square variance (MSV)

Table-3 : Determinants of Behavioural Factors Influencing Investment Decision – Rotated Component Matrix

Rotated Component Matrix[a]				
	Component			
	1	2	3	4
Representativeness_3	0.860			
Representativeness_4	0.816			
Representativeness_2	0.811			
Representativeness_5	0.791			
Representativeness_2	0.687			
Representativeness_1	0.621			
Gambler_Fallacy_2		0.826		
Gambler_Fallacy_1		0.783		
Gambler_Fallacy_3		0.733		
Herding_4			0.884	
Herding_3			0.880	
Herding_2			0.810	
Herding_1			0.805	
Herding_6			0.744	
Herding_5			0.629	
Overconfidence_2				0.781
Overconfidence_7				0.692
Overconfidence_1				0.673
Overconfidence_5				0.617
Overconfidence_4				0.584
Overconfidence_6				0.575
Overconfidence_3				0.572
Overconfidence_8				0.533

Source- Author created

Table-4 : Reliability and Validity Statistics – Determinants Behavioural Factors Influencing Investment Decision

	CR	AVE	MSV	MaxR(H)	Rep	OVc	Heu	GF
Rep	0.930	0.769	0.903	0.937	**0.877**			
OvC	0.820	0.503	0.082	0.887	0.149	**0.634**		
Heu	0.955	0.632	0.958	0.940	0.887	0.432	**0.764**	
GF	0.974	0.740	0.958	0.935	0.896	0.214	0.979	**0.455**

Rep – Representativeness, Ovc- Over Confidence, Heu – Heuristics , GF – Gamblers Fallacy

was evaluated, which needed to exceed the AVE. Lastly, the maximum reliability (MaxR(H)) was assessed, which needed to be greater than the MSV. The second criterion for assessing validity is known as discriminant validity, which entails the evaluation of discriminant validity using the Fornell-Lacker criterion. **Afthanorhan, A., et al. (2021).**

Table-5 : Measurement Model – Determinants of Behavioural Factors Influencing Investment decision

Model Fit Summary				
CMIN				
Model	NPAR	CMIN	Degrees of Freedom	CMIN/DF
				($\chi 2$/df)
Default model	87	212.997	735.677	2.895
Criteria				<3.000
RMR, GFI				
Model	RMR	GFI	AGFI	PGFI
Default model	0.035	0.877		
Criteria	<0.100	>0.80		

Source : Author created using AMOS

The table-5 displays the essential statistics for model fit. The chi-square statistic divided by the degrees of freedom ($\chi 2$/df) is observed to be within the permissible range of 3, precisely measuring at 2.895. The observed result for Goodness of Fit (0.877) exceeds the proposed criteria. The boundary estimation results in a calculated value of 0.035 for the Resting Metabolic Rate (RMR). The aforementioned model has received substantial attention among scholars, and its measures of fit are deemed reasonably suitable.

Table-6 : Structural Relationship - Determinants of Behavioural Factors Influencing Investment Decision

			Unstd Estimate	Std Estimate	P value
Investment_Decision	<---	Herding	0.282	0.072	***
Investment_Decision	<---	Representativeness	0.398	0.073	***
Investment_Decision	<---	Overconfidence	0.188	0.082	***
Investment_Decision	<---	Gamblerfallacy	0.201	0.118	***

Source – Author created using AMOS

Table-6 presents an analysis of the influence of behavioral characteristics, namely Herding, Representativeness, Overconfidence, and Gambler's Fallacy, on investing decision-making. Both standardized and unstandardized estimates are included, together with the corresponding p-values, which serve as indicators of the importance of the association. The findings suggest that the three identified behavioral elements exert a noteworthy influence on individuals' investing decision-making processes. There exists a positive correlation between herding behavior, representativeness heuristic, and overconfidence in relation to investment decision-making. This implies that individuals tend to rely on the behavior of others, their own biased views, and an inflated sense of confidence when making investment choices. Moreover, the obtained p-values indicate that these associations possess statistical significance, hence providing additional support for the significance of behavioral factors in influencing investment choices.

Figure-1 : Structural Model - Determinants of Behavioural Factors Influencing Investment Decision
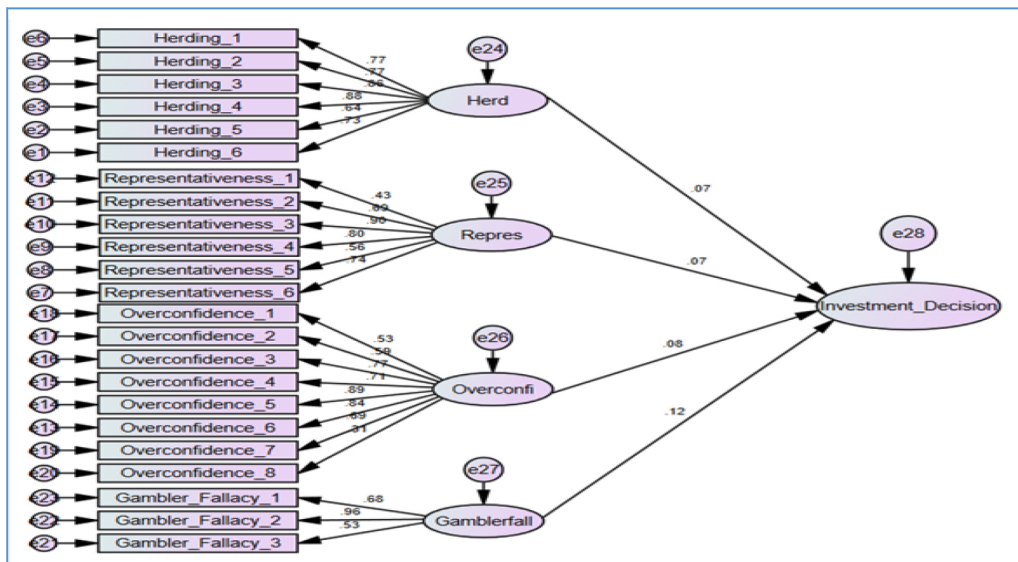
Source- Author created using AMOS

A one unit increase in mean scores of herding will increase investment by 28% of a unit . This means that as the mean scores of herding increase by one unit, investment is likely to be increased by 28%. The coefficient B of 0.282 suggests a strong impact of herding on investment decisions. Moreover, this relationship is statistically significant because the p-value of the variable is 0.000. It is clear

that herding has a significant influence on investment choices. The underlying premise is that investors may follow the majority and make this decision based on others' steps. The coefficient, b, then provides the suggestion that the impact of herding is positive but lower at 0.072. Importantly, the p-value of the constant is still 0.000 and helps conclude that herding has an important impact on investment choices. For that reason, investors should pay attention to the behavior of others when making their own investment choices.

The regression analysis given in Table 6 above suggests that the coefficient B is 0.398, with b being 0.073 and a significance level of p=0.000. The strong coefficient of 0.398 underlines the fact that there is a strong correlation between the variable under investigation and that of investment decisions. In practice, this implies that an increase in the mean scores of representativeness would lead to a 40% positive change in investment decisions. The single lowest significance level of p=0.000 indicates that the changes are not due to chance but rather have a profound influence on the invention. Having confirmed the role of representativeness in investment choice, clients are advised to take caution in their investment selection process. The inclusion of representativeness in the scenario might play to the advantage of the customer as it would be that the said client would be subject to increased influences on their past experiences or even recent events. With that in mind, investors must also consider other variables in the investment equation. Foremost of these include diversification and long investment hauls. It might also be interesting to get a reaction on the inner mechanisms through which the variable of consideration influences other investment ventures. Would these influences be the same under different market conditions?

From the output above, one unit increase in mean scores of overconfidence will have a positive impact on investment decisions by 19%. The value of B is 0.188, its beta is 0.082, and the probability value is 0.000. The probability value is very low, meaning that the relationship is statistically significant. This implies that overconfidence has a notable influence on investment decisions, as reflected in the low value of beta. Investors should ensure that they consider their overconfidence in decision-making and the likely biases such attitudes may add to the process. They can take a number of measures to ensure that this bias does not affect their judgment. For example, they may need to ask for a second opinion before making investment decisions. They may also need to ensure that they carry out adequate research before making their choices. By engaging in some level of education and self-reflection, investors can always appreciate the fact

that they are overconfident and, thereby, ensure that it does not influence their decision-making process. In the end, they will make more informed and less risky investments.

The results show that a one unit of mean scores in Gambler Fallacy will increase the investment decision by 20% . This implies that the number of individuals becoming more susceptible to the gambler fallacy's rate increases by 20%. This confirms the knowledge that cognitive biases have a significant impact on the decisions that investors make. Therefore, investors should recognize the impact of the Gambler Fallacy on investment decisions and should look for means of reducing these effects to reduce their losses. Consequently, insights based on the effects of cognitive biases on individuals' decisions are important because they would help investors make rational decisions. There exist different strategies that investors might opt to consider. First, they can seek advice from other professionals. Conducting research and considering different aspects of the investment would help them in making rational decisions. Investors should also consider diversifying their investment plans. Knowing the effects of Gambler Fallacy should also ensure that investors take measures to reduce these biases. Education and information are important because they help people in making better decisions thereby improving their investment success.

Conclusion

Investment decisions made by knowledge workers are influenced by several factors, including herding behavior, heuristics, overconfidence, and the gambler's fallacy . The impact of psychological biases will be felt even among those who have high-levels of education and knowledge. One such behavioral bias that may affect the decision of venture capitalists is herding behavior. Here, individuals are inclined to imitate the actions of others rather than performing their analysis. Similarly, the combination of the herd effect with the use of heuristics and overconfidence by knowledge workers might result in relying on cognitive shortcuts and overrate their ability to predict market movements. This will increase the possibilities for such individuals to make risky venture decisions. The erroneous belief can sometimes result in defective choices on the part of knowledge workers. These individuals may commit the gambler's fallacy that mistakenly postulates that the previous occurrences or events will have on future ones. In the process, these individuals will ignore the actual probability of achieving positive outcomes. In general, psychological biases have a profound impact on investment choices made by people whose professions are knowledge-intensive. For this reason, it is essential for such individuals to have knowledge

about the above biases and mitigate their impact. The importance of this research is that it reveals the level of its significance since it elaborates on the importance of understanding the psychological factors impacting venture decisions. By recognizing the above behavior and cognitive biases, people engaged in such kind of occupations as pertinent knowledge-intensive organizations might be able to take corrective measures minimizing the chances of taking risky ventures. This study is significant because it is an essential contribution towards developing effective approaches to be implemented via continuous education and training in order to deliver certain outcomes within the investment sector. This new level of awareness can result in better performance and increased financial prosperity.

The research strategy used in this study is quantitative. In future research, researchers might attempt to apply a mixed methodology approach, which features both quantitative and qualitative methodologies. A mixed approach would be beneficial in exploring the biases and characteristics of the decision-making processes exhibited by knowledge workers in the investment domain. By collect both the quantitative data and the qualitative insights gained during interviews or surveys, researchers will be able to understand the exact biases that affect decision-making fully and develop precise strategies to mitigate them. The mixed methodological approach would help in gaining a more insightful viewpoint into the complexities experienced during decision-making in investments, thus leading to better educational programs and training geared toward knowledge workers. The weakness of the study is that the sample is too small.

References

1.   Agarwal, A., Verma, A., & Agarwal, R. K. (2016). Factors influencing the individual investor decision making behavior in India. Journal of Applied Management and Investments, 5(4), 211-222.

2.   Bhattacharya, R. (2012). Behavioral finance: An insight into the psychological and sociological biases affecting financial decision of investors. ZENITH International Journal of Business Economics & Management Research, 2(7), 147-157.

3.   Bloomfield, J., & Fisher, M. J. (2019). Quantitative research design. *Journal of the Australasian Rehabilitation Nurses Association*, 22(2), 27-30.

4.   Chaokromthong, K., & Sintao, N. (2021). Sample size estimation using Yamane and Cochran and Krejcie and Morgan and green formulas and Cohen statistical power analysis by G* Power and comparisions. *Apheit International Journal*, *10*(2), 76-86.

5.   Dangol, J., & Manandhar, R. (2020). Impact of heuristics on investment decisions: the moderating role of locus of control. *Journal of Business and Social Sciences Research*, *5*(1), 1-14.

6.   Deccax, R. A., & Campani, C. H. (2019). Investor segmentation: how to improve current techniques by incorporating behavioural finance concepts?. International Journal of Economics and Business Research, 18(1), 31-48.

7.   Deshmukh, G. K., & Joseph, S. (2016). Behavioural finance: an introspection of investors psychology. Indian Journal of Commerce and Management Studies, 7(1), 97.

8.   Fong, B. (2021). Analysing the behavioural finance impact of'fake news' phenomena on financial markets : a representative agent model and empirical validation. Financial Innovation, 7(1), 1-30

9.   Gupta, S., & Shrivastava, M. (2022). Herding and loss aversion in stock markets: mediating role of fear of missing out (FOMO) in retail investors. *International Journal of Emerging Markets*, *17*(7), 1720-1737.

10.   Hair Jr, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, *109*, 101-110.

11.   Joo, B. A., &Durri, K. (2015). Comprehensive review of literature on behavioural finance. Indian Journal of Commerce and Management Studies, 6(2), 11.

12.   Kandpal, V., &Mehrotra, M. R. (2018). Role of Behavioral Finance in Investment Decision–A Study of Investment Behavior in India. International Journal of Management Studies, 4(6), 39.

13.   Keswani, S., Dhingra, V., & Wadhwa, B. (2019). Impact of behavioral factors in making investment decisions and performance: study on investors of National Stock Exchange. *International Journal of Economics and Finance*, *11*(8), 80-90.

14.   Khan, I., Afeef, M., Jan, S., & Ihsan, A. (2021). The impact of heuristic biases on investors' investment decision in Pakistan stock market: moderating role of long term orientation. *Qualitative Research in Financial Markets*, *13*(2), 252-274.

15.   Lakshmi, J., & Minimol, M. C. (2016). Effect of overconfidence on investment decisions: A behavioural finance approach. Splint International Journal of Professionals, 3(2), 70.

16.   Madaan, G., & Singh, S. (2019). An analysis of behavioral biases in investment decision-making. *International Journal of Financial Research*, *10*(4), 55-67.

17. Nareswari, N., Balqista, A. S., & Negoro, N. P. (2021). The The Impact of Behavioral Aspects on Investment Decision Making. *Jurnal Manajemen dan Keuangan*, *10*(1), 15-27.

18. Peteros, R., & Maleyeff, J. (2013). Application of behavioural finance concepts to investment decision-making: Suggestions for improving investment education courses. International Journal of Management, 30(1), 249.

19. Ramiah, V., Zhao, Y., Moosa, I., & Graham, M. (2016). A behavioural finance approach to working capital management. The European Journal of Finance, 22(8-9), 662-687.

20. Saeed, K. (2019). Impact of heuristic biases on investment decision locus of control playing a moderating role. *Available at SSRN 3499658*.

21. Sahi, S. K., Arora, A. P., &Dhameja, N. (2013). An exploratory inquiry into the psychological biases in financial investment behavior. Journal of behavioral finance, 14(2), 94-103.

22. Shia, T. H., Mansor, R., & Majid, N. A. (2023). Confirmatory Factors Analysis of Scale Measuring Secondary School Students' Learning Behaviours.

23. Vijaya, E. (2016). An empirical analysis on behavioural pattern of Indian retail equity investors. Journal of Resources Development and Management, 16, 103-112.

24. Virigineni, M., & Rao, M. B. (2017). Contemporary developments in behavioural finance. International Journal of Economics and Financial Issues, 7(1), 448-459.

GST Composition Scheme on Small Taxpayers in Tamil Nadu

PAVITHRA. S AND B. KANNAN

Abstract : *"This research investigates the effects of the composition scheme of the Goods and Services Tax (GST) on the degree of acceptance exhibited by small taxpayers in the state of Tamil Nadu." This study investigates the significance of awareness, perspective, and comprehension as fundamental elements of the GST composition scheme, and assesses how they collectively influence acceptance. This study used data from fifty small taxpayers enrolled under the GST composition scheme in Tamil Nadu. The research was based on descriptive statistics and multiple regression. While awareness is generally good, the findings show that business community members have a modest comprehension of GST. The research found a positive association between acceptance and awareness, perspective, and understanding, which was statistically significant. The regression findings show that acceptability is significantly affected by the GST composition scheme. Specifically, a modification of one unit in the scheme leads to an increase of 1.40 units in acceptance. This study enhances comprehension regarding the impact of the GST composition scheme on the perspectives of minor taxpayers, thereby offering valuable insights into the ongoing tax reforms in India.*

Keywords : Acceptance; Awareness; Business Community; Goods and Services Tax; Perspective.

Pavithra. S, Full Time Ph. D Research Scholar Department of Commerce, Thanthai Periyar Government Arts and Science college (A), Affiliated to Bharathidasan University, Tiruchirappalli Tamil Nadu-620 023, E-mail: pavi311094@gmail.com.

Dr. B. Kannan, Associate Professor & Research Supervisor, PG and Research Department of Commerce, Thanthai Periyar Government Arts and Science college (A), Affiliated to Bharathidasan University, Tiruchirappalli, Tamil Nadu- 620 023, E-mail: thaiyammalkannan@gmail.com

1. Introduction

Direct taxes and indirect taxes are the two main types of taxes that are often categorized. It is implied by the name that direct taxes are given out directly, while indirect taxes are paid out indirectly. Indirect taxes are paid out before the taxpayer receives the products or services, Conversely, direct taxes are remitted after the taxpayer's receipt of income. According to Gayatri and Bai (2018), indirect taxes include things like CENVAT, service tax, customs duty, and excise duty. A new age in indirect taxation has begun with the introduction of GST, which is expected to significantly affect the Indian economy. For local and foreign players in India's market, this tax structure provides a solid foundation. (The research conducted by Deshmukh and colleagues in the year 2022). The Goods and Services Tax (GST) is an important indirect tax that generates revenue for economies worldwide, including India's (Khan and Singh, 2022). According to the "Union Budget and Finance Commission" report, of the total tax revenue received by the country, 65% comes from indirect sources, while only around 35% comes from direct sources, such as income and company taxes. Malhotra and Kumar (2019) also note that local governments impose extra indirect taxes on municipalities.

The main objectives of the GST implementation were to bring about uniformity and do away with cascading in indirect taxes. Additionally, it aimed to streamline the complex and lengthy process of computing various forms of indirect taxes that existed in the country prior to the implementation of GST (Keen, 2014). Micro enterprises are classified as organizations that have made a minimum capital investment of twenty-five lakh rupees in plant and apparatus. Small businesses are those that have investments of over ten lakh rupees but under two crore rupees (Bhattacharya and Londhe, 2014). And lastly, Medium Businesses are defined as those that invest between two and five crore rupees (Indian currency). Simplified processes and reduced tax burden are two ways in which schemes like the Composition Scheme, mandatory registration, and non-eligibility of registration help enterprises. Fostering individual responsibility for the country's economy requires a constructive attitude toward residents toward the tax system. So, the purpose of this research is to find out how small-scale taxpayers in India feel about the Goods and Service Tax and how accepting they are of it.

1.1. Objectives of the Study

The study sought to accomplish the following objectives:

1.   To assess the extent of awareness among small taxpayers in Tamil Nadu on the GST Composition Scheme.

2.   In order to examine the perspectives and understanding of small taxpayers in Tamil Nadu regarding the GST Composition Scheme.

3.   To assess the impact of GST composition scheme on acceptance level of the small taxpayers of Tamil Nadu.

1.2. Hypothesis

H_0 : There is no significant impact of the GST composition scheme practices on acceptance level of the small taxpayers of Tamil Nadu.

H_1 : There is a significant impact of the GST composition scheme practices on acceptance level of the small taxpayers of Tamil Nadu."

2. Review of Literature

Although the GST has been implemented successfully in a number of countries worldwide, the idea is still relatively fresh in India. Currently, there are 160 nations that have effectively implemented the GST on a global scale (Lourdunathan and Xavier, 2017). France was the pioneer in adopting the GST and introduced it in 1954. Various countries worldwide adopt distinct versions of GST, each with its unique characteristics. Countries such as Singapore and Australia implement taxes on all goods and services at a uniform rate (Zhou et al., 2013). In contrast, countries like Brazil, Canada and India, implement a dual system in which the national government & the states each impose different rates of GST (Sharma, 2021). These rates range from 0 to higher and lower, with some exemptions included. Abroad, numerous research has been undertaken on various aspects of GST (Bhasin and Mittal, 2016). However, there is a scarcity of studies conducted in the Indian context, as GST is still in its early stages in India. Certain studies related to the current investigation are listed below:

Dey (2020) observed that certain sectors such as telecommunication, insurance, and aviation bear a greater tax burden on the general public. However, certain products, such as FMCG items including food items, toothpaste, tea, coffee, edible oil, spices, etc., have experienced a decrease in price.

Ali et al. (2019) found that the Composition Scheme is designed to provide relief to small businessmen from tedious paperwork. In addition, holders of the Composition scheme are able to obtain goods and services at a lower rate of GST without utilizing Input Tax Credit (ITC).

Jadhav et al. (2017) stated that there are no advantages for E-commerce businesses under the Composition Scheme. The majority of small sellers make a significant contribution to the Indian economy, including those involved in the Ecommerce business. However, the E-commerce business is beyond the scope of the Composition Scheme.

Pandit (2017) examined the effects of the GST on MSMEs in the Indian environment. According to his hypothesis, small and medium-sized businesses (SMEs) will suffer during the first stages of the GST implementation because of the rising costs of compliance and administrative complexity. Nonetheless, the application of technical advancements and a strong IT infrastructure may facilitate future compliance procedures.

Patil (2017) claims that, as compared to the standard system, the Composition system lessens the compliance burden. The Programme is only available for certain manufacturing goods and services. Unlike the standard system, which requires monthly, quarterly, and annual compliances, the composition scheme only requires one return to be filed.

Suman (2017) assessed how the Goods and Services Tax (GST) will affect Indian sole proprietors and small company owners. Primary data was derived from a survey of SMEs, which he used. A poll was undertaken for the study, revealing that the majority of respondents lacked comprehension of the mechanisms behind GST.

Kour et al. (2016) determined how the GST affected small and medium-sized businesses (SMEs). Additionally, they examined the ways in which indirect taxes differ from the GST, along with the potential benefits and challenges that may arise from its implementation. The writers claim that the introduction of GST will have a major impact on the expansion and development of our economy.

Gang (2014) conducted an examination on the fundamental principles and characteristics of the GST in India. He emphasized that the implementation of GST would be a beneficial change for our country's indirect tax system as it would encompass all sectors of goods and services. All kinds of enterprises would be impacted by the introduction of the GST, including large and small-scale entities, as well as intermediaries such as importers, exporters, merchants, professionals, and consumers.

According to **Prakash (2014**), expected that the industry, trade, agriculture, and consumers will profit more from the central and state adoption of GST. This will

be accomplished by extending and broadening the scope of input taxes set-off and service tax set-off. The execution of GST presents us with the most advantageous opportunity to expand our tax revenue sources.

Taqvi et al. (2013) clarified that GST is the sole indirect tax that has a direct impact on all sectors and segments of our nation. The objective is to establish a consolidated market that will yield advantages for both businesses and the economy. Furthermore, they have clarified that both the state and federal governments will simultaneously implement the GST model, with the national government overseeing the implementation of the central GST and the local governments managing the implementation of the State GST.

Zainol et al. (2013) examined how the GST affected Malaysian SMEs and recommended that governments assess the repercussions of reforming taxes on SMEs to alleviate the negative impacts of GST on their business operations.

Beri (2011) said that after gaining independence, India has enacted a number of changes to its tax system. Since GST would consolidate many existing indirect taxes in India, including customs duty, service tax, central excise duty, and others, its adoption will represent a significant indirect reform. The implementation of GST will result in the consolidation and expansion of taxation by means of centralized levies on goods and services.

According to **Vasanthagopal (2011**), the country's expanding economy will benefit from a seamless transition from the current convoluted indirect tax structure to the GST system. The efficacy of GST will result in its adoption by over 130 nations worldwide, making it the favored type of indirect taxation in Asia as well.

According to **Zariyawati (2010),** the historical data on the adoption of GST in other countries, most of them saw a favorable effect on their revenue. However, despite the successful implementation of GST in Malaysia, the citizens still have doubts and uncertainty about it. The study's findings revealed that a significant proportion of Malaysians are unconvinced by the GST system.

Ahmed and Poddar (2009) determined that the introduction of GST in India will result in a more effective and clear tax system, resulting in a rise in economic output and efficiency. However, the advantages of GST rely heavily on the sensible and well-thought-out architecture of the GST system.

According to the study material from the "Institute of Company Secretaries of India (ICSI)", the composition scheme helps to alleviate the strain of compliance.

The Composition Scheme is subject to restrictions in certain areas, such as being restricted to intra-state supply and reliant on turnover. Furthermore, the Composition Scheme is applicable to produced commodities, excluding specific goods such as Pan Masala, Tobacco, Ice-Cream, and others that have been notified. The Composition plan has been expanded to include service industries with a turnover of up to Rs 50 Lakhs.

3. Research Methodology

The study was conducted in the state of Tamil Nadu. The participants in the study were small taxpayers registered under the GST who were part of the composition scheme. Data was gathered between September 2023 and January 2024. The research employed the Convenience Sampling Technique for data gathering. The target group consisted of 500 respondents who were small taxpayers registered under the GST and had chosen the composition scheme of registration. The sample size chosen via convenience sampling surpassed the required size determined using Cochran's Formula (384.16 needed). In this study, the degree of acceptance towards GST was analyzed by regressing it against the independent variable: GST composition scheme practices. The degree of acceptability towards GST is used as the dependent variable in this research. "Descriptive research analysis was used in the present study. Primary and secondary sources must be consulted in order to arrive at the solution to the study's stated issue. For this research, we used survey and personal contact methods to collect primary data, and we retrieved secondary data from the Goods and Service Tax Act. Reports from the Indian government's Ministry of Micro, Small, and Medium Enterprises, as well as articles from academic journals, books, websites, and other relevant sources, make up the body of knowledge.

In order to find out how the adoption of GST correlated with the indicated independent criteria, a survey was sent out to the Tamil Nadu business sector. The questions in the survey were taken from papers written by Marimuthu and Bidin (2016), Fadzillah and Husin (2016), and Marimuthu et al. (2012). In order to gauge how much people agreed or disagreed, the research used a four-point Likert scale. Results might be as high as 4 (strongly agree) or as low as 1 (strongly disagree). The data was checked for validity and reliability and for correlations between the variables before the multiple regression analysis."

4. Results and Discussion

The table-1 presents the pertinent details of the respondent's background. The respondents consist of 475 males, accounting for 95% of the total, and 25 females,

representing 5% of the total. Out of the total respondents, 323 individuals (65%) are between the age category of 18 to 35 years. Additionally, 116 respondents (23%) are between the ages of 35 and 60, while the remaining 61 individuals (12%) are 60 years and older.

In the table provided, 241 respondents, accounting for 48% of the total, have a GST Taxable Turnover of Business ranging from Rs.10,00,000 to Rs.50,00,000. Additionally, 151 respondents, representing 30% of the total, have a GST Taxable Turnover of Business ranging from Rs.50,00,001 to Rs.1,00,00,000. Furthermore, there are 108 respondents with a GST Taxable turnover exceeding from Rs.1,00,00,001 to 1,50,00,000. The Turnover categories are determined according to the compliance requirements specified by the GST Law in India. With respect to the Business 418 Constitution, 83% of the respondents are Sole Proprietors, while 10% of the respondents have a Partnership Firm, and 7% of Private Limited Company. The survey participant was either the proprietor or a crucial executive of these enterprises.

Table-1 : Demographic Profile of Respondents

Particulars		Frequency	Percentage (%)
Gender	Male	475	95
	Female	25	5
Total		**500**	**100**
Age in years	18-35	323	65
	35-60	116	23
	60 & above	61	12
Total		**500**	**100**
Annual Turnover	10-50 Lakhs	241	48
	50-1 Crore	151	30
	1-1.5 Crore	108	22
Total		**500**	**100**
The Business Constitution	Sole Proprietorship	418	83
	Partnership Firm	49	10
	Private Limited Company	33	7
Total		**500**	**100**

Source: Primary Data

Descriptive Analysis and Reliability of Variables

The stability and consistency of the four constructs reflecting the variables were assessed by a reliability test (Table-2). All four constructs had Cronbach Alpha values more than 0.7, which is considered very reliable, according to the study's results.

Table-2 : Reliability Test

Constructs	Items	Values of Cronbach's alpha
GST Composition Scheme practices	4	0.711
Awareness	6	0.740
Perspective	6	0.749
Understanding	6	0.799
Level of Acceptance	3	0.781

Source: Primary Data

The awareness of taxpayers was assessed and yield a mean score of 3.86. This indicates a favorable awareness across the business community towards GST, as seen in Table-3. In general, the business community that was examined demonstrated awareness of the presence of the GST in Tamil Nadu. The respondents' perspective on the GST system was analyzed and it was found that the business community generally reacted positively to all assertions with a score of 3.54 (Table-3). The business community has a moderate understanding of GST, as indicated by the mean score of 2.63 evaluating the understanding construct (Table-3). The business community was fully aware that GST is an input tax credit, a consumption tax, a transaction-based tax, and a tax that is collected and paid on a self-assessment basis.

The score for assessing the level of acceptance construct was 3.85, signifying a high degree of endorsement of GST within the business society (Table 3). The results indicate that a significant majority of respondents hold a contrary opinion to such assertions. In addition, they express skepticism over the perceived simplicity of the planned GST system and doubt its potential to contribute to the economic development of the state. In addition, the respondent did not favor raising the income tax rate as a means of helping the government generate more money, in comparison to implementing the GST. Nevertheless, the respondents concur that the GST mostly favors the government rather than the taxpayers. Additionally, they acknowledge that the adoption of GST promotes fraudulent behavior among individuals.

Table-3 : Descriptive Analysis

Items	Mean	SD
GST Composition scheme Practices	3.34	1.07
Awareness	3.86	0.85
Perspective	3.54	0.83
Understanding	2.63	0.95
Level of Acceptance	3.85	0.88

Source: Primary Data

Table-4 shows that at the 1% significance level, there is a statistically significant relationship between the independent and dependent variables. There is a positive and statistically significant relationship between acceptance and each of the three components of the GST composition scheme: awareness, viewpoint, and comprehension.

Table-4 : Relationship Between the Variables

Impact of GST composition scheme and acceptance level	GST Composition scheme Practices	Awareness	Perspective	Understanding	Level of Acceptance
GST Composition scheme Practices	1.00	0.711**	0.689**	0.581**	0.599**
Awareness		1.000	0.743**	0.734**	0.764**
Perspective			1.000	0.612**	0.783**
Understanding				1.000	0.765**
Level of Acceptance					1.000

**correlation is significant at the 0.01 level (2-tailed).

Source: Primary Data

The variables, namely Awareness, Perspective, and Understanding, are collectively referred to as "GST composition scheme practices" in table 5. The p-value, being less than 0.01, signifies that the GST composition scheme has a substantial influence on the acceptance level at a significance level of 1%.

A one-unit change in GST composition Scheme impact results in a 1.40 -unit increase in the level of acceptance. Thus, the alternative hypothesis suggests that the GST composition scheme has a substantial influence on the level of acceptance among small taxpayers in Tamil Nadu.

Table-5 : Impact of GST Composition Scheme on Level of Acceptance Regression Model Summary

Model		R	R square	Adjusted R square	Error Estimation
1		0.698	0.582	0.511	0.406
Table of Regression					
Model		Un Standardized coefficient		Standardized Coefficient	t value	P value
Dependent variable	Independent variable	Beta	Standard Error	Beta		
Level of Acceptance	GST composition scheme practices	0.429	0.199		30.329	0.001
		1.401	0.389	0.897		

Source: Primary Data

5. Findings and Conclusion

The research looked into how small taxpayers in Tamil Nadu felt about the Goods and Services Tax (GST) and how that affected the composition practices. The study's overarching goals were to assess small taxpayers' familiarity with and feelings about the GST composition scheme, as well as their thoughts and feelings about the system's impact on their acceptance. A questionnaire was administered to 500 participants to collect data, which was then analyzed using multiple regression. The results indicate that small taxpayers in Tamil Nadu generally possess a positive level of awareness (mean score of 3.86) and attitudes (mean score of 3.54) on the GST composition scheme. Nevertheless, the level of understanding is only modest, with a mean score of 2.63. This suggests that there is still space for progress in knowing the intricacies and ramifications of the concept. The general degree of acceptance is moderate, with an average score of 3.85, indicating a sense of cautious optimism or skepticisms among the participants.

The regression study confirms a substantial and favorable influence of the GST composition scheme practices on the degree of acceptance among small taxpayers "(R = 0.698, R square = 0.582, Adjusted R square = 0.511, and Error Estimation = 0.406)." The standardized coefficient for the impact of the GST composition scheme is 1.401, meaning that a one-unit change in the system's impact leads to a 1.401-unit rise in the level of acceptance. The obtained result is statistically significant, as indicated by the low p-value of 0.001. This finding further supports the premise that the composition scheme of GST has a substantial impact on the acceptance level of small taxpayers in Tamil Nadu. Ultimately, the research emphasizes the significance of the GST composition system in influencing the attitudes and levels of acceptance among small taxpayers. Although there is already a generally positive level of awareness and viewpoints, further improving understanding could lead to even greater acceptance on a larger scale. The discovered substantial influence highlights the importance of the GST composition scheme in the field of taxation and its ability to promote acceptance and adherence among small enterprises in the area. Policymakers and stakeholders should utilize these findings to enhance communication strategies and support systems in order to effectively promote the integration of the GST composition scheme among small taxpayers in Tamil Nadu.

References

1.   Ahamad, E., & Poddar, S. (2009). Goods and Service Tax Reforms and Intergovernmental Consideration in India. *Asia Research Center", LSE*.

2.   Alie, A. H., Iqbal, J., Ahmed, S., & Bhat, A. A. (2019). Impact of GST on FMCG Sector in India. *Research Journal of Humanities and Social Sciences*, *10*(1), 24-28.

3.   Beri, Y. (2011). Problems and prospects of Goods and Services Tax (GST) in India. *Economic affairs*, *56*(4), 353-357.

4.   Bhasin, R., & Mittal, A. (2016). GST in Select Countries of the World: Lessons for India. *VISION: Journal of Indian Taxation*, *3*(2), 81-91.

5.   Bhattacharya, S., & Londhe, B. R. (2014). Micro entrepreneurship: Sources of finance & related constraints. *Procedia Economics and Finance*, *11*, 775-783.

6.   Bhowmik, G. (2016). Goods and Services Tax (GST) in India: Prospects and the Road Ahead. *The Management Accountant Journal*, *51*(4), 19-26.

7.   Deshmukh, A. K., Mohan, A., & Mohan, I. (2022). Goods and services tax (GST) implementation in India: A SAP–LAP–Twitter analytic perspective. *Global Journal of Flexible Systems Management*, *23*(2), 165-183.

8.   Iqbal, B. A. (2016). Emerging Issues of GST. *The Management Accountant Journal*, *51*(4), 14-18.

9.   Jadhav, M. P., Yewale, M. M., Kalyankar, M. T., & Nemane, M. V. (2017). Impact of GST on E-Commerce. *International Journal of Advanced Engineering Research and Science*, *4*(8), 237241.

10.   Keen, M. (2014). Targeting, cascading and indirect tax design. *Indian Growth and Development Review*, *7*(2), 181-201.

11.   Khan, N. A., & Singh, D. N. B. (2022). *GOODS AND SERVICES TAX (GST): AN ANALYSIS OF THE INDIRECT TAX REFORM IN INDIA* (Doctoral dissertation, GALGOTIAS UNIVERSITY).

12.   Kour, M., Chaudhary, K., Singh, S., & Kaur, B. (2016). A study on impact of GST after its implementation. *International Journal of Innovative studies in sociology and humanities*, *1*(2), 17-24.

13.   Lourdunathan, F., & Xavier, P. (2017). A study on implementation of goods and services tax (GST) in India: Prospectus and challenges. *International Journal of Applied Research*, *3*(1), 626-629.

14.   MA, Z. (2010). An exploratory study of goods and services tax awareness in Malaysia.

15.   Malhotra, R. K., & Kumar, R. COMPOSITION SCHEME UNDER GST FACILITATE FOR SMALL SCALE BUSINESSES AND CONSUMERS.

16.   Marimuthu, M., & Bidin, Z. (2016). Awareness, attitude and probable area of difficulties towards the proposed goods and services tax in Malaysia. *International Review of Management and Marketing*, *6*(8), 175-180.

17.   Marimuthu, M., Bidin, Z., & Abd Jabbar, H. (2012). Perceptions of tax agents towards the proposed goods and services tax in Malaysia.

18.   Mohammad Fadzillah, N. S., & Husin, Z. (2016). The acceptance level on GST implementation in Malaysia. *Gading Journal for the Social Sciences*, *19*(01).

19.   NM, G., & BAI, M (2018). IMPACT ON SMALL TRADERS THROUGH COMPOSITION SCHEME–A STUDY. *REQUEST FOR FEEDBACK & DISCLAIMER 41*.

20. Pandit, S. (2017). GST: Opportunities and challenges for Indian MSMEs. *Inspira-Journal of Commerce, Economics & Computer Science (JCECS)*, *3*(3), 208-214.

21. Patil, S. (2017). Myths and reality of goods and services tax (GST): A study. *PRATIBHA: International Journal of Science, Spirituality, Business and Technology (IJSSBT)*, *5*(2), 47-52.

22. SAHOO, A. K. (2018). Structure of Agricultural Credit System in India. *REQUEST FOR FEEDBACK & DISCLAIMER 41.*

23. Shaik, S., Sameera, S. A., & Firoz, M. S. C. (2015). Does goods and services tax (GST) leads to Indian economic development. *IOSR journal of business and management*, *17*(12), 1-5.

24. Sharma, C. K. (2021). The political economy of India's transition to goods and services tax.

25. Suman, S. (2017). Study on New GST Era and its Impact on Small Businesses Entrepreneurs. *Journal of Accounting, Finance & Marketing technology*, *1*(2), 24-36.

26. Taqvi, S. M. A., Srivastava, A. K., & Srivastava, R. K. (2013). Challenges and opportunities of goods and service tax (GST) in India. *Indian Journal of Applied Research*, *3*(5), 413-415.

27. Vasanthagopal, R. (2011). GST in India: A big leap in the indirect taxation system. *International Journal of Trade, Economics and Finance*, *2*(2), 144.

28. Venkat, A. M. (2016). GST Model for India. *The Management Accountant Journal*, *51*(4), 27-29.

29. Zainol, B. I. D. I. N., Munusamy, M. A. R. I. M. U. T. H. U., & Hijattullah, A. J. (2013). Perceptions of Tax Agents towards the Proposed Goods and Service Tax in Malaysia. In *Proceedings of the 2013 SIBR Conference on Interdisciplinary Business & Economics Research, Kuala Lumpur*.

30. Zhou, L. Z., Tam, J., & Heng-Contaxis, J. (2013). The introduction of goods and services tax in Malaysia. *Centre for Public Policy Studies*, 1-29.

Impact of SDG Disclosure on Higher Education Institution's Ranking in India : An Empirical Study

Ajay Kumar Singh and Kangan Jain

Abstract : *The objective of current study is to study the impact of HEI SDG disclosures on HEI overall performance ranking score in context of India. The embryonic stage of development of literature in this area, time until Agenda 2030 deadline and the criticality of HEIs in catalysing social transformation provides a rationale for current study. The outcome of the study can help assess if prioritising sustainability efforts leads to better HEI performance ranking score. OLS regression is employed to test the study hypothesis and data for same has been pulled from the Times Higher Education database. It is seen that the concept of sustainability reporting is in its nascent stage in Indian HEIs with very few HEIs making such disclosures. The empirical analysis reveals a low, positive and statistically significant relationship between overall HEI score and its impact score which is based on SDG disclosures. Spatial variation in adoption and progress towards SDGs is visible upon observation with SDG 4,7,9 and 6 being the most reported and SDGs 15, 14 and 13 being the least reported. The outcome of the study can help HEI management and the policy makers undertake meaningful sustainability measures by strategically allocating resources.*

Keywords :   Higher Education Institutions, Sustainability Disclosures, Sustainable Development Goals, Linear Regression, University Ranking.

1. Introduction

Sustainable development is a dictum that has caught attention of development planners, industry practitioners, international agencies, researchers and environmental activists alike (Ukaga et al., 2010; Mensah, 2019). The pervasiveness and popularity of the concept calls for its clear understanding

Ajay Kumar Singh, Head, Department of Commerce, University of Delhi - 110007.

Kangan Jain, Research Scholar, Department of Commerce, Delhi School of Economics, New Delhi - 110007.

which has received ample academic attention since its introduction in the UN Brundtland Report in 1987 (Scopelliti et al., 2018; Shepherd et al., 2016; Gray, 2010; Mensah & Enu-Kwesi, 2019). While literature abounds in definition of the concept of sustainable development, the most ubiquitous definition of the term is found in the UN Brundtland Report which defines it as development that meets the needs of present generation without compromising on the ability of the future generations to do so (Schaefer & Crane, 2005). It is a development paradigm that calls for prudent environmental interaction by the society without damaging future resources.

Built upon the Millennium Development Goals (MDGs), the Sustainable Development Goals (SDGs) are a set of 17 global objectives that extend the foundation laid by the MDGs. The MDGs, established in the year 2000 were a significant milestone in the global development agenda. Eradication of abject poverty, hunger, improvement in access to basic education, healthcare and sanitation were the primary focus of the MDGs. Despite their notable progress, the MDGs are criticized for their narrow scope and lack of inclusivity, as they targeted developing countries. The need for a more comprehensive and inclusive framework to address complex challenges of the 21st century has led the United Nations to launch the sustainable development goals (SDGs).

Education plays a crucial role in sensitising and mobilising society towards a sustainable future. Higher education institutions (HEIs) are temples of education that play a pivotal role in realising the SDGs due to their unique position and influence in society. Knowledge creation and its dissemination, research, innovation and technology, education, capacity building and community engagements enable HEIs to contribute in the pursuit of sustainable development.

Current study is an attempt to study the impact of HEI SDG disclosures on their overall performance rank score. Towards this objective, the study presents a systematic review of literature. The rest of the study is structured as follows. Section 2 introduces the concept of SDGs and brings out the criticality of HEIs in realising SDGs. Section 3 presents a rationale for the study and in section 4, a systematic review of literature is provided. In section 5, the study presents a model to find the impact of HEI SDG disclosures on its overall performance rank score and pilot tests it taking data for India. Thereafter the study provides implications of its findings followed by conclusion and limitations.

2.1 SDGs

Built upon the Millennium Development Goals (MDGs), the Sustainable Development Goals (SDGs) are a set of 17 global objectives that extend the foundation laid by the MDGs. The MDGs, established in the year 2000 were a significant milestone in the global development agenda. Eradication of abject poverty, hunger, improvement in access to basic education, healthcare and sanitation were the primary focus of the MDGs. Despite their notable progress, the MDGs are criticized for their narrow scope and lack of inclusivity, as they targeted developing countries. The need for a more comprehensive and inclusive framework to address complex challenges of the 21st century has led the United Nations to launch the sustainable development goals (SDGs). The UN endorsed set of 17 goals and 169 targets which was ratified by 193 member nations to provide the first ever global sustainability matrix for a liveable future. These are a set of goals which encompass a wide range of objectives from poverty and hunger elimination to industry, innovation and infrastructure; from clean energy to decent work and economic growth, quality education and human wellbeing, climate change, restoration of natural habitats and biodiversity, peace, justice and global partnerships to realise these objectives. These goals recognise the interdependence of all members in the global community in realising the broad goals of sustainability at the environmental, social and governance (ESG) levels.

2.2 HEIs and SDGs

Education plays a major role in shaping character and nation building. HEIs play a crucial role in catalysing social transformation to achieve sustainable development (Leal Filho et al., 2019a, 2019b; Hueske & Guenther, 2021; De Iorio et al., 2021; Almeida et al., 2013; Ramos et al., 2015; Kioupi & Voulvoulis, 2019; Disterheft et al., 2013; Moggi, 2019; Singh & Mohanty, 2022). HEIs role in sustainable development requires an integration of their core activities of research, education, knowledge creation, dissemination and community engagement through a pan-institution approach (Bhowmik et al., 2018; Adams, 2018; Ramisio, 2019; Blasco et al., 2020; Arsenault, 2021).

SDG 4 focussing on access to quality education and lifelong learning applies directly to HEIs but the interconnectedness of the different SDGs precludes isolation of education from achieving all other SDGs. HEI's prowess in research, teaching and community engagement enables them in supporting SDG progress across all dimensions (Leal Filho et al., 2019a; de La Poza et al., 2021). The criticality of HEIs in promoting and achieving SDGs is well documented

(Leal Filho et al., 2019a; Aversano et al., 2020; Nicolò et al. 2020; Caputo et al., 2021; Arsenault, 2021; de La Poza et al., 2021; Blasco et al., 2020).

3. Rationale and Objectives of the Study

On the one hand, the SDGs established in 2015 have attracted fair academic attention over the years. Since SDGs were launched in later part of 2015, it can be safely assumed they became part of academic research from 2016 onwards. Cursory review using SCOPUS database shows that 34,739 research articles have been published since 2016 in English language having SDG or sustainable development goals in their title, abstract or body. This is based on search query: (TITLE-ABS-KEY (sustainable AND development AND goals) OR TITLE-ABS-KEY (sdg*) OR TITLE-ABS-KEY (agenda 2030)) AND PUBYEAR > 2015 AND PUBYEAR < 2024 AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE , "English")), run on 02/09/2023.

Upon searching for studies based on HEIs using the search query : (TITLE-ABS-KEY (higher AND education AND institution*) OR TITLE-ABS-KEY (hei*) OR TITLE-ABS-KEY (universit*) OR TITLE-ABS KEY (college*)) AND PUBYEAR > 2015 AND PUBYEAR < 2024 AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE, "English")), 7,59,578 articles were retrieved for a period ranging from 2016 to 2023. At the same time, a search query run on SDGs and HEIs presented only 2139 articles published in English language. Inclusion of the search keyword 'disclosure' further reduced our output to mere 14 articles with publication period range starting from 2021. This is based on a search query run on 02/09/2023.

These statistics reveal the upcoming nature of research seeking to explore the impact of HEI SDG disclosures and its impact on overall HEI performance rank score. The merging of HEI sustainability efforts reflected in such disclosures and ongoing sustainability debates circling around SDGs offer an interesting area for academic exploration. With still time until the Agenda 2030 deadline and economic, social and political influence of HEIs, makes it relevant for them to play their role in the socio-economic development by contributing to the SDGs. It is for this reason, we opted to explore if such disclosures have any impact on HEI's overall performance metric (rank score). Current study is an attempt in this direction seeking to answer the pertinent question, 'Does SDG disclosure by HEIs have any impact on their overall performance rank score?' To the best of our understanding this is one of the preliminary studies dealing with this

objective. The findings from systematic review of literature are used to propose a model for measuring the impact of HEI SDG disclosures on its overall performance rank score. The study also tests the proposed model using data for Indian HEIs and presents the key findings followed by policy implications.

4. Systematic Review of Literature

An essential part of academic research is literature review. Existing literature provides a base for knowledge extension. Literature review is part of planning which provides direction to overall research. There is a growing school of thought which endorses scientific conduct of literature reviews such that the outcome is verifiable and replicable. It is here that the methodology of literature reviews gains significance (Xiao and Watson, 2019).

SCOPUS database being the largest dataset for multidisciplinary research works is the chosen database for the purpose of current literature search (Gusenbauer and Haddaway, 2020).

To conduct a systematic literature review, current study uses the SCOPUS database and employs a 5-step procedure as provided in Denyer and Tranfield (2009) and Wolfswinkel et al. (2013).

Step 1 : Formulation of Research Question

The research question formulated for conducting the SLR was, 'what is the impact of HEI SDG disclosures on its overall performance rank score?'

Step 2 : Scoping of Literature

SCOPUS database is chosen for conducting the current SLR. Given the choice of database, authors have searched relevant literature employing a comprehensive search query.

Step 3 : Inclusion and exclusion criteria

A broad-based search query was employed using the keywords provided in Table No. 1:

Table No. 1: Search Keywords

Higher Education Institution*	AND	Sustainable Development Goal*	AND	Disclosure*
HEI*		SDG*		
Universit*		Agenda 2030		
College*				
EXCLUDE: Non-English documents				
INCLUDE: Articles				

Non-English documents were excluded from the study. The inclusion criteria were limited to articles in journals. Since journal articles are blind peer reviewed, it ensures good quality research to proceed with an SLR. The search query was run on 02/09/2023. Screening of articles was done to assess suitability of subject matter by reading their abstracts and keywords.

A systematic flowchart showing the identification, screening and selection stages for systematic review is shown in Figure No.1.

Figure No.1 : Flowchart Showing Different Phases of Records Selection for Systematic Review
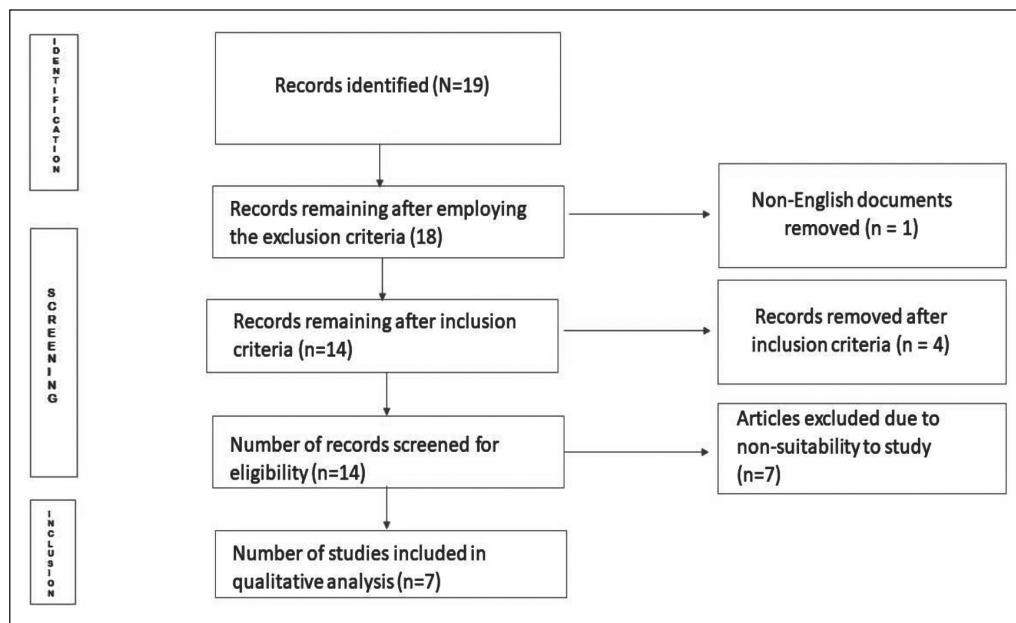
Step 4 : Study Evaluation and Selection: In order to assess the relevance of the 14 articles so identified, an independent assessment was done focussing on the abstract. Based on relevance of abstracts for the current study, all 14 articles were considered relevant by author and hence included in this study. It was at this stage that the 14 articles were fully retrieved from the SCOPUS database. Details of the search process are presented in appendix 1. Based on complete reading of the retrieved articles, only 7 were found suitable for the purpose of this current study.

Step 5 : Synthesis and Analysis: Based on content analysis of information on website regarding sustainability efforts of all Portuguese HEI's, Monteiro et al. (2023) have identified that large and public funded HEIs have made detailed sustainability disclosures with more than 50% of considered HEIs making such disclosures. Saha et al (2021) found no relation between the extent of carbon emission disclosures and SDG reporting by UK HEIs. De Lorio et al. (2022) has found a statistically significant and positive impact of HEI macro context, size and diversity on its SDG disclosures.

De La Poza et al. (2021) has reported a positive relation between HEI overall rank score and its SDG achievements by employing linear and logistic regression models. The data for world university rank score was taken from the Times Higher Education (THE) database and the year of study was 2019. Social and environmental SDGs are reported in considered literature to be the most reported (Caputo et al., 2021; Zanellato and Tiron-Tudor, 2021; Pontelli et al., 2023).

Review of literature reveals the embryonic nature of research seeking to explore impact of HEI SDG reporting on its overall performance rank score. Using this as a starting point, current study attempts to study this relation in context of India.

Proposed Model

Based on the literature, we propose the model provided in Figure No. 2, to measure the impact of HEI SDG disclosures on their overall performance rank score.

The study has made an attempt to test the proposed model using India-wide data for HEI SDGs disclosure and its impact of HEI overall performance rank score.

5. Model Testing

5.1. Variable Selection

Times Higher Education (THE) impact scores have been used to measure HEI sustainability efforts in terms of SDGs. THE rank score database till date it is the only comprehensive rank score database that is audited independently (De La Poza et al., 2021) and THE impact scores is so far the only comprehensive measure capturing university sustainability performance in terms of SDGs (Simina, 2022).

Table No. 2 : SDG reporting by HEIs

Sr. No.	Study	Focus	design	Main findings
1	Monteiro et al. (2023)	Determinants of sustainability reporting in HEIs	Content analysis of information on website Logit regression Portuguese HEIs	63.6% HEIs disclose information on SDGs on their websites. Public and larger institutions disclose more information.
2	Pontelli et al. (2023)	Identify sustainability practices of universities	Content analysis and descriptive statistics of management reports 63 Brazilian public universities 2018	Low SDG disclosure. Disclosed SDGs 13, 16, 11, 12.
3	De Lorio et al. (2022)	Cross-country analysis of SDG disclosures in university context to find internal and external factors affecting such disclosures	OLS regression THE world university rank score 844 universities in 81 countries 2021	Positive, significant impact of institutional macro context, university size and diversity on SDG disclosures.
4	Zanellato and Tiron-Tudor (2021)	Strategy followed by universities towards UN SDGs	Case study of Babes-Bolyai University, Romania 2016-2019	Contribution made towards SDGs 10, 16, 17, 4, 5, 6 and 9.
5	De La Poza et al. (2021)	Assess alignment of SDG achievements with the overall Times Higher Education (THE) rank score	descriptive analysis, linear and logit regression global top 500 universities 2019-2020	Overall rank score is related to the reporting of HEIs' SDG achievements.
6	Saha et al. (2021)	Examine impact of carbon emission disclosures (CED) in the annual reports of UK higher education institutions (HEIs) on extent of SDG reporting by UK HEIs	disclosure index publicly funded universities in the UK 2019 annual reports	No relation between carbon emission disclosure and disclosure of SDGs.
7	Caputo et al. (2021)	Explore HEI's contribution to Agenda 2030	content analysis HEIs adopting GRI standards - 2019	Social and environmental SDGs most disclosed - SDG 4, 8, 10.

Figure No.2 : Proposed Model
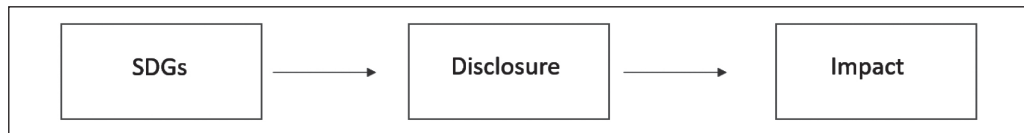
The choice of variables is based on literature. The study employs an OLS regression to construct the model. Impact score and SDG score are used interchangeably hereafter in the study. THE impact score is taken as the independent variable. The control variables are age (Roberts, 1992; Hossain & Hammami, 2009); location (Da Silva and Aibar, 2010) and ownership (De La Poza et al., 2021). The zonal classification of states is considered on the basis of the Zonal Council, Ministry of Home Affairs, Government of India to account for location of HEIs.

5.2. Hypothesis Construction

Consistent with the objective of the study to find the impact of HEI SDG disclosures on their overall performance rank score, the following hypotheses were tested :

Hypothesis 1

$H01_a$: There is no impact of SDG score of HEI on the HEI's overall performance rank.
$HA1_a$: There is impact of SDG score of HEI on the HEI's overall performance rank.

$H01_b$: HEI's overall performance rank is not affected by location of the HEI
$HA1_b$: HEI's overall performance rank is affected by location of the HEI

$H01_c$: HEI's overall performance rank is not affected by age of the HEI
$HA1_c$: HEI's overall performance rank is affected by age of the HEI

$H01_d$: HEI's overall performance rank is not affected by ownership of the HEI
$HA1_d$: HEI's overall performance rank is affected by ownership of the HEI

5.3. Methodology

THE impact rank scores was launched in the year 2019 and data has been assessed for four years 2019, 2020, 2021 and 2022. The Times Impact Rank score (THE) assesses the 17 SDGs based on four broad areas of research, stewardship, outreach

and teaching. Research in relevant fields is the conventional way for HEIs to deliver on an SDG, while HEIs being custodians of societal resources such as students, faculty and other staff, are aware of their stewardship role. By reaching out to the larger community, HEIs can make a significant social impact concerning SDGs along with sensitising society in general and students in particular to planetary ramifications of their actions through suitable curricula. Impact rank score is calculated based on weighted average score for 3 strongest SDGs (26% weightage) plus SDG 17 i.e. partnership for the goals (22% weightage). SDG score was self-calculated as weighted average of the 3 reported SDGs along with SDG 17. State and age of the institution, calculated as difference between year of establishment and current year under study, was taken from respective HEI websites and Wikipedia. OLS regression (Weisberg, 2005) is employed for the purpose of this study. Tests have been conducted on SPSS.

5.4. Analysis

On an average, 64 Indian HEIs have applied for and obtained overall institutional rank score/score; 37 have applied for and obtained the SDG impact rank score/score. Out of the average of 64 institutions obtaining THE overall institutional rank score, 19 institutions have made sustainability disclosures for all the four years 2019-2022 with public institutions showing relatively greater proclivity to make such disclosures (Fig. 2). This amounts to roughly 30% of those institutions that apply to THE for overall institutional rank score, making SDG disclosures. The inclination of Indian HEIs towards making sustainable impact is reflected by the proportion of those HEIs featuring under global impact rank score to HEIs featuring under overall institutional rank score. As is visible in Table No.3, although HEI inclination to make sustainability disclosures is on rise since the number of HEIs obtaining impact scores is increasing over the years, less than 50% of institutions seeking overall rank score are making sustainability disclosures.

Several reasons can be attributed to limited sustainability adoption in Indian HEIs. Firstly, there is a lack of definite guidelines on SDG adoption and disclosure in HEIs in India. Secondly, there is commoditization of education serving vested interests of investors by focussing on attracting and retaining students ignoring sustainability dimensions. Thirdly, there is complete absence of accountability at policy level. The metric management model adopted by HEIs globally lays emphasis on quantitative aspects of teaching and learning prejudicial to the

HEI sustainability endeavours which may not give immediate short-term returns. Fourthly, HEIs face lack of resources (man hours, money) to adopt sustainable practices. Fifthly, there is difficulty in incorporating SDGs in curriculum and lack of training among staff to teach newer courses centring sustainability. Lack of management support and excessive faculty workload is also attributed to SDG indifference in several HEIs. Lastly, the limited diffusion of education for sustainable development can also be attributed to mental models and resistance to change at the university level.

Table No.3 : Number of HEIs Obtaining THE Rank Score/Score

Year	Overall Rank score/score	Impact Rank score/score	Both rank score/score	HEI inclination towards SDGs*
2019	49	13	10	20.40%
2020	56	26	15	26.78%
2021	63	49	26	41.27%
2022	89	61	26	29.21%
Average	64.25	37.25	19.25	

Source: Author's own compilation; *(number of HEIs obtaining impact rank score/number of HEIs obtaining overall rank score)*100.

Figure No.3 : Number of HEIs Making SDG Disclosures Based on Ownership
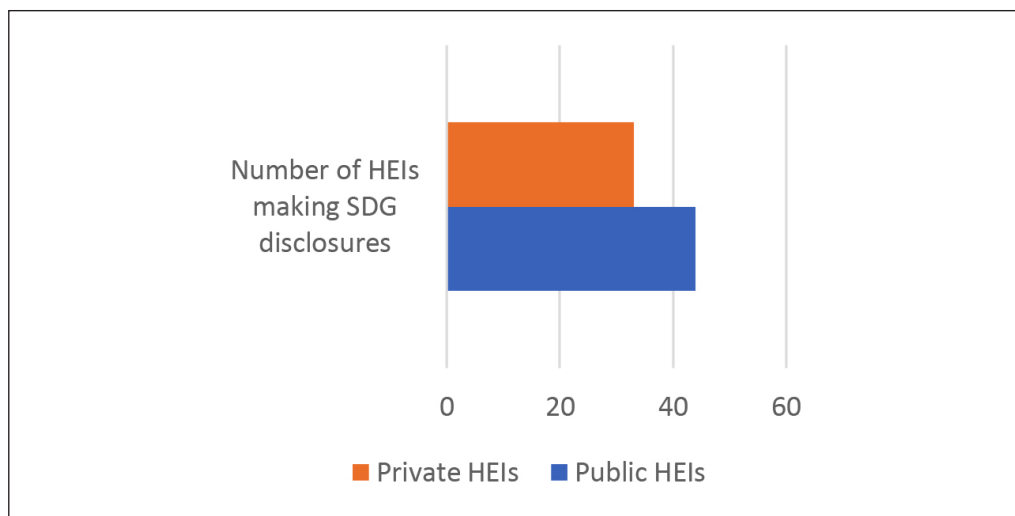
Figure No.4 : Geographical Spread of HEIs Making SGD Disclosures
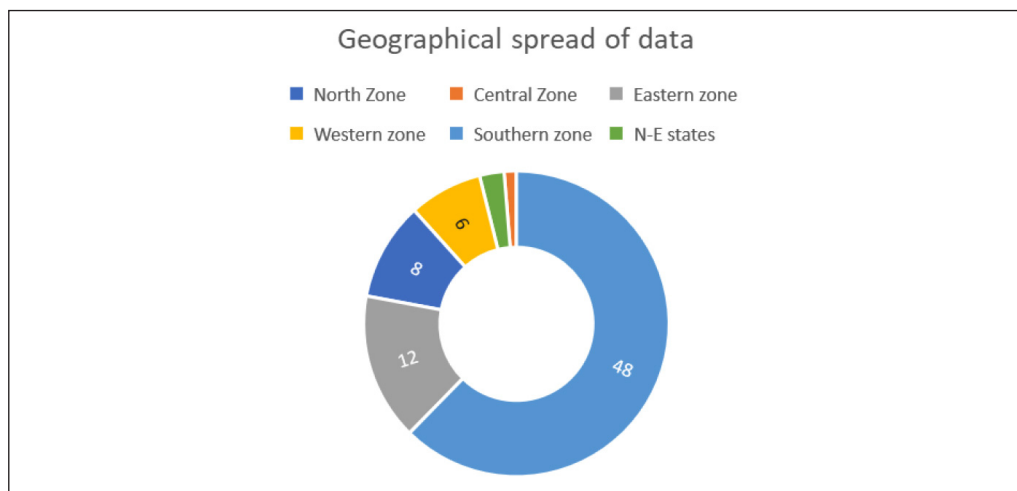
Figure No.4 shows that HEIs in the southern zone comprising states such as Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and the Union Territory of Puducherry (Zonal Council, Ministry of Home Affairs) marked by higher literacy levels and a higher female autonomy (Dyson & Moore, 1983), are engaging and disclosing sustainability efforts in SDG terms. The southern zone is followed by the eastern zone comprising states such as Bihar, Jharkhand, Orissa, Sikkim and West Bengal, in terms of sustainability performance. Relative to north, west, central and northeast, the eastern zone also has higher proclivity towards education. These statistics reveal that how a state values education emerges as a factor influencing HEI sensitivity towards SDGs with level of education showing to have a direct and positive correlation with HEI SDG disclosures.

Table No.4 presents a summary of most and leased disclosed SDGs by HEIs based on their location. The zonal disclosure of SDGs by HEIs indicate differences in SDG disclosure. Regional priorities, local challenges (position of women) and community needs can be some factors that constitute the locational differences responsible for different SDGs reported by HEIs in different zones e.g., Northeast India is characterised by indigenous communities, economic disparities and historically limited access to infrastructure, amenities and economic development. Hence SDG1 – No Poverty is the most prioritised in this region. In similar way, South Indian states prioritise SDG 5 – Gender Equality as influenced by social progressiveness, higher levels of literacy and Matriarchal traditions.

Table No.4 : HEI SDG Disclosure Based on Location

Zone	Dummy	Most disclosed SDGs	Least disclosed SDGs
1	Northern	4, 3, 9	13, 14, 5, 16
2	Central	6, 7, 9	*
3	Eastern	4, 10	1, 13, 14, 15
4	Western	6, 12	2, 11, 13, 14, 15
5	Southern	5, 9, 7	2, 15, 16
6	North-Eastern	1, 7, 12	*

At the all-India level, SDG 4,7,9 and 6 were the most disclosed SDGs, while SDG 15, 14 and 13 were the least disclosed in the order provided. Disclosure on SDG 17 was mandatory under THE impact rank score methodology.

The Times database provided overall institutional scores in ranges. So, to get one representative figure, as per THE methodology, the overall institution score was self-calculated after assigning 30% weightage each to teaching, research and citation scores, 7.5% weightage to industry income and 2.5% weightage to international outlook. In similar way, overall impact score was self-calculated. As per THE methodology, SDG rank score was based on HEI disclosures of four any SDGs with SDG 17 – Partnerships for the Goals being a compulsory disclosure. The impact score was self-calculated using THE methodology - 26% weight was assigned to each of the three SDGs disclosed along with 22% weight to SDG 17. Within each SDG, THE has captured SDG performance of HEIs based on its research, the impact and evidence in the disclosed sustainability area. This weighted average score calculation helped convert the rank or ordinal data in some cases and range in other cases into ratio scale which lends itself for the purpose of hypothesis testing suited to the study.

In order to test our hypothesis 1, we examined the existence of direct linear relationship using Pearson's correlation matrix (Table No. 5) between our dependent variable, overall institutional score and our independent variable, overall SDG score and our control variables – age of the HEI, ownership and location of the HEI.

An OLS Linear Regression was performed on the set of dependent, independent and control variables. The model was statistically significant at 5% (p-value<0.01) with no multicollinearity problems, and VIF coefficients were always below 2.

The total model explained ~35% of the variability of overall score. The independent variable, overall SDG score is aligned with the overall institutional score in the same direction. For the control variables, public institutions reflect higher overall rank score and as HEIs grow older, their engagement in obtaining higher institutional rank score decreases. This can be understood as when institutes are young, they need to put in more efforts to attract students while once they are old and established, by the word-of-mouth, students keep pouring in without much effort by the HEI in positioning and branding itself. There is low, positive and statistically significant relation between overall SDG score and overall HEI score. The empirical analysis causes us to say that HEI SDG disclosure affects HEI overall performance ranking score.

Table No.5 : Pearson's Correlation Matrix

		Overall Institutional consolidated self calculated	dOwnership	Sigma SDG_Impact rank score_self calculated	Age	culture/location dummy
Overall Institutional consolidated self calculated	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	77				
dOwnership	Pearson Correlation	-.387**	1			
	Sig. (2-tailed)	.001				
	N	77	77			
Sigma SDG_Impact rank score_self calculated	Pearson Correlation	.238*	.068	1		
	Sig. (2-tailed)	.037	.558			
	N	77	77	77		
Age	Pearson Correlation	-.283*	-.173	-.138	1	
	Sig. (2-tailed)	.013	.132	.233		
	N	77	77	77	77	
culture/location dummy	Pearson Correlation	-.179	.000	.062	-.133	1
	Sig. (2-tailed)	.119	1.000	.593	.250	
	N	77	77	77	77	77

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table No.6 : Linear Regression Model of Overall Institutional Score

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
dOwnership	-7.507	1.515	-.466	-4.955	.000	.967	1.034
Age	-.091	.024	-.364	-3.808	.000	.938	1.066
culture/location dummy	-1.421	.550	-.242	-2.586	.012	.980	1.021
Sigma SDG_Impact rank score_self calculated	.128	.051	.235	2.507	.014	.977	1.024

a. Dependent Variable: Overall Institutional consolidated self calculated

Table No.7 : Model Fit – ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	733.040	1	733.040	13.241	.001[b]
	Residual	4151.947	75	55.359		
	Total	4884.987	76			
2	Regression	1351.573	2	675.787	14.153	.000[c]
	Residual	3533.414	74	47.749		
	Total	4884.987	76			
3	Regression	1607.801	3	535.934	11.938	.000[d]
	Residual	3277.186	73	44.893		
	Total	4884.987	76			
4	Regression	1870.853	4	467.713	11.172	.000[e]
	Residual	3014.134	72	41.863		
	Total	4884.987	76			

a. Dependent Variable: Overall Institutional consolidated self calculated

b. Predictors: (Constant), dOwnership

c. Predictors: (Constant), dOwnership, Age

d. Predictors: (Constant), dOwnership, Age, culture/location dummy

e. Predictors: (Constant), dOwnership, Age, culture/location dummy, Sigma SDG_Impact rank score_self calculated

Table No.8 : Model Summary[e]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.387[a]	.150	.139	7.440	.150	13.241	1	75	.001	
2	.526[b]	.277	.257	6.910	.127	12.954	1	74	.001	
3	.574[c]	.329	.302	6.700	.052	5.708	1	73	.019	
4	.619[d]	.383	.349	6.470	.054	6.284	1	72	.014	1.796

a. Predictors: (Constant), dOwnership
b. Predictors: (Constant), dOwnership, Age
c. Predictors: (Constant), dOwnership, Age, culture/location dummy
d. Predictors: (Constant), dOwnership, Age, culture/location dummy, Sigma SDG_Impact rank score_self calculated
e. Dependent Variable: Overall Institutional consolidated self calculated

The following model is presented in the study :

Overall HEI score$_{it}$ = $\beta_1 \Sigma$ SDG impact rank score$_{it}$ + β_2 downership$_i$ + β_3 Age$_i$ + $\beta_4$dlocation$_i$ + ε

Where :

Overall HEI score$_{it}$ is the overall institutional consolidated score for *ith* (*i* = from 1 to 77) HEI in year *t* (*t* = 2019, 2020, 2021, 2022).

β_n = coefficients of the explanatory terms

SDG impact rank score$_{it}$ = self-calculated SDG impact rank score for the *ith* (*i* = from 1 to 77) HEI in year *t* (*t* = 2019, 2020, 2021, 2022).

downership$_i$ = dummy variable to capture effect of ownership of the *ith* (*i* = from 1 to 77) HEI

Age$_i$ = Age of the *ith* (*i* = from 1 to 77) HEI calculated as difference between 2022 and year of establishment.

dlocation$_i$ = dummy variable to capture effect of location of the ith (*i* = from 1 to 77) HEI

ε = random error term

5.5. Discussion

The results of this study are compatible with those of Pontelli et al. (2023); Zanellato and Tiron-Tudor (2021) and Caputo et al. (2021) according to which SDG 4, 9, 12, 16 and 17 were most relative of all goals in disclosures by HEIs. Caputo el al. (2021) and Leal Filho et al. (2019a) also report SDG 4 which relates to quality education, to be the most disclosed SDG. SDG 4 is directly associated with the core objective of HEIs which includes imparting education and lifelong skills. HEIs are also hubs of water and energy consumption and public institutions with relatively greater land area availability, are in a position to take measures towards solar energy generation for self-consumption and rainwater harvesting. HEIs with their forte in research and training are incubation hubs for upcoming entrepreneurs. They are contributing significantly to industry, innovation and infrastructure by nurturing a solution-oriented research mindset and industry interface is becoming more popular in HEIs which develops a solution orientation among students. Study reveals lack of holistic sustainable development propagated at Indian HEIs which is compatible with findings of Pontelli et al. (2023); Zanellato and Tiron-Tudor (2021) and Caputo et al. (2021). Higher commitment by public HEIs towards sustainable practices as revealed in our study is compatible with results of Monteiro et al. (2023)

6.1. Managerial Implications

The need for India to achieve SDGs is in its own interest apart from global perspective. In the struggle to make progress respecting planetary boundaries, all stakeholders – individuals, corporations, HEIs, schools, society and the government need to play an active role. Current study is focussed on HEI sustainability disclosures based on UN SDGs and its impact on overall institutional rank score to explain the phenomenon of sustainability disclosures in context of India. Though we are on a progressive trajectory, efforts need to be buckled up. Few HEIs have shown some commitment towards SDGs voluntarily. The current study has some managerial implications. Firstly, HEIs should encourage research around sustainability by providing scholarships to such scholars. Secondly, strengthening socio-emotional learning (SEL) quotient can be seen as a way for HEIs to achieve SDGs by integrating youth with society enabling percolation of knowledge beyond academic walls. Thirdly, joint projects with government agencies, industry and NGOs can help HEIs to leverage on their research and resources from the community and government. Partnerships and collaboration in this direction can provide a better integration of HEIs with

SDGs. Fourthly, integration of sustainability awareness in teaching and learning curriculum is recommended for imparting the necessary knowledge and skills among students to contribute to sustainable growth in the neglected areas. Fifthly, monitoring and reporting HEI SDG efforts can put normative pressure on other HEIs and HEI sustainability efforts can be used to signal HEI commitment to the society and environment. Sixthly, the growing sustainability awareness, this may help attract more students and better faculty to the HEI. Disclosures, if made transparently, can also attract funding from corporations which will overcome the resource-constraint in implementing the SDGs. Lastly, there is a need to embed partnerships, charters in the university system to produce socially sustainable patterns.

6.2. Policy Implications

Findings of the study indicate small uptake of sustainability efforts by Indian HEIs which signals cherry picking of easy to execute SDGs. Policy focus and financial support in the lesser implemented SDGs along with capacity building and training programmes for faculty, staff and students can help mobilise HEI efforts towards the lesser disclosed SDGs. The commitment of Government of India towards integration of HEIs with SDGs is visible in the recently launched Unnat Bharat Abhiyan (UBA) 2.0, a flagship programme of MHRD in its policy framework on ''Fostering Social Responsibility and Community Engagement in Higher Educational Institutions in India'', stresses on the role of HEIs in conducting local SDG centric research along with teaching the underprivileged in their local communities (UGC, 2020). The 'Nadi ko Jano Abhiyan', part of Research for the Resurgence Foundation, has helped Indian HEIs to work partly towards SDG 14 i.e. Life below water by encouraging students to create a database of Indian rivers. The NAAC grading framework partially covers SDG 1, 5, 10, 17, 8 and 9. The framework can be extended to cover remaining SDGs. The pan-India (including HEI) adoption of the Swachh Bharat Abhiyan has been instrumental in making progress towards SDG 6.

7. Recommendations

We recommend mandatory sustainability reporting for all HEIs irrespective of their size and ownership structure. Just as with Companies Act, 2013 making CSR mandatory for bigger companies, corporate CSR performance remarkably improved, in similar vein, mandatory reporting on SDG performance can go a long way in HEI sustainability realisation. It could be an extension to existing National Assessment and Accreditation Council (NAAC) grading and National Institutional Rank score Framework (NIRF) rank score to integrate student as

well as institution sustainability initiatives in their framework in a more meaningful manner. We expect that having a formalised body displaying HEI SDG performance apart from their academic grades/scores is likely to have a positive impact on their SDG progress.

8. Conclusion

Current study has highlighted grave under-reporting of Sustainable efforts captured under SDG reporting framework by Indian HEIs. Out of the 1043 universities, 42343 colleges and 11799 (AISHE 2020) stand-alone institutions, sustainability disclosures are provided by a handful of HEIs in India. The contribution of current study lies in examination of the current state of HEIs in SDG adoption in India and if SDG adoption is aligned to overall institutional performance reflective in its rank score. It is seen that spatial variation in adoption and progress towards SDGs is visible upon observation with SDG 4,7,9 and 6 being the most reported and SDGs 15, 14 and 13 being the least reported. The outcome of the study has implications both for HEI management as well as policy makers.

Apart from integrating sustainability in curriculum and focussing on research in the area, there is a need for greater monitoring of sustainability measures in HEIs, encouraging transparency in such reporting and bringing sustainability disclosures within policy framework. Strategic alignment of SDGs into HEI vision and mission is a way forward. Fostering institutional partnerships and collaborations with industry, government and NGOs can help integrate the research base of HEIs and fund base of the partner to realise sustainability objectives.

9. Limitations and way forward

Current study has its limitations. Firstly, only secondary data has been employed for the purpose of this study. Secondly, THE methodology for metric determination is dynamic and hence data studied was lacking. Thirdly, limited time series data was analysed due to recency of the SDG reporting phenomenon. This precludes the user from using the outcome of the study as an indicator of future HEI sustainability performance and results at most are reflective of an ongoing trend in this regard. Lastly, THE has relied on HEI self-disclosure on SDGs. This means data lacks reliability. Moreover, HEIs with limited resources do not find a place in this database. The study can be extended to the global level and newer dimensions can be added to the existing model such as macro-context.

References :

Adams, C. A. (2018). Debate: Integrated reporting and accounting for sustainable development across generations by universities. Public Money & Management, 38(5), 332-334.

Almeida, C. M. V. B., Santos, A. P. Z., Bonilla, S. H., Giannetti, B. F., & Huisingh, D. (2013). The roles, perspectives and limitations of environmental accounting in higher educational institutions: an emergy synthesis study of the engineering programme at the Paulista University in Brazil. Journal of Cleaner Production, 52(1), 380-391.

AISHE (All India Survey on Higher Education). (2020). Available at https://aishe.gov.in/aishe/viewDocument.action?documentId=277 (Accessed 10 July 2022).

Aversano, N., Di Carlo, F., Sannino, G., Tartaglia Polcini, P., & Lombardi, R. (2020). Corporate social responsibility, stakeholder engagement, and universities: New evidence from the Italian scenario. Corporate Social Responsibility and Environmental Management, 27(4), 1892-1899.

Arsenault, N. (2021). The Role of Universities towards a Sustainable Future: Integrating the Sustainable Development Goals. [Major Paper, Master of Environmental Studies, Faculty of Environmental & Urban Change, York University]. York space institutional repository. Available at http://hdl.handle.net/10315/38961 (Accessed 3 September 2023).

Bhowmik, J., Selim, S. A., & Huq, S. (2018). The role of universities in achieving the sustainable development goals [Policy Brief]. International Centre for Climate Change and Development. Independent University, Bangladesh. Available at http://www.icccad.net/wp-content/uploads/2015/12/Policy-Brief-on-role-of-Universities-in-achieving-SDGs.pdf (accessed 15 August 2022).

Blasco, N., Brusca, I., & Labrador, M. (2020). Drivers for universities' contribution to the sustainable development goals: An analysis of Spanish public universities. Sustainability, 13(1), 89.

Caputo, F., Ligorio, L., & Pizzi, S. (2021). The contribution of higher education institutions to the SDGs—An evaluation of sustainability reporting practices. Administrative Sciences, 11(3), 97.

Da Silva, S. M., and B. Aibar. (2010). Determinants of Environmental Disclosure in the Annual Reports of Large Companies Operating in Portugal. Corporate Social Responsibility and Environmental Management, 17(4), 185–204.

De Iorio, S., Zampone, G., & Piccolo, A. (2022). Determinant factors of SDG disclosure in the university context. Administrative Sciences, 12(1), 21.

De la Poza, E., Merello, P., Barbera, A., & Celani, A. (2021). Universities' reporting on SDGs: Using the impact rankings to model and measure their contribution to sustainability. Sustainability, 13(4), 2038.

Denyer, D. and Tranfield, D. (2009). Producing a systematic review. In Buchanan, D. and Bryman, A. (eds) The Sage Handbook of Organizational Research Methods. Sage. 671–689.

Disterheft, A., Caeiro, S., Azeiteiro, U.M., & Leal Filho, W. (2013). Sustainability Science and Education for Sustainable Development in Universities: A Way for Transition. In: Caeiro, S., Filho, W., Jabbour, C., Azeiteiro, U. (eds) Sustainability Assessment Tools in Higher Education Institutions. Springer, Cham. https://doi.org/10.1007/978-3-319-02375-5_1

Dyson, T., & Moore, M. (1983). On Kinship Structure, Female Autonomy, and Demographic Behavior in India. Population and Development Review, 9(1), 35–60. https://doi.org/10.2307/1972894

Gray, R. (2010). Is accounting for sustainability actually accounting for sustainability… and how would we know? An exploration of narratives of organisations and the planet. Accounting, Organizations and Society, 35(1), 47-62.

Gusenbauer, M., & Haddaway, N. R.(2020): Which academic search systems are suitable for systematic reviews or meta.analyses? Evaluating retrieval qualities of Google Scholar, PubMed, and 26 other resources. Research synthesis methods, 11(2), 181-217.

Hossain, M., & Hammami, H. (2009). Voluntary disclosure in the annual reports of an emerging country: The case of Qatar. Advances in Accounting, 25(2), 255-265.

Hueske, A. K., & Guenther, E. (2021). Multilevel barrier and driver analysis to improve sustainability implementation strategies: Towards sustainable operations in institutions of higher education. Journal of Cleaner Production, 291(1), 125899.

Kioupi, V., & Voulvoulis, N. (2019). Education for sustainable development: A systemic framework for connecting the SDGs to educational outcomes. Sustainability, 11(21), 6104.

Leal Filho, W., Shiel, C., Paco, A., Mifsud, M., Avila, L. V., Brandli, L. L., Molthan-Hill, P., Pace, P., Azeiteiro, U.M., Vargas, V.R., & Caeiro, S. (2019). Sustainable Development Goals and sustainability teaching at universities: Falling behind or getting ahead of the pack?. Journal of Cleaner Production, 232(1), 285-294.

Leal Filho, W., Vargas, V. R., Salvia, A. L., Brandli, L. L., Pallant, E., Klavins, M., ... & Vaccari, M. (2019). The role of higher education institutions in sustainability initiatives at the local level. Journal of Cleaner Production, 233(1), 1004-1015.

Mensah, J. (2019). Sustainable development : Meaning, history, principles, pillars, and implications for human action: Literature review. Cogent social sciences, 5(1), 1653531.

Mensah, J., & Enu-Kwesi, F. (2019). Implications of environmental sanitation management for sustainable livelihoods in the catchment area of Benya Lagoon in Ghana. Journal of Integrative Environmental Sciences, 16(1), 23-43.

Moggi, S. (2019). Social and environmental reports at universities: A Habermasian view on their evolution. Accounting Forum, 43(3), 283-326.

Monteiro, S., Ribeiro, V., Vilhena, E., Lemos, K., & Molho, C. (2023). Determinants of online-reporting on sustainable development goals : the case of Portuguese Higher Education Institutions. Social Responsibility Journal, Vol. ahead-of-print No. ahead-of-print.

Nicolo, G., Manes-Rossi, F., Christiaens, J., & Aversano, N. (2020). Accountability through intellectual capital disclosure in Italian Universities. Journal of Management and Governance, 24(4), 1055-1087.

Pontelli, G. E., Maffini, C. A., Kneipp, J. M., & Gomes, C. M. (2023). Environmental Disclosure in Brazilian Public Universities. Journal of technology management & innovation, 18(1), 27-36.

Ramisio, P. J., Pinto, L. M. C., Gouveia, N., Costa, H., & Arezes, D. (2019). Sustainability Strategy in Higher Education Institutions : Lessons learned from a nine-year case study. Journal of Cleaner Production, 222(1), 300-309.

Roberts, R.W. (1992). Determinants of corporate social responsibility disclosure : An application of stakeholder theory. Accounting, Organisations and Society 17(6), 595–612.

Ramos, T. B., Caeiro, S., Van Hoof, B., Lozano, R., Huisingh, D., & Ceulemans, K. (2015). Experiences from the implementation of sustainable development in higher education institutions: Environmental Management for Sustainable Universities. Journal of Cleaner Production, 106(1), 3-10.

Saha, A. K., Al.Shaer, H., Dixon, R., & Demirag, I. (2021). Determinants of carbon emission disclosures and UN sustainable development goals: The case of UK higher education institutions. Australian Accounting Review, 31(2), 79-107.

Schaefer, A., & Crane, A. (2005). Addressing sustainability and consumption. Journal of macromarketing, 25(1), 76-92.

Scopelliti, M., Molinario, E., Bonaiuto, F., Bonnes, M., Cicero, L., De Dominicis, S., ... & Bonaiuto, M. (2018). What makes you a 'hero' for nature? Socio-psychological profiling of leaders committed to nature and biodiversity protection across seven EU countries. Journal of environmental planning and management, 61(5-6), 970-993.

Shepherd, E., Milner.Gulland, E. J., Knight, A. T., Ling, M. A., Darrah, S., van Soesbergen, A., & Burgess, N. D. (2016). Status and trends in global ecosystem services and natural capital: assessing progress toward Aichi Biodiversity Target 14. Conservation Letters, 9(6), 429-437.

Simina, P. R. A. (2022). The Importance of Sustainability for University Competitiveness. *Studies in Business and Economics*, *17*(1), 187-201.

Singh, A.K., & Mohanty, V.L. (2022). Engagement of Universities with Society to Realise SDGs. *University News*, *60*(12), March 21-27.

Ukaga, O., Maser, C., & Reichenbach, M. (Eds.). (2010). *Sustainable development: Principles, frameworks, and case studies*. CRC Press.

University Grants Commission. (2020). *Fostering Social Responsibility and Community Engagement in Higher Educational Institutions in India.* [National Curriculum Framework & Guidelines]. Available at https://www.unescochair-cbrsr.org/wp-content/uploads/2020/08/UBA_Framework_Document.pdf (Accessed 12 July 2022).

Weisberg, S. (2005). *Applied linear regression*. John Wiley & Sons.

Wolfswinkel, J. F., Furtmueller, E., & Wilderom, C. P. (2013). Using grounded theory as a method for rigorously reviewing literature. *European journal of information systems*, *22*(1), 45-55.

Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. *Journal of Planning Education and Research, 39*(1), 93-112.

Zanellato, G., & Tiron-Tudor, A. (2021). Toward a sustainable university: babes-bolyai university goes green. *Administrative Sciences*, *11*(4), 133.

Zonal Council, Ministry of Home Affairs, Government of India. https://www.mha.gov.in/en/page/zonal-council.

Appendix 1:

(TITLE-ABS-KEY (higher AND education AND institution) OR TITLE-ABS-KEY (hei*) OR TITLE-ABS-KEY (universit*) OR TITLE-ABS-KEY (college*) AND TITLE-ABS -

KEY (sustainable AND development AND goals) OR TITLE-ABS-KEY (sdg*) OR TITLE-ABS-KEY (agenda 2030) AND TITLE-ABS -

KEY (disclosure*)) AND PUBYEAR > 2015 AND PUBYEAR < 2024 AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE, "English"))

Do the Categories of the IPOs Differ in the Post-listing Performance Risk? : An Evidence Assessment of Indian SME Financing

Drashti Kaushal Shah and P. K. Priyan

Abstract : *The 'Atmanirbhar Bharat Abhiyaan' is being greeted as an economic revival from a global pandemic, and to restart India's MSMEs(Micro, Small and Medium Enterprises). Modi government has announced special packages and offered a 15% equity infusion to MSMEs to tap the capital market. Such a move of the government increases the trust of the investors towards investments in MSMEs. Valuation of such unorganized firms is difficult, hence investments in SME IPOs are highly risky. Volatility refers to the degree of change related to stock price, higher volatility implies a higher risk of investments. Using 187 IPOs listed on NSE Emerge, the present study measures volatility for an initial one month from listing. Further, it compares the performance based on issue-specific variables, market-related variables, and company-specific variables. Volatility is found significantly higher for IPOs with higher RNOW, higher subscription ratio, and issued during positive market sentiment.*

Keywords : Initial Return Volatility, SME IPOs, Performance Uncertainty.

Introduction

MSMEs contribute significantly to most countries' economic development and employment. (Stein, Goland & Schiff, 2010). In, the Indian context, MSMEs employ over 11 crores workers, contributes 29% of Gross Domestic Product (GDP), and encompass nearly fifty percentage of exports. Around 90.19 lakh MSMEs are registered in India and out of which 6.33 crore (99.4 %) are micro-

Drashti Kaushal Shah, Assistant Professor, S. R. Luthra Institute of Management, Surat, Gujarat. A/302, Sneh Sangini Apartment, Opp. Bhulabhai Park, Adaian, Surat, Gujarat - 395 009, M : 90999 80879, shahdrashti@gmail.com

P. K. Priyan, Professor, G. H. Patel Postgraduate Department of Business Management, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat. priyanspu@gmail.com

enterprises. The 'Atmanirbhar Bharat Abhiyaan' is greeted as an important fiscal policy to ease India's economic difficulty due to pandemics. 'Atmanirbhar' package to restart India's MSME sector was announced by the Modi government on 13th May 2020. In order to boost the growth of MSMEs, the government has planned to provide 15% equity infusion to those who want to take finance through a public listing. The idea is to hold the funds for 2-3 years in MSMEs and sell the same when it appreciates and uses the funds in reinvesting in another encouraging MSME. The government has kept Rs 50,000 crore as a rolling fund, which will be continuously invested.

Access to finance is the biggest challenge for exponential growth of MSMEs. In the global competitive market, to compete against Chinese products, MSMEs exposure towards the capital market becomes essential. A public listing of SMEs provides growth and liquidity to investors and employees holding ESOPs and exit routes to private equity investors. In India, BSE SME and NSE Emerge, established in 2012, provide SMEs a public listing opportunity with least compliances and cost compared to the mainboard exchange. NSE Emerge and BSE SME exchange has raised 6481.22 cores since its inception to December 2019 by successfully issuing 524 SME IPOs (Source: Handbook of Statistics_2019, SEBI). During the pandemic situation of Covid19, 20 SME IPOs have successfully raised 120.07 crores from March to October 2020.

Regulations for listing at SME exchanges are significantly different than mainboard IPOs listing. Listing at SME exchanges is exempted from SEBI approval, in-principal approval of stock exchanges, and public notice requirements. Hence, the risk associated with the SME investment increases, and assessing the same becomes very important. Volatility refers to the degree of change related to stock price, higher volatility implies that a security's share price can possibly be accelerate in any direction, while less volatility implies a more stable price. The higher volatility indicates that security is riskier. Volatility is often assessed as the standard deviation which helps to identify stocks for successful investing. The present study contributes by measuring the volatility of SME IPOs India listed on NSE Emerge since its inception in the year 2012 and comparing based on various company, issue, and market-specific variables.

Literature Review

Volatility is the standard deviation of the first 30 days post listing of IPOs (Mcguinness, 2016); while for 20 trading days post listing (Sahoo, 2014b; Sahoo, 2015). Listing day volatility is the distinction between high price and low price

scaled by amount of high price and low price (Sahoo, 2014a). Fundamentally strong IPO stocks minimizes the post listing performance risk (Sahoo, 2017). Hong Kong IPOs evidenced initial period volatility of 5.361 percent and 30-day volatility of 3.563 percent (Mcguinness, 2016). Indian IPOs evidenced 0.17 percent of volatility (Sahoo, 2014a); while volatility of 12.52 percent (Sahoo, 2014b); 0.15 percent listing day volatility, and 18.03 percent 20 days post (Sahoo, 2015).

Older firms are considered as established firms that possess a lower extent of risk (Ritter, 1991). Pre-IPO profitability provides information about the business prospects, and superior information reduces performance risk (Welch, 1989). Oversubscription ratio and volatility are positively associated (Vong, 2006). Higher level of post listing volatility for the firms associated with reputable investment bank underwriters, firms backed by venture capital, firms listed on the NASDAQ stock exchange, lower levels of debt, belongs to the technology sector listed during the period with high market volatility (Gleason, Johnston & Madura, 2008).

Underpricing, market sentiment, and float size effects initial return volatility; IPOs with a large offer size, reduce the offer price spreads and the reputation of underwriters leading to less volatility (Mcguinness, 2016). Listing day returns are affected by the volume of informed investors, while the volume of uninformed investors accelerates post listing volatility (Abraham, Harris & Auerbachet, 2016). Analyst favourable recommendation reduces listing day volatility (Sahoo, 2014a). IPO firms' board diversity and reputation and a large number of outside directors shrink aftermarket IPO price volatility; venture capital-backed IPOs are less volatile for the short-run (Sahoo,2014b). Subscription rate gives a compelling sign to assessing both listing and post-listing price variability; larger issues have reported less volatility (Sahoo, 2015). IPOs are more transparent and likely to be less volatile with the participation from anchor investors, where as the market condition emphatically increases the volatility (Sahoo, 2017).

Based on the detailed review of literature, the present study tries to fulfil the gap by following ways. **First**, the study is focused on the SME Exchange of India with the recent dataset, sample of IPOs listed on NSE EMERGE from its inception from the year 2012 to August 2019 to uncover volatility up to 30 days of listing. **Second,** the study **compares** the magnitude of volatility for issue, company, and market-specific variables.

Objective

The present study has twofold objectives; 1) is to measure the performance of IPOs listed on NSE Emerge in terms of volatility and 2) is to compare issue, company, and market specific variables for listing day, 10, 20, and 30 days post listing volatility.

Rationale

The government encourages the capital market route for MSMEs to overcome the pandemic situation of Covid19, by providing 15 % equity infusion of up to Rs. 50000crores. The pricing and performance of SME IPOs play a significant in the future interest of investors, issuers, and regulators. The present study encompasses a new segment of the volatility of post listing, which is an important but not researched area. The findings would have suggestions for the issuers, investors and regulators.

Data and Methodology

Sample Selection

The sample data for this study consists of all the IPOs that were listed on the NSE Emerge stock exchange from its inception in September 2012 to August 2019. Table 1 outlines the sample for the study. Data has been collected from various sources such as https://www.nseindia.com/emerge/, Capitaline Plus Software, NIFTY Small Cap 250 Index data collected from https://www.nseindia.com, and few variables collected from https://www.chittorgarh.com/.

TABLE-1 : DETAILS OF SAMPLE

Sample period September 2012 to August 2019	
Particulars	**Number of IPOs**
Total number of IPOs issued during sample period	196
Excluded: Traded less than 30 days from listing	7
Finance and Investment Sector Firms	2
Final Sample Size	**187**
Sample as percentage of total IPOs	95.41 %

Description of Variables

This study measures the IPO volatility post one month of listing and further evaluates the difference in IPO performance with different categories. Variables mentioned below are included in the study based on significance proved in the earlier studies.

Dependent Variable : After Market Price Risk (Volatility)

Assessment of price risk (price variability) indicates the quality of IPOs. IPOs with higher price variability are considered riskier than the less price variability. The study uses Sahoo's (2017) extreme value measure for volatility measurement. The study measures the volatility i.e. risk as the natural log high price divided by the low price on listing day. Listing day volatility is termed as Vol, and simple average Vol for first 10, 20, and 30 days post listing are termed as Vol_10d, Vol_20d, and Vol_30d. Risk and volatility are used interchangeably.

Description of Categories

Table 2 enlist the definition of variables, and for the comparison based on Age, CFO_TA, PIPH, RNOW, DE, share premium, listing delay, risk factors, subscription times, offer size; the sample of 187 IPOs have been classified into four quartiles based upon the lower value (Q1) to a high value (Q4). And for market sentiment, the sample has been divided into two categories, positive and negative market sentiments.

TABLE-2 : DEFINITION OF VARIABLES

Variables	Definition
CATEGORY 1 Company Specific Variables	
Age	Age of the firm is defined as number of years between incorporation and IPO listing.
CFO_TA	Operating cashflow during the financial year immediately preceding the IPO, scaled by total assets of the firm is encompassed as CFO_TA.
PIPH	Percentage of equity ownership held by the promoter; post-IPO defined as PIPH.
RNOW	Ratio of profit after tax to net worth in the financial year immediately preceding the IPO is defined as RNOW.
DE	Debt to equity capital ratio (book value) in the financial year immediately preceding the IPO is considered as DE.
CATEGORY 2 Issue Specific Variables	
Share Premium	Present study defines the share premium as the ratio of offer price to face value
Listing Delay	Listing delay is considered as a number of days between listing day and offer closing day.
Risk Factors	Number of Risk Factors mentioned in the IPO prospectus
Subscription Times	Subscription times are defined as the number of times the overall IPO is over scribed measured as the ratio of the total number of shares applied to the number of shares offered.
Offer Size	Offer Size is defined as IPO offer price multiplied with number of shares issued.
CATEGORY 3 Market Specific Variables	
Market Sentiment	Nifty Small Cap 250 index average daily return during 30 trading days preceding the IPO opening is encompassed as market index return.

Empirical Results and Analysis

Extent of IPO Performance : Volatility

The performance of SME IPOs is depicted in Table-3. The volatility of 187 SME IPOs issued during the period is depicted with the minimum, maximum, mean, and standard deviation values. Listing day volatility ratio (vol) is evidenced mean 0.08, and declined to 0.05 for average 10 days volatility, 0.04 for 20 and 30 days post listing. The minimum values for the volatility ratio are 0.00 throughout the period, which indicates no variability of price. Maximum of volatility is highest on a listing day, then declined trend of the same is evidenced.

TABLE-3 : VOLAILITY PERFORMANCE OF SME IPOS

	N	Minimum	Maximum	Mean	Std. Deviation
Vol	187	0.00	0.38	0.08	0.07
Vol_10	187	0.00	0.13	0.05	0.03
Vol_20	187	0.00	0.09	0.04	0.02
Vol_30	187	0.00	0.08	0.04	0.02

Comparison of IPO Performance Based on Categories

Normality check of dependent variables i.e. volatility indicates that data are not normal. To compare the performance based on company, issue, and market-specific variables, non-Parametric tests such as the Mann-Whitney U test and Kruskal- Wallis test is applied. Results of the same are depicted in Table 4.

Volatility indicated the variation of share price, measured as the natural log of high to low price ratio, Table 4 depicts the comparison of volatility for the different categories, represents mean for each quartile and p-value (significance value) of Krushkal Wallis or Mann Whitney U test.

Detail study of Table 4 indicates IPOs with higher RNOW resulted in higher volatility. The highest volatility of 20 and 30 days of the listing results for IPOs falling highest RNOW quartile (Q4). Here, the difference is statistically significant for Vol_20 and Vol_30. Higher

TABLE-4 : VOLATILITY OF SME IPOS BASED ON DIFFERENT CATEGORIES.

Variable	Category	No. IPOs	Vol	P value Vol	Vol_10	P value Vol_10	Vol_20	P value Vol_20	Vol_30	P value Vol_30
Company Specific Variables										
Age	Q1	47	0.08	0.329	0.05	0.425	0.04	0.257	0.04	0.159
	Q2	47	0.07		0.04		0.04		0.03	
	Q3	46	0.09		0.04		0.03		0.03	
	Q4	47	0.08		0.05		0.04		0.04	
CFO_TA	Q1	47	0.07	0.519	0.05	0.411	0.04	0.411	0.04	0.323
	Q2	47	0.08		0.05		0.04		0.04	
	Q3	46	0.08		0.05		0.04		0.04	
	Q4	47	0.10		0.06		0.05		0.05	
PIPH	Q1	47	0.08	0.465	0.05	0.425	0.04	0.697	0.04	0.867
	Q2	47	0.09		0.05		0.04		0.04	
	Q3	46	0.08		0.06		0.05		0.04	
	Q4	47	0.08		0.05		0.05		0.04	
RNOW	Q1	47	0.08	0.248	0.05	0.27	0.04	0.012**	0.04	0.004***
	Q2	47	0.09		0.05		0.04		0.04	
	Q3	46	0.09		0.05		0.04		0.04	
	Q4	47	0.07		0.06		0.05		0.05	
DE	Q1	47	0.08	0.855	0.05	0.511	0.05	0.467	0.04	0.702
	Q2	47	0.08		0.05		0.04		0.04	
	Q3	46	0.08		0.05		0.04		0.04	
	Q4	47	0.08		0.05		0.04		0.04	

(Contd...)

		Issue Specific Variables								
Share Premium	Q1	47	0.09	0.278	0.05	0.905	0.04	0.701	0.04	0.597
	Q2	47	0.08		0.05		0.05		0.04	
	Q3	46	0.07		0.05		0.04		0.04	
	Q4	47	0.09		0.05		0.04		0.04	
Listing Delay	Q1	47	0.07	0.266	0.05	0.448	0.04	0.826	0.04	0.665
	Q2	47	0.09		0.05		0.04		0.04	
	Q3	46	0.09		0.05		0.04		0.04	
	Q4	47	0.09		0.06		0.05		0.04	
Risk Factors	Q1	47	0.10	0.302	0.05	0.203	0.05	0.468	0.04	0.5
	Q2	47	0.08		0.06		0.05		0.04	
	Q3	46	0.07		0.05		0.04		0.04	
	Q4	47	0.08		0.05		0.04		0.04	
Subscription Times	Q1	47	0.05	0.000***	0.04	0.000***	0.04	0.000***	0.03	0.001***
	Q2	47	0.09		0.05		0.04		0.04	
	Q3	46	0.10		0.06		0.05		0.04	
	Q4	47	0.08		0.06		0.05		0.05	
Offer Size	Q1	47	0.08	0.867	0.05	0.961	0.04	0.836	0.04	0.512
	Q2	47	0.08		0.05		0.04		0.04	
	Q3	46	0.08		0.05		0.05		0.04	
	Q4	47	0.08		0.05		0.04		0.04	
		Market Related Variables								
Market Sentiment	Positive	113	0.08	0.594	0.05	0.007***	0.05	0.005***	0.04	0.008***
	Negative	74	0.08		0.04		0.04		0.04	

*, **, *** indicate significance at 10 %, 5 % and 1 % level respectively

RNOW signals the higher future prospect of the firm thereby increasing the price, resulting in higher volatility.

IPOs with higher levels of subscription result in higher volatility. Volatility for 10, 20, and 30 days post listing resulted significantly highest with quartile (Q4) than other quartiles. Higher subscription during IPOs results in higher demand by investors who failed to get allotment. Results in higher demand lead to higher volatility in the price of the shares.

Positive market sentiment resulted significantly higher for vol_10, vol_20, and vol_30. The positive market condition leads to an increase in demand of investors in the secondary market for the initial days of listing, resulting in higher liquidity. Higher price volatility during the initial phase of listing for IPO stocks resulted from the higher liquidity.

Age, CFO_TA, PIPH, DE, Share premium, listing delay, a number of risk factors, offer size, lead manager prestige, method of pricing reported insignificantly different volatility for listing day, 10, 20, and 30 days from listing.

Conclusion

Volatility ratio on the listing day ratio found 0.08 which is in the declining trend up to 1-month post listing. Price variation is found to be very low, thereby age, CFO_TA, PIPH, DE, Share premium, listing delay, a number of risk factors, offer size, lead manager prestige, method of pricing reported insignificantly different volatility for listing day, 10, 20 and 30 days from listing. IPOs with higher RNOW (Q4), higher level of subscription ratio (Q4), and IPOs issued during positive market sentiment resulted in higher volatility.

Implications and Future Scope of Study

Comparative analysis of IPO aid in understanding its nature of it and assist in better decision-making for primary market investors. The scope of the study is limited in twofold: one is in terms of its coverage to SME IPOs listed on NSE Emerge only and the other is the only comparison. The future researcher can delimit the same by extending the study to explore the factors responsible for the difference of performance of IPO based on the above categories.

References

Journals

Abraham, Rebecca, Judith Harris, and Joel Auerbach. "IPO performance at announcement and in the aftermarket." *Journal of Economic Studies* 43.4 (2016): 574-586.

Gleason, Katherine, James Johnston, and Jeff Madura. "What factors drive IPO aftermarket risk?." Applied Financial Economics 18.13 (2008): 1099-1110.

McGuinness, Paul B. "Voluntary profit forecast disclosures, IPO pricing revisions and after-market earnings drift." *International Review of Financial Analysis* 46 (2016): 70-83.

Ritter, Jay R. "The long run performance of initial public offerings." *The journal of finance* 46.1 (1991): 3-27.

Sahoo, Seshadev. "Do analyst's pre-issue recommendation create value? Empirical evidence from Indian IPO market." *The Spanish Review of Financial Economics* 12.2 (2014a): 82-95.

Sahoo, Seshadev. "The Impact of Corporate Board Structure on the Pricing Performance of Initial Public Offerings." *IUP Journal of Applied Finance* 20.4 (2014b).

Sahoo, Seshadev. "Subscription rate and volatility: An investigation for Indian IPOs." *Journal of Emerging Market Finance* 14.1 (2015): 20-58.

Sahoo, Seshadev. "Do anchor investors create value for initial public offerings? An empirical investigation." *IIMB management review* 29.4 (2017): 259-275.

Stein, Peer, Tony Goland, and Robert Schiff. "Two trillion and counting: Assessing the credit gap for micro, small, and medium-size enterprises in the developing world." *The World Bank* (2010): 1-16.

Vong, Anna PI. "Rate of subscription and after-market volatility in Hong Kong IPOs." *Applied Financial Economics* 16.16 (2006): 1217-1224.

Welch, Ivo. "Seasoned offerings, imitation costs, and the underpricing of initial public offerings." *The Journal of Finance* 44.2 (1989): 421-449.

Websites

https://www.sebi.gov.in/reports-and-statistics/publications/jul-2020/handbook-of-statistics-2019_44233.html (accessed on 10th October, 2020).

Pradhan Mantri MUDRA Yojana –
A Three-Dimensional Performance Appraisal

J. Madegowda and Inchara P M Gowda

Abstract : *Realizing the importance and contribution of Micro Units/ Enterprises for the economic development of the country and also their financial problems, the Government of India has established Micro Units Development and Refinance Agency (MUDRA) under the aegis of Pradhan Mantri MUDRA Yojana. And this agency has designed three loan schemes viz., Shishu, Kishor and Tarun to cater to the financial needs of micro units. Since its inception in 2015, the Agency has completed seven years of its yeoman service in the form of funding hitherto unfunded micro units. Although it (MUDRA) is not directly funding/lending micro units, it is facilitating the provision of financial assistance to micro units through many banking and financial institutions. In this backdrop, the present paper aims at evaluating its performance from three different dimensions viz., scheme, social strata and lender-institutions. The study finds that the Agency has not only sets the targets but also ensures that these targets are achieved/ exceeded. Further, there has been a continuous improvement in its performance. However, the study highlights certain drawbacks in the system which need to be addressed by the authorities to make the Scheme more effective and useful.*

Keywords : PMMY, MUDRA, Micro Units, Shishu, Kishor, Tarun

J. Madegowda, Ph.D., Professor, Department of Business Administration,Vidyavardhaka College of Engineering, PB No. 206, Gokulam 3rd Stage, Mysuru - 570 002 (Karnataka), E-mail: jmadegowda@vvce.ac.in, Mobile: 9448415234.

Inchara P M Gowda, MBA., PGDFM., PGDFIM., M.A (Econ)., Ph.D., ICSSR Post-Doctoral Fellow, Sahyadri Commerce and Management College, Vidya Nagar, Mattur Road, Shivamogga 577 203 (Karnataka), E-mail: incharapmgowda@gamai.com, ORCID : https://orcid.org/0000-0001-7646-1485, Mobile: 8197206247.

Introduction

Indian economy has been a predominantly agrarian economy and the primary sector was contributing more than 50% to country's gross domestic product (GDP) and the least contributor was the tertiary sector. But now, their roles have been exchanged – tertiary sector is the major contributor to the GDP (53.89%) and primary sector is the least contributor (20.19%). Of course, there are a few reasons for this change in role/importance including erroneous pricing policy for agricultural produces – more specifically, pricing at an unreasonably lower level without considering the total cost of cultivation/growing. However, in all the three sectors of the economy including secondary sector (manufacturing) and tertiary sector (service), micro, small and medium enterprises (MSMEs) have been playing an important role.

Within the MSME sector, micro units/enterprises (MUs or MEs) are playing a pivotal role from the points of view of employment opportunities, varieties of goods and services they offer, productive and profitable utilization of locally available resources, zero or minimum import content, diffusion of economic power, export earnings, removal of regional imbalances, etc (Figure-1). For instance, out of about 633.88 lakh unincorporated non-agricultural MSMEs in India, about 99.47% (i.e., 630.52 lakh enterprises) are micro enterprises. And out of these MEs, about 51.40% are in rural parts of the country strengthening rural economy of the country.

Figure-1 : Multifarious Role/Contributions of MEs/MSMEs

However, many studies including a few committees have highlighted a major and common problem of MUs viz., financial problems – lack of availability of adequate and timely credit, and high cost of credit are some of the common financial problems of MSMEs. Besides, collateral security requirements and limited access to equity capital are proving to be other major hurdles for MSMEs in obtaining the required finance (Prime Minister's Task Force, 2010). It is also observed that these enterprises have not been able to utilize their full potential due to many problems and the major problem is the 'financial gap'[1] (Guntur and Mythili, Summer 2013). The governments (both the Central and State Governments) which have realized both the significance and problems of MUs formulated and implemented many schemes for MEs. And the recent one is the Pradhan Mantri MUDRA Yojana (PMMY) which is designed and implemented exclusively for the benefit of MUs. Under the aegis of PMMY, Micro Units Development and Refinance Agency (MUDRA) is established (Figure-2).

Figure-2 : Launch of MUDRA – Chronology
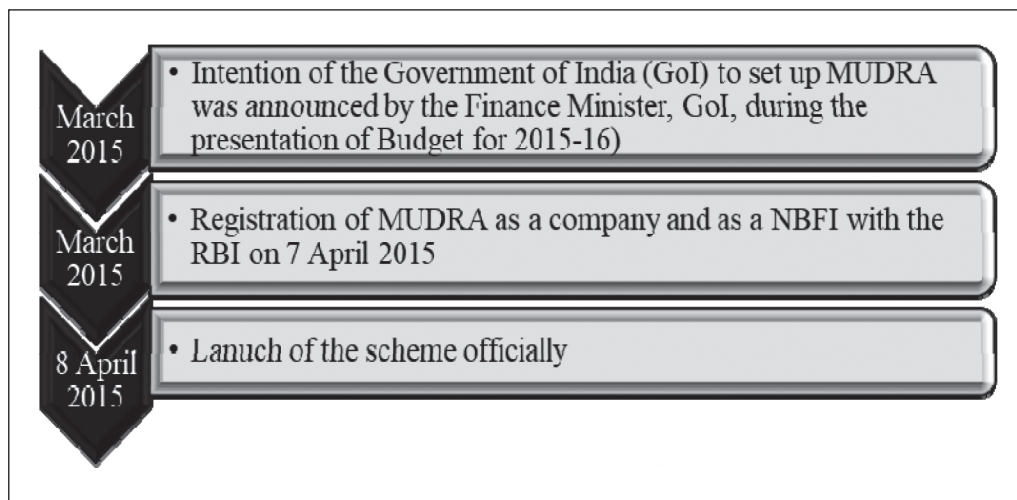
Keeping in mind the stage of growth/development of MU including the business life-cycle that the loanee-enterprise is in, and their financial requirements, MUDRA (under PMMY) has designed three products/schemes. They are, Shishu, Kishore and Tarun (Figure-3). These three schemes signify the growth, development and funding requirements of beneficiaries.

Figure-3 : MUDRA Loan Schemes
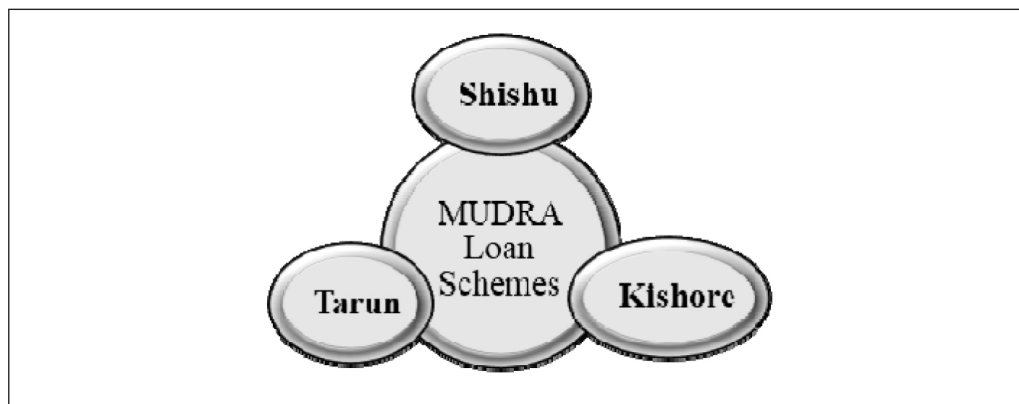
The salient features of MUDRA loan schemes are summarized below in the following table (Table-1).

Table-1 : Salient Features of MUDRA Loan Schemes

Sl. No.	Particulars	Shishu	Kishore	Tarun
(1)	Loan Limit/Range	≤ ₹ 50,000	> ₹ 50,000, ≤ ₹ 5 lakh	> ₹ 5 lakh, ≤ ₹ 10 lakh
(2)	Interest	1% per month	Left to the bank's discretion	Left to the bank's discretion
(3)	Repayment Period	≤ 5 years	Left to the bank's discretion	Left to the bank's discretion
(4)	Collateral	Loans under all three schemes are collateral-free - the bankers/lenders (who participate in the scheme) are directed by the agency (MUDRA) not to insist on the collateral security from the loan applicants for sanctioning and disbursing loans.		

At this stage of analysis, three important aspects need a special mention. They are identified below :

● MUDRA, as already pointed out, does not provide loans and advances to MEs directly. Instead, it facilitates the provision of loans and advances to MEs through the participating lender-banking/financial institutions such as public sector banks (PSBs), private sector banks (PVSBs), regional rural

banks (RRBs), small financial banks (SFBs), state co-operative banks, micro-finance institutions (MFIs), etc.

● Maximum amount of loans and advances (to be) sanctioned by the lender-bankers and other financial institutions depends upon the category to which the applicant-entrepreneurs belong.

● Consequent to the revision of definition of MEs and treating Service MEs on par with Manufacturing MEs (with effect from 1 July 2020)[2] has resulted in the increase in the number of MEs eligible to apply for financial services made available under MUDRA.

Literature Review

MSMEs are the backbone of the country as they, among others, generate a large number of employment opportunities, contribute to national GDP, etc. And MUDRA has contributed to the growth of MSME sector with an emphasis on the support to woman-entrepreneurs in the country (Shashank and Mayya, 2022). The major problems faced by the MEs include, among others, lack of information, financial illiteracy, entry level policies, high cost of borrowings, lack of infrastructure, lack of financial access, technological barriers, etc. Therefore, the government has come out with MUDRA loans to support the MEs with collateral-free loans (Yogesh, June 2019). And due to the problems they are facing, many MSMEs have become sick and many more are on the verge of becoming sick. And to address this problem of widespread sickness in MSMEs, the Reserve Bank of India (RBI)/Ministry of MSMEs of GoI have taken a few concrete measures aiming at making the MSMEs sound economic entities … (Inchara P. M Gowda, January 2017).

PMMY, a key initiative of the GoI, aims at developing and improving entrepreneurial culture in the country by facilitating collateral-free and cheap credit to millions of unfunded MEs that are struggling to establish on account of lack of funds. It boosts the morale of 'first generation entrepreneurs' (Gunjan., Rashmi and Raj, October 2020). This scheme is expected to play an important role in achieving the goal of financial inclusion (Manish and Ritesh, December 2017). Therefore, MUDRA aims at supporting a large number of MEs by bringing them into the formal financial system and providing necessary credit to them at affordable rate. This scheme has received appreciation for its contribution to financing and stimulating growth at the bottom of the pyramid through banking and financial institutions (Prerna, June 2020). Within the framework of PMMY and keeping in mind the overall objective and developments, the products of

MUDRA viz., Shishu, Kishore and Tarun are designed to meet the requirements of different sectors and entrepreneurial requirements (Anita and Rupesh, 2022). MUDRA bank has proved to be a cornerstone from the point of view of small business financing in India. It has not only facilitated credit support to small scale sector but also contributed to the financial inclusion and formalization of informal units (Toran and Nema, April 2019). However, the scheme (MUDRA) is affecting the results/performance of participating bankers adversely (Inchara and Ramesh, Oct 2018-March 2019). Of course, this problem is not unique to India and it is true even in other parts of the world. For example, although the SMEs in Europe are at the heart of the economy and financed primarily by the banking companies, the regulatory measures in the past have deeply affected financing SMEs (Jocelyne., Bertrand and Mark, 2014).

Research Gap

On the lines of the above, a few more experts/researchers have worked on MUDRA. However, these studies focused on theoretical framework of MUDRA with little bit of performance evaluation. And it is also obvious from the literature review that earlier studies have not made attempts to evaluate the performance of the scheme from different perspectives like scheme-wise, social strata-wise, lender-wise, etc. Therefore, this paper is an attempt to fill this research gap in whatever little way it can.

Research Problem/Issues

There are certain research issues/problem such as, (i) whether there is a significant improvement in the performance of the scheme year after year in terms of number of micro units assisted, amount of loan sanctioned and disbursed, etc., (ii) whether, more or less, equal importance is given to different loan schemes, different social strata, etc., (iii) whether all participating groups are performing well from the point of view of assisting micro units, etc. These issues need to be addressed systematically and evaluated as objectively as possible.

Objectives

The primary objective of the study is to evaluate the performance of MUDRA in terms of loans and advances sanctioned and the number of micro units assisted. Centred around this primary objective, the following are the specific objectives:

(1) To evaluate the overall performance of the scheme over the years with the help of three measures viz., number of accounts/loans sanctioned, amount of loan sanctioned and the amount of loan disbursed,

(2)   To examine the scheme-wise (Shishu, Kishore and Tarun) performance of MUDRA.

(3)   To appraise scheme-wise and different social strata-wise (General, SC, ST and OBC) performance of MUDRA, and

(4)   To assess the performance of the scheme from the perspective of different participating lender groups such as PSBs, PVSBs, RRBs, etc.

Hypotheses

Keeping in mind the objectives of the study and besides addressing the above objectives, the following hypotheses are formulated for testing :

(1)   **$H0_1$:** There exists no significant variance in the performance of MUDRA.

(2)   **$H0_2$:** There exists no significant difference in the amount of loans sanctioned per ME under different schemes for different categories.

Other objectives are addressed with the help of analysis and interpretation of performance statistics using Trend, Mean, CAGR, etc.

Sources of Data, Study Period, Methodology, etc

A few relevant aspects of methodology such as sources of data, study period, etc., are presented below:

●   This study is primarily based on the data from secondary sources more particularly, the Annual Reports of MUDRA, 2015-16 to 2021-22. Of course, data/literature are also collected from other secondary sources such as journals, websites, etc.

●   The study covers a period of all seven years of functioning of MUDRA from 2015-16 (first year of inception of MUDRA) to 2021-22 (latest year for which necessary performance statistics are available).

●   Method of study is purely descriptive/analytical in nature.

●   For analysis of data, a few descriptive statistics (Mean), Standard Deviation (SD, ó), Coefficient of Variation (CV) and Compound Annual Growth Rate (CAGR) are used besides carrying out one-sample *t* test, correlation and Chi Square *t* test for testing the hypotheses.

Limitations

The studies of this nature suffer from a few innate limitations and this study is not an exception. As already stated, the scope of the study covers only three-dimensional appraisal of performance viz., scheme-wise, social strata-wise and lender-agency wise performance evaluation. Therefore, other dimensions/perspectives of performance evaluation such as, state-wise and district-wise performance evaluation of MUDRA schemes, implications of MUDRA loans on the NPAs of lender-institutions, etc., are outside the scope of the present study.

Data Analysis and Interpretation

In the light of the above, an attempt is made in the following paragraphs to evaluate the performance of MUDRA from each of the three perspectives/dimensions. It may be noted here that each dimensional performance evaluation addresses one objective of the study each.

Overall Performance Evaluation

Using three performance indicators/measures viz., (i) number of PMMY loans sanctioned, (ii) amount of loan sanctioned and (iii) the amount of loan disbursed, overall performance of the scheme is examined here. These details, for all seven years, are presented below (Table-2) followed by a brief analysis.

It is evident from the above that the number of PMMY loans (i.e., the number of beneficiary-entrepreneurs) sanctioned has registered a continuous increase from the first year of inception of 2015-16 to 2021-22 with an exception of 2020-21 during which there was a reduction (one of the reasons for reduction being the COVID-related lock-down). It increased from 3.49 crore beneficiaries in 2015-16 to 6.22 crore in 2019-20 (pre-COVID year) accounting for an increase by 2.73 crore accounts working out to 78.46% increase which is commendable. However, during 2020-21, it declined to 5.07 crore but improved again to 5.38 crore accounts in 2021-22. During this seven-year period, about 34.94 crore loans were sanctioned under PMMY. And there is a consistent improvement in the performance with no wide variation from one year to another as reflected by the SD of one crore accounts and CV of 20.04%. Seven-year annual average works out to 4.99 crore beneficiaries from PMMY. And the CAGR is positive and it works out to 6.38% which is an indication of growth in the number of PMMY Loans sanctioned.

Not only the number of loans sanctioned, but also the amount of loan sanctioned registered an incessant increase during the study period except during 2020-21 (during which it declined marginally owing to the ill-effects of COVID-19).

Table-2 : Performance of MUDRA, 2015-16 to 2021-22

Year	Number of PMMY Loans Sanctioned	Total Amount (₹ crores) of Loan,		Amount of Loan sanctioned per Account (₹)
		Sanctioned	Disbursed	
2015-16	3,48,80,924	1,37,449.27	1,32,954.73	39,405
2016-17	3,97,01,047	1,80,528.54	1,75,312.13	45,472
2017-18	4,81,30,593	2,53,677.10	2,46,437.40	52,706
2018-19	5,98,70,318	3,21,722.79	3,11,811.38	53,737
2019-20	6,22,47,606	3,37,495.00	3,29,684.63	54,218
2020-21	5,07,35,046	3,21,759.00	3,31,402.20	63,419
2021-22	5,37,95,526	3,39,110.35	3,31,402.20	63,037
Sum/Average	34,93,61,060	18,91,742.05	18,59,004.67	54,149
Mean	4,99,08,723	2,70,248.86	2,65,572.10	53,142
SD	1,00,01,708	82,182.68	82,672.59	8,689
CV	20.04	30.41	31.13	16.35
CAGR	6.38	13.77	13.94	6.94
Test Results:				
One-sample *t*-test	13.199			16.186
df	6			6
p value	0.000			0.000
		r = 0.997 and paired *t*-test = 0.917225317		

Source : Compiled the table based on the calculations made using the data collected from, *Annual Reports, MUDRA, 2015-16 to 2021-22*.

It increased from ₹1,374.49 billion in the first year of inception to ₹3,391.10 billion in 2021-22 accounting for an increase (in the amount of loan sanctioned annually) by ₹2,016.61 billion or by 1.47 times. During this seven-year period, totally ₹18,917.42 billion was sanctioned with an annual average of ₹2,702.49 billion. And there is no wide variation in the year-to-year amount of loan sanctioned as reflected by the SD of ₹821.83 billion and CV of 30.41%. Further, CAGR is also positive at 13.77% indicating increase in the amount of loan sanctioned.

At this stage, it may be noted that the agency (MUDRA) sets the target for each year in advance in terms of amounts of loans and advances to be sanctioned by the participating banks and FIs to entrepreneurs under MUDRA (both scheme-wise, bank-wise, etc). For example, for the financial year 2016-17, the authorities had set a target loan sanction of ₹1,80,000 crore – (i) PSBs : ₹77,700 crore; (ii) PVSBs and branches of foreign banks : ₹21,000 crore; (iii) RRBs : ₹15,000 crore; and (iv) non-banking finance companies, NBFCs : ₹66,300 crore. And a comparison of amount of loan sanctioned with the target set shows that the scheme has not only achieved the target but also exceeded the target except for the year 2020-21 during which it was only 91.71% (owing to COVID-19 related lockdown). This achievement is commendable and assumes importance as it is a government-sponsored scheme (Figure-4).

Figure-4 : Sanction of Loan under MUDRA – Target *Vs* Actual
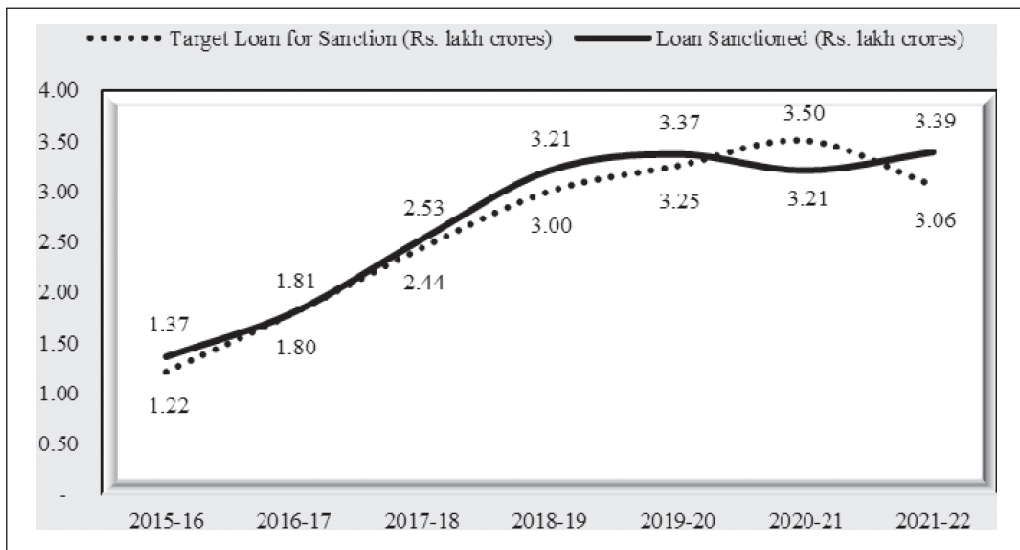
Another important achievement of the scheme is that the amount of loan disbursed is more than 96% of the amount of loan sanctioned for each of the years of the study period and during 2020-21, it crossed even 100% (to reach 103%). As there is no much difference between the amount of loan sanctioned and disbursed, only the amount of loan sanctioned is used for performance evaluation.

Even the amount of loan sanctioned per entrepreneur (i.e., per ME) has accounted for a continuous increase (except for the last year of the study period during which there was a marginal decline). It increased from ₹39,405 in 2015-16 to 63,037 in 2021-22 representing an increase by ₹23,632 or by 59.97%. On an average, an amount of ₹54,149 of loan was sanctioned per account during this study period (simple average of averages for seven years works out to ₹53,142). The CAGR is positive at 6.94% with no wide variation in the year-to-year performance as evident from the SD of ₹8,689 and CV of 16.35%.

Besides, for testing the first null hypothesis, '*H0₁ : There exists no significant variance in the performance of MUDRA*', one-sample *t*-test is carried out and the summary of test results is presented above (Table 2). At 5% level of significance for degree of freedom (*df*) 6 (n-1), the calculated values of *t* are 13.199 (for number of units assisted) and 16.186 (for amount of loan sanctioned per unit) against the table value of 2.447. This shows that each of the calculated values is greater than the table value. Further, *p* value is 0.000. Hence, the null hypothesis is tested and rejected accepting the alternative hypothesis and concluded that the variance (number of units assisted and amount of loan sanctioned per unit) is statistically significant. This supports the conclusion drawn earlier based on analysis using Trend, Mean, CAGR, etc.

Further, paired *t* test is carried out to test whether there existed equal variance between the amount of loan sanction and the amount of loan disbursed, and the summary of test results is presented above (Table 2). The test result shows that at 5% level of significance for *df* 6, the calculated value of *t* = 0.917 against table value of *t* of 2.447 indicating that the calculated value of *t* is less than the table value of *t*. Therefore, by accepting the null hypothesis, it could be concluded that the difference observed between the amount of loan sanctioned and disbursed is statistically insignificant, and the difference in the variance might have arisen due to chance. Besides, the correlation between these two measures showed strong positive relationship with *r* standing at 0.997 indicating that 99.70% of the loan amount sanctioned was disbursed to the beneficiary-units.

From the above factual analysis and the test results, it can be inferred that the performance of the scheme, MUDRA, is commendable as it not only sets the targets but also monitors the progress closely to ensure that the actual performance is either equal to, or exceeds, the targets. Further, there has been a continuous improvement in its performance in terms of number and amount of loans sanctioned, amount of loan disbursed and the amount of loan sanctioned per MU.

Scheme-wise Performance Evaluation

As already stated, there are three loan schemes under MUDRA viz., Shishu, Kishor and Tarun. In order to evaluate the scheme-wise performance of MUDRA (one of the three dimensions of performance evaluation), two parameters/ measures viz., number of PMMY loans sanctioned and the amount of loan sanctioned are considered for only the last year of the study period viz., 2021-22 as the performance is, more or less, similar in all years. In this backdrop, the relevant details are presented below (Table-3).

Table-3 : Scheme-wise Performance of MUDRA, 2021-22

Loan Scheme	Number of PMMY Loans Sanctioned	Amount of Loan Sanctioned (` crores)	Relative Share in the Total (%)		Amount of Loan sanctioned per ME (`)
			Number of Loans	Amount Sanctioned	
Shishu	4,17,21,154	1,24,747.37	77.56	36.79	29,900
Kishore	1,10,88,206	1,37,644.38	20.61	40.59	1,24,136
Tarun	9,86,166	76,718.61	1.83	22.62	7,77,948
Total	5,37,95,526	3,39,110.36	100.00	100.00	63,037

Source: Compiled the table based on the calculations made using the data collected from, ***Annual Report, MUDRA, 2021-22***.

It is unequivocal from the content of the above table that, out of 5.38 crore loans sanctioned during 2021-22, 4.17 crore loans were under Shishu scheme accounting for 77.56% of total PMMY loans sanctioned. The next highest loan category/scheme is Kishore wherein loans were sanctioned for 1.11 crore accounts and this number works out to 20.61% of total number of loans sanctioned. And the least is under Tarun scheme wherein only 9.86 lakh loans were sanctioned and these beneficiaries account for mere 1.83% of the total number of beneficiaries (lowest share).

However, from the point of view of amount of loan sanctioned, the performance statistics present an entirely different picture. Out of ₹3,391.10 billion of loan sanctioned during 2021-22, ₹1,247.47 billion (second highest amount) was under Shishu scheme accounting for 36.79% of the amount of total loan sanctioned. On the other hand, the amount of loan sanctioned under Tarun of ₹767.19 billion works out to 22.62% of total loan sanctioned. This means, 1.83% of loan accounts received 22.62% of the amount of loan sanctioned under Tarun as against 77.56%

of beneficiaries receiving only 36.79% of loan amount under Shishu. In the case of Kishore, loans were sanctioned to 1.11 crore accounts accounting for 20.61% of total loan accounts. These beneficiaries were sanctioned a loan amount of ₹1,376.44 billion (highest amount) accounting for 40.59% of the total loan sanctioned (highest share).

As a result of difference in both the loan accounts and loan amounts among three schemes, one can find the difference in the amount of loan sanctioned per ME from one scheme to another. From the table, it is apparent that the amount of loan sanctioned per MU under Shishu of ₹29,900 is very low as compared to ₹7.78 lakh per MU sanctioned under Tarun. Of course, this is due to the difference in the slab fixed for different schemes. But the mute question is,

> With this paltry amount of ₹29,900 of loan, what income-generating business unit/ entity can be set up?

And more importantly,

> the range (i.e., the difference between the upper and lower limits) is very low at ₹50,000 in the case of Shishu (Max. ₹50,000) as compared to ₹5 lakh in the case of Tarun (Max. ₹10 lakh – Min. ₹5 lakh) and ₹4.50 lakh in the case of Kishore (Max. ₹5 lakh – Min. ₹50,000).

However, this difference (i.e., scheme-wise relative share in beneficiaries and in loan amount) becomes clear from the following figure (Figure-5).

Figure-5 : Relative Shares of Different Schemes in Loan Accounts and Loan Amounts (%)
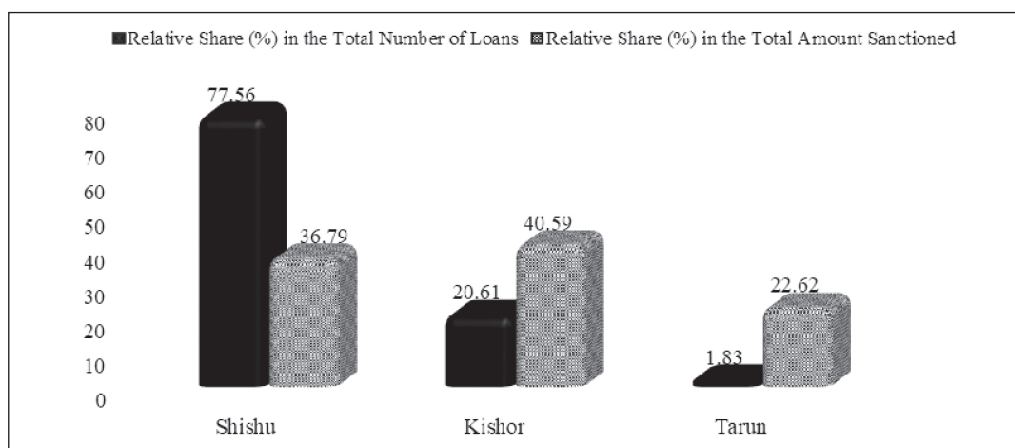
Social Strata-wise Performance Appraisal

The second important dimension is the evaluation of performance of the scheme from the point of view of loans provided to different social strata viz., General Category (General), Schedule Caste (SC), Schedule Tribe (ST) and Other Backward Communities (OBC). For this purpose, again the performance statistics for 2021-22 pertaining to the number of accounts for which loan was sanctioned and the amount of loan sanctioned are considered. These details are presented below (Table-4).

Table-4 : Social Strata-wise Loan under MUDRA, 2021-22

Category	Number of PMMY Loans Sanctioned	Amount Sanctioned (₹ crores)	Relative Share in the Total (%)		Amount of Loan sanctioned per ME (₹)
			Number of Loans	Amount Sanctioned	
General	2,59,94,139	2,13,883.91	48.32	63.07	82,282
SC	93,64,702	37,303.61	17.41	11.00	39,834
ST	35,18,084	14,452.54	6.54	4.26	41,081
OBC	1,49,18,601	73,470.30	27.73	21.67	49,247
Total	5,37,95,526	3,39,110.36	100.00	100.00	63,037

Source: Compiled the table based on the calculations made using the data collected from, *Annual Report, MUDRA, 2021-22*.

It is obvious from the above (Table-4) that the government, through MUDRA, is arranging for financial assistance (loan) to different sections of the society including those who are not backed by adequate assured income and who were till now deprived of financial assistance from formal financial institutions. And justification is done to different sections. This is appreciable. However, two points, as presented below need to be highlighted as they deserve appropriate action from the authorities concerned.

In the case of OBC, the percentage (27.73% of total beneficiaries) appears to be much lower compared to the percentage of OBC population. It is necessary for the agency to create awareness about the scheme among the eligible persons from this group and among all other sections of society.

And the second observation/finding is, out of four broad categories of social strata, only in the first category viz., General, the relative share in the amount of

loan sanctioned is substantially higher at 63.07% when compared to their relative share in the number of loans sanctioned of 48.32%. And in other three categories, it is reverse e.g., in the case of SC, these shares are 11% and 17.41% respectively. Similar is the situation in the case of other two categories viz., ST (4.26% and 6.54% respectively) and OBC (21.67 % and 27.73% respectively). And this is true in all three loan schemes as evident from the following (Table-5).

Table-5 : Scheme-wise and Category-wise Loan Amount Sanctioned per ME

Loan Scheme	Amount of Loan Sanctioned per MU (₹)				
	General	SC	ST	OBC	Average
Shishu	30,951	28,800	27,515	29,516	29,900
Kishore	1,47,612	87,476	93,225	1,01,752	1,24,136
Tarun	7,97,462	6,68,306	6,61,131	6,76,488	7,77,948
Average	82,282	39,834	41,081	49,247	63,037
Test Results:					
Chi-square value					7,422.34
df					6
p					0.000

Source: Compiled the table based on the calculations made using the data from, ***Annual Report, MUDRA, 2021-22***.

From the above, it is unequivocal that there is a significant difference in the amount of loan sanctioned per ME owned by General category persons (e.g., ₹82,282) on the one hand, and each of other three categories on the other (e.g., SC : ₹39,834; ST: ₹41,081 and OBC : ₹49,247). And this type of difference can be observed in all three loan schemes - in each of the three schemes, the amount of loan sanctioned for beneficiaries of General category is higher than for the beneficiaries of other three categories viz., SC, ST and OBC. This is also supported by the results of Chi-Square Test carried out (summary of test results presented in Table-5 above).

Chi-Square Test is applied to test whether there is significant difference among Shishu, Kishore and Tarun schemes against amount of loan sanctioned per unit under different categories of social strata. The result of test shows that, at 5% level of significance for *df* 6, the calculated value of X^2 is 7,422.34 against

the table value of X^2 of 12.592. This indicates that the calculated value is greater than the table value. Further, *p* value stands at 0.000. Therefore, the second null hypothesis, '*H0$_2$: There exists no significant difference in the amount of loan sanctioned per ME under different schemes for different categories*' is tested and rejected. Hence, alternative hypothesis is accepted and concluded that the amount of loan sanctioned per ME under Shishu, Kishore and Tarun for General, SC, ST and OBC categories is statistically significant. This brings the point to the fore that the authorities must address this issue with all seriousness as these sections of the society have generally been deprived of formal institutional financing.

Bank-wise Performance Evaluation

Performance of MUDRA scheme is also examined from the point of view of participating institutions (third dimension) viz., banking companies, MFIs, non-banking finance companies (NBFCs), etc., enrolled by MUDRA using the number of beneficiaries, total amount of loan sanctioned and the amount of loan sanctioned per account. It may be noted here that need-based term loan, overdraft facility, composite loan for acquiring capital assets and/or to meet working capital requirements, etc., are provided to the Mus under PMMY. The relevant details are presented below (Table-6).

Table-6 : MUDRA – Bank-wise Performance, 2021-22

Bank Group or Group of FIs	Number of Accounts for which Loan was Sanctioned	Amount of Loan Sanctioned (₹ crores)	Amount of Loan Sanctioned (₹) per ME
PSBs	61,21,790 (11.38)	1,04,082.49 (30.69)	1,70,020
PVSBs	2,45,49,895 (45.64)	1,17,679.31 (34.70)	47,935
RRBs	13,08,154 (2.43)	20,342.83 (6.00)	1,55,508
MFIs and NBFCs	1,56,04,422 (29.01)	67,798.00 (19.99)	43,448
SFBs	62,11,265 (11.55)	29,207.40 (8.61)	47,023
Total	5,37,95,526	3,39,110.35	63,037

Note: Figures in the parentheses represent the relative share of each bank/FI group to total.

Source: Compiled the table based on the calculations made using the data collected from, *Annual Reports, MUDRA, 2021-22*.

It is apparent from the above that out of five groups of participating institutions, PVSBs are lending to highest number of MEs (2.45 crores) accounting for 45.64%

of the total number of MEs served during 2021-22. These PVSBs have also sanctioned the highest amount of loan of ₹1,176.79 billion which works out to 34.70% of the total amount of loan sanctioned by all groups (again, highest share). This is much against the general notion that it is normally the PSBs which top the list with larger share. However, the amount of loan sanctioned by PVSBs per MU is below average (for all groups of ₹63,037). It is, therefore, obvious that these banks are lending more to MEs under Shishu category.

Among other four groups, the MFIs and NBFCs have extended loan to more number of MEs (1.56 crores) which works out to 29.01% of total number of MEs served. This is on the expected lines as MFIs are already into this field and working closely with the economically backward people/region. However, the amount of loan sanctioned is not the second highest – they sanctioned only ₹ 677.98 billion accounting for only 19.99% of total loan sanctioned by all groups. Therefore, the amount of loan sanctioned per ME is lowest at ₹43,448 which is again lower than the average for all participating institutions of ₹63,037. This implies that these institutions are also sanctioning loans for more applicants under Shishu.

Another major participating group is the PSBs and they have sanctioned loans to 61.22 lakh MEs accounting for 11.38% (second lowest). But these banks have sanctioned ₹1,040.82 billion of loan (30.69%, second highest share) and therefore, per ME, they sanctioned ₹1,70,020 which is highest among all groups and which is also much higher than the average for all groups of ₹63,037. Hence, it is evident that they are focusing more on loans to MEs under Kishor and Tarun schemes.

Similarly, the RRBs are also providing loans to MEs under MUDRA scheme. It can be observed from the table that the amount of loan sanctioned by them works out to 6% to 2.43% of MEs assisted by all lender-groups. Therefore, the amount of loan sanctioned per ME works out to ₹ 1,55,508 which is second highest and much above the average for all groups of ₹ 63,037. This also indicates that the RRBs are providing loans to more number of applicants under Kishor and Tarun schemes. The last participating group is the SFBs sanctioning ₹ 47,023 per ME – indicating that they are focusing on Shishu scheme.

Summary of Major Findings and Suggestions

Although the findings are presented at the appropriate places in the 'Data Analysis and Interpretation' section of the paper, the summary of the same is presented below along with plausible suggestions wherever necessary.

(1) During seven years of its functioning, MUDRA has improved its performance continuously year after year from the perspectives of number of beneficiaries, amount of loan sanctioned, amount of loan disbursed, amount of loan sanctioned per ME (except for year affected by COVID-19). This is a positive part of the scheme.

(2) Although setting targets for each of the participating banks/MFIs/NBFCs and for each year in terms of number and amount of loan is desirable, it (i.e., targets) puts pressure on the lender-institutions. In the race to reach the target, credit appraisal may become a victim leading to further deterioration in the asset quality of bankers which in turn results in further accumulation of non-performing assets (NPAs) of banks. The reports appeared in the newspapers show that the banks are searching for the parties and encouraging them to apply for loans under MUDRA e.g., a case (Barmer, Rajasthan) investigated by the Central Bureau of Investigation (CBI) has showed a senior official of a PSB providing 26 loans worth ₹62 lakh under PMMY without proper verification. On the other hand, the bank officials are in a quandary – if they sanction loan (without objective credit appraisal), it harms their banks, and if they do not sanction loan, loan seekers complain to politically light to heavy weights. However, lender-bankers might not have been able to evaluate loan applications from the point of view of their financial viability resulting in the quicker sanction of loans based on lightly evaluated credit appraisal reports or without verifying the credentials of loan seekers and with inconsistent appraisal amounts (Mehmet and Erkut, October 2012). Besides, it is almost impossible for the banking companies to monitor the progress in the funded projects as the number (of beneficiaries) is very large. Therefore, it may end up in diversion of funds by the loanees for other purposes than the purpose for which it was availed. This defeats the very purpose of providing loans and advances. Hence, it is suggested that the lender-institutions must be given free hand to sanction loan to genuine applicants after carrying out due-diligence.

(3) An important feature of the scheme is that it lays emphasis on collateral-free loans which is totally against the sound doctrines of financial management. As the banking companies (and other financial institutions) use the public money (i.e., deposits, borrowed money, etc) for lending, they are accountable for the judicious and profitable employment of deposits. It may be noted here that the bankers (more particularly, the PSBs) are already suffering from NPA menace. And if the beneficiaries who availed loans

under MUDRA fail to repay (at least a few), it aggravates the problems of lenders. Therefore, it is desirable for the authorities to revisit this Clause to the effect that some kind of security is given by the borrowers for the loans taken. Alternatively, the authorities which direct the provision of collateral-free loans should also take the responsibility of reimbursing the default amounts under this scheme. This is necessary to ensure that helping the MEs is not at the cost of lenders.

(4) Most of the economies all over the world including India are functioning in an inflationary situation implying changes in the price level including prices of capital goods. And this change in the price level is normally in the form of rise in prices. It is found from the analysis that the maximum loan amount fixed under Shishu category is too low (₹50,000). It is also found that the amount of loan sanctioned per ME under Shishu of ₹29,900 is very low (as compared to ₹7.78 lakh per ME sanctioned under Tarun). Therefore, the maximum limit for loans under Shishu, fixed about eight years ago, should be increased appropriately to at least to ₹1.50 lakh.

(5) There is a significant difference in the amount of loan sanctioned per ME owned by General category persons (e.g., ₹82,282) on the one hand, and each of other three categories on the other (e.g., SC : ₹39,834; ST : ₹41,081 and OBC : ₹49,247). The authorities must, therefore, look into this area and see that the deprived classes receive adequate attention/share.

(6) A few participating lenders are lending, on an average, a very low amount per ME (e.g., ₹47,935 by PVSBs as against ₹1,70,020 by PSBs). The PVSBs may be lending more parties under Shishu to reach the target in terms of number of loans sanctioned. This aspect should be investigated by the authorities to ensure that the loans are provided even under Kishore and Tarun schemes.

Conclusion

MUDRA is doing a worthy service as it is focusing on funding those who are, more or less, hitherto deprived of access to formal institutional finance. Further, MUDRA is setting target (for each scheme, participating bank, etc) and closely monitoring the progress to ensure that the targets are reached. Further, financial assistance is facilitated to different social strata including women, first generation entrepreneurs, etc., which is appreciable. However, as identified above, there are a very few shortcomings in the scheme which need to be addressed on the

lines suggested above. The researchers hope that the authorities plug these loopholes at the earliest and make the scheme more effective and useful.

Scope for Further Research

Although this paper evaluates the performance of MUDRA as comprehensively as possible, still there are a few areas which deserve a thorough research. These areas include, among others, the following:

(1) State-wise and district-wise performance evaluation of MUDRA scheme.

(2) NPAs and NPA ratios (both gross and net) and also special mention accounts (SMAs) of MUDRA loans.

(3) Problems of lenders from the point of view of credit appraisal, monitoring the funded projects, recovery, etc.

Notes

(1) 'Financial gap' refers to a situation of demand for financial assistance by MUs exceeding the supply of the same by the financial institutions.

(2) Prior to 1 July 2020, the criteria for manufacturing and service enterprises in micro sector were different. These criteria for definition of MEs were based on the Micro, Small and Medium Enterprises Development Act, 2006 (MSMED Act, 2006) - maximum limit to qualify as a ME was ' 10 lakh (service) to ' 25 lakh (manufacturing) of investment in plant and machinery or equipment. With effect from 1 July 2020, the criteria for identification of MEs (and also for the identification of small and medium enterprises, SMEs) was revised. There are two important aspects in the revised definition and they are, (i) the distinction between manufacturing and service micro enterprises is removed, and both (manufacturing micro enterprises and service micro enterprises) are defined similarly, and (ii) the definition which was based (prior to 1 July 2020) only on the amount of investment, now (with effect from 1 July 2020), includes turnover also. Therefore, micro unit/ enterprise is one where investment in plant and machinery or equipment does not exceed ' 1 crore and the annual turnover not exceeding ' 5 crore.

References

Anita Bindal & Rupesh Roshan Singh. (2022). A study and review of PMMY. *Journal of Education*. XXIII(1): 309-15.

Gunjan Bhayana., Rashmi & Raj Kumar. (October 2020). Role of MUDRA yozana in entrepreneurship development. *Pacific Business Review International*. 13(4): 63-72.

Guntur Anjana Raju & Mythili Kurpad. (Summer 2013). SME securitization: A new ray of hope for SMEs in India. *Journal of Structural Finance*. 19(2): 89-119.

Inchara P. M Gowda. (January 2017). MSMEs – RBI's framework for revival and rehabilitation. *Money Wise*. 5(1): 22-7.

Inchara P M Gowda & Ramesh H N. (October 2018 - March 2019). Pradhan Mantri MUDRA Yojana – Serving micro units at the cost of lenders? *AMBER – ABBS Management Business and Entrepreneurship Review*. 10(1): 6-14.

Jocelyne Bendriss., Bertrand Lavayssiere & Mark Tilden. (June 2014). Financing SMEs. Needed innovations are emerging. *Revue d'Economic Financiere*. Vol. 114 (based on translated version from French).

Manish Agarwal & Ritesh Dwivedi. (December 2017). Pradhan mantri MUDRA yozana: A critical review. *Parikalpana*. 13(2): 97-106.

Mehmet Yazici and Erkut Baloðlu. (October 2012). Information sharing in property appraisal to reduce collateral risk in banking. *Maliye Finans Yazilari*. 26(97): 37-59 (based on translated version from Turkish).

MUDRA, *Annual Reports, 2015-16 to 2021-22*. Retrieved from, https://www.mudra.org.in/

Prerna Jain. (June 2020). MUDRA yojana to 'fund the unfunded': An analysis. *International Journal of Advanced Research in Commerce, Management and Social Science*. 3(2): 182-8.

Prime Minister's Task Force. (2010). *Report of prime minister's task force on micro, small and medium enterprises*. Ministry of MSMEs, GoI. Retrieved from http://msme.gov.in/WriteReadData/DocumentFile/PM_MSME_Task_Force_Jan2010.

Shashank, B. S & Mayya, Sureshramana. (2022). A case study on the impacts of PMMY on the banking sector in India. *International Journal of Case Studies in Business, IT and Education*. 6(1): 256-67.

Toran Lal Verma & Nema D K. (April 2019). Performance evaluation of MUDRA bank (with special reference to state of Madhya Pradesh). *Journal of Emerging Technologies and Innovative Research*. 6(4): 343-55.

Yogesh D Mahajan. (June 2019). A study and review of PMMY in the state of Maharashtra. *International Journal of Advance and Innovative Research*. 6(2): 1-7.

Role of Adopting Robotic Process Automation (RPA) in the Medical Sector

Sofia Khan and R K Tailor

Abstract : *Managing biomedical databases efficiently is of paramount importance in the medical sector, as these databases store critical information that is crucial for patient care, research, and decision-making. However, the complexity and volume of biomedical data pose significant challenges in terms of data collection, integration, and analysis. This research article explores the potential of Robotic Process Automation (RPA) in enhancing biomedical database management in the medical sector. Through a comprehensive literature review and quantitative analysis, this study investigates how RPA can automate various tasks involved in biomedical database management. RPA enables the automation of data extraction, data entry, data cleaning, and data integration processes. By automating these labour-intensive tasks, RPA reduces manual effort, minimizes errors, and enhances data accuracy. Furthermore, this research delves into the impact of RPA on data analysis and decision-making processes in the medical sector. RPA facilitates the processing and analysis of large volumes of data, leading to faster insights and more informed decision-making. The study also examines the benefits and challenges associated with implementing RPA in biomedical database management. It highlights the potential for improved operational efficiency, cost savings, and enhanced patient care outcomes. Additionally, the article addresses the challenges of data privacy and security, regulatory compliance, and the need for ongoing monitoring and optimization of RPA solutions. By automating labour-intensive tasks, RPA streamlines data management processes, improves data quality, and empowers healthcare organizations to make data-driven decisions. However, the study acknowledges the need for careful planning, stakeholder engagement, and continuous evaluation to ensure successful implementation of RPA solutions.*

Keywords : Robotic Process Automation, Healthcare, RPA, Biomedical, Artificial Intelligence, Database Management, Machine Learning.

Sofia Khan, Research Scholar, Department of Business Administration, School of Business and Commerce, FOMC, Manipal University Jaipur, Jaipur Rajasthan. Email. sofiakhanlagos@gmail.com

Dr.R K Tailor, Associate Professor, Department of Business Administration, School of Business and Commerce, FOMC, Manipal University Jaipur, Jaipur, Rajasthan. Email. rajeshkumar.tailor@jaipur.manipal.edu

Introduction of Robotic Process Automation (RPA) in Medical Sector

The integration of advanced technologies in the healthcare industry has opened up new avenues for improving efficiency, enhancing patient care, and streamlining operations. Among these technological advancements, Robotic Process Automation (RPA) has emerged as a powerful tool with the potential to revolutionize the medical sector. RPA, a form of automation technology that utilizes software robots to automate repetitive tasks and processes, offers a wide range of applications in healthcare settings. From managing patient data to optimizing administrative workflows, RPA has the capability to transform how healthcare providers deliver services and allocate resources. In the medical sector, numerous complex tasks and processes occur daily, ranging from claims management and data extraction to scheduling patients and ensuring regulatory compliance. These tasks are often time-consuming, prone to errors, and require significant allocation of resources. By implementing RPA, healthcare organizations can automate these repetitive tasks, freeing up valuable time for healthcare professionals to focus on patient care and more complex decision-making processes. RPA enables the seamless integration of various systems, streamlining data management and facilitating efficient information exchange across different departments and healthcare providers. Moreover, RPA brings increased accuracy and precision to data entry and processing. By minimizing human errors and inconsistencies, RPA helps to maintain data integrity and ensures reliable and up-to-date information is available for healthcare professionals. This has a direct impact on the quality of care provided to patients, as accurate and timely data enables better diagnoses, treatment plans, and monitoring of patient progress.

Additionally, RPA has the potential to significantly reduce operational costs in the healthcare sector. By automating tasks that were previously performed manually, organizations can achieve cost savings, improved resource allocation, and increased productivity. RPA can also help healthcare providers meet stringent regulatory requirements by ensuring compliance with privacy and security protocols while handling sensitive patient information. The utilization of RPA in the medical sector holds great promise for improving healthcare delivery, enhancing patient experiences, and optimizing resource utilization. However, it is important to carefully plan and implement RPA solutions, taking into account the specific needs and complexities of healthcare organizations. With the right implementation strategy and ongoing monitoring, RPA can

become an invaluable tool for transforming the medical sector, ultimately leading to better outcomes for patients, healthcare providers, and the industry as a whole.

Robotic process automation is a sort of automation in which software is used to do back-office tasks such as data extraction, form completion, and file transfer. Through Application Programming Interface (APIs) and user interface interactions, it combines and conducts repetitive tasks across business and productivity applications. By implementing scripts that resemble human activities, RPA solutions automate the execution of varied tasks, processes, and transactions across heterogeneous software platforms (Khan, Tailor, Uygun, & Gujrati, 2022). Utilizing logic and structured inputs, Robotic Process Automation (RPA) uses technology to simplify commercial operations. Using RPA technologies, software may be configured to scan and comprehend applications for processing transactions, modify data, trigger responses, and interact with digital systems. (Tailor & Khan, FINTECH IN INVESTMENT MANAGEMENT FOR MODERN ENTREPRENEURS, 2022). Numerous bots that have been built to automate operations in an enterprise network are one of the easier RPA implementations (Tailor & Khan, 2022).

Figure-1 : Hierarchy of Automation
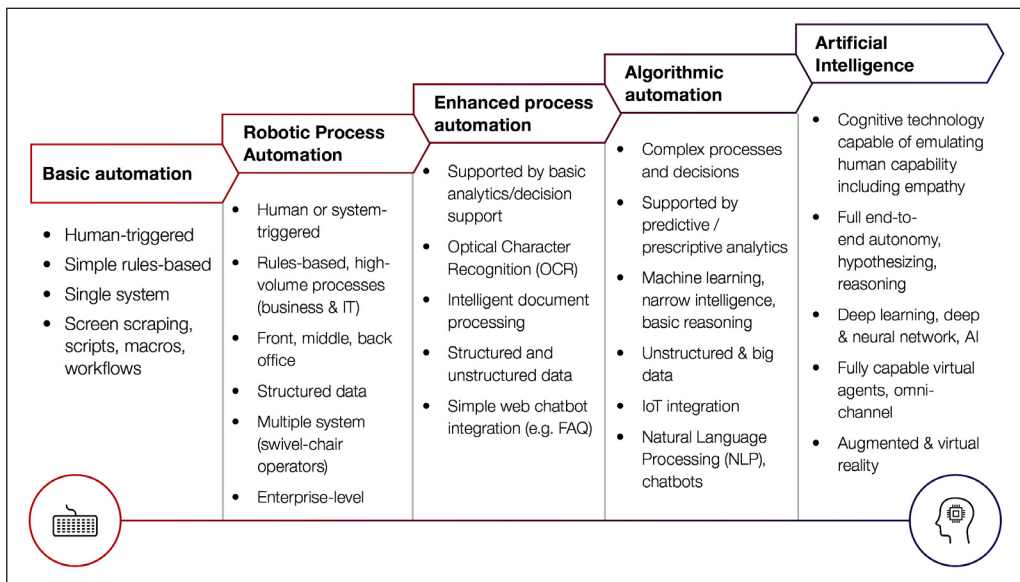
Source: https://www.cgi.com/sites/default/files/2021-08/intelligent-automation-healthcare.pdf ; 3:00 PM

Numerous highly sensitive client engagements occur in the healthcare business, but there are also many activities which consumes time, procedures which are repetitive and administrative duties that do not require specialist knowledge. From front-office activities to operational operations to patient engagement and bill payment, RPA may automate jobs across the enterprise. Healthcare companies work in real time, with no interval (Williams, 2021). Processes are slowed by cumbersome, error-prone procedures, from cost structures it has an impact on everything to conform to the experience of patient. RPA software increases efficiency by automating operations that enhance data and reporting accuracy and allow for faster decision-making (Tailor & Kumar, Application of *Robotic Process Automation (RPA) in queue management system of shopping malls of rajasthan*, 2020). This results in cost savings and, as a result, resources may be used where they are most needed (Pathuri, 2020). RPA automates operations involving data sets that are structured and logical, and it frequently makes use of a business requirements to make choices based on established rules and circumstances (Ahuja & Tailor, 2021). RPA can handle unstructured data but only if a robot extracts the information first and then utilises natural language processing and optical character recognition to convert it to structured data (Helpsystems, n.d.).

A healthcare provider refers to an entity or individual, such as a physician, nurse practitioner, or clinical psychologist, that offers medical services. The evolving landscape of technology, patient advocacy, changing expectations of patients and providers, as well as economic and demographic shifts, are creating new demands in the delivery of healthcare. Healthcare professionals are constantly under pressure to improve patient experiences and outcomes while managing costs. Effective utilization of digitalization and new technologies has the potential to enhance patient care, increase revenue for providers, expedite cash flow, and improve satisfaction among both staff and clients. Within healthcare institutions, various personnel including administrative staff, doctors, and nursing assistants perform repetitive tasks that follow set rules. Automating such tasks can free up time for these individuals to engage in higher-value activities.

The demand for improved healthcare access and quality is increasing as the population grows. Demographic studies indicate that several countries will experience a significant increase in the proportion of elderly individuals in the coming decades. As shown in the chart below, Europe, the United States, and Japan are projected to witness a rise of approximately 40%, 50%, and 100%, respectively, in their senior population by 2030. Moreover, across all continents,

Figure-2 : Past and Anticipated Percentage of the Population above Age 65
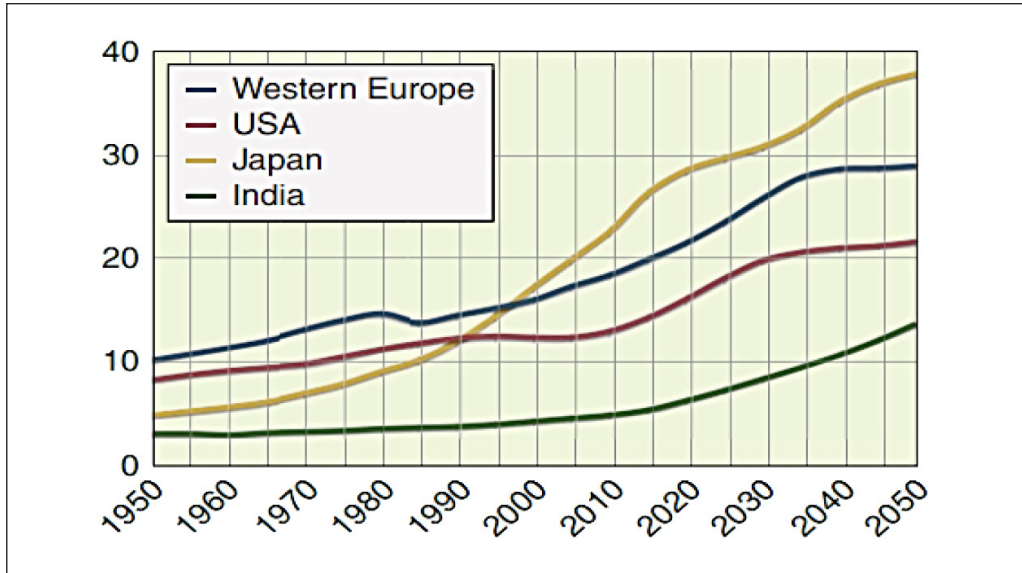
Source : Allison, O. M., Mataric, M. J., & Christensen, H. I. (2010). Medical and Health-Care Robotics. IEEE Robotics & Automation Magazine, 26-37. 10:00 PM

there will be a more than 100% increase in the number of individuals aged 80 and above. Advancements in medical technology have contributed to the extension of human lifespan (Allison, Mataric, & Christensen, 2010). Coupled with declining birth rates, this demographic shift will result in an overall aging of society, which will have significant implications for areas such as education, housing, healthcare, and industrial production. With an aging population, the prevalence of injuries, disorders, and illnesses is also expected to rise. Chronic diseases like diabetes, autism, obesity, and cancer show notable increases across all age groups.

1.1. Robotic Process Automation (RPA) in Medical Sector

The utilization of Robotic Process Automation (RPA) in the medical sector has proven to be a powerful tool for enhancing the management of biomedical databases. With the ever-increasing volume and complexity of healthcare data, efficient management and analysis of biomedical databases have become crucial for healthcare providers, researchers, and administrators. By implementing RPA

in this context, organizations can streamline and automate various tasks related to the visualization, collection, and analysis of biomedical data. RPA technology offers a range of benefits when applied to biomedical database management. Firstly, it significantly reduces the manual effort and time required for data collection and entry. Repetitive and time-consuming tasks such as data extraction from different sources, data entry into databases, and data cleaning can be automated through RPA. This not only saves valuable time but also minimizes the risk of human errors and ensures data accuracy.

Furthermore, RPA enables seamless integration and consolidation of data from multiple sources. In the medical sector, data is often scattered across various systems, such as electronic health records, laboratory systems, imaging systems, and research databases. RPA can automate the process of data extraction from these disparate sources, harmonize the data, and populate the biomedical database, creating a unified and comprehensive data repository. Additionally, RPA can facilitate advanced data analytics and visualization techniques. Once the biomedical database is populated, RPA can be leveraged to perform automated data analysis, generate insights, and visualize the findings. This empowers healthcare professionals and researchers to make informed decisions, identify trends, and discover valuable patterns in the data. Moreover, the scalability and flexibility of RPA make it an ideal solution for managing biomedical databases of varying sizes and complexities. Whether it's a small clinic or a large research institution, RPA can adapt to the specific needs and requirements of the organization. It can handle high volumes of data, accommodate different data formats, and scale up or down based on demand.

Therefore, the application of Robotic Process Automation (RPA) in the management of biomedical databases brings significant improvements to the medical sector. It streamlines data collection, enhances data accuracy, facilitates data integration, enables advanced analytics, and promotes better decision-making. By embracing RPA, healthcare organizations can unlock the full potential of their biomedical data, leading to improved patient care, accelerated research, and more efficient healthcare operations.

1.2. Scope of Robotic Process Automation (RPA) in the Medical Sector

The scope of enhancing biomedical database management in the medical sector through Robotic Process Automation (RPA) is significant and encompasses various aspects. Here are some key points highlighting the scope of this enhancement :

Figure-3 : Scope of RPA in Healthcare
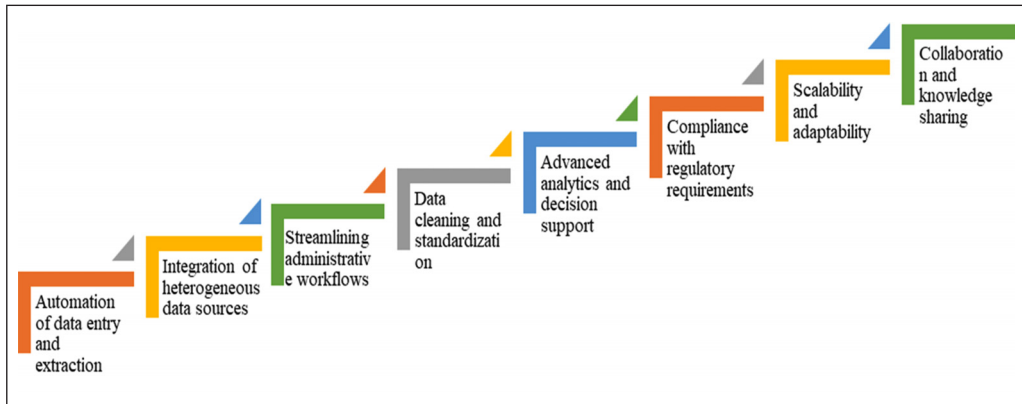
1.2.1. Automation of Data Entry and Extraction

RPA can automate the process of data entry and extraction from multiple sources, such as electronic health records, laboratory systems, and research databases. This automation reduces manual effort, minimizes errors, and ensures the timely and accurate collection of data.

1.2.2. Integration of Heterogeneous Data Sources

Biomedical databases often contain data from diverse sources, making data integration a complex task. RPA can streamline the integration process by automating data mapping, transformation, and consolidation, ensuring a unified and comprehensive database.

1.2.3. Streamlining Administrative Workflows

RPA can automate various administrative tasks in healthcare organizations, including scheduling appointments, managing patient records, and processing claims. By automating these workflows, RPA improves efficiency, reduces operational costs, and enhances overall administrative productivity.

1.2.4. Data Cleaning and Standardization

Biomedical databases often contain inconsistent or incomplete data. RPA can automate data cleaning processes, including error detection, deduplication, and standardization of data formats. This ensures data integrity and improves the quality and reliability of the database.

1.2.5. Advanced Analytics and Decision Support

RPA can facilitate advanced data analytics techniques, such as data mining, predictive modeling, and trend analysis. By automating these processes, RPA enables healthcare professionals to derive valuable insights from the biomedical database, aiding in clinical decision-making, research, and population health management.

1.2.6. Compliance with Regulatory Requirements

The medical sector is subject to stringent regulations and privacy laws, such as HIPAA. RPA can assist in ensuring compliance by automating data anonymization, access control, and audit trails, thereby safeguarding patient privacy and maintaining regulatory compliance.

1.2.7. Scalability and Adaptability

RPA solutions can be scaled up or down based on the size and needs of the healthcare organization. They can accommodate expanding data volumes, evolving technology infrastructure, and changing organizational requirements, providing flexibility and adaptability to meet future demands.

1.2.8. Collaboration and Knowledge Sharing

RPA can facilitate data sharing and collaboration among healthcare professionals, researchers, and institutions. It enables secure and controlled access to the database, allowing for seamless information exchange and collaboration, ultimately fostering innovation and advancements in medical research and patient care.

1.3 Benefits of Robotic Process Automation (RPA) in Medical Sector

Benefits of Enhancing Biomedical Database Management through RPA in the Medical Sector:

1.3.1. Improved Data Accuracy

RPA automates data entry and extraction processes, reducing the risk of errors and ensuring higher data accuracy in biomedical databases. This enhances the reliability and integrity of the data, leading to better patient care and research outcomes.

Figure-4 : Benefits of RPA in Healthcare
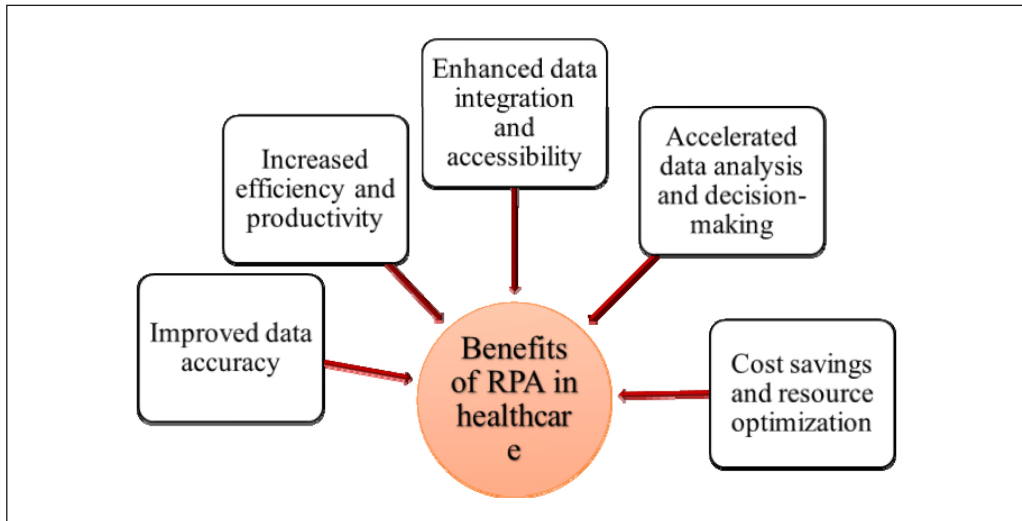
1.3.2. Increased Efficiency and Productivity

RPA automates repetitive and time-consuming tasks, freeing up healthcare professionals' time to focus on more critical activities. This improves overall operational efficiency, allowing for better resource utilization and increased productivity within healthcare organizations.

1.3.3. Enhanced Data Integration and Accessibility

RPA streamlines the integration of heterogeneous data sources, creating a unified and comprehensive database. This improves data accessibility, enabling healthcare professionals and researchers to retrieve and analyze data more efficiently.

1.3.4. Accelerated Data Analysis and Decision-making

RPA enables advanced analytics and visualization techniques, allowing for faster and more accurate data analysis. This facilitates timely decision-making, leading to improved patient care, research insights, and population health management.

1.3.5. Cost Savings and Resource Optimization

By automating repetitive tasks, RPA reduces manual effort, minimizing operational costs associated with data management. It optimizes resource

allocation, enabling healthcare organizations to allocate resources more strategically and efficiently.

1.4. Challenges of Enhancing Biomedical Database Management through RPA in the Medical Sector

1.4.1. Data Privacy and Security

Biomedical databases contain sensitive patient information, and ensuring data privacy and security is crucial. Implementing RPA requires robust security measures to protect patient data from unauthorized access or breaches.

1.4.2. Regulatory Compliance

The medical sector is subject to strict regulations, such as HIPAA, regarding patient data handling and privacy. RPA implementation must comply with these regulations, requiring careful planning and adherence to legal requirements.

1.4.3. System Integration Complexities

Integrating RPA with existing healthcare systems and infrastructure can be challenging. Compatibility issues, data mapping, and system interoperability need to be addressed to ensure seamless integration and data flow.

1.4.4. Change Management and Stakeholder Engagement

Implementing RPA involves organizational changes and may require staff training and engagement. Healthcare professionals and staff need to adapt to new processes and workflows, requiring effective change management strategies and stakeholder buy-in.

1.4.5. Continuous Monitoring and Maintenance

RPA systems need ongoing monitoring, maintenance, and updates to ensure optimal performance. Regular audits, troubleshooting, and system enhancements are necessary to address potential issues and keep the RPA solution up to date.

1.4.6. Ethical Considerations

RPA implementation should take ethical considerations into account, ensuring transparency, fairness, and responsible use of automation in healthcare. Ethical guidelines and frameworks should be in place to guide the deployment and operation of RPA systems.

1.5. Application of Robotic Process Automation (RPA) in Enhancing Biomedical Database Management in the Medical Sector

Robotic Process Automation (RPA) offers promising applications in enhancing biomedical database management in the medical sector. Here are some keyways in which RPA can be applied:

1.5.1. Data Extraction and Entry Automation

RPA can automate the process of extracting data from various sources, such as electronic health records, medical devices, and laboratory systems. It can also automate data entry tasks, ensuring the timely and accurate transfer of data into the biomedical database. This automation reduces manual effort, minimizes errors, and improves data quality.

1.5.2. Data Integration and Consolidation

Biomedical databases often contain data from diverse sources. RPA can automate the process of data integration by mapping, transforming, and consolidating data from different systems and formats. This automation ensures a unified and comprehensive database, facilitating easier data access and analysis.

1.5.3. Data Cleaning and Standardization

RPA can automate data cleaning processes, such as error detection, deduplication, and standardization of data formats. By automating these tasks, RPA improves the quality and consistency of data within the biomedical database, enhancing its reliability for patient care, research, and decision-making.

1.5.4. Workflow Automation

RPA can automate various administrative workflows in healthcare organizations, such as appointment scheduling, patient registration, and billing processes. By automating these repetitive tasks, RPA reduces manual effort, improves efficiency, and accelerates the overall workflow in managing biomedical databases.

1.5.5. Advanced Analytics and Decision Support

RPA enables advanced analytics techniques, such as data mining, predictive modeling, and trend analysis, within the biomedical database. It can automate the extraction and analysis of data to generate valuable insights for clinical decision-making, research, and population health management.

1.5.6 Compliance and Security Measures

RPA can assist in ensuring compliance with regulatory requirements, such as HIPAA, by automating data anonymization, access control, and audit trails. It helps maintain data privacy and security within the biomedical database, safeguarding sensitive patient information.

1.5.7. Scalability and Adaptability

RPA solutions can be scaled up or down based on the size and needs of the healthcare organization. They can accommodate expanding data volumes, evolving technology infrastructure, and changing organizational requirements, providing scalability and adaptability to meet future demands.

It is important to note that the application of RPA in biomedical database management should be done thoughtfully and in consideration of specific organizational needs. Effective implementation requires a thorough understanding of data workflows, stakeholder engagement, and careful planning to ensure seamless integration with existing systems and workflows. By leveraging RPA in biomedical database management, healthcare organizations can streamline data processes, improve data quality, enhance operational efficiency, and ultimately deliver better patient care, research outcomes, and decision-making in the medical sector.

The contemporary medical sector has evolved to encompass situations and activities that involve direct human interaction in settings such as operating rooms, rehabilitation centers, and family environments. This is in contrast to earlier robotic systems developed several decades ago primarily for automating monotonous and hazardous tasks. In recent years, there has been a notable increase in both commercial and academic interest in medical and healthcare robots. Telerobotic technology, for instance, is now frequently employed in surgical procedures, leading to reduced recovery times and more consistent outcomes. Robotic rehabilitation systems have also proven successful in providing physical and occupational therapy, offering a higher level of treatment intensity that can be continuously adjusted according to the patient's requirements. Breakthroughs in robotics technology hold immense potential in facilitating the development of innovative treatments for a wide range of diseases and disorders. They can also improve the quality and accessibility of care, ultimately enhancing patient outcomes (Allison, Mataric, & Christensen, 2010).

In the medical sector, there are three distinct phases in which robotic process automation (RPA) can be applied for visualizing, collecting, and analyzing medical data.

Figure-5 : Robotic Process Automation : Phase-1

Figure 6. Phase 1
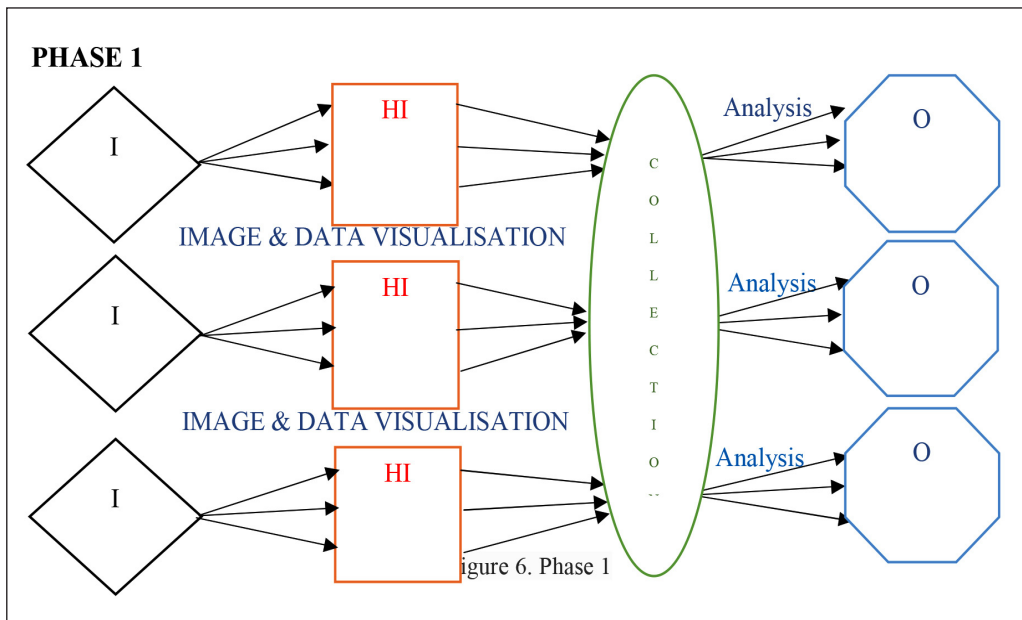
I = Input;   HI = Human Interference;   O = Output

Currently, the biomedical field is responsible for overseeing tasks such as data collection, image collection, and data review. In the medical sector, it is crucial to accurately interpret the results as human expertise relies on capabilities and experience. Therefore, the biomedical sector utilizes human expertise in visualizing and managing data. Humans are involved in categorizing, classifying, and assessing images and data to create appropriate data clusters that can be presented to authorities and policymakers. Human involvement is also necessary for error detection and management. After analyzing the data, outcomes are generated.

Figure-6 : Robotic Process Automation : Phase-2

Figure 6. Phase 2
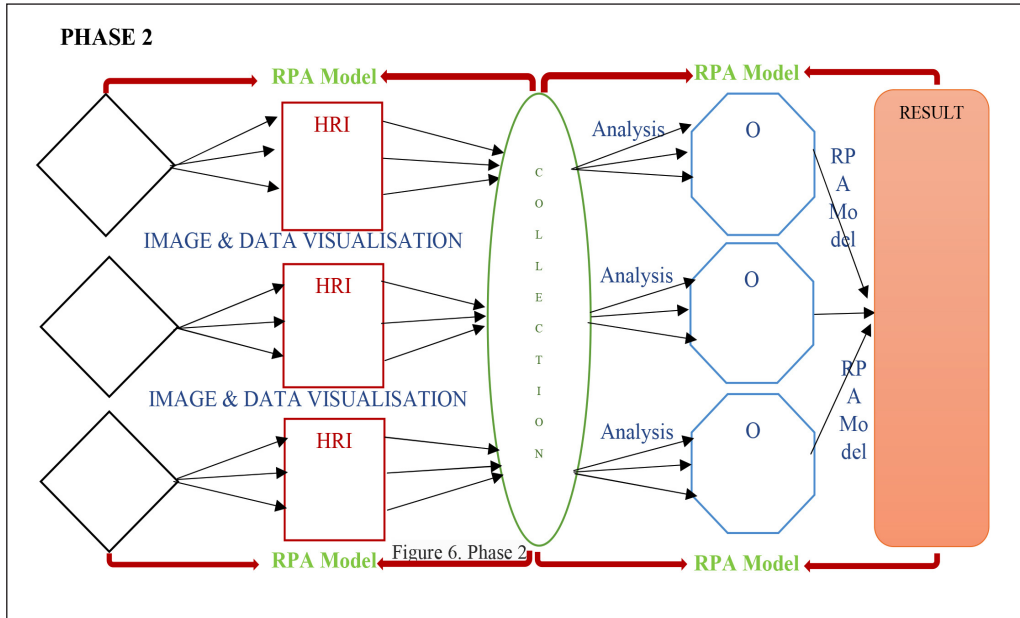
I= Input;   HI= Human Robot Interaction;   O= Output

Result = Experimental Result through Robotic Process Automation (RPA) model

In the medical sector, the utilization of robots is increasing as they are employed for exploration, information gathering, and physical manipulation tasks. In the past, human-robot interfaces primarily focused on supporting human supervision and direct interaction with robots. However, advancements in detection, mobility, and autonomy are rapidly improving the capabilities of robots, presenting new opportunities for researchers, technicians, and analysts to collaborate with robots in their respective fields (Szafr & Szafr, 2021).

By leveraging the outputs generated by robots, such as analyzing fresh sequence data, interpreting maps, or collaborating with robots to understand and mitigate contextual uncertainties and risks, users can shift their focus from directly controlling specific aspects of robot operations to achieving the overall mission objective. As robot capabilities progress, human-robot interfaces will become increasingly important in enabling data-centric operations.

Research in human-robot interaction (HRI) primarily aims to develop user interfaces that effectively enable people to teleoperate and manage robots. These systems aim to support data collection, interpretation, and decision-making by humans, which requires presenting robotic information in a manner that facilitates quick and accurate human comprehension. Data analysis involves the process of examining and deriving meaningful insights from the data, which can be either qualitative or quantitative, such as sensor measurements. Through data processing, individuals generate valuable insights that deepen their understanding of a subject or problem and guide subsequent judgments and actions.

Visualization plays a crucial role in aiding users to make inferences from data in HRI. HRI data often encompasses various types of information, including robotic tasks, and complex relationships can exist between these tasks and other variables, such as domain standards or aspects of the datasets. Visualization techniques offer diverse methods to create visual representations of data that support important activities and incorporate contextual information about the data, constraints, and user objectives. Integrating data visualization concepts into robot interfaces can enhance HRI by better supporting sensemaking, which refers to the process of using information, particularly directly obtained from data and relevant domain expertise, to develop conclusions and guide actions.

Sensemaking, a fundamental concept in visualization, involves utilizing data to infer the current state of the world, increasing awareness, and informing decision-making processes (Vizlib, 2019). Decision-making based on sensemaking can include determining which building to inspect or which course of action to take. Visualizations enable users to employ data patterns to generate knowledge that provides comprehensive context for their decisions. Some decisions rely solely on the data presented in the visualization, while others involve integrating data with knowledge or context to make sense of multiple variables.

Improving the design of robot interfaces requires explicit consideration and preparation for decision-making processes, including specifying the data and information activities necessary to achieve specific objectives (Szafr & Szafr, 2021). Given that human capabilities are reliant on skills and experience, it is crucial to understand the outcomes in the medical industry, as well as the human expertise employed in data management and visualization in the biomedical field. People play a role in the categorization, classification, and evaluation processes of images and data to generate appropriate data clusters and provide them to authorities

and policymakers. Error detection and correction can be addressed once data analysis and output are generated. Robotic Process Automation (RPA) can assist in capturing experimental results from the generated output.

Figure-7 : Robotic Process Automation : Phase-2

Figure 8. Phase 3
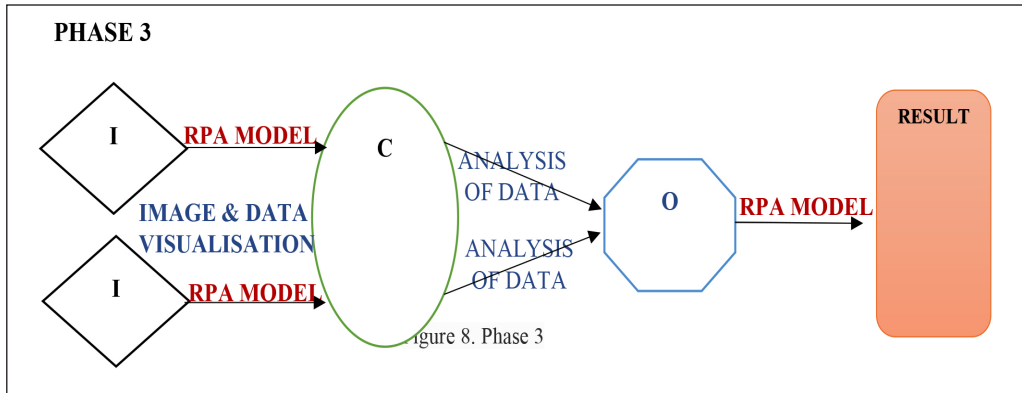
I= Input;   O= Output; C= Collection of data

Result = Experimental Result through Robotic Process Automation (RPA) model

When adopting completely automated analysis, RPA enables users to examine data across several issues using a single representation. With the flexibility that image and data visualization using RPA affords, users may develop situational awareness, modify operations in dynamic environments, and swiftly, simply evaluate mission condition across a variety of aspects and measures. The design of a visualization affects the best information activities that it can support. For instance, although line graphs display trends, people are far more likely to focus on numbers in bar charts than in line graphs, which provide summary data whereas line graphs allow value estimation. Robots are frequently employed to gather data, however this fact is rarely stated clearly.

By reducing human interference and involving Robotic Process Automation (RPA) in image and data categorization, classification, and assessment so that proper data clusters can be prepared and the same should to the authorities and policy makers. The detection of inaccuracies can also be managed and after collection of data and analysis of the data, output is generated, as a result of output, experimental results are produced through Robotic Process Automation (RPA) Model.

2. Objectives of the Study

The primary aims of the study are as follows:

1.   To study the robotic process automation for healthcare industry.

2.   To identify the parameters associated with robotic process automation for healthcare industry.

3.   To examine the effectiveness of application and adoption of robotic process automation programme in healthcare industry.

3. Hypotheses

To examine the effectiveness of application and adoption of robotic process automation programme in healthcare industry, following three hypotheses were formulated :

Hypothesis 1 : There is no significant change in satisfaction of employees after application and adoption of Robotic Process Automation programme.

Hypothesis 2 : There is no significant change in capacity utilisation of resources after application and adoption of Robotic Process Automation Programme.

Hypothesis 3 : There is no significant change in career development of employees after application and adoption of Robotic Process Automation Programme.

4. Analysis of Data and Findings

Paired sample t- test was applied through SPSS to analyse that whether there is any significant change in the satisfaction scores, capacity utilisation scores and career development scores of the employees before and after application and adoption of robotic process automation programme.

Assumptions of paired t test were fulfilled i.e. factors were independent of each other; each paired measurement was obtained from the same factors of employees. The dependent variable (satisfaction scores, capacity utilisation scores and career development scores) were on the ratio scale and measured differences in test scores pre and post awareness program were normally distributed.

Factor 1 : Satisfaction of Employees by Adoption of Robotic Process Automation (RPA)

Descriptive		
Skewness		
	Statistic	Std. Error
Difference	-0.284	0.354

Descriptive		
Kurtosis		
	Statistic	Std. Error
Difference	-0.936	0.695

Source : Author's calculation.

Generally, Z score could be estimated by dividing skewness values or excess kurtosis value with their standard errors. For small sample size (n<50), z-value between -1.96 to +1.96 is adequate to prove normality of data in any research.

Here, Z scores for Skewness is -0.284/0.354 is -0.802 which is between -1.96 to +1.96. And, Z scores for Kurtosis -0.936/0.695 is -1.35 which is between -1.96 to +1.96. So, it can be concluded that the data is normally distributed i.e., the difference in test scores before and after application and adoption RPA programme are normal.

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Difference	0.107	385	0.195[*]	0.962	385	0.093

Generally, when P > 0.05, null hypothesis is accepted, and data are called as normally distributed data. Shapiro-Wilk test was considered for assuring that the data is normal as the sample size<50.In the above table, the P-value is 0.093 which is greater than 0.05. So, it can also be concluded that the differences in the test scores of before and after application and adoption of RPA programme are normal. Then, after data normality, in the following table paired t test has applied to identify the significant differences:

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Scores before RPA application and adoption	39.32	385	3.218	0.527
	Score after RPA application and adoption	42.93	385	3.373	0.461

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Scores before RPA application and adoption Score after RPA application and adoption	-5.600	4.712	0.702	-7.016	-4.184	-7.973	44	0.000

There was a significant difference in the satisfaction scores before RPA application and adoption programme (M=39.32, SD=3.218) and after attending RPA application and adoption programme.

Factor 2 : Capacity Utilisation of Resources by Adopting RPA

Descriptive Skewness		
	Statistic	Std. Error
Difference	-0.386	0.354

Descriptive Kurtosis		
	Statistic	Std. Error
Difference	-0.235	0.695

Here Z scores for Skewness -0.386/0.354 is -1.09 which is between -1.96 to +1.96. Z scores for Kurtosis -0.235/ .0695 is -0.338 which is between -1.96 to +1.96. Thus, it can be concluded that the data is normally distributed.

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Difference	0.122	45	0.093	0.975	45	0.438

The P-value of Shapiro-Wilk test is 0.438 which is greater than 0.05. Thus, it can be concluded that the difference in test scores of RPA application and adoption are normal. After confirming the normality, paired t-test was applied which is showing in the following table:

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Scores before RPA application and adoption	-6.533	4.855	0.724	-7.992	-5.075	-9.027	44	0.000
	Score after RPA application and adoption								

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Scores before RPA application and adoption	38.27	45	5.487	0.818
	Score after RPA application and adoption	44.80	45	4.283	0.638

Source : Author's calculation.

There is a significant difference in the capacity utilisation scores before application and adoption of RPA program and after application and adoption of RPA programme. Hence, it can be said that the capacity utilisation for resources can be fluctuated with the implementation of RPA programme in medical industry.

Factor 3 : Career Development of Employees by Adopting RPA

Descriptive		
Skewness		
	Statistic	Std. Error
Difference	-0.039	0.354

Descriptive		
Kurtosis		
	Statistic	Std. Error
Difference	-1.085	.695

Here Z scores for Skewness -0.039/0.354 is 0.11 which is between the range of -1.96 to +1.96. Z scores for Kurtosis is also -1.085/0.695 is -1.56 which is also between -1.96 to +1.96. Hence, it can be concluded that the data is normal.

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Difference	.168	45	.003	.931	45	.010

It is clear from the above table that Z scores for Skewness -0.039/0.354 is 0.11 which is between -1.96 to +1.96 value. And Z scores for Kurtosis is -1.56 which is between -1.96 to +1.96. Hence, the data is normal.

Paired Samples Statistics		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Scores before RPA application and adoption	9.16	45	3.424	0.510
	Score after RPA application and adoption	14.62	45	4.706	0.702

Paired Samples Test		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Scores before RPA application and adoption Score after RPA application and adoption	-5.467	4.251	.634	-6.744	-4.189	-8.626	44	0.000

Source : Author's calculation.

There was a significant difference in the product development scores before application and adoption of RPA and after application and adoption of RPA programme.

It is, therefore, can be concluded that the application and adoption of robotic process automation can significantly improves satisfaction, capacity utilisation and career development in the healthcare industry. With the help of robotic process automation, the industry can increase employee's effectiveness and performance with AdTech tools and techniques. The robotic process automation

is not only associated in production but, it will also improve in various other operating and finance activities.

5. Conclusion

In conclusion, the application of Robotic Process Automation (RPA) in enhancing biomedical database management holds great potential for the medical sector. By leveraging the capabilities of RPA, healthcare organizations can streamline data processes, improve data quality, enhance operational efficiency, and ultimately deliver better patient care, research outcomes, and decision-making. RPA enables automation of various tasks such as data extraction, entry, integration, cleaning, and standardization, freeing up valuable time for healthcare professionals to focus on higher-value activities. The automation of administrative workflows and advanced analytics through RPA further enhances efficiency and enables faster and more accurate decision-making. The benefits of RPA in biomedical database management are significant. It improves data accuracy, consistency, and accessibility, leading to better patient outcomes and research insights. It also contributes to cost savings by reducing manual effort, minimizing errors, and optimizing resource allocation. Furthermore, RPA ensures compliance with regulatory requirements and enhances data security and privacy.

However, implementing RPA in the medical sector also presents challenges. These include integrating RPA with existing systems, ensuring data privacy and security, addressing regulatory compliance, and managing change within the organization. It is crucial for healthcare organizations to carefully plan and strategize the implementation of RPA, taking into account specific needs and requirements. Therefore, the application of RPA in enhancing biomedical database management has the potential to revolutionize the medical sector. By harnessing the power of automation and advanced data processing, healthcare organizations can improve efficiency, accuracy, and patient care while reducing costs. It is essential for organizations to embrace the opportunities presented by RPA and navigate the challenges to unlock its full potential in biomedical database management.

6. References

1.   Ahuja, S., & Tailor, R. (2021). Performance evaluation of Robotic Process Automation on waiting lines of toll plazas. *Natural Volatiles & Essential Oils 8(5)*, 10437-10442.

2.   Allison, O. M., Mataric, M. J., & Christensen, H. I. (2010). Medical and Health-Care Robotics. *IEEE Robotics & Automation Magazine*, 26-37.

3.   Baker, A. (2020). How Financial Technology can help the Healthcare Industry. *Fintech Weekly*.

4.   Byrd, J. (n.d.). *8 Key Benefits of Automation in Healthcare*. Retrieved from Relatient: https://www.relatient.com/automation-in-healthcare/

5.   Chen, Y. C., Chen, Y., & Ying, Y. (2021). Applications of Blockchain in the Medical Field: Narrative Review. *Journal of Medical Internet Research*.

6.   CitiustTech. (2020). *Robotic Process Automation in Healthcare*. Retrieved from CitiustTech: https://www.citiustech.com/

7.   Dilmegani, C. (2020, October). *RPA in Healthcare: Benefits, Use Cases & Case Studies in 2022*. Retrieved from AI Multiple: https://research.aimultiple.com/rpa-healthcare/#:~:text=RPA%20enables%20healthcare%20providers%20to,improve%20data%20confidentiality%20as%20well.

8.   Edermaniger, L. (2017). How fintech could power medtech. *MedTechengine*.

9.   George, C. (2021, October). *Fin-Tech for Health-Tech; Changing how we pay for healthcare*. Retrieved from Healthworld.com from The Economic Times : https://health.economictimes.indiatimes.com/news/industry/fin-tech-for-health-tech-changing-how-we-pay-for-healthcare-/86812384

10.   Gupta, D. (2022, May). *Top 5 applications of RPA in Healthcare*. Retrieved from Appinventiv : https://appinventiv.com/blog/rpa-in-healthcare/

11.   Helpsystems. (n.d.). *Robotic Process Automation (RPA) in Healthcare*. Retrieved from Helpsystems : https://www.helpsystems.com/solutions/automation/robotic-process-automation/healthcare

12.   JOSHI, N. (2019, March Friday). *7 use cases of RPA in the healthcare industry*. Retrieved from Allerin : https://www.allerin.com/blog/7-use-cases-of-rpa-in-the-healthcare-industry

13.   Kahuha, E. (2020, November). *Robotic Process Automation (RPA) in the Healthcare Industry*. Retrieved from section: https://www.section.io/engineering-education/robotic-process-automation-use-cases-in-the-healthcare-industry/

14.   Kahuha, E. (2020, November). *Robotic Process Automation (RPA) in the Healthcare Industry*. Retrieved from Section: https://www.section.io/engineering-education/robotic-process-automation-use-cases-in-the-healthcare-industry/

15. Kaur, S. (2022, May). *RPA In Healthcare : Benefits & Use-Cases in 2022*. Retrieved from Signity : https://www.signitysolutions.com/blog/rpa-in-healthcare/

16. Khan, S., Tailor, D. R., Uygun, D. H., & Gujrati, D. R. (2022). Application of robotic process automation (RPA) for supply chain management, smart transportation and logistics. *International Journal of Health Sciences, 6(S3)*, 11051–11063.

17. Klubnikin, A. (2021, July). *RPA in healthcare : a crucial step towards intelligent automation*. Retrieved from Itrex: https://itrexgroup.com/blog/rpa-in-healthcare/#

18. Lahane, K.K., & Sutar, A. A. (2021). AUTOMATION IN HEALTHCARE USING RPA. *International Research Journal of Modernization in Engineering Technology and Science*.

19. Mettler, M. (2016). Blockchain technology in healthcare: The revolution starts here. *2016 IEEE 18th International Conference on e-Health Networking, Applications and Services (Healthcom).* Research Gate.

20. Montgomery, I. (n.d.). *Robotic Process Automation (RPA): 6 use cases in healthcare*. Retrieved from stlpartners : https://stlpartners.com/articles/digital-health/rpa-6-use-cases-in-healthcare/

21. Nallasivam, A. (2022, January). *RPA in Healthcare Industry : Use Cases and Benefits*. Retrieved from Claysys : https://www.claysys.com/blog/rpa-in-healthcare-industry/

22. Path, U. (n.d.). Robotic Process Automation (RPA) in Healthcare Sector. *Ui Path*, 17.

23. Pathuri, H. (2020). *Digitalization of the Healthcare Industry by Implementing Robotic Process Automation and Machine Learning Solutions.* South-Eastern Norway : The University of South-Eastern Norway.

24. Philippon, T. (2016). THE FINTECH OPPORTUNITY. *NATIONAL BUREAU OF ECONOMIC RESEARCH* .

25. Ribitzky, R., Clair, J. S., Houlding, D. I., McFarlane, C. T., Ahier, B., Gould, M., ... Clauson, K. A. (2018). Pragmatic, Interdisciplinary Perspectives on Blockchain and Distributed Ledger Technology : Paving the Future for Healthcare. *Blockchain in Healthcare today*, 1-15.

26. Szafr, D., & Szafr, D. A. (2021). Connecting Human-Robot Interaction and Data Visualization. *ACM/IEEE International Conference on Human-Robot Interaction (HRI '21),* (p. 12). New York, USA: ACM.

27. Tailor, D.R., & Khan, S. (2022). FINTECH IN INVESTMENT MANAGEMENT FOR MODERN ENTREPRENEURS. *Academy of Entrepreneurship Journal, 28(2)*, 1-8.

28. Tailor, D. R., & Kumar, S. (2020). Application of Robotic Process Automation (RPA) in queue management system of shopping malls of rajasthan. *UGC CARE Journal*, 293-298.

29. Tailor, R., & Khan, S. (2022). Robotic Process Automation (RPA) in the Aviation Sector. In K. Kankaew, *Global Air Transport Management and Reshaping Business Models for the New Era* (pp. 289-300). IGI Pulisher.

30. Vizlib. (2019, September). *What can data visualisation do for Pharma and Life Sciences?* Retrieved from Vizlib : https://home.vizlib.com/what-can-data-visualisation-do-for-pharma-and-life-sciences/#:~:text=Data%20visualisation%20helps%20organisations%20access,to%20make%20life%2Dchanging%20decisions.

31. Williams, P. (2021, September). *The healthcare industry of today is overburdened by high costs, incredibly high volume and stringent regulations. These pressures can challenge the quality and urgency of patient care.* Retrieved from IBM : https://www.ibm.com/cloud/blog/amazing-ways-that-rpa-can-be-used-in-healthcare

Festival Effect on Stock Market Buoyancy Among Selected SAARC Countries

Surya A and K Kanniammal

Abstract : *Festivals hold significance in the lives of people and thus holds importance in the stock market as well. Festival effect identifies the effect of festivals on the stock market. This study tries to find the effect of festivals on selected SAARC Countries. The data includes exploring Diwali effect on Sectoral Indices in NSE mainly banking and FMCG Sector and on Colombo Stock Exchange and Ramadan Effect on Karachi Stock Exchange and Dhaka Stock Exchange. The period of study for Diwali is 10 days before and 10 days after for 10 years ranging from 2012-2022.The festival effect was analyzed using ARCH test and GARCH model which helps in determining the heteroskedasticity. The study revealed that there is Diwali effect in Banking Sector alone while the results of FMCG Sector and CSE Index were insignificant. The result of Ramadan effect on Karachi Stock Market and Dhaka Stock Exchange shows that the holy month had no distinct impact on the stock market.*

"Calendar anomalies arise due to seasonality in the stock, i.e., the stock price is systematically lower or higher in a particular calendar period" (Harish Kumar and Rachna Jawa,2017). A festival is a time designated for feasting or celebration. Religious holidays are observed with great interest around the world. These holidays are not always intended for fun; they can also be used to honor historical figures. For example, Buddha Poornima is observed in honor of Lord Buddha, just as Krishna-Ashtami is observed on the day of Lord Krishna's birth. Religious

Surya.A, Research Scholar, Department of Commerce, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore-641043, Email Id: 21phcof010@avinuty.ac.in, Contact No: 6238648308

Dr. K. Kanniammal, Professor, Department of Commerce, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore-641043, Email Id: kanniammal_comm@avinuty.ac.in, Contact No: 9965520151

holidays commemorate historical occurrences including births, deaths, conquests, defeats, etc.

The efficient market theory is refuted by calendar anomalies that exist in stock market. As Asian countries are known to have an inclination towards spirituality, festivals play an even more important role in the life of Asian people. As a result, these celebrations may affect investors' purchasing and selling patterns. The presence of such calendar anomalies can hinder the central paradigm of finance i.e., the efficient market theory. Thus, it questions the efficiency of stock markets to assimilate information and inculcate such information in the prices of each security. Because they are the main cause of the aberrations in stock returns, calendar anomalies are among the topics that are studied the most in financial literature.

The Diwali or Deepavali festival is observed in India as a celebration of the triumph of good over evil. Deepavali, which translates to "an array of lights" in Sanskrit, suggests that light has dislodged gloom from peoples' life. In honor of the goddess Laxmi, who is a symbol of prosperity, Diwali is celebrated. Different regions of the nation observe Diwali for various reasons.

Mahurat trade is an hour-long trading session on the Indian stock exchanges that takes place to commemorate Diwali. It is a prevalent belief that mahurat trading generates wealth and prosperity all year long. Stock brokers perform "Lakshmi Puja" at the exchanges on the evening of Diwali, followed by Mahurat trading.

The holy month of Ramadan is a month of fasting, spiritual training, and self-discipline in the Islamic calendar. "Since people devote more time than usual to religious rites during Ramadan, ordinary economic activity slows down and the entire attitude of the nation changes" (K Khan et al,2017).

Diwali is regarded as one of the significant festivals in India and Sri Lanka and has tremendous impact on business. This event will have an effect on stock trading because it directly influences several industries, including the banking sector, FMCG sector, Consumer Durables sector etc. Ramadan is considered holy month in Pakistan and Bangladesh and have an impact on business as well.

● Thus, the study tries to explore the effectiveness of the sectoral indices of Indian stock market and indices of selected SAARC countries to the existing anomalies.

- The study helps in identifying whether the festive of Diwali has any kind of impact on the various sectors.

- The study aims to investigate how Ramadan affects the Pakistan Stock Market.

- The study helps the investors in giving due consideration to the sector in which they should invest.

- The study helps the speculators to take advantage of such calendar anomalies to earn higher profits.

- The study also requires the authorities concerned to be more vigilant and cautious of the happenings in the stock market during such days.

The South Asian Association for Regional Cooperation (SAARC) is a union of South Asian states and a regional intergovernmental organization. The Governments of all member countries officially adopted the SAARC Charter on December 8, 1985, which marked the organization's founding. "According to estimates from 2021, the SAARC region accounts for 3% of the planet's land area, 21% of its population, and 5.21% (or USD 4.47 trillion) of the world's economic output. The region's member nations are incredibly different in terms of their size, population, resource endowments, and level of economic development. In the SAARC area, India is the biggest and most developed nation" (M Sehrawat and AK Giri,2016).

"Over the past 20 years, the SAARC region has undergone tremendous change in the fields of financial sector, economic reform efforts, and the liberalization and globalization processes. The purpose of the sector-based index is to provide a single value for the performance of a number of companies that represent a group of related sectors or a certain economic sector" (Shanmugasundram et al,2013).

The current study investigates whether any calendar anomalies exist in the selected SAARC stock market i.e. four emerging stock markets by examining the major indices of these countries i.e., NSE Bank Index and FMCG Index (India), CSE (Sri Lanka), KSE 100 (Pakistan), DSE (Bangladesh). The study examines the degree of association between stock returns and the festival dates appearing in the calendar. It also looks into how these markets are integrated regionally and globally. The existing research analyzed the calendar effects in each country individually or the other calendar effects in SAARC nations but very little is

done to quantify the interdependence among the stock markets in Asia and to identify the impact festivals hold in the SAARC nations. The festivals hold a greater importance particularly in Asian Stock Market.

Due to deregulation and globalization, South Asian stock markets have drawn institutional investors from both home and abroad. In particular, diversifying their funds across markets has helped these investors lower portfolio risk.

Indices used for the Study

FMCG Index :

Fast-moving consumer goods (FMCGs) are mass-market, non-durable products that are readily available. 15 companies that produce these products and are listed on NSE make up the CNX FMCG index. The free float market capitalization method was also used to calculate this index, using a base period of 1 January 1996 and a base value of 1000. The market capitalization is calculated using the free float approach by multiplying the stock price by the number of shares that are freely traded on the market. Excluded are the locked-in shares held by promoters and governments.

Bank Index :

 Numerous underlying causes have led to significant changes in the Indian banking sector. The CNX Bank index includes the most liquid and adequately financed Indian banking firms. It acts as a benchmark for investors and market intermediaries to evaluate the capital market performance of Indian banks. The index consists of twelve stocks from the banking sector that are traded on the National Stock Exchange. The CNX Bank index was introduced on January 1st, 2000, using the free float market capitalization approach, with a base value of 1000.

KSE 100 Index

The KSE-100 Index on the Pakistan Stock Exchange (PSX) provides a starting point for comparing values throughout time. The index is calculated using the representative corporations with the largest market capitalization. The firm from each sector with the greatest market capitalization is also included to fully represent the market.

CSE ASPI Index

The Colombo Stock Exchange in Sri Lanka leverages the All Share Price Index as one of its main stock indices. It runs based on market capitalization. The

shares are weighed based on market capitalization. The foundation year for the index is 1985, with a base value of 100. The Sri Lankan stock market's longest and broadest statistic is this one.

DSE Index

DS30 (Dhaka Stock Exchange 30 Index was created using the same free-float technique as the other indices around the globe. Using the free-float methodology, market capitalization is calculated by multiplying the equity's price by the number of shares that are currently trading on the market. Promoters' and governments' locked-in shares are not included in the free-float calculation.

The efficient market hypothesis is a theory that contends that stock prices take into account all previously accessible information and no one is capable of generating any sort of super normal profits, comes in direct conflict with the calendar anomalies. The coverage of study is limited to indices in selected SAARC countries like NSE Bank Index and FMCG Index in India, CSEASPI in Sri Lanka, KSE 100 Index in Pakistan, DSE 30 Index in Bangladesh. The indices from other countries in SAARC couldn't be considered due to non-availability of data. As far as Afghanistan is considered, there is no stock exchange.

Review of Literature

The examination of the literature shows that the level of efficiency in stock markets around the world is clearly region specific.

Shikta Singh and Chandrabhanu Das (2020) examined the calendar effects on the key service sector indices on the Indian securities market in their study. The Garch and OLS regression approaches were employed for the investigation, which covered the years 2010 to 2019. The results show that the index returns and volatility are affected by the January effect and the turn of the month. The study is helpful in policy making and its implementation to the various regulators of the market and industries. **Rossi, Kalimullah Khan Muhammad Ali Nasir Matteo (2017)** Studied how Ramadan have an impact on the stock exchange in Pakistan. Through the use of GARCH and OLS models, the effects of Ramadan were explored. They concluded that Ramadan has a slightly favourable effect on stock market but was not significant enough to prove the hypothesis true. **Shanmugasundram and Benedict D J (2013)** studied the sectoral indices to identify the volatility existing in the stock indices. The study aimed to offer empirical evidence to support the identification of risk components in sectoral

indices and CNX Nifty Index, as well as to examine the risk relationship over various time periods. **Fazal Husain (1998)** in his study attempts to explore a seasonal pattern, mainly effect of Ramadan. The effect of Ramadan was analyzed by using regressions and GARCH models respectively. The investigation came to the conclusion that stock returns have significantly decreased, which causes return volatility.

Fazal J.et al (2005) conducted research on the impact of Ramadan on the Saudi Arabian stock market. The study revealed a systematic decline in the stock returns which indicates that Ramadan has a considerable impact on the pricing of assets, particularly the decisions made by investors in Islamic nations about product and asset allocation. The study came to the conclusion that although day of the week and other effects were negligible, the stock market is susceptible to the turn of the month effect. **Tadepalli, M. and et al (2018)** conducted a thorough literature study about the existence of calendar anomalies in stock markets all over the world. The study helps in identifying what are the anomalies observed so far in the different stock markets and thus helping in understanding the occurrence of anomalies over the past years. **U Jerinabi and et al (2016)** studied how Exchange Rate volatility affected SAARC countries' export growth. The findings showed that there is no relationship between the exchange rate and export pricing. **K Ramya and et al. (2015)** in their analysis, they examined the correlation between EVA and share prices of specific BSE companies. The study revealed that EVA does not have impact on share prices. **Khanna V and Mittal A (2016)** examined the presence of Day of the Week Effect by exploring the major indices of BRICS. The study considered 14 years stock return data. The results, however, show that the DOW effect only exists in the stock markets of China and India. The findings imply that market inefficiency still persists and that the market has not yet priced risk adequately by strategically attacking the market at the right times. As a result, by modifying their portfolios appropriately, investors can take use of this technical expertise to generate abnormal returns and enter the stock market to make abnormal profits.

R Kumar and RS Dhankar (2009) investigated the volatility and correlations in stock returns by considering selected SAARC countries. This study makes an effort to look at the regional integration and interconnectedness of the stock markets in South Asia with those in other parts of the world. The study also looks at crucial elements of an investing plan when choices are made in an uncertain and risky environment. The study disproves the association between stock returns and predicted volatility, but it discovers a strong association with

unanticipated volatility. It shows how investors adjust their risk premium to account for anticipated changes in stock prices but intend to increase it again to account for unforeseen changes. Since entering the liberalization phase, South Asian financial markets have shown interconnection as well as dependence on the global stock market. The study found that stock markets experienced unexpected volatility. Since entering the liberalization phase, South Asian financial markets have shown evidence of both dependency on the global stock market and interregional interconnectedness.

A Kotishwar (2021) in his study examined the volatility in stock markets in SAARC nations. It was found out that volatility of stock markets in India and Bangladesh were highly influenced by the global equity market's volatility. **V Tripathi and R Seth (2016)** analyzed the weak form efficiency in selected SAARC countries. Only the relevant stock markets were considered because of non-availability of sufficient data from other stock exchanges. Tools like Descriptive statistics, Unit Root Test, Variance Ratio Tests were applied in the study. The findings revealed the existence of volatility in stock markets other than India and Bangladesh. The stock markets in India and Bangladesh follows random walk. **Madhu Sehrawat and A K Giri (2016)** examined the effects of financial development on economic growth with reference to SAARC countries. The historical background about SAARC was discussed throughout the study. The study found that while price instability is detrimental to economic progress in the SAARC region, financial development and trade openness support it.

Although a lot of research has been done on identifying volatility in stock markets, identifying the calendar effects like day off the week effect etc. there is less mention about the effect of festivals on the Asian countries.

Data and Methodology :

To analyze the impact of festivals on stock market, the stock returns for 10 years were considered. The festival of Diwali was considered for identifying the effect of festival on stock markets in India and Sri Lanka. The holy month of Ramadan was considered in case of Pakistan and Bangladesh. The stock returns of Bank Index, FMCG Index and CSE ASPI were examined by using 10 working days prior to and 10 working days after Diwali. Data relating to the daily returns were collected from NSE Sectoral Indices mainly Bank Index and FMCG Index. As far as Ramadan is considered, the month of Ramadan in every year for 10 years was considered.

Hypotheses

H_1: The festival of Diwali has no substantial impact on NSE Bank Index returns.

H_2: The festival of Diwali has no substantial impact on NSE FMCG Index returns.

H_3: The festival of Diwali has no effect on the CSE Index returns.

H_4: The month of Ramadan has no influence on the KSE 100 Index returns.

H_5: The month of Ramadan has no impact on the DSE30 Index returns.

The Table-1 depicts the dates of Diwali and Ramadan which occurred during the 2012-2022 period.

Table-1 : Diwali and Ramadan in last Ten years

SL NO	YEAR	DIWALI IN INDIA	DIWALI IN SRILANKA	RAMADAN PAKISTAN	RAMADAN BANGLADESH
1	2012	13 NOVEMBER	13 NOVEMBER	19 JULY- 18 AUGUST	-
2	2013	03 NOVEMBER	02 NOVEMBER	8 JULY- 7 AUGUST	8 JULY- 7 AUGUST
3	2014	23 OCTOBER	22 OCTOBER	28 JUNE-28 JULY	28 JUNE-28 JULY
4	2015	11 NOVEMBER	10 NOVEMBER	17 JUNE- 16 JULY	17 JUNE- 16 JULY
5	2016	30 OCTOBER	29 OCTOBER	6 JUNE- 5 JULY	6 JUNE- 5 JULY
6	2017	19 OCTOBER	18 OCTOBER	27 MAY- 26 JUNE	26 MAY- 24 JUNE
7	2018	7 NOVEMBER	6 NOVEMBER	16 MAY- 15 JUNE	16 MAY- 14 JUNE
8	2019	27 OCTOBER	27 OCTOBER	6 MAY-5 JUNE	5 MAY- 3 JUNE
9	2020	14 NOVEMBER	14 NOVEMBER	24 APRIL-23 MAY	24 APRIL-24 MAY
10	2021	4 NOVEMBER	4 NOVEMBER	13 APRIL- 12 MAY	13 APRIL- 13 MAY
11	2022	-	-	-	2 APRIL- 2 MAY

Source: Secondary Data

Model

The following methods were adopted to analyze the daily returns among selected SAARC countries. Firstly, a simple linear regression model incorporating dummy variables was implemented. Afterwards, the normality and autocorrelation tests were used to evaluate the model's validity. The regression model was adjusted by using a GARCH model to explain the volatility in the residuals.

Tools used in the Study

Daily Returns

Applying the following formula, the daily returns for each index were calculated:

$$R_d = \log\left(\frac{l_d}{l_{d-1}}\right) \times 100 \qquad (1)$$

Where,

"R_d = daily percentage return of index on day d, l_d = the closing value of the index on day

d, l_{d-1} = the closing value of the stock returns on the day d-1.

The daily returns for the index were calculated in the place of daily returns of stocks. This approach yielded more accurate results" (Nageswari and Selvam, 2011).

Regression Model

The OLS approach was used in conjunction with a linear regression model. The independent variable could not be mathematically expressed because it was a moment in time (such as the Diwali festival). Following French (1980), dummy variables were instead utilized and coded as either 0 or 1. The following equation was used :

$$R_d = \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + ... \alpha_n D_n + e_d + \qquad (2)$$

Where, R_d = return of the index on day d, D_{1-n} = dummy variables representing a specific time (day or month), $\alpha_1 - \alpha_n$ = coefficients to be estimated, e_d = random error term for month d.

The GARCH Model

The concept of autoregressive conditional heteroskedasticity (ARCH) means that at a particular time (t), the error depends on the squared error from previous intervals. When the variances of the observations show irregularities and changes over time, the generalized ARCH (GARCH model) is used.

The GARCH model was utilized in the analysis to correct the linear model and accurately explain the volatility clustering. The time series should be stationary and without any autocorrelations. Any violations of the regression standards result in an invalid model. In such cases, a more suitable model takes its place. This approach was followed by testing for autocorrelation in the data and conducting normality tests.

In the case that the data did not follow a normal distribution, it was intended to rectify the model by using a GARCH model. The autocorrelation effect in the residuals would be removed and results would be more accurate with this method.

The natural log of stock prices' initial difference has been used to determine the return on equity. The GARCH model is utilised to investigate the Diwali effect on the Indian stock market. The data was gathered between January 2012 and December 2021. The following is the proposed model for analysis :

$$LnSM\ d = \beta0 + \beta1(LnSMd\text{-}1) + \beta2Dd + e \qquad \textbf{(3)}$$

Where,

"LnSM d = Dependent variable (stock market), *β0* = Constant, *LnSM d-1* = Independent variable (lag term of stock market) D_d = Dummy variable (Diwali, Ramdan) e = Error term" (K Khan, et al. 2017).

Analysis and Findings

The data analysis was carried out by taking the natural log, OLS estimation, heteroskedasticity test followed by a GARCH analysis. Table-2 gives the source from which data were collected from each nation's stock market.

<div align="center">

Table-2 : **Sample and Data Source**

</div>

Country	Index	Data Period	Data Source
India	Bank Index, FMCG Index	Jan.2012-Dec.2021	www.nseindia.com
Sri Lanka	CSE	Jan.2012-Dec.2021	www.investing.com
Pakistan	KSE	Jan.2012-Dec.2021	www.investing.com
Bangladesh	DSE	Jan.2013-Aug.2022	www.investing.com

Source: Secondary Data

Table-3 gives the results of determining number of lags, SC&HQ suggests one lag as optimal as well as all other criteria point to one as the ideal lag. Asghar and Abid (2007) proposed SC as the best criteria for the selection of lag in returns hence one lag is chosen as optimal.

Table-3 : Optimal Lag Selection

Lag	LogL	SC[3] BI	FMCGI	SC[3] PK	SC SL	SC BAN
0	6450.913	-5.217086	-5.898069	-6.077650	-6.439722	-4.084665
1	9281.201	-7.496166*	-8.174758*	-8.319185*	-8.690217*	-6.362395
2	9285.114	-7.486684	-8.164105	-8.307948	-8.680583	-6.415883
3	9286.913	-7.475489	-8.153506	-8.296627	-8.673258	-6.421432
4	9288.557	-7.464170	-8.142161	-8.286815	-8.664636	-6.630623
5	9292.936	-7.455065	-8.134498	-8.281014	-8.653611	-6.663655
6	9298.339	-7.446788	-8.125706	-8.270501	-8.643313	-6.667559*
7	9306.394	-7.440660	-8.120053	-8.259487	-8.632089	-6.656437
8	9307.775	-7.429126	-8.113194	-8.249481	-8.622162	-6.647547

Source: Computed Data

[3]SC = Schwarz info. criterion

Regression analysis was performed using OLS method of estimation. The results are presented in Table-4. According to the study, lagged stock prices have a favorable effect on current period stock prices. At the 5% level, the findings were statistically significant ($p < 0.05$). Additionally, the Diwali festival had a positive coefficient value, which suggested that Diwali has a favorable effect on bank index and CSE index. The analysis done in FMCG revealed that Diwali is insignificant. The holy month of Ramadan had a negative impact on the Karachi Stock Exchange while it had a positive impact on the Dhaka Stock Exchange. The autocorrelation between the residuals were later tested to verify the validity of these results. However, both the D-W statistic and R-squared confirms normality of the data. 'The standard normal distribution suggests having a higher R value with a Durbin value closer to 2' (Sharma & Deo, 2014).

Table-4: OLS Estimation

	R[1]	S. E[2]	T	P[3]
DIWALI BANK INDEX	8.23E-15	3.60E-15	2.288423	0.0222
DIWALI FMCG INDEX	2.56E-16	2.05E-15	0.124882	0.9006
DIWALI CSE INDEX	-5.02E-16	2.45E-16	-2.054084	0.0401
RAMADAN KSE 100 INDEX	-9.02E-16	1.58E-15	0.124882	0.9544
RAMADAN DSE INDEX	1.41E-16	1.67E-17	8.438299	0.0000

Source: Computed Data

[1] R-Squared

[2] Standard Error

[3] t value

[4] Probability

To examine an ARCH effect before running the model, we performed a residual diagnostic test as shown in Figure-1 :

The residuals show that there is volatility in returns.

The heteroscedasticity test revealed that the no ARCH impact null hypothesis was rejected with 99% confidence (P< 0.01). Similar to the last scenario, the variable RESID (-1)2 has a p-value of less than 0.05, indicating that it is significant. This suggests that the present period volatility and the preceding period volatility of residuals or errors are related in selected SAARC nations.

The study was then carried out using the GARCH model with two GARCH terms stated above.

Figure-1 : Residual Diagnostic Test
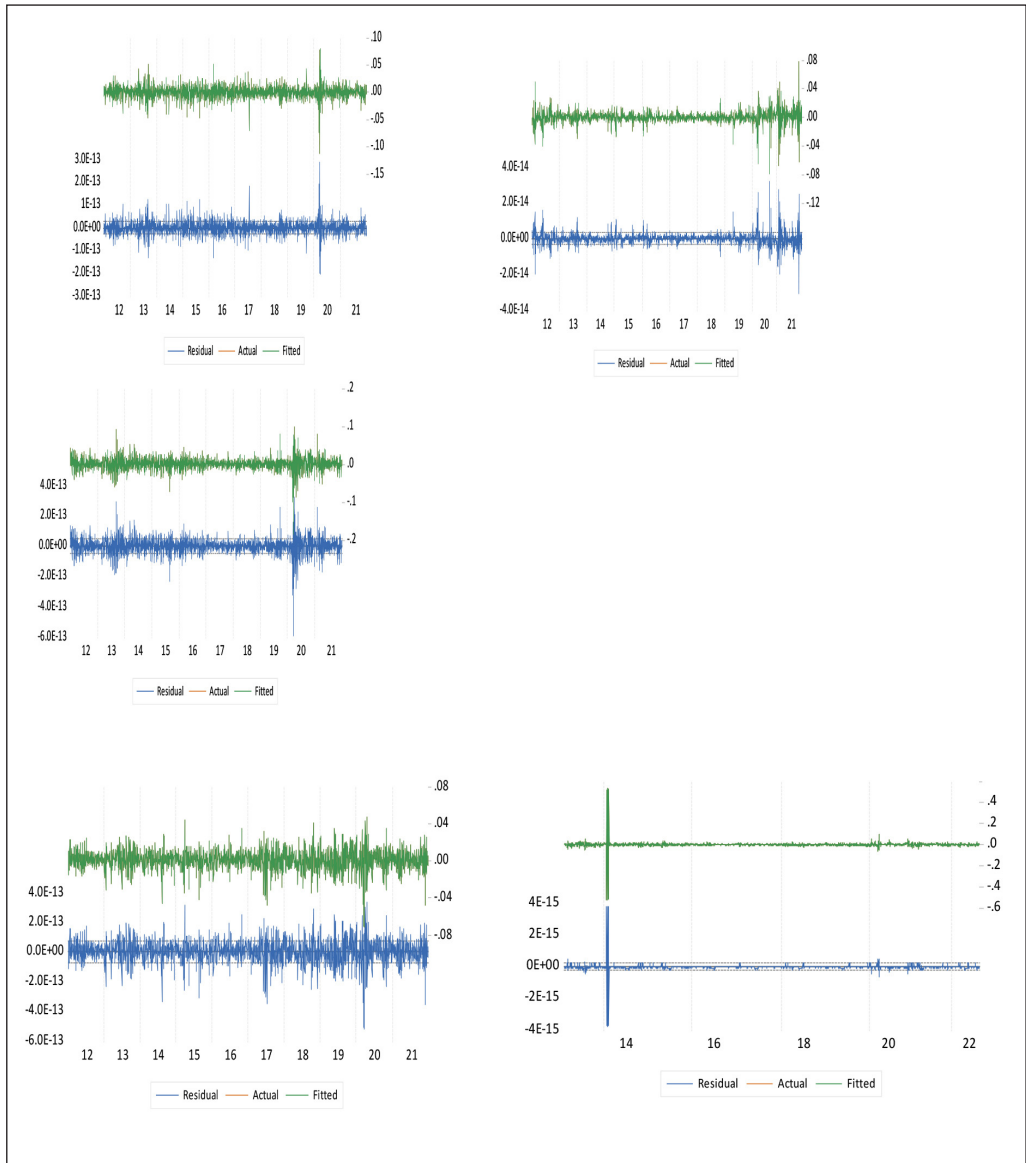
Source : Authors Own Compilation

Table-5 : Heteroskedasticity Test: ARCH

	F	Obs*R^2	Prob. F	Prob. $\tilde{\chi}(1)$
Diwali Bank Index	16.56081	16.46403	0.0000	0.0000
Diwali FMCG Index	145.5571	137.5833	0.0000	0.0000
Diwali CSE Index	208.3588	191.2584	0.0000	0.0000
Ramadan KSE 100 Index	93.12962	89.82365	0.0000	0.0000
Ramadan DSE Index	282.2215	251.1863	0.0000	0.0000

Source : Computed Data

Table-6 : GARCH Model (2010-2021)

V	Coeff.	S.E	Z	Prob.
C	0.000711	0.000253	2.816774	0.0049
RETURN (-1)	0.071188	0.023077	3.084834	0.0020
RETURN (-2)	-0.047163	0.020255	-2.328408	0.0199
DIWALI	0.001769	0.000797	2.220477	0.0264
	Variance Eq.			
C	3.03E-06	6.44E-07	4.714765	0.0000
RESD(-1)^2	0.080992	0.005923	13.67498	0.0000
GAR(-1)	0.907287	0.007381	122.9142	0.0000
R^2	0.005520			
Adj. R^2	0.004313			
S.E. of reg.	0.015389			
Sum squared	0.585435			
Log l	7199.426			
D-W stat	2.029457			

Source : Computed Data

According to analysis the stock market's impact on the current period's stock market is positive for one period after the lag, but somewhat negative for the second. There is a positive impact of Diwali on Bank index as the results were statistically significant (p=0.0264). This can lead to the conclusion that participants attitude during the time of festivity is not passive. The two GARCH terms used in the study demonstrate that the first residual has a favorable effect on stock market while the second residual has a negative impact. Khan K et al (2017) implied that "Durbin-Statistics value close to 2 indicate that the model used is stable and hence the results obtained are quiet reliable results".

Table-7 : GARCH Model (2010-2021)

V	Coeff.	S.E	Z	Prob.
C	0.000551	0.000198	2.786796	0.0053
RETURN(-1)	0.027211	0.021416	1.270624	0.2039
RETURN(-2)	-0.014400	0.020073	-0.717383	0.4731
DIWALI	0.000187	0.000688	0.271894	0.7857
	Variance Eq.			
C	5.90E-06	1.06E-06	5.551531	0.0000
RESD(-1)^2	0.075006	0.007069	10.60991	0.0000
GAR(-1)	0.872395	0.014698	59.35539	0.0000
R^2	-0.001555			
Adj. R^2	-0.002771			
S.E. of reg.	0.010971			
Sum squared	0.297547			
Log l	7862.664			
D-W stat	2.071816			

Source : Computed Data

The results were statistically insignificant (p=0.7857) indicating that Diwali has no positive impact on the FMCG sector. The first residuals show a positive value while the second residual shows a negative value.

Table-8 : GARCH Model (2012-2021)

V	Coeff.	S.E	Z	Prob.
C	1.75E-05	0.000116	0.150583	0.8803
RETURN (-1)	0.210448	0.024790	8.489147	0.0000
RETURN (-2)	0.091667	0.023983	3.822072	0.0001
DIWALI	6.31E-05	0.000429	0.146992	0.8831
	Variance Eq.			
C	1.74E-06	2.11E-07	8.274089	0.0000
RESD(-1)^2	0.182803	0.010196	17.92851	0.0000
GAR(-1)	0.797505	0.012049	66.18722	0.0000
R^2	0.017397			
Adj. R^2	0.016117			
S.E. of reg.	0.008210			
Sum squared	0.155235			
Log l	8513.727			
D-W stat	2.141192			

Source : Computed Data

The results revealed that Diwali has no significant impact on the Colombo Stock market as the results were statistically insignificant (p =0.8831). Thus, even though the value obtained is a positive value, it doesn't ensure a significant impact of festival on the stock market.

Table-9 : GARCH Model (2012-2021)

V	Coeff.	S.E	Z	Prob.
	0.000983	0.000182	5.385245	0.0000
RETURN(-1)	0.190044	0.022774	8.344619	0.0000
RETURN(-2)	-0.036868	0.021676	-1.700886	0.0890
RAMADAN	0.000358	0.000603	0.594499	0.5522
	Variance Eq.			
C	4.76E-06	7.91E-07	6.020476	0.0000
RESD(-1)^2	0.153104	0.014101	10.85747	0.0000
GAR(-1)	0.804884	0.017158	46.91088	0.0000
R^2	0.017006			
Adj. R^2	0.015812			
S.E. of reg.	0.010233			
Sum squared	0.258733			
Log l	81041.88			
D-W stat	2.074567			

Source : Computed Data

Because the findings were statistically insignificant, it was determined that Ramadan had no meaningful impact on KSE (p= 0.5522). Thus, even though the value obtained is a positive value, it doesn't ensure a significant impact of holy month on the stock market.

Table-10 : GARCH Model (2013-2022)

V	Coeff.	S.E	Z	Prob.
C	-0.001105	0.000135	-8.204719	0.0000
RETURN (-1)	-0.080129	0.028029	-2.858820	0.0043
RETURN (-2)	-0.108248	0.026815	-4.036831	0.0001
RAMADAN	0.000799	0.000514	1.553882	0.1202
	Variance Eq.			
C	6.38E-06	8.97E-07	7.107544	0.0000
RESD(-1)^2	1.081436	0.056443	19.15982	0.0000
GAR(-1)	0.435263	0.016231	26.81716	0.0000
R^2	0.063298			
Adj. R^2	0.062056			
S.E. of reg.	0.027697			
Sum squared	1.736025			
Log l	7171.126			
D-W stat	2.535135			

Source: Computed Data

The results determined that Ramadan has no meaningful impact on the Karachi Stock market as the results were statistically insignificant (p= 0.1202). Thus, even though the value obtained is a positive value, it does not guarantee that holy month will have a substantial impact on the stock market.

Conclusion

Research Outcomes

A well-developed financial system can enhance the risk-taking ability of a country and help for long term survival. While analyzing the SAARC countries, festivals do hold an importance as people celebrate each of them for their uniqueness and purpose. Thus, there can be an impact on the investment behavior as well. As some of the festivals are celebrated as a good sign for new beginnings people tend to invest in stock market as a sign of auspiciousness. The effect of Diwali as a festival on different sectors of economy were analyzed mainly in the Banking and FMCG Sector in India and Colombo Stock Exchange in Sri Lanka. The results revealed the influence of Diwali on Banking Sector as positive and the impact on FMCG Sector and CSE was negative.

While we consider the impact of festivals and significant calendar dates on other markets, there was no significant impact of Ramadan on the Pakistan and Bangladesh Stock Market.

Thus, the study helps in identifying the influence of festivals on stock markets and helps in understanding which sectors to concentrate on both for the investors and the regulators.

Implication, Limitation and Future Scope of Research

The study will help the investors to identify the festival effect existing in the Stock markets and invest judiciously. In Asia especially, the festivals do hold significance and thus the impact of the same has to be assessed. It will help the regulators to frame policies for eliminating the chances of insider trading as well. The present study has used only ten years of data which can be extended further. The current study has only considered only 2 festivals in order to identify the festival effect hence, other festivals which can have an impact on the SAARC nations can also be considered.

References

Abinaya, K., & Jerinabi, U. (2016). Impact of Exchange rate volatility on Export growth of SAARC countries. *Imperial journal of interdisciplinary research*, 2.

Adaramola, A. O., & Adekanmbi, K. O. (2020). Day-of-the-week effect in Nigerian stock exchange: adaptive market hypothesis approach. *Investment Management & Financial Innovations*, *17*(1), 97.

Amarnani, N., & Vaidya, P. (2014). Study of calendar anomalies in Indian stock markets. *2014) Perspectives on Financial Markets and Systems-Market Efficiency, Behavioural Finance and Financial Inclusion,(Ahmedabad, Institute of Management, Nirma University).*

Anuradha, N. and Rajendran, G., (2014), Does month matter? Calendar effect in foreign institutional investment. *Journal of Business Studies Quarterly*, Vol.6, No.1, pp.133-155.

Aravind, M., & Ramya, K. (2015). Relationship between eva (economic value added) and share prices of select companies in bse-sensex-an empirical study. *Journal of Commerce and Accounting Research*, 4(3), 19-26.

Basher, S.A. and Sadorsky, P. (2006), "Day-of-the-week effects in emerging stock markets", *Applied Economics Letters*, Vol. 13 No. 10, pp. 621-628.

Bhatia, P., & Gupta, P. (2020). Sub-prime crisis or COVID-19: A comparative analysis of volatility in Indian banking sectoral indices. *FIIB Business Review*, 9(4), 286-299.

Cao, N. D., Trinh, V. Q., & Nguyen, T. Q. (2021). Is the era of the day-of-the-week anomaly over?. *International Journal of Banking, Accounting and Finance*, 12(2), 118-140.

Husain, F. (1998). A seasonality in the Pakistani equity market: The Ramadhan effect. *The Pakistan Development Review*, 77-81.

Jindal, N. (2019). Calendar Anomalies in Indian Stock Market: An Empirical Analysis. *IUP Journal of Financial Risk Management*, 16(4).

Khan, K., Nasir, M. A., & Rossi, M. (2017). The calendar anomalies on performance and volatility of stock market: the effects of Ramadan on Karachi Stock Exchange. *Global Business and Economics Review*, 19(1), 54-69.

Kotishwar, A. (2021). Global Markets Effect on Stock Market Volatility with Reference to Saarc Nations–a Study. *A Kotishwar, Global Markets Effect on Stock Market Volatility With Reference to SAARC Nations–A Study, International Journal of Management*, 11(12), 2020.

Kumar, R., & Dhankar, R. S. (2009). Asymmetric volatility and cross correlations in stock returns under risk and uncertainty. *Vikalpa*, 34(4), 25-36.

Mallikarjuna, M., & Rao, R. P. (2017). Volatility behaviour in selected sectoral indices of Indian stock markets. *Asian Journal of Research in Banking and Finance*, 7(2), 23-34.

Sehrawat, M., & Giri, A. K. (2016). The impact of financial development on economic growth: Evidence from SAARC countries. *International Journal of Emerging Markets*.

Seyyed, F. J., Abraham, A., & Al-Hajji, M. (2005). Seasonality in stock returns and volatility: The Ramadan effect. *Research in International Business and Finance*, *19*(3), 374-383.

Shanmugasundram, G., & Benedict, D. J. (2013). Volatility of the Indian sectoral indices– A study with reference to National Stock Exchange. *International Journal of Marketing, Financial Services & Management Research*, *2*(8), 1-11.

Sharma, A & Deo, V. (2014). Seasonal Anomalies in Indian Stock Exchange. *International Research Journal of Finance and Economics*, (118), 74-101.

Tadepalli, M. S., & Jain, R. K. (2018). Persistence of calendar anomalies: insights and perspectives from literature. *American Journal of Business*.

Tripathi, V., & Seth, R. (2016). Market Efficiency, Inter-linkages and volatility transmission in stock markets of selected SAARC countries. *South Asian Journal of Management*, *23*(4), 149.

Rural Consumer Concern and Challenges in Digital Transformation

P. Yadaiah and Debandra Nath Dash

Abstract : *The present business era consist of digital transformation and digital payments. The farmers and illiterates in rural areas are suffering a lot to adopt modern payment systems where there is a shortage of hot cash in market and most of the payment is done through digital wallets. The crucial process's that use digital technologies to create new business process, culture and customer experiences to integrate with modernization of the market dynamics. Digitalization is the application of digital technologies to develop existing business process. In other words digitalization is the integrations of digital tools and technologies, digital portals in to various aspects of the organization vision, mission, objectives and goals tasks ect, to achieve, improve and develop in efficiency, collaboration, successful leadership. Digital transformation happens only when the barriers are rectified and smoothened for further functioning of the digital transformation by making digital tools, applications working simpler and more efficient for business and customer development thus affecting the world digital economy. It probably includes implementing software systems, digital tools, digital portals, data analytics and digital strategies. Digitalization slowed by the elements like lack of agility and non flexibility, on collaboration in the digital ecosystem, on personalization and customization, geographical barriers and lack of security and privacy. Digital transactions are dominating more than physical cash transaction in the market. The present paper discussing about rural people problems, issues and challenges with reference to digital payments and concern possible solutions to perform user friendly operations.*

Keywords : Technology, Innovation, Digital Payment, Digital Operations.

Dr.P.Yadaiah, Associate Professor, CSI Institute of PG Studies, Secunderabad.

Dr.Debendra Nath Dash, Member Secretary (I/C) & Assistant Director, MGNCRE, MoE, GoI, Hyderabad.

Introduction

Indian economy is one of the fast growing economies of the world. Despite of global turbulences of economic conditions, Indian economy has been focusing on development. In the recent past, there are significant developments that have taken place in the Indian financial system, which has led to huge transformations, trends and changes in the business dynamics. Though the government of India has been focusing on the digital transactions initiatives since last few years, the actual impact of digital payments has taken place in India in significant manner post the demonetization period. India economy has the intrinsic structure of rural and urban economic developments. Majority of the Indian economy depends on rural economy, and only when the digital payment methods become an integral part of rural economic development, the digital initiatives could be considered as successful. In the recent past, digital payments has gained momentum in the country, both in the case of rural and also the urban segments. India has predominantly been a cash driven economy and the culturally the deep rooted trends of cash based purchases has widely been the economic culture. In wake of the government initiatives towards transformation towards digital economy, and many private companies emerging in the space of digital transaction solutions like the EW allets, Mobile app solutions (UPIs), payment bank licenses issued by RBI, it is imperative that the market is gearing up towards more transparent and compliance based system, and of digital trends. For successful implementation of digital transactions and digital banking system, certain key processes that are very essential are net/mobile banking, more of ecommerce presence in rural segments, digital transaction solutions like the PoS solutions usage in merchandise, usage of plastic currency etc. But the crux factor that has to be taken in to consideration is about how effectively the system is adaptable in the rural segments of the country, considering the opportunities and challenges according to the existing scenario. In this research paper, the emphasis is on gaining insights in to the opportunities and challenges that are envisaged in the digital payments system penetration in to rural segments.

Urban-Rural Divide to exist in India's Digital Payments :

1.   **Lack of Infrastructure –** Lack of sufficient digital payment infrastructure like ATMs, POS Terminals at all retail, grocery or small stores, lack of even micro ATMs, digital kiosks, etc. limited digital access points like Common Service centers (CSCs), etc. is one of the main reasons why people in rural India still rely mainly on cash for most of their transactions.

According to the latest report, rural India hosts only about 40,000 odd ATMs where 62% of the Indian population resides!
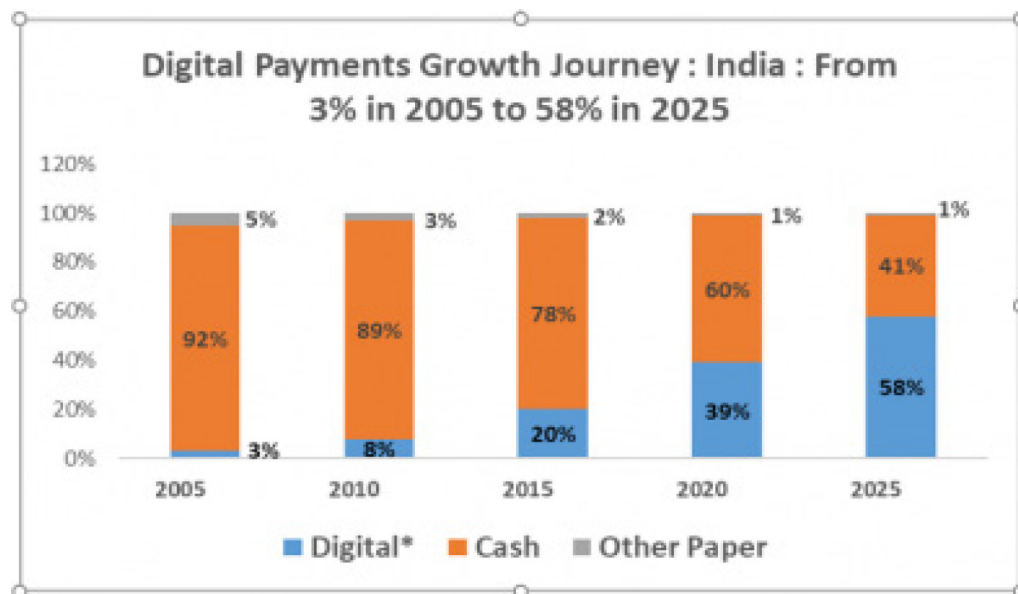
Source: ABP News Bureau , 12-2023

Lack of Internet & Smart Phone Accessibility – In addition to lack of digital payment infrastructure, another vital reason for low digital payment adoption in rural India is poor penetration of internet and smart phones in rural India while most of the digital payment options available today mainly rely on good internet connectivity and/or use of a smart phone.

Rural Internet usage has gained in recent months as per the new government reports, still, there's a big gap in the internet penetration between rural and urban India.

Limited Digital Literacy – Limited digital literacy and awareness either about the various digital payment options available or about how to use them securely is another top reason for low digital payment adoption among the rural population.

Literature :

Lambert Kofi Osei, Yuliya Cherkasova and Kofi Minta (2023) conducted a study primarily to review the intellectual framework of the digital banking

transformation. The authors' findings conclude that countries including UK, USA, Germany and China have conducted the largest number of studies regarding the issue of digital banking transformation.

Shruti Sharma and Himani Upreti (2022) remark that all organizations need to adapt to the changing environment in order to survive in this cut throat competition. They should adopt latest tools of artificial intelligence and automation for not only their survival but also their future growth. The organizations in the financial sector are no exceptions and, therefore, they should also keep pace with the changing technology in order to compete effectively, economically and efficiently in today's competitive era.

Inese Mavlutova, Aivars Spilbergsetal (2020), observe that the financial sector is changing due to the advent of novel, new technologies especially digital modes of payments. As a result, the financial sector is becoming sustainable due to increasing efficiency in its operations and widening the customers base by addition of all in the formal banking sector. The study highlights two aspects firstly the trends of changes in financial sector due to adoption of technology and the increased sustainability of financial institutions due to the new technology. Secondly, it focuses on the correlation between the increase of digital payments and its impact on the operational efficiency and financial inclusion of the financial institution's in Baltic States vis a vis various countries in Europe.

Dr.S.Amudhan, Dr. Sayantani Banerjee, Dr.J.Poornima (2022), observe that theorganization, data, software and technology are the four major players involved in digital transformation. In the context of India, its banking system plays a crucial role as trustees of public money and its parking in the relevant profitable business. In India and similarly placed third world countries the banks play an important role in the public finance domain as other financial institutions are still evolving. Therefore, it is vital that the banks' stability be ensured. The article concluded that adoption of digital banking services has a significant impact on the rural customers.

Renu Singh and Garima Malit (2019) observe that the banking services have improved steadily with the adoption of digitalization in the country. This has enhanced the customer services and actually provided them all products and

services at their doorsteps using a laptop or a smart phone. Though, the Indian banking industry has adopted the latest technology for providing best services to the consumers but there has been a substantial difference between the rural and urban customers. The urban banking customers, due to various reasons, have adopted the technology well, whereas the rural ones still have a number of issues in the usage of the technology for conducting financial transactions. The article evaluates the various openings of growth due to the increased rural banking and also the pitfalls associated with the same. It also highlights the significance of increasing financial literacy in today's time.

Objectives :

1. To Study rural consumer awareness factors with reference to digital payments

2. To identify various practical problems faced by rural consumers in this regard.

3. To propose framework to face this challenges by rural consumers.

4. To suggest banks and financial agencies to guide in this regard.

Hypothesis :

H_{01} : There is no significance association between Gender and digital operation literacy among rural users in Rural Yadadri.

H_{02} : There is no significance relation between consumer education qualification and media impact on adopting digital payments.

Population :

The rural consumers in Yadadri Bhuvanagiri district of Telangana State, especially people form Ramannapet, Narayanpur and Valigonda mandal's are considered as survey population.

Sample :

A Sample of 100 rural consumer's opinion was considered from above population by random sampling method with the help of structured questionnaire containing various digital payment challenges on likert scale basis.

Analysis:

Table-1 : Gender wise Frequencies of respondents			
	Frequency	Percent	Cumulative Percent
Male	60	60.0	60.0
Female	40	40.0	100.0
Total	100	100.0	

Inference: The Gender wise data indicating that, 60 percent of male people and 40 percentages of female people responded for the study.

Table-2 : Age wise Frequencies of respondents			
	Frequency	Percent	Cumulative Percent
18-25	23	23.0	23.0
26-35	42	42.0	65.0
36-45	22	22.0	87.0
46-55	10	10.0	97.0
Above 55	3	3.0	100.0
Total	100	100.0	

Inference : The Age of the respondents reflecting that, major share of 42 % are belongs to 26-35 years of age and 23 % are youth belongs to 18-25 years followed by 22% are 36-45 years of age people, responded for the study.

Factor Analysis (Challenges)

Table-3 : KMO and Bartlett's Test values of tested variables		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.914
Bartlett's Test of Sphericity	Approx. Chi-Square	2776.739
	df	55
	Sig.	.000

Before beginning factor analysis, the researcher verified the data's eligibility by using the KMO-test, Bartlett's which is a measure of sampling adequacy. 0.681 >0.6 is the KMO value. The Bartlett's Test of Sphericity is a measure of a set of variables' multivariate normality (Sig. value is less than 0.05 indicates multivariate normal and acceptable for factor analysis).

Table-4 : Total Variance values of tested variables						
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.828	89.345	89.345	9.828	79.345	789.345
2	.728	6.617	95.962		10.0	**89.34**
3	.160	.977	97.418			
4	.107	.970	98.388			
5	.053	.482	98.870			
6	.041	.369	99.239			
7	.026	.241	99.479			
8	.025	.229	99.708			
9	.014	.129	99.837			
10	.012	.111	99.948			
11	.006	.052	100.000			
Extraction Method: Principal Component Analysis.						

The variance matrix shows 89 percent (65% is statistically valid) variation on the investigated variable, implying that 11 percent of other variables are impacting the digital payment challenges.

Scree Plot
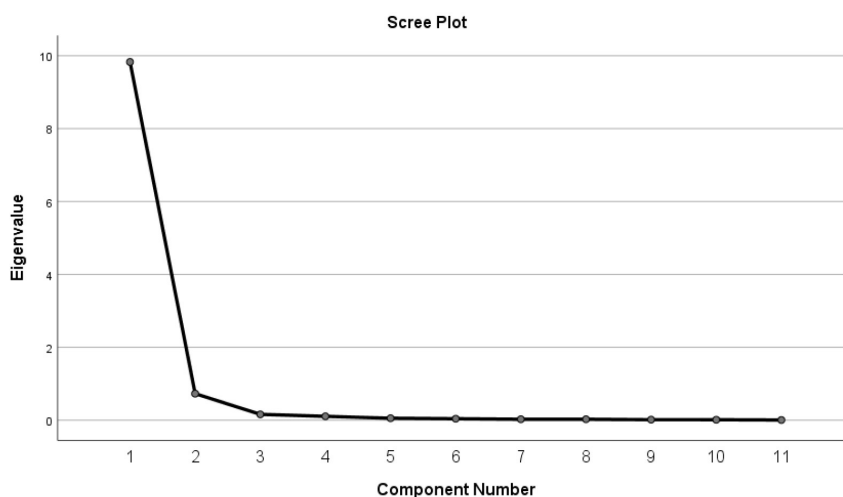
Table-5 : Rotated Component values of tested variables

Component	Component Matrix[a]	
	1	2
Dig. Access	.632	.532
D.F.Mgmt.	.277	.677
Dig ref source	.689	**.889**
Media impact	.765	.265
Dig. Privacy	.966	.366
Other.Use a/c	**.951**	-.751
Dig. Network fail	-.170	.670
Hacker impact	.454	.254
Bal.Enq stat	.820	.120
Dig. Channel	.245	.545
Dig.F. Operation	.725	-.325
Extraction Method: Principal Component Analysis.		
a. 1 Components extracted.		

The Above component matrix values indicating that, out of 11 tested factors only 2 factors are filtered based on Eigen values. The 2 factors are treated as highly influencing factors while adopting digital payment system in rural consumers. Those factors are most of the users in rural areas afraid about the use digital financial services because other people may be able to access my account i.e hacking and cyber cheatings may happen in the digital payment process. The second influencing factor is most of the relatives and friends are forcing to use easy digital payment systems for their various daily payment activities provoke them to use such digital transaction system.

H_{01} : There is no significance association between Gender and digital operation literacy among rural users in Rural Yadadri.

Gender * Dig.privacyCrosstabulation							
			Dig.privacy				Total
Gender			S.Disagree	Disagree	N	Agree	S.Agree	
	Male	Count	13	11	12	24	0	60
		% within Gender	21.7%	18.3%	20.0%	40.0%	0.0%	100.0%
	Female	Count	0	0	0	14	26	40
		% within Gender	0.0%	0.0%	0.0%	35.0%	65.0%	100.0%
Total		Count	13	11	12	38	26	100
		% within Gender	13.0%	11.0%	12.0%	38.0%	26.0%	100.0%

The above cross tab values indicating that, Female consumers are strongly agreed that , there is a gap in digital operation literacy compare with male.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	63.158[a]	4	**.000**
Likelihood Ratio	84.586	4	.000
Linear-by-Linear Association	46.798	1	.000
N of Valid Cases	100		
a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 4.40.			

Inference : The above chi-square table values reflecting that, sig. value (<0.005) reveals, **Reject** the null hypothesis, i.e the gender wise digital literacy vary from male to female. The males are somehow practising and try to utilizing digital mode of payments and facing some problems compare with Females.

H_{02} : There is no significance relation between consumer education qualification and media impact on adopting digital payments.

Education * Media impact							
		Media impact					
Education		S.Disagree	Disagree	N	Agree	S.Agree	Total
UptoXth	Count	13	12	12	22	0	59
	% within Education	22.0%	20.3%	20.3%	37.3%	0.0%	100.0%
Inter	Count	0	0	0	17	2	19
	% within Education	0.0%	0.0%	0.0%	89.5%	10.5%	100.0%
UG	Count	0	0	0	0	15	15
	% within Education	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
PG	Count	0	0	0	0	7	7
	% within Education	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Total	Count	13	12	12	39	24	100
	% within Education	13.0%	12.0%	12.0%	39.0%	24.0%	100.0%

The above cross tab values indicating that, the media impact has no such impact on usage of digital payments among rural consumers.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	115.291[a]	12	**.074**
Likelihood Ratio	124.799	12	.000
Linear-by-Linear Association	47.861	1	.000
N of Valid Cases	100		
a. 13 cells (65.0%) have expected count less than 5. The minimum expected count is .84.			

Inference : The above chi-square table values reflecting that, sig. value (>0.005) reveals, **Accept** the null hypothesis, i.e the education qualification of rural consumers are not at all influencing by media advertisements regarding digital payments usage. This is may be due to fear of loss or theft of money from their digital wallet.

Discussion of Results :

As part of 'Paperless, Cashless and Faceless' services across the country especially in rural and remote areas, various modes of digital payments are being provided like Banking Cards, Mobile Wallets, Internet Banking, Mobile Banking, Bank Pre-paid Cards, Micro ATMs, Point of Sale machines (PoS), Aadhaar Enabled Payment System (AEPS) and Unstructured Supplementary Service Data (USSD).

Challenges

Despite gaining significant popularity and adoption, several challenges must be addressed to ensure sustained growth and success of digital payments. Some of the significant challenges are:

Security Concerns

One of the biggest challenges is security. With the increasing volume of digital transactions, there is a higher risk of cyber-attacks, fraud, and identity theft. The providers must ensure robust security measures, such as multi-factor authentication, encryption, and fraud detection systems, to prevent such incidents.

Lack of Trust

Many consumers still prefer cash transactions due to concerns about the security of digital payments and the possibility of technical failures. Building trust among consumers is crucial for its success.

Limited digital Infrastructure

Despite the significant expansion of digital infrastructure in India, many rural areas still lack adequate digital infrastructure such as internet connectivity and smartphones. This makes it difficult for people in those areas to access and use such payments.

Interoperability

With multiple providers in the market, there is a need for interoperability between different platforms to ensure seamless transactions between various providers. This is especially important for small merchants who may need more resources to accept payments from multiple providers.

Regulatory Challenges

This industry is highly regulated, with different regulations and compliance requirements from various regulatory bodies. This can make it challenging for digital payment providers to operate efficiently and effectively.

In conclusion, digital payments have immense potential, but several challenges need to be addressed to ensure their sustained growth and success. Addressing these challenges will require collaboration between stakeholders, including governments, financial institutions, and technology companies, to create a secure, convenient, and inclusive ecosystem.

Conclusion

The respondents in Yadadri Bhuvanagiri rural lives are centred around being paid in cash and conducting their own purchasing with cash only. It is the traditional way that business is done in many areas and domains. In rural telangana there is a perception that having every transaction be tracked could invite trouble via more scrutiny or higher taxes. Cash doesn't leave a digital footprint which is what some consumers prefer. The mindset of rural consumers like Cash is an immediate transfer of value. Digital payments, despite recent developments, still involve more steps than exchange of cash. If you can count it in your hand - it's real - is the mindset of some consumers.

The respondents have a misconception regarding Cash is accepted everywhere but digital payments are not. Not yet anyway. It will become much harder for people to avoid it in the future with the economic goals set by the government. Respondents in this region may have limited experience with the online world through lack of exposure and understanding of how it works. It's a big jump into the unknown with your hard earned money, especially if you have no one to explain it to you.

References :

- Dr. Ravi CS. "Digital payments system and rural India : A review of transaction to cashless economy", International Journal of Commerce and Management Research, 2017.

- Dr.S.Amudhan , Dr. Sayantani Banerjee , Dr.J.Poornima (2022) "Impact of Digital Transformation Of Banking Sector In Rural Areas" Journal of Positive School Psychology " Vol.6 , No.2.

- Inese & Aivars, K. (2020). Impact of acquisitions on financial performance of selected softwarecompanies in India. *International Journal of Innovative Technology and Exploring Engineering*, *8*(9), 2415-2419.

- Jain M., 2016. Three charts show how mobile wallets are exploding in India. [Online] Available at: https://scroll.in/article/809228/three-charts-show-howmobile-wallets-are-exploding-in-india-but-plasticcards-arestill-ahead.

- Osei, L. K., Cherkasova, Y., & Minta, K. (2023). Unblocking the full potential of digital transformation in banking : a bibliometric review and emerging trend. Future Business Journal, 9, article number 30.

- Renu Singh & Garima Malik, 2019. "Impact of Digitalization on Indian Rural Banking Customer : With Reference to Payment Systems," Emerging Economy Studies, International Management Institute, vol. 5(1), pages 31-41, May.

- Shruthi Sharma & Himani, MS (2022). Technological relationship between capital structure and financial efficiency in ACC Ltd. *International Journal of Innovative Technology and Exploring Engineering*, *8*(11), 2009-2013.

- Sujith TS, Julie CD. "Opportunities and Challenges of E-Payment System in India", International Journal of Scientific Research and Management (IJSRM), 2017.

A Bibliometric Analysis on Smart Mobility in Urban Areas : A Metro Urban Transit

Sandeep Kumar Goel, Deepali jain, Mamta,
Poonam Mittal and Mohammed Kamalun Nabi

Abstract : *Rail Based Metro Urban Transit (MRT) is one of the key components of Urban transport strategy for big cities in India.Comfortable mode of Travelling Metro Urban mobility in terms of various transportation initiatives is becoming more relevant in the setting of escalating globalization and global rivalry. As a result, it becomes imperative to use its measurements to gauge the volume and quality of academic work that has been completed. Consequently, the primary goal of this research is to assess the work on the Metro Urban Transit through a Scientific literature review, analyse the Global trend of research on Mass Rapid Transit and Identifies the best journals to encompass the literature. Bibliometric methodology used in this to analyse and evaluate literature review . Through Bibliometric analysis, can analyse Global Trend by Three-Field Plot, Keywords analysis, Countries Collaboration, yearly trends, and the Identification of the most-cited countries. Visualization techniques, including citation networks and co-authorship maps, are prepared to represent complex relationships within the scholarly literature. A bibliometric examination of research papers in the Web of Science and Scopus database reveals that the area has expanded over the past 36 years, producing hundreds of research articles. Despite this, there is no comprehensive overview on this topic as a whole in the literature. 184 documents generated from different 116 sources, 428 Authors contributed, rising from 1 document in 1987 to 11 Articles in 2023*

Dr.Sandeep Kumar Goel, Associate Professor, Department of Commerce, Acharya Narendra Dev College (University of Delhi), sandeepgoel@andc.du.ac.in, 9811880884

Prof. Deepali Jain, Professor, Department of Commerce, Dr.Bhim Rao Ambedkar College (University of Delhi), jaindeepali003@gmail.com, 9811949193.

Prof.Mamta, Professor, Department of Commerce, Dr.Bhim Rao Ambedkar College, University of Delhi, mamtayadav1966@gmail.com, 9871114355

Prof.Poonam Mittal. Professor, Department of Commerce, Dr.Bhim Rao Ambedkar College, mittalpoonam7@gmail.com, 9811077565.

Prof.Mohammed Kamalun Nabi, Professor, Department of Commerce &Business Studies, Faculty of Social Sciences, Jamia Millia Islamia, mnabi@jmi.ac.in, 989940435

with highest in 2021 with 18 Articles. Annual Growth rate 6.89%, An average citation per doc 15.85%, The largest collaboration found between USA and China, the most affiliated university who published the most articles on this topic belongs to USA "University of Minnesota twin cities", The most cited Countries are USA, China and Italy. Three- Field Plot is also used which shows that USA has more author's affiliation and highest connection with author Cao X, with theme "Transit" followed by China, Australia, Netherland, UK. Railroads, Transportation, Urban Transportation, and Subways are the trending topics and the topics which need more attention are Sustainable development, Energy Conservative, Computer Simulation etc. The highest number of documents was published in the Journal "Transportation Research Record" and the highest occurred term is "Metro System".

Keywords : Metro Urban, Sustainable Development, Transit, Urban Metro.

1. Introduction

As a consequence of India's rapid economic growth, urban areas have emerged as significant contributors to the nation's Gross Domestic Product (GDP), with a growing share. This has prompted a notable surge in migration from rural to urban regions. However, the expanding urbanization and haphazard, unregulated development have placed significant strain on urban infrastructure, particularly the transportation system. Furthermore, the increase in personal income levels has led to a higher ownership of private vehicles, exacerbating the issue of traffic congestion (Aditi, 2019). The development of transit systems in India is a result of historical, economic, and urbanization factors that have evolved, Before India gained independence in 1947, transportation was primarily through railways, roadways, and waterways. After independence, there was a significant focus on nation-building and economic development. The expansion of the railway network continued, and the Indian government played a central role in establishing and maintaining the country's transportation infrastructure. As India's population grew and urbanized, cities faced challenges related to congestion, pollution, and the need for an efficient transportation system, The integration of different modes of transportation, such as the coordination between metro systems, suburban railways, buses, and other transit options, has improved connectivity within cities. City planners in England during the 19th century were the first to acknowledge the need for a consistent, extensive, and efficient transportation system in growing cities. After gaining

independence, it took us over 37 years to establish our initial metro system, the Kolkata Metro Railway System. Although similar Mass Rapid Transit Systems (MRTS) projects were initiated in Mumbai and Chennai, they fell short in addressing the pressing urban transportation demands. One contemporary MRTS initiative, as proposed by the Delhi Metro Rail Corporation (DMRC), is the Delhi Metro System (Aditi, 2019). The most effective strategy for alleviating traffic congestion likely involves the widespread adoption of mass transit systems. The increase in the

Transportation systems worldwide grapple with a host of challenges, including traffic congestion, declining quality of life, accessibility issues, rising costs, emissions that harm the environment, increased reliance on private vehicles, and at times, a lack of seamless connectivity within and between different modes of transport. Smart mobility is viewed as a potential solution to address some of these issues by providing comprehensive and intelligent mobility services, reducing transportation expenses, promoting safety, and tackling pollution and traffic congestion. In this context, urban metro systems represent a practical and sustainable choice. Smart mobility aims to enhance the quality of life and bolster the sustainability of urban areas. This report aims to provide a comprehensive overview of research in the field of Urban Metro Transit by performing a bibliometric analysis of 184 articles from the Web of Science Core Collection and Scopus databases. The review not only identifies the major research themes, research trends, and international collaborations but also underscores the existing gaps in the literature. Furthermore, the report outlines a research agenda to guide future investigations and offers an integrated conceptual framework.

Moreover, the literature review aids in the identification and addressing of the research questions as listed below.

RQ1: What is the current pattern in the Publications and the Countries Collaboration?

RQ2: What are the influential Journals, Highest occurred Key-words.?

RQ3: The research gaps and Trending Topics?

In this research, a total of 184 journal articles were subject to examination within a vast bibliometric dataset. The initial step involved searching for articles using keywords such as "Metro Transit," "Metro Urban Transit," "Role of Metro Transit," and "Role of Metro Urban Transit" in the Scopus database, resulting in

the retrieval of 257 research papers for bibliometric analysis utilizing Scientometric methodology. After narrowing down the selection to only English-language, Conference and Article papers, 152 papers remained from the original 173 in the Scopus database. Similarly, when applying the same language restriction to the Web of Science (WoS) database, 105 papers were retained. Further, 73 duplicated documents were removed after merging data from both databases using R Studio software to obtain the results from Biblioshiny, so left with 184 final documents.

The paper is organized as follows: Part 1 contains the introduction, section 2 covers the literature review, section 3 outlines the methodology, section 4 presents the results, and section 5 concludes the study. Section 6 addresses the limitations, and it ends with a references section.

2. Literature Review

One of the central goals of urban policies is to attain sustainable development. Given that transportation plays a pivotal role in urban life, numerous efforts have been undertaken to promote the adoption of sustainable transportation options, notably public transit. Nevertheless, these efforts have not consistently yielded successful outcomes, as highlighted by (Jain & Singh, 2019). Furthermore, the concept of Transit Oriented Development (TOD) primarily revolves around the integration of transportation infrastructure and land use planning, with a focus on holistic planning. This approach serves as an effective strategy to encourage walking and the utilization of public transit, curbing urban sprawl, and fostering the creation of more vibrant, sustainable communities. (Calthrope, 1993) emphasized that Transit Oriented Development (TOD) places a strong emphasis on designing communities that prioritize pedestrian-oriented mobility and encourage the use of public transportation. Meanwhile, defined TOD as a compact, mixed-use community Centred around a transit station intentionally designed to reduce car usage and promote mass transit. (Salvensen, 1996) defined it as a development within a specified geographical area around a transit station, featuring a diverse range of land uses and multiple landowners. It's worth noting that contemporary urban planning research is increasingly shifting its focus towards smart mobility, as indicated by (Yigitcanlar & Kamruzzaman, 2019). Since its inception, the concept of smart mobility has brought innovation to the realms of urban and transportation planning. As this approach gains more recognition and technological feasibility, it has also begun to influence policy-making, as observed in studies by (Tomaszewska & Florea, 2018; Yigitcanlar & Kamruzzaman, 2019).

Traditionally, academic research has primarily focused on sustainable modes of mobility. However, digital platforms have shifted their focus away from sustainable forms of mobility, now emphasizing active forms of mobility, as noted by (Aletà et al., 2017). The nature of future mobility is undergoing a significant transformation due to the rapid advancements and innovations in the transportation and related sectors. The recent advancements in the transportation sector have given a significant boost to mobility solutions in urban and smart cities, as noted by (Prajeesh & Pillai, 2022). Typically, discussions about enhancing mobility predominantly revolve around addressing traffic issues. However, in the context of smart cities, mobility challenges extend beyond mere traffic congestion. The expansion of cities, especially in areas with low population density, has led to an urban structure characterized by multiple centres (polycentric). This structure is marked by decentralized, scattered, and fragmented transportation links, often resulting in a greater reliance on private vehicles due to longer distances and limited competition in public transportation, as pointed out by (Monzón, 2020). The ability to move efficiently within the growing cities of today remains a critical concern. The movement of people and goods within a city is fundamental to economic growth and the overall quality of daily life. Consequently, the concept of mobility encompasses far more than merely addressing traffic and transportation issues. In the present day, the mobility system has evolved into a sophisticated and intelligent network (Jamme et al., 2019). A vast repository of data and knowledge is available concerning autonomous vehicles, connected cars, mobility as a service, and intelligent traffic management. This data is harnessed, organized, and subjected to analysis in order to make predictions about the future.

Connected vehicles and their essential technological foundations are comprehensively discussed, highlighting how connected mobility and these vehicles are poised to shape forthcoming trends in the field of transportation, as elucidated by (Habib & Lynn, 2020). Electric vehicles (EVs) are set to play a significant role in future mobility, aligning with the aforementioned trends. The global transportation system is projected to increasingly incorporate electric vehicles, as emphasized by (Sanchez-Iborra et al., 2020). Electric vehicles are gaining prominence, particularly in response to the current concerns surrounding global warming. There is a significant push to engage in research and development across various key domains, including battery technology, battery management systems (BMS), and communication infrastructure tailored for electric vehicles (EVs). This encompasses a wide range of aspects, from central management systems (CMS) to mobile applications and electric vehicle supply

equipment (EVSE). Many startups, original equipment manufacturers (OEMs), and industry giants are making substantial investments in these sectors, driven by remarkable growth and progress in the field.

Metro urban transit in India refers to a contemporary, rapid transit system designed to meet the growing transportation demands of India's densely populated cities. Metro systems have been established in major Indian cities like Delhi, Mumbai, Kolkata, Chennai, and others to combat the challenges of traffic congestion, air pollution, and limited urban space. These systems boast dedicated tracks, high-frequency train services, and strategically placed stations, providing a reliable and eco-friendly means of transportation. They play a pivotal role in sustainability by significantly reducing the environmental footprint of individual car travel, thereby contributing to cleaner air and decreased greenhouse gas emissions. Their importance for research lies in their potential to mitigate urban mobility challenges and foster sustainable development. By examining the impact of metro systems on urban sustainability, researchers can delve into topics such as reduced traffic congestion, energy efficiency, improved air quality, and their role in reshaping urban landscapes. Understanding these factors can aid policymakers, urban planners, and stakeholders in enhancing transportation infrastructure, urban development, and environmental conservation, making metro urban transit in India a crucial subject for research in sustainable urban planning and development.

Research Gaps and Research Novelty

There is a notable scarcity of in-depth microlevel literature assessments on the topic of "Metro Urban Transit," and no comprehensive scientific study has been encountered thus far. While there have been a limited number of prior research and reviews, they have primarily employed manual review methods and have been narrowly focused, lacking a broader perspective. Consequently, a significant research gap exists because there is a lack of comprehensive reviews on studies within this field.

This study stands out from prior research in several key ways:

1. It undertakes a comprehensive literature review on the subject of metro urban transit.

2. Instead of relying on conventional literature review methods, this paper employs techniques such as Countries Collaboration, Three-Field Plot, Keywords analysis, yearly trends, and the Identification of the most-cited countries.

3. It also identifies the best Journals to encompass the literature.

To address the gaps in existing knowledge, this study will analyse the constraints of the current body of research.

A critical research gap in urban metro transit that has been relatively underexplored until now is the intersection of metro systems with emerging technologies and their broader societal implications. While previous research has primarily focused on the technical and operational aspects of metro transit, there is an urgent need to investigate the impact of disruptive technologies such as autonomous vehicles, AI, IoT on metro transit systems. Moreover, the research should consider the broader societal implications, including questions related to equity, privacy, and access. How do these technologies affect different demographic groups, and how can metro systems ensure inclusivity in their adoption? Additionally, researchers should explore the environmental impact of integrating emerging technologies, examining how they can either reduce or exacerbate carbon footprints. Investigating this uncharted territory at the intersection of metro transit and emerging technologies is crucial for the future of urban mobility. It would not only facilitate the development of smart and adaptive metro systems but also ensure that they align with the evolving needs and values of urban populations in an increasingly interconnected and technology-driven world.

Objectives of the Study

1.   To analyse the Global Trend.

2.   To see Countries' collaboration, Three-Field Plot and Key-word analysis of Authors.

3.   To find the Most cited Countries and Top Journals.

4. Methodology

Bibliometric methodology is a systematic approach used in research to analyse and evaluate scholarly publications, primarily focusing on their quantitative aspects. This method involves the collection, cleaning, and analysis of large datasets of academic literature, often sourced from databases like Web of Science, Scopus, and Google Scholar. Through bibliometric analysis, researchers can gain insights into various aspects of academic research, such as publication trends, author productivity, citation patterns, and the impact of individual papers, authors, or research fields. Visualization techniques, including citation networks

and co-authorship maps, are commonly employed to represent complex relationships within the scholarly literature. Bibliometric indicators like citation counts, h-indices, and impact factors play a crucial role in assessing research productivity and impact. This methodology is invaluable for making informed decisions regarding research priorities, funding allocations, and collaborations, offering a data-driven approach to understanding the evolving landscape of academic knowledge.

5. Results

5.1. Trend on Metro Urban Transit Worldwide

Table-1 presents the summarised statistics of the bibliometric metadata, which contains the period from 1987, 428 Authors with 184 Documents with multiple 116 sources, an Annual Growth rate of 6.89%, An average citation per doc 15.85% and Total keywords from all the documents are 526. Remarkably, publications on this topic were at an increasing level for some years and simultaneously decreasing in other years like number of Documents published in the year 2012 was 8 but in the immediate year, it declined to 7 same patterns for the succeeding years and the factors behind this fluctuations were Population growth, funding Cycle, Infrastructure Development, Economic Conditional, Technological Advancement etc. This topic gained the highest momentum in 2021 and has followed a steady decrease. As shown in Figure 1 publications in the database rose from 1 document in 1987 to 11 Articles in 2023 with the highest in 2021 with 18 Articles.

Table-1 : Trend on Metro Urban Transit

Timespan	Sources	Documents	Annual Growth Rate
1987:2023	116	184	6.89 %
Authors	Authors of single-authore	International Co-Authorsh	Co-Authors per Doc
428	18	13.59 %	3.33
Author's Keywords (DE)	References	Document Average Age	Average citations per doc
526	3495	8.26	15.85

Figure-1 : Annual Scientific Production
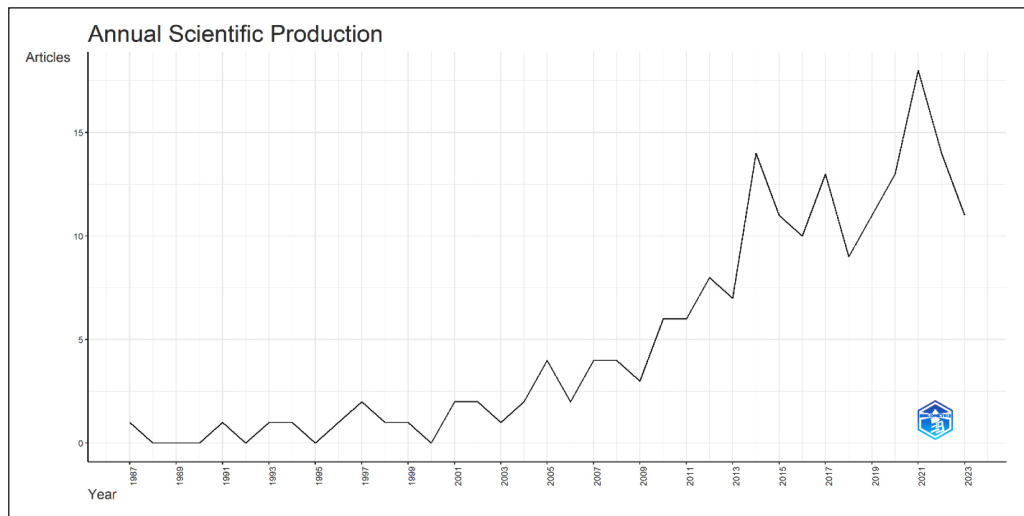
5.2. Countries Collaboration

As shown in Figure-2, The largest collaboration found between USA and China with the frequency 15 followed by China and Australia (frequency=3), China and Canada (frequency=2), China and Singapore (frequency=2), USA and Canada (frequency=2) and the highest collaborating country was China.

Figure-2 : Countries Collaboration Map
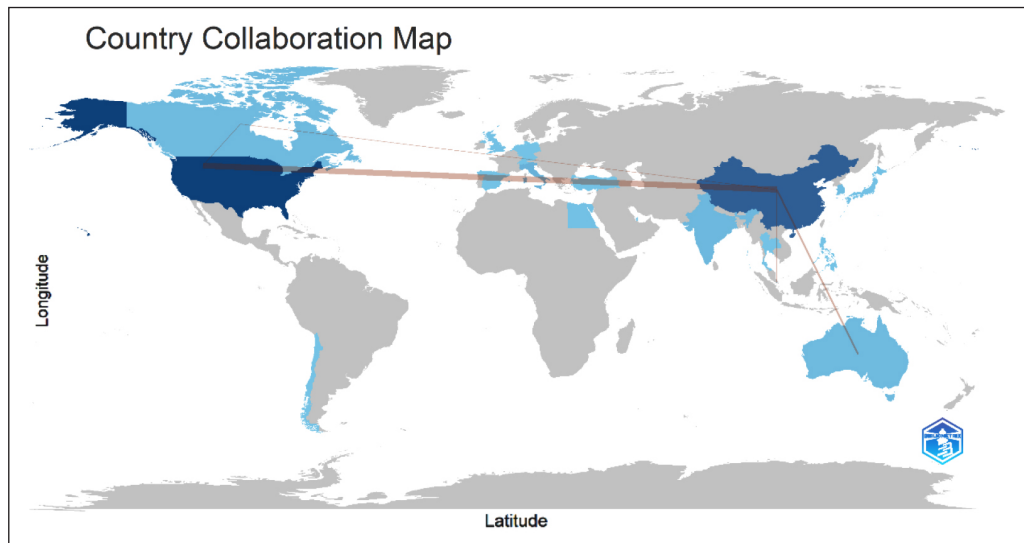
5.3. Three-Field Plot

As per figure 3, Countries are on the left of the diagram with Authors on the center and Themes on the left. Note the height of the boxes and thickness of the connecting lines, which defines that USA has more author's affiliation and highest connection with author Cao X, with theme "Transit" followed by China, Australia, Netherland, UK.

Figure-3 : Three Field Plot
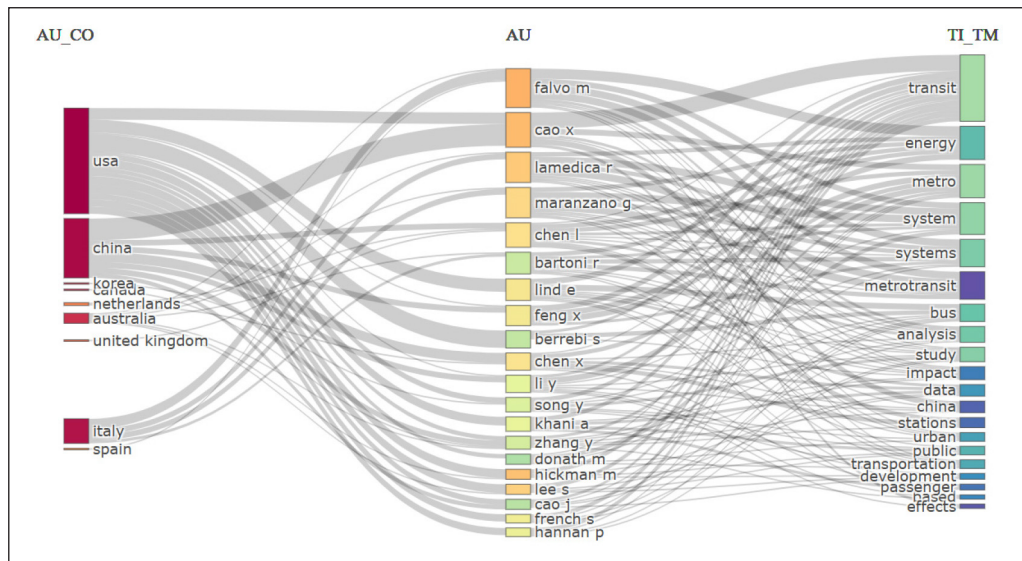
5.4. Top Most Relevant Sources

The highest number of documents published in the Journal "Transportation Research Record" with 28 number of documents, followed by "Journal of Urban Planning and Development" (number of documents=5), "Transportation (number of documents=5), "Transportation Research Part A Policy and Practice (number of documents=5) and IEEE Transactions on Intelligent (number of documents=3).

5.5. Most Cited Countries

The most cited country is the USA with a Total citation of 1016 and the average article per citation were 18.10, followed by China (TC=825, AAC=17.20), Italy (TC=279, AAC=31.00), Singapore (TC=106, AAC=53.00) and Canada (TC=95, AAC=31.70).

Table-2 : Most Relevant Sources
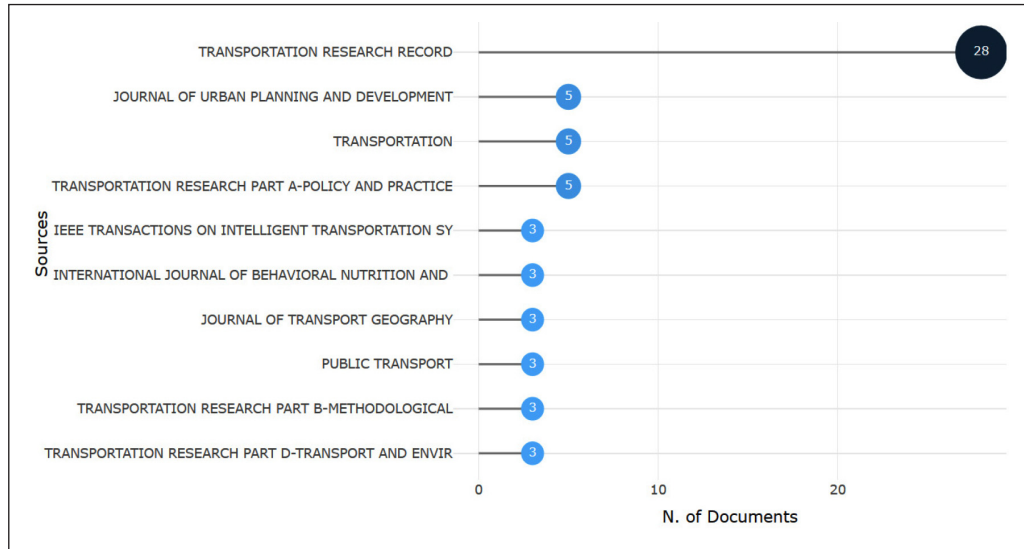
Table-3 : Most Cited Countries

Country	TC	Average Article Citations
USA	1016	18.10
CHINA	825	17.20
ITALY	279	31.00
SINGAPORE	106	53.00
CANADA	95	31.70
AUSTRALIA	93	93.00
EGYPT	86	43.00
JAPAN	57	57.00
UNITED KINGDOM	51	51.00
INDIA	38	5.40

5.6. Co-Occurrence of Keywords

There are 8 clusters with 147 items, with "Metro System" is the highest occurred term and Total link strength (occur=25, TLS=210), followed by Subway (occur=20, TLS=143), Mass Transportation (occur=19, TLS=143), "Light Rail Transit" (occur=18, TLS=156) and China (occur=17, TLS=147).

Figure-4 : Co-Occurrence of Keywords

6. Conclusion

Research on urban metro transit is essential for several compelling reasons. First and foremost, urban metro systems play a pivotal role in addressing the burgeoning challenges of urbanization and population growth. They offer an efficient, sustainable, and space-saving solution to alleviate traffic congestion, reduce air pollution, and provide convenient transportation for millions of people in densely populated cities. Our findings reveal Over the past 36 years, numerous research articles have been published on this subject, fostering its development. However, a bibliometric analysis of the literature indicates that there has not been a comprehensive assessment of the topic in its entirety. of 184 research papers published between 1987 and 2023, rising from 1 document in 1987 to 11 Articles in 2023 with the highest in 2021 with 18 Articles, an Annual Growth rate of 6.89%, An average citation per doc of 15.85% and Total keywords from all the documents are 526. The largest collaboration was found between USA

and China with a frequency of 15 followed by China and Australia. Urban metro transit has yielded valuable insights that are instrumental in shaping the future of transportation systems in cities worldwide. These findings often reveal the significance of well-designed metro systems in reducing traffic congestion and associated problems, such as air pollution and time wasted in traffic. The highest number of documents was published in the Journal "Transportation Research Record" with 28 number of documents, followed by "The Journal of Urban Planning and Development". The most cited country is the USA, followed by China, Italy, Singapore and Canada, Further the finding says that the USA has more author affiliation and the highest connection with author Cao X, with the theme "Transit" followed by China, Australia, Netherlands, UK.

The outcomes derived from the co-occurrence network analyses "Metro System" is the highest occurred term and Total link strength (occur=25, TLS=210), followed by Subway, Mass Transportation, "Light Rail Transit" and China (occur=17, TLS=147). In the realm of notable scholarly journals, the Journal "Transportation Research Record" with 28 documents, followed by "Journal of Urban Planning and Development", "Transportation "Transportation Research Part A Policy and Practice and IEEE Transactions on Intelligent. China's collaboration prominence and the notable affiliations contributing to this field have also been identified, Scholars might use the study's findings to offer an overview of the literature.

7. Limitations

It is also important to highlight the flaws of the paper :

1.   The study primarily relied on data from the WoS and Scopus core collections, potentially excluding relevant articles not covered by these databases.

2.   While the WoS and Scopus databases are commonly used in academia, the comprehensiveness of their coverage is not guaranteed.

3.   The data collection process was confined to academic journals, possibly overlooking pertinent research on Metro Urban Transit from other sources.

4.   Paucity of Time and Funds.

Bibliography

Aditi, A. (2019). (PDF) Mass Transit in India : A Need for Change. *Journal of Civil Engineering and Environmental Technology*, 2(August), 50–55. https://www.researchgate.net/publication/335004369_Mass_Transit_in_India_A_Need_for_Change

Aletà, N. B., Alonso, C. M., & Ruiz, R. M. A. (2017). Smart Mobility and Smart Environment in the Spanish cities. *Transportation Research Procedia*, *24*, 163–170. https://doi.org/10.1016/j.trpro.2017.05.084

Habib, M. A., & Lynn, R. (2020). Planning for Connected, Autonomous and Shared Mobility: A Synopsis of Practitioners' Perspectives. *Procedia Computer Science*, *170*, 419–426. https://doi.org/10.1016/j.procs.2020.03.084

Jain, A. D., & Singh, E. (2019). Transit oriented development in india : A critical review of policy measures. *International Journal of Recent Technology and Engineering*, *7*(6), 745–751.

Jamme, H. T., Rodriguez, J., Bahl, D., & Banerjee, T. (2019). A Twenty-Five-Year Biography of the TOD Concept: From Design to Policy, Planning, and Implementation. *Journal of Planning Education and Research*, *39*(4), 409-428. https://doi.org/10.1177/0739456X19882073

Monzón, A. (2020). Dimensions of Accessibility Benefits. *"Dimensions of Accessibility Benefits", International Transport Forum Discussion Papers, No. 2020/26*. www.itf-oecd.org

Prajeesh, C. B., & Pillai, A. S. (2022). Indian Smart Mobility Ecosystem - Key Visions and Missions. *AIP Conference Proceedings*, *2555*(May). https://doi.org/10.1063/5.0124596

Sanchez-Iborra, R., Bernal-Escobedo, L., & Santa, J. (2020). Eco-efficient mobility in smart city scenarios. *Sustainability (Switzerland)*, *12*(20), 1–15. https://doi.org/10.3390/su12208443

Tomaszewska, E. J., & Florea, A. (2018). Urban smart mobility in the scientific literature - Bibliometric analysis. *Engineering Management in Production and Services*, *10*(2), 41–56. https://doi.org/10.2478/emj-2018-0010

Yigitcanlar, T., & Kamruzzaman, M. (2019). Smart Cities and Mobility: Does the Smartness of Australian Cities Lead to Sustainable Commuting Patterns? *Journal of Urban Technology*, *26*(2), 21-46. https://doi.org/10.1080/10630732.2018.1476794.

A Bibliometric Analysis of Fintech and Financial Inclusion

RIMISHA VERMA AND SANJAY KUMAR SINHA

Abstract : *Over the past ten years, technology has changed how financial inclusion is promoted, created, provided, and used. Global financial inclusion has accelerated due to the growing use of smartphones and the internet, the accessibility of inexpensive data, Fintech, digitalization, blockchain technology, machine learning, and artificial intelligence. Lockdowns brought on by COVID-19 increased public awareness of fintech. The primary topics and contemporary dynamics of Fintech and financial inclusion are identified in this paper, along with recommendations for future lines of inquiry. The study looks at 480 journal articles from 2011 to January 2023 that are taken from the Web of Science database using bibliometric analysis. We determined a few keywords and the journals where these papers are published based on the bibliometric study. Finally, we make some recommendations regarding possible future study directions in this field.*

Research question : *What is the future research direction of fintech and financial inclusion? What is the conceptual structure of the research involving Fintech and Financial Inclusion?*

Purpose : *This study aims to examine the key intellectual and influential aspects of financial technology and financial inclusion literature. and to evaluate the future research direction of financial technology and financial inclusion literature.*

Design/methodology/approach : *This paper adopts R software package. RStudio software was employed, including Excel. RStudio is used to build networks of scientific articles, journals, researchers, organizations, countries, and terms. Bibliometric analysis was performed based on Annual Scientific production, Sources, Authors and Countries, Three field plots and Conceptual Structure.*

Keywords : Fintech, Financial Inclusion, BibFex, World Cloud, Annual Citation, Inter-Country Collaboration

Rimisha Verma, Research Scholar, Department of Management, Chaudhary Ranbir Singh University, Jind (Haryana), India. Mail: vermarimisha@gmail.com

Prof. Sanjay Kumar Sinha, Dean, Department of Management, Faculty of Commerce and Management, Chaudhary Ranbir Singh University, Jind (Haryana), India.

Introduction

The term financial inclusion has attained a lot of attention these days. Financial inclusion refers to the availability to both individuals and businesses of useful and cost-effective financial goods and services, including payments, transactions, savings, credit, and insurance, that are provided sustainably and ethically. Seven of the seventeen Sustainable Development Goals are made possible by financial inclusion, according to this goal. The G20 reiterated its commitment to putting into practice the G20 High-Level Principles for Digital Financial Inclusion and pledged to promote financial inclusion globally. According to the World Bank Group, financial inclusion is a crucial tool for reducing extreme poverty and fostering shared prosperity (Bank, 2018) .

The term "fintech," short for "financial technology," refers to technological advancements made in the creation and provision of financial services and goods. The use of Big Data, artificial intelligence (AI), and machine learning to assess investment possibilities, improve portfolios, and reduce risks are recent developments in the field of finance technology. The goal of fintech, which is increasingly focused on client outcomes, is to enable the delivery of customised, actionable advice to investors with better accessibility and at a reduced cost (*The Fintech Industry & Financial Technology*).

To address the current global concerns of poverty, inequality, climate change, environmental degradation, prosperity, peace, and justice, financial inclusion is a critical component. This approach is heavily reliant on fintech. One approach to avoid or lessen the impact of life's obstacles, such as illness, crime, poverty, unemployment, old age, and others, is to have access to money. People who are not a part of the financial system lack the resources to manage and plan for such risks. For example, farmers who sell goods without access to electronic payment systems must worry about theft; many would try to consume as much as they can right away rather than accepting the chances. (Zetzsche et al., 2019).

FinTech is the application of technology to strategy and the provision of financial services and goods. All facets of the economy are affected, either positively or negatively, by it, including diverse types of regulators, dealers, financial organisations, and clients' types of companies. The difficulties with digital technologies are widespread and essential in all highly regulated sectors. Still, particularly financial institutions might promote peer-to-peer exchange of currency, unorthodox methods of payment, and an increase in the volatility of financial markets. FinTech also refers to the application of technology in the

provision of financial services. Since the early 1990s, there has been a term called "FinTech."(*Fintech (the Word, That Is) Evolves | American Banker*, n.d.)

Literature Review

The tradition of bibliometric analysis was initiated by (Cole & Eales, 1917). It was started with the name of comparative anatomy.

(Tran et al., 2022) examined the effect of financial inclusion on multidimensional poverty. Using the multivariate probit model with the dataset of Vietnam the author showed that financial inclusion reduced multidimensional poverty. Specifically, households owning bank accounts, having savings at banks, using debit cards, and credit cards, or investing in stocks or bonds were less likely to fall into multidimensional poverty.

(Hidayat & Sari, 2022)displayed the linkage between financial inclusion and the Welfare of Indonesia. The index of financial inclusion(IFI) was calculated based on dimensions of availability, accessibility and usage of financial services. The panel data estimation results showed that the financial inclusion index had a positive and significant effect on the welfare of the Indonesian people as proxied by the human development index.

The financial inclusion Journey was studied from 2000 to 2020 by (Chhatoi et al., 2021). The authors analysed the information from the Scopus database. They produced the visualisation network with the help of VoSviewer software. Journal-wise, author-wise, country and keyword-wise analysis was done by the authors. It was concluded that research attention should be given to financial policymaking aiming at poverty eradication through women's contribution and there was ample research on financial services and microfinance.

(Gálvez-Sánchez et al., 2021) aimed to analyse the research advances made in the field of financial inclusion and the main lines of investigation currently being addressed using a bibliometric analysis. They proposed the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals for further research.

(Alrawashdeh et al., 2022) used VoSViewer and R Studio for the analysis on fintech. The authors concluded the focus on five clusters, Sustainability (Switzerland), Financial Innovations, Investment Management, Europe Journal of Finance and Electronic Commerce.

(Nguyen, 2016) discussed blockchain as a financial technology for future sustainable development. It was indicated that blockchain has a framework of cooperation. There will be cooperation among banks, technology companies, the market as well as regulatory agencies. It was a leading trend to transform business and blockchain technology was majorly used in businesses.

Research Methodology

A bibliometric analysis's primary goal is to compile prior research on the issue and adjacent areas to create unbiased, repeatable conclusions. It attempts to provide a thorough methodological analysis in addition to classifying earlier research. A bibliometric analysis's primary goal is to compile prior research on the topic and adjacent areas to produce unbiased, repeatable results. It seeks to provide a thorough methodological analysis of the research findings in addition to classifying earlier studies. The outcomes are specified by research questions to demonstrate that the study provides new information to the body of literature. (Tepe & Geyikci, 2022)

The study is descriptive. Bibliometric analysis is used here. The bibliometric analysis provides insights into the field's intellectual structure and thematic evolution. The literature review provides insights into the progression of knowledge within each theme and helps identify future research directions. Within the bibliometric analysis, the study includes performance analysis and science mapping. Performance analysis reveals essential characteristics of the field of research in terms of sources, authors, and documents; The science mapping, done through the synthesis of the knowledge structure, helps understand the thematic evolution and the current status of research. It also gives insights into future research directions. The first and most significant step in any bibliometric study is identifying relevant documents consistent with the study's objective.

The study uses "Financial inclusion" And "Financial technology" or "Fintech" as keywords for search in the title to find articles related to Fintech and financial inclusion. I restricted the search to only English language articles or research papers published in Web of Science. A total of 815 documents were found, out of which 50 documents are from the period of 2011 to 2022. These 50 documents are shortlisted for bibliometric analysis.

The Web of Science data was taken for this research. In Web of Science, Titles were looked at. "Financial inclusion and financial technology or fintech" was

used to search. BibTex was exported from the Web of Science. Then R Studio was used. Library(Bibliometrix) was initiated. Then Biblioshiny() was entered. Then a screen popped (127.0.0.1:3331)where I used my BibTex. The Steps used were Data>Load Data>Import or Load "Import raw files". The database was chosen as the Web of science. Then I chose BibTex from my downloads in the browse section. After this, the analysis was Started with the Start button. The Total number of Documents was 938. English was chosen in the filter as language. The years 2011 to 2023 were selected as period. Average Citations per year ranged from 0 to 49. All sources were chosen. After the filter finally 861 Documents were filtered. The Main information, Annual scientific production, and Average citation per year were taken for the first analysis. The three field plots with Author, Sources and keywords were used. After that Most relevant sources, source impact, most relevant author, most locally cited author and Author impact were analysed. Further Corresponding Author Country, most relevant countries were taken for research. After this Most frequent word, Word cloud image and tree map were used to analyse the words. At the end, the Co-Occurrence network and Collaboration World map were studied.

To this end, the study used the 2011 to 2023 period in the search strategy and document selection process. While the number of documents from the early years is scanty, and the last decade has seen significant advancement in the field, the logic of using the more extended period is to avoid missing out on any seminal study.

Bibliometric Analysis and Findings

1. Summary

The analysis on fintech and financial inclusion through bibliometric analysis is done for time period from 2011 to 2023. Bibliometric analysis in Figure-1. Along with table-1 Summarises the final database was filtered on the basis of year 2011-2023 and English Language. 861 documents from 480 sources were taken. The annual growth rate was 17.6%. There were 1830 authors.

2. Annual Scientific Production

Figure-2 and Table-2 shows the growth in annual scientific production in Fintech and financial inclusion. It is visible that Fintech and technology influence how

Figure-1 : Main Information on Financial Inclusion and Fintech

Timespan	Sources	Documents	Annual Growth Rate
2011:2023	480	861	17.6 %

Authors	Authors of single-author	International Co-Authors	Co-Authors per Doc
1830	195	28.92 %	2.57

Author's Keywords (DE)	References	Document Average Age	Average citations per do
1912	1	2.8	10.49
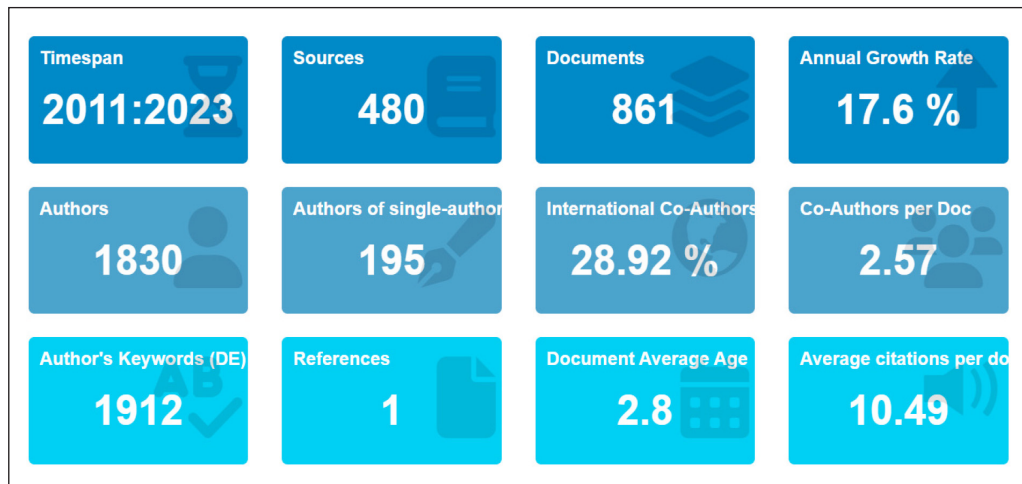
Table-1 : Summary of Dataset

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2011:2023
Sources (Journals, Books, etc)	480
Documents	861
Annual Growth Rate %	17.6
Document Average Age	2.8
Average citations per doc	10.49
References	1
DOCUMENT CONTENTS	
Keywords Plus (ID)	940
Author's Keywords (DE)	1912
AUTHORS	
Authors	1830
Authors of single-authored docs	195

AUTHORS COLLABORATION	
Single-authored docs	230
Co-Authors per Doc	2.57
International co-authorships %	28.92
DOCUMENT TYPES	
article	566
article; book chapter	73
article; proceedings paper	3
book	10
book review	9
correction	7
editorial material	36
editorial material; book chapter	14
meeting abstract	2
proceedings paper	121
review	20

financial inclusion is growing, becoming available, and consumed. Increased innovation, trust, and availability of cheap data have increased financial inclusion. The rapid growth and access to technology have made financial inclusion possible as per Figure-3. There is a surprising increase in total number of articles based on fintech and financial inclusion from 2011 to 2022. There was 1 article in 2011 and with an increase in a number of **articles till January 2023**, the number of articles reached to a total of 256 articles.

As per table-3 and figure-4, The mean total citation per article has decreased from 2011 to 2012 and further increased from 2012 to 2013 from 0 to 1.5. Then increased from 1.5 mean citations per article to 22 mean citations per article from 2013 to 2014. Year 2017 had the maximum mean citation per article, followed by year 2018.

Figure-2 : Annual Scientific Production
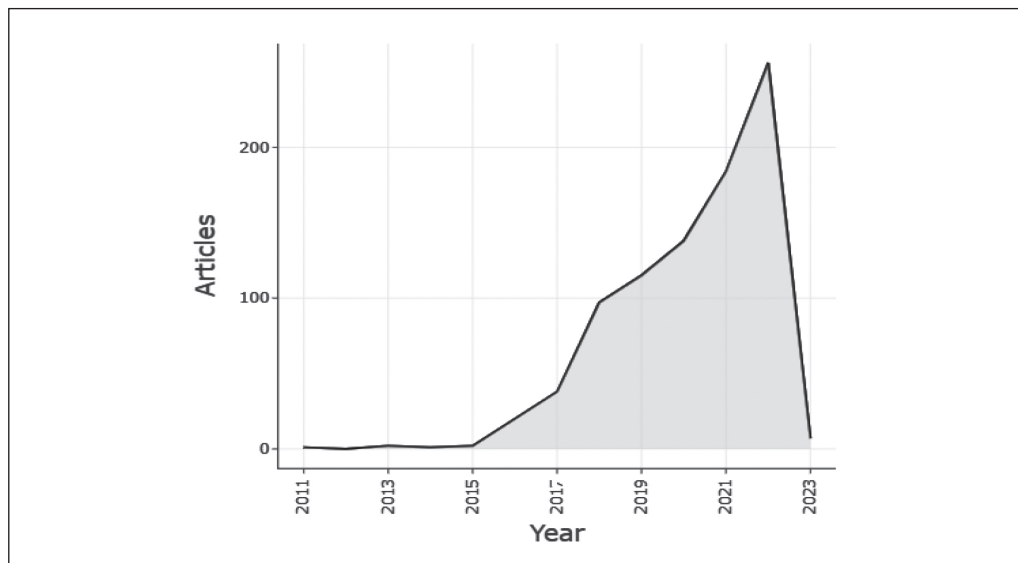
Table-2 : Annual Scientific Production of Financial Inclusion and Fintech as per Number of Articles

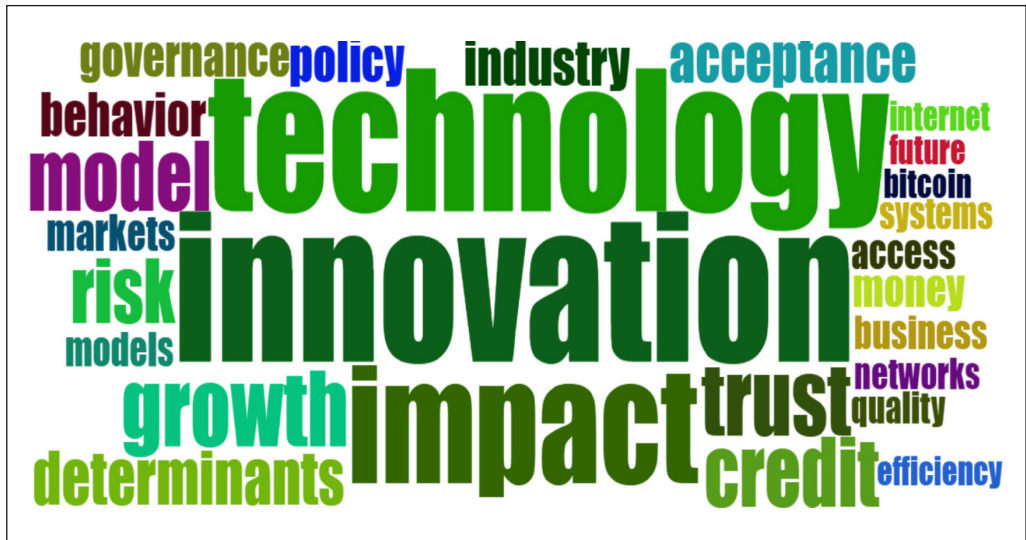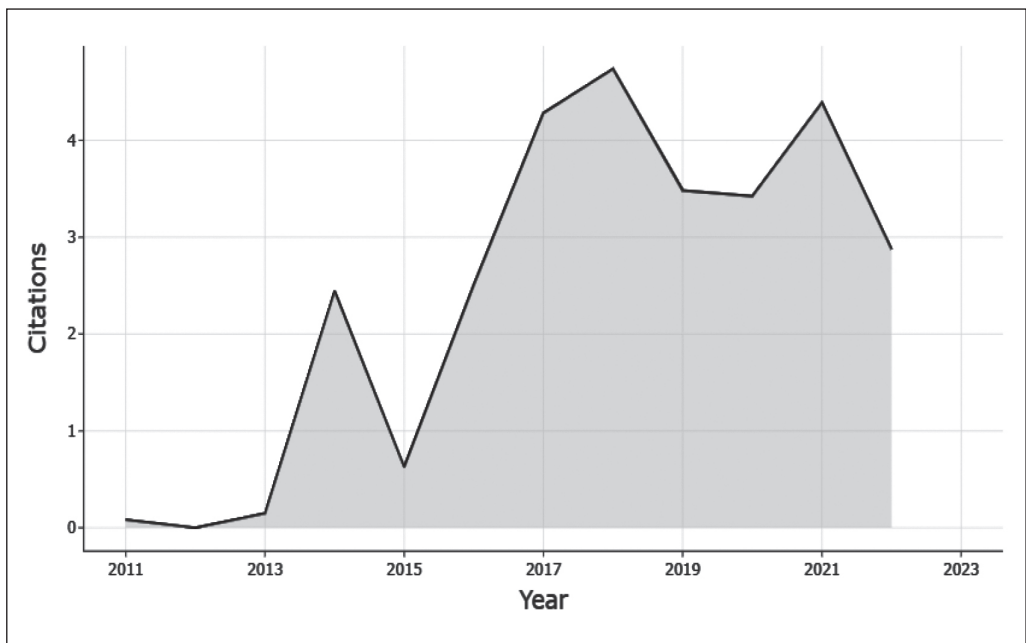| Year	Articles
2011	1
2012	0
2013	2
2014	1
2015	2
2016	20
2017	38
2018	97
2019	115
2020	138
2021	184
2022	256
2023	7

Figure-3 : Word Cloud

Figure-4 : Annual Citation per Year of Fintech and Financial Inclusion

Table-3 : Annual Citations Per Year of Fintech and Financial Inclusion

Year	N	MeanTCperArt	MeanTCperYear	CitableYears
2011	1	1	0.08	12
2012	0	0	0	0
2013	2	1.5	0.15	10
2014	1	22	2.44	9
2015	2	5	0.63	8
2016	20	17.55	2.51	7
2017	38	25.68	4.28	6
2018	97	23.68	4.74	5
2019	115	13.92	3.48	4
2020	138	10.27	3.42	3

3. Sources

861 articles on Fintech and Financial inclusion appeared in 480 journals (Table-1). The research domain is covered by numerous publications from other areas, which reflects the diversity of the research field in that subject (Low & Siegel, 2020). Sustainability, Financial Innovation, Rise and Development of Fintech: Accounts of Disruption from Sweden and Beyond, finance research letters are the most relevant journals based on the number of articles as per Table-4. Industrial management & data systems have a maximum number of citations (304). Followed by Financial innovation with citations (280) and several articles(18), followed by technological forecasting and social change with citations (279), followed by sustainability and small business economics. Interestingly, Sustainability has a maximum number of articles but not a maximum number of citations. It proves that a journal with a maximum number of citations need not have maximum citations. The country China comes out to be the most cited country with the maximum number of articles(172) as well (Table-4 and Figure-5).

It demonstrates unequivocally that the journal with the greatest publication volume is not always the one with the most impact on research. This could be a result of the publications in these journals having just been released and not having received as many citations overall. Interestingly, the most cited source that is Industrial Management & data Systems was published in the year 2018 (Table-5 and Figure-6). Sustainability, Financial innovation Technological forecasting and social change had the maximum h index.

Table-4 : Most Relevant Sources of Fintech and Financial Inclusion

Sources	Articles
Sustainability	28
Financial Innovation	18
Rise and Development of Fintech : Accounts of Disruption from Sweden and Beyond	13
Finance Research Letters	12
Technological Forecasting and Social Change	11
Journal of Risk and Financial Management	10
Asian Economic Policy Review	9
Journal of Cultural Economy	9
Journal of Economics and Business	9
Cogent Economics \& Finance	7

Table-5 : Source Impact of Fintech and Financial Inclusion

Element	h_index	g_index	m_index	TC	NP	PY_start
Sustainability	10	14	2	223	22	2019
Financial Innovation	8	13	1	280	13	2016
Technological Forecasting and Social Change	8	11	2	279	11	2020
Finance Research Letters	6	10	1.5	153	10	2020
Environment and Planning A-Economy and Space	5	5	1	89	5	2019
European Journal of Finance	5	6	1.25	123	6	2020
Small Business Economics	5	5	1	209	5	2019
Handbook of Blockchain, Digital Finance, and Inclusion, Vol 1 : Cryptocurrency, Fintech, Insurtech, and Regulation	4	4	0.667	40	4	2018
Industrial Management \& Data Systems	4	5	0.667	304	5	2018
International Review of Financial Analysis	4	4	1	48	4	2020

Figure-5 : Most Relevant Sources of Fintech and Financial Inclusion
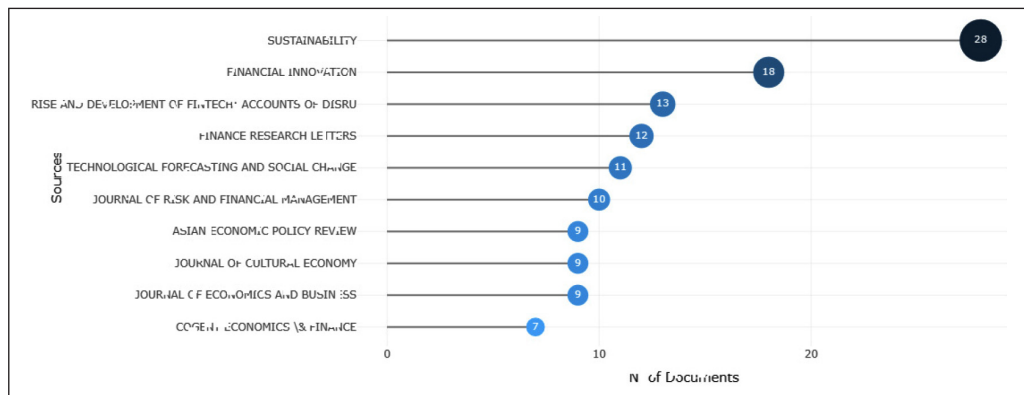
Figure-6 : Source Impact of Fintech and Financial Inclusion
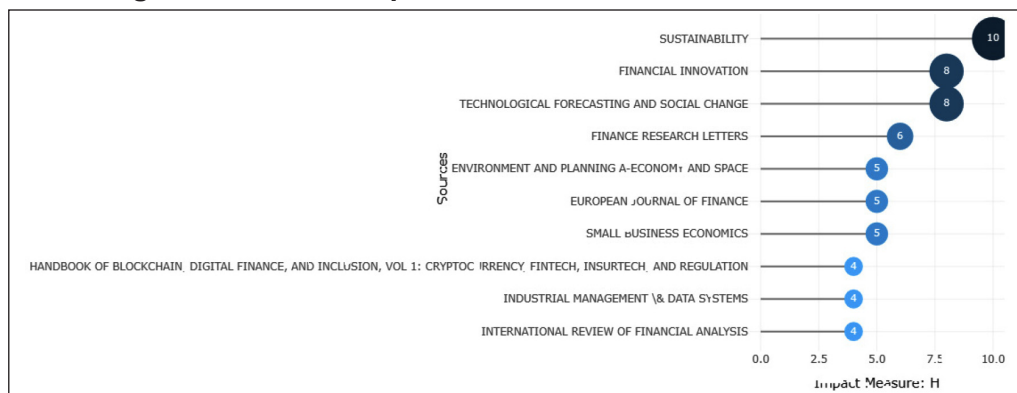
4. Author and Countries

From 2011-January 2023, 1830 total authors with 195 single authors were found related to Fintech and Financial Inclusion according to Table-1. Based on the overall number of publications and citations, the authors in the research field that were deemed most relevant were determined. The authors' productivity is demonstrated by the total number of articles, but their influence on the study is demonstrated by the total number of citations. LI J, ZHANG Y, ARNER DW, CHEN X, ALAM N, BUCKLEY RP, WOJCIK D, GUPTA L, JAGTIANI J and ZAMENI A are the most productive authors (Left Panel of Table and figure-7). ARNER DW, JAGTIANI J, WIJCIK D, BUCKLEY RP AND CHEN X are the Top-5 most-cited authors and co-authors of most cited article (Middle Panel of Table-7). ARNER DW, JAGTIANI J, WIJCIK D, BUCKLEY RP AND CHEN X also had maximum h-index, which shows the maximum impact of these authors (Table-7 and figure-8).

Table-6 : Most Local Cited Authors of Fintech and Financial Inclusion

Authors	Articles	Articles Fractionalized
LI J	10	3.4
ZHANG Y	10	2.79
ARNER DW	9	2.92
CHEN X	9	2.75
ALAM N	7	3
BUCKLEY RP	7	2.08
WOJCIK D	7	4.7
GUPTA L	6	2
JAGTIANI J	6	2.5
ZAMENI A	6	2

Table-7 : Author's Impact with h Index, g Index and m Index

Element	h_index	g_index	m_index	TC	NP	PY_start
ARNER DW	5	7	0.625	233	7	2016
JAGTIANI J	5	6	0.833	182	6	2018
WOJCIK D	5	6	1.25	75	6	2020
BUCKLEY RP	4	6	0.5	226	6	2016
CHEN X	4	7	1.333	54	7	2021
LI J	4	7	0.667	82	7	2018
LI X	4	4	1	106	4	2020
LUO S	4	4	1.333	64	4	2021
SUN Y	4	4	0.571	115	4	2017
ASHTA A	3	3	0.5	54	3	2018

Figure-7 : Most Relevant Authors of Fintech and Financial Inclusion
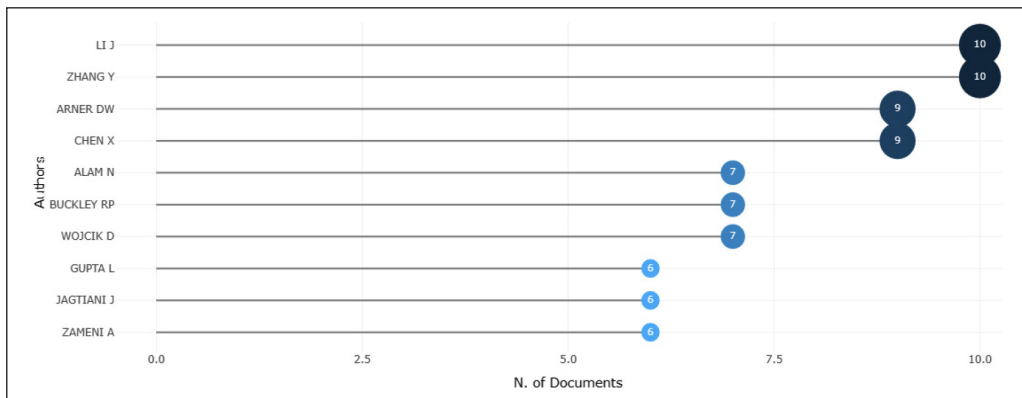
**Figure-8 : Author's Impact of Top 10 Authors Shown With H Index**
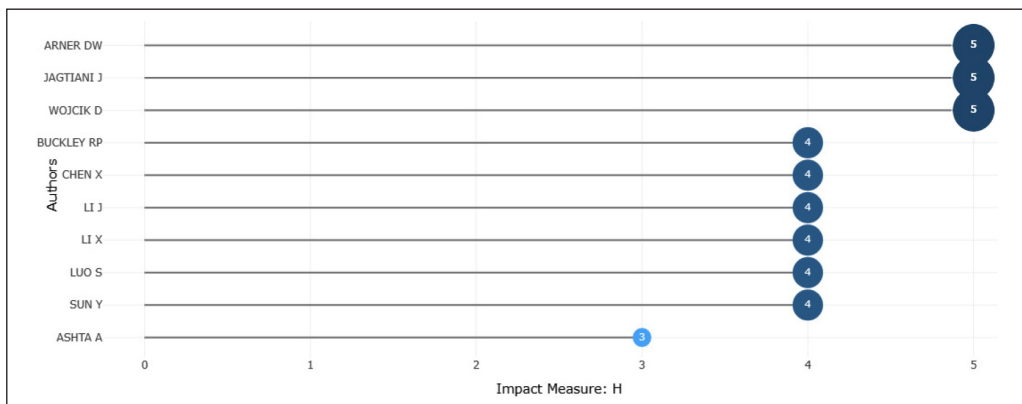
China, USA, United Kingdom, Indonesia and Australia have the highest number of published articles (Table 8). On the other hand, China has the highest number of Intra-country collaboration indices, followed by USA, UK, Indonesia and Korea. Inter country collaboration indices is highest in China, then followed with USA, UK, Australia and Malaysia (Table 8 and figure 9). Figure 10 shows the collaboration between countries through a world map.

Figure-9 : Corresponding Author's Most Relevant Countries
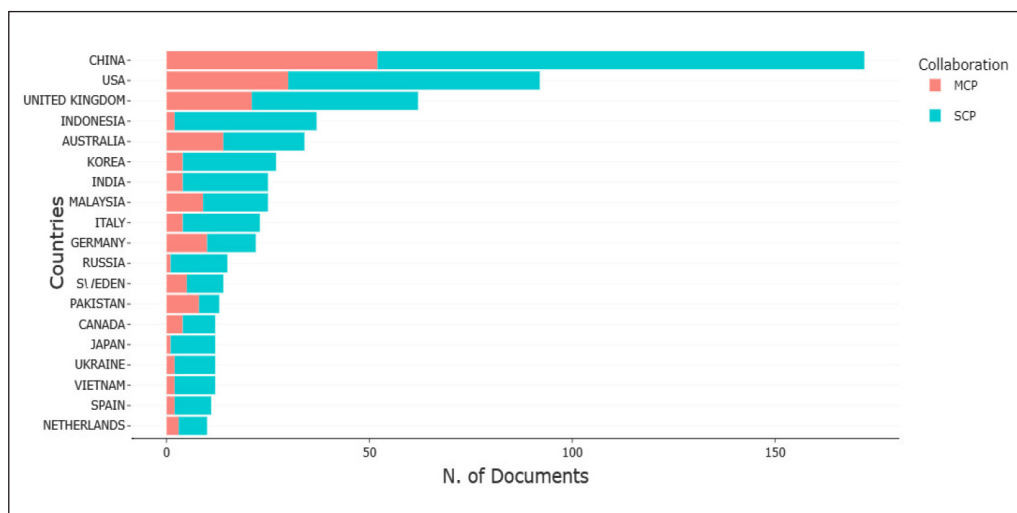
Table-8 : Most Relevant Countries, SCP: Intra-Country Collaboration Indices, MCP : Intercountry Collaboration Indices

| Country	Articles	SCP	MCP	Freq	MCP_Ratio
CHINA	172	120	52	0.2	0.302
USA	92	62	30	0.107	0.326
UNITED KINGDOM	62	41	21	0.072	0.339
INDONESIA	37	35	2	0.043	0.054
AUSTRALIA	34	20	14	0.039	0.412
KOREA	27	23	4	0.031	0.148
INDIA	25	21	4	0.029	0.16
MALAYSIA	25	16	9	0.029	0.36
ITALY	23	19	4	0.027	0.174

Figure-10 : Collaboration World Map
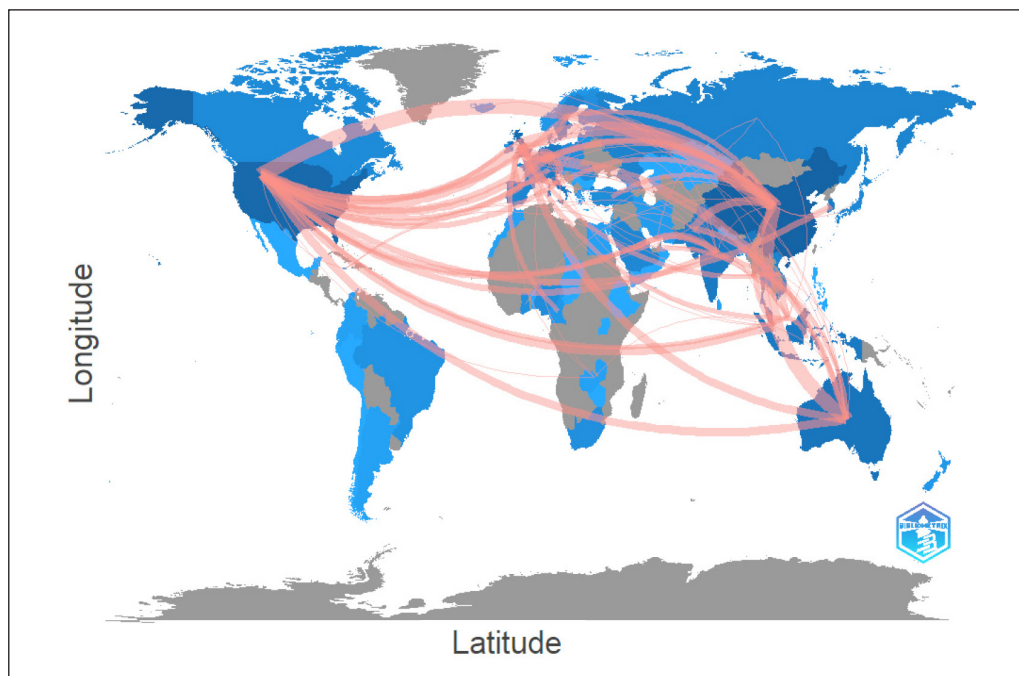
5. Three Field Plot

Three field plots (Figure-11) shows the relationship between three fields using Plots. Sources (left), Authors (middle), and Keywords(right) are the three fields. Wojcik d, Jagtiani J, Zhang Y, Rabbani me and Hassan mk are important authors. Fintech, financial inclusion, finance, innovation and China emerged as the primary keywords. Fintech and Islamic finance: digitalization, development and disruption, Earnings management, fintech driven incentives and sustainable growth complex systems, legal and mechanism design factors, Rise and development of fintech: accounts of disruption from Sweden and beyond remained the preferred sources.

6. Conceptual Structure

We analysed the conceptual structure of the field using the most frequent keywords, keywords-co-occurrence, and study of thematic evaluation about research in Fintech and Financial inclusion.

Figure-11 : Author, Sources and Keywords are Shown with Three Field Plot
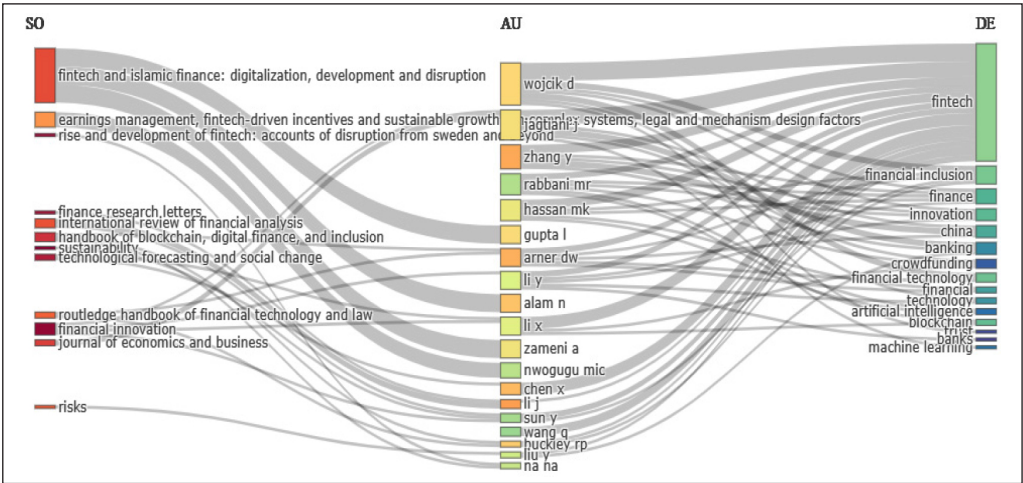
6.1. Most Frequent Words

Keyword analysis offers insights into popular themes in the domain of research. The word cloud of 50 most relevant keywords based on fintech and financial inclusion (Figure-3 and Figure-12) shows Innovation, technology, impact, information and adoption as the most important keywords. In addition, performance, growth, trust, credit and model are the most important words. Post 2019 due to the emergence of COVID-19, the number of articles has increased. The Word cloud in Figure-3 also shows other emerging themes like model, finance, market services, determinants and acceptance.

Figure-12 : Tree Map of Fintech and Financial Inclusion
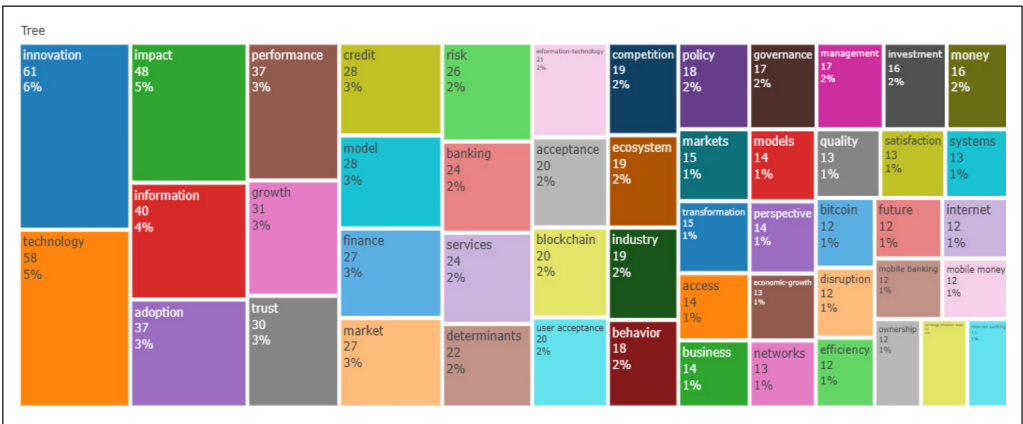
Figure-13 : Most Frequent Words Used
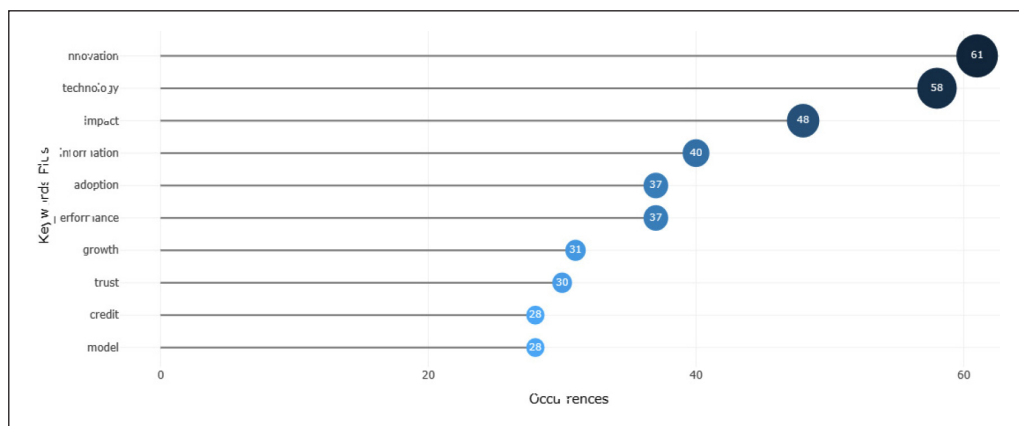
Table-9 : Most Frequent Words

Words	Occurrences
innovation	61
technology	58
impact	48
information	40
adoption	37
performance	37
growth	31
trust	30
credit	28
model	28

6.2. Co-occurrence Analysis of the Authors' Keywords

Co-occurrence analysis offers insights into the dominant themes in Fintech and financial inclusion (Figure 14) . Some of the most prominent keyword pairs are Technology and innovation, Impact and Information, adoption and trust, performance and impact, adoption, performance and growth, technology and finance, Risk, Trust and performance, blockchain, finance and technology, IT, Banking and Technology acceptance model. Analysing the co-occurrence network the major keywords and themes found are (Figure-14 and Table-10):

- Technology (in the context of innovation and finance)

- Adoption and Trust (In context of user acceptance, behaviour and information technology)

- Finance and blockchain (In context of banking and performance)

- Innovation (Enabled by impact and information)

- Application of technology, impact and adoption (In context of growth, market and acceptance)

Figure-14 : Co-occurrence Network of Fintech and Financial Inclusion
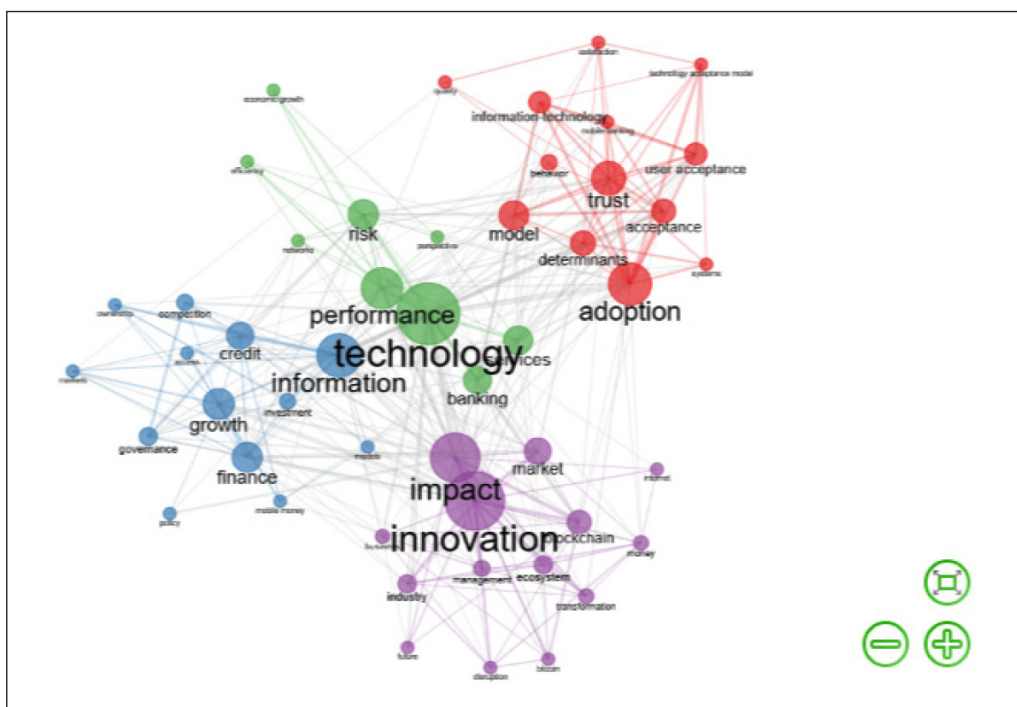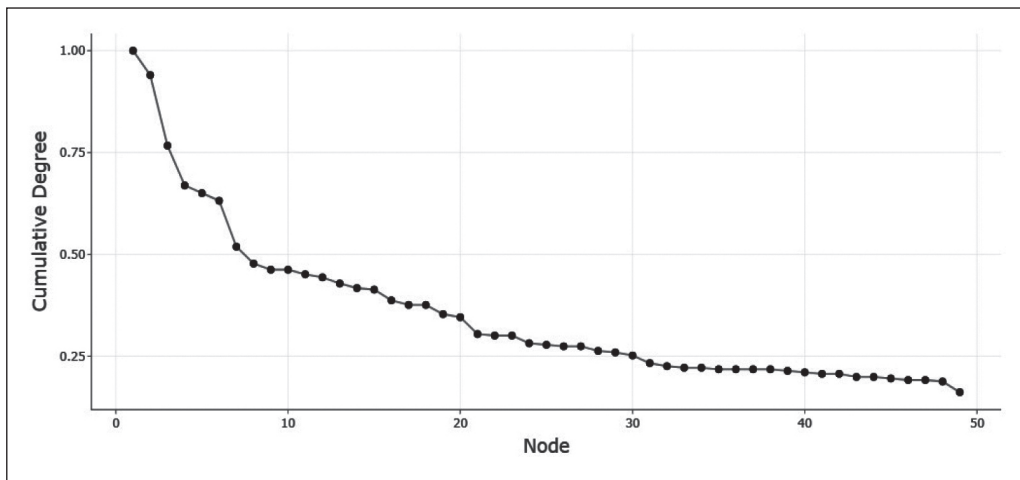

7. Conclusion

Researchers from the technology and finance areas may collaborate on future studies because Fintech is an interdisciplinary topic. They can add to the discussion about uses of technology (Ecosystem, banking, Artificial Intelligence, Blockchain, etc.) and how they affect the design of financial inclusion through

Table-10 : Co-network Analysis of Fintech and Financial Inclusion

Node	Cluster	Betweenness	Closeness	PageRank
adoption	1	63.06574	0.013514	0.043355
trust	1	43.8817	0.012821	0.034709
model	1	14.6839	0.012346	0.024454
determinants	1	21.85363	0.0125	0.024232
information-technology	1	1.186121	0.01	0.018415
acceptance	1	6.129259	0.012195	0.025793
user acceptance	1	10.86962	0.011905	0.022994
behaviour	1	2.130035	0.011111	0.011088
quality	1	2.156131	0.009804	0.008491
satisfaction	1	3.016691	0.010638	0.011092

Figure-15 : Co-occurrence Network with Degree Plot Graph

various financial products and services, the Technology acceptance model, consumers, and regulatory bodies.

Using bibliometric research, the study determined the conceptual and intellectual framework of Fintech and financial inclusion. Additionally, the thematic map created by bibliometric analysis is analysed. This method provides a thorough

understanding of the main points of several research on the relevant subjects and how they add to the corpus of literature in the area. It also cleared the path for comprehending the areas of research that still need to be done. As a result, our study uses bibliometric analysis to present an accurate picture of Fintech and financial inclusion research. It does, however, have some restrictions. Literature from year 2011 to January 2023 is taken into account. This filter applies to the current investigation, even though there is little chance of missing important publications in the field because of the length of time.

The keywords employed were particular to the subject of the study. To obtain further information, one might also consider examining a combination of other keywords like blockchain, internet banking and technology.

References

Alrawashdeh, N., Alsmadi, A. A., & Al-Gasaymeh, A. (2022). FinTech: A Bibliometric Analysis for the Period of 2014-2021. *Quality - Access to Success*, *23*(188), 176–188. https://doi.org/10.47750/QAS/23.188.24

Bank, W. (2018). *Financial Inclusion*. World Bank. https://www.worldbank.org/en/topic

Chhatoi, B. P., Sahoo, S. P., & Nayak, D. P. (2021). Assessing the academic journey of "financial inclusion" from 2000 to 2020 through bibliometric analysis. *Journal of Scientometric Research*, *10*(2), 148–159. https://doi.org/10.5530/JSCIRES.10.2.29

Cole, F. J., & Eales, N. B. (1917). the History of Comparative Anatomy/: Part I .— a Statistical Analysis of the Literature. *Science Progress*, *11*(44), 578–596.

Fintech (the Word, That Is) Evolves | American Banker. (n.d.). Retrieved October 24, 2022, from https://www.americanbanker.com/opinion/fintech-the-word-that-is-evolves

Gálvez-Sánchez, F. J., Lara-Rubio, J., Verdú-Jóver, A. J., & Meseguer-Sánchez, V. (2021). Research advances on financial inclusion: A bibliometric analysis. *Sustainability (Switzerland)*, *13*(6), 1–19. https://doi.org/10.3390/su13063156

Hidayat, P., & Sari, R. L. (2022). Linkage between financial inclusion and Indonesian welfare: a recent evidence. *Cogent Business and Management*, *9*(1). https://doi.org/10.1080/23311975.2022.2108299

Low, M. P., & Siegel, D. (2020). A bibliometric analysis of employee-centred corporate social responsibility research in the 2000s. *Social Responsibility Journal*, *16*(5), 691–717. https://doi.org/10.1108/SRJ-09-2018-0243

Nguyen, Q. K. (2016). Blockchain-A Financial Technology for Future Sustainable Development. *Proceedings - 3rd International Conference on Green Technology and Sustainable Development, GTSD 2016*, 51–54. https://doi.org/10.1109/GTSD.2016.22

Tepe, G., & Geyikci, U. B. (2022). *Fintech Companies: A bibliometric analysis*.

The Fintech Industry & Financial Technology. (n.d.). Retrieved February 6, 2023, from https://www.cfainstitute.org/en/research/fintech

Tran, H. T. T., Le, H. T. T., Nguyen, N. T., Pham, T. T. M., & Hoang, H. T. (2022). The effect of financial inclusion on multidimensional poverty: the case of Vietnam. *Cogent Economics and Finance, 10*(1). https://doi.org/10.1080/23322039.2022.2132643

Zetzsche, D. A., Buckley, R. P., & Arner, D. W. (2019). FinTech for Financial Inclusion: Driving Sustainable Growth. *Journal of Finance*, *first edit*(February), 1–26. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3245287

Influence of E-WOM on Consumer Purchase Decision Using PLS-SEM

MUKESH AND MAHABIR NARWAL

Abstract : *E-WOM is an interpersonal source through which consumers share their reviews and experiences with others related to a service or product. Today E-WOM plays a crucial role in influencing the purchase decision of the consumer. This paper presents an empirical study to examine the influence of E-WOM (online word of mouth) on consumer purchase decisions. Also, this study examined the influence of E-WOM quantity, E-WOM quality and sender expertise on the purchase decision of the consumer. Data from 552 respondents were collected from Haryana through a multistage sampling method. Using PLS-SEM 3, findings reveal that there is a significant impact of E-WOM and E-WOM quality on consumer purchase decisions but the impact of the sender's expertise and E-WOM quantity was not found significant.*

Keywords : E-WOM, E-WOM Quality, E-WOM Quantity, Sender's Expertise, consumer purchase decision, PLS-SEM.

Personal Reflexive Statement

My study interest focuses on the influence of online word-of-mouth communication on consumer purchase decisions. Word of mouth is a type of communication which motivates people to spread news whether it is positive or negative. In this era, offline word of mouth is replaced by online word of mouth as easily availability of smartphones and internet access. WOM (word of mouth) is a medium where we can communicate our thoughts to others without personally communicating them and this driven me to conduct this research.

Dr.Mukesh, Assistant professor, Department of Commerce, Government College Sector-9 (Gurugram), Email ID: kmkumar101@gmail.com

Dr.Mahabir Narwal, Professor, Department of Commerce, Kurukshetra University (Kurukshetra), Email ID: msnarwal@kuk.ac.in

Introduction

Ismagilova et al. (2017) identified E-WOM as communication medium where information is exchanged between former, actual and potential consumers about a service, product or a brand through internet. Few researchers (Yan et al., 2015; Filieri et al., 2018 and 2015; Wang et al., 2015) argued that E-WOM is a good source of information and behavior of consumer is influenced by it, on the other hand Marsha and Roof-shaffer (1988) opined that customer purchase decision is significantly affected by traditional WOM. Many researchers studied the influence of E-WOM on smart phone purchase intention (Chen et al., 2016), hotel booking (Teng et al., 2017; Ladhari and Michaud, 2015) and travel destination (Jalilvand and Samiei, 2012).

To avail information about a company's product or service, consumers seek it through online with the help of internet (Gupta and Harris, 2010; Lee et al., 2011). Bickart and Schindler (2001) and Brooks (1957) revealed that people consider personal sources more credible and found WOM more than other media sources. The influence of food & beverage industry highlighted that reviews which are posted online are very precious for consumers as people do not interact with services and product prior consumption (Kim et al., 2015) and consumers depend on others review for their decision (Zhang et al., 2010; Mitchell and McGoldrick, 1996). Park and Lee (2007) observed E-WOM reliable and valuable as consumer share their experiences and reviews online.

Electronic Word-of-Mouth (E-WOM)

Munnukka et al. (2015) mentioned that consumers consider E-WOM as a source which provides useful information because it contains experiences and opinions of people rather than information generated by company. Traditional WOM involves face to face communication between people but online WOM consist sharing of opinions and experiences in writing (Soares et al., 2012).

On the other hand, Hennig-Thurau et al. (2004) defined E-WOM as sharing negative or positive statements about a service or product by former, actual or potential customers through internet which can be seen by other people. E-WOM helps consumer in their purchase decision by reducing uncertainty and risk about a service or product (Chatterjee, 2001) and it also provide information about service quality and product quality (Chevalier and Mayzlin, 2003). Balakrishnan et al. (2014) depicted influence of E-WOM and online advertisement

on purchase intention and brand loyalty and revealed that social media is very important for modern marketing. It was also suggested that companies should focus on social media to promote their brand or product. Thus, it hypothesized that:

H₁ : E-WOM positively affects purchase decision.

E-WOM Quality/Quantity

Fan et al. (2013) revealed that consumer is conscious about right information of their purchase decision, also if content is good it will increase consumer's trust for E-WOM. Consumer purchase decision is positively influenced by online reviews which are logical, understandable and clear (Lin et al., 2013). Cacioppo and petty (1984) defined that a review with emotional material in reviews rather than arguments which support review, is not considered credible. Quality of E-WOM considered good when information is comprehensive, accurate, timeliness and relevant (Cheung and Thadani, 2010). Lin et al. (2013) identified that product popularity can be known by quantity of comments posted on online platform about a service or product. Cheung and Thadani (2010) defined E-WOM quantity as number of comments posted on online platform. If number of comments are more, it catches consumers attention (Fan et al., 2013) and it also represent the popularity of the product when online reviews searched by consumer (Cheung and Thadani, 2010). Thus, based on the above discussion following hypothesizes are setup :

H₂ : E-WOM quality affects purchase decision.

H₃ : E-WOM quantity affects purchase decision.

Purchase Intention/Decision and Sender's Expertise

Dodds et al. (1991) and Fishbein & Azjen (1975) described purchase intention as possibility to buy a service or product after seeing an advertisement. When intentions are high, there are more chances to purchase the product or service (Hosein, 2012; Schiffman & Kanuk, 2006). Purchase intention is deepen by ethics of business (Creyer & Ross, 1997). Few researchers (Lamba and aggarwal, 2014; Almana and Mirza, 2013) studied engagement of consumers towards WOM, which leads to purchase decision. Doh and Hwang (2009) identified the social media importance on purchase intention of the consumer.

Jacoby and Hoyer (1981) defined that as an opinion leader, knowledge of expert helps consumer in their purchase decision about a service or product and consumers consider knowledge of professional expert rather than advice of any other person (Alba and Hutchinson, 1987). The information must be shared by expert who possesses the knowledge about a product, as people consider this information in place of any other (Gilly et al., 1998). As a result, following hypothesis can be proposed:

H_4: *Sender's expertise affects purchase decision.*

Research Gap

When people want to purchase a service or product, they want to confirm their decision and search various option of information including WOM. Online WOM is a famous tool as it provides a large platform with various medium of information. Purchase decision of consumer influenced by E-WOM (Chatterjee, 2001) but Nugroho and Wuisan (2021) found no significant impact of E-WOM on purchase decision. Few researchers (Alrwashdeh et al., 2019; Torlak et al., 2014; Elseidi and El-Baz, 2016) argued that E-WOM quality, E-WOM quantity and E-WOM positively influence brand image of smart phone. Here a comparative study is proposed to consider all aspects of E-WOM and its influence on consumer purchase decision. Therefore, study aims to know the E-WOM impact on consumer purchase decision.

Research Methodology

The empirical study was conducted to check the influence of E-WOM on purchase decision of the consumer. For the purpose of this study, questionnaires were distributed to 600 and in response 552 accurate responses were received. Demographic information contained in first part of the questionnaire in which information of respondents about age, marital status, educational qualification, gender, income and occupation were asked. Multistage sampling method was used to collect the data in Haryana state. To analyze the data PLS-SEM 3 was used.

Results

To check the internal consistency composite reliability (CR) and Cronbach's Alpha (CA) was tested. The value of CR lies from 0.817 to 0.931 (table-1) which

is above the threshold value 0.7 (Nunnally & Bernstein, 1994; Fornell & Larcker, 1981) and values of CA were from 0.797 to 0.894 (table 1), which is also above 0.7 (Urbach and Ahlemann, 2010). Hair et al. (2011) regarded composite reliability as a better criterion for internal reliability. Further convergent validity was checked through average variance extracted (AVE) and outer loadings. Convergent validity is tested to check correlation in the same construct. Factor loading below 0.4 should be eliminated; loading above 0.4 is analyzed for the impact (Krasnova et al., 2008). One statement from E-WOM was removed, as the value was below 0.4 and rest of the values are above 0.6 (table-2). AVE values should be higher than 0.5 (Urbach and Ahlemann, 2010) and the value of AVE lies from 0.609 to 0.817 (table-1), which is above the lower acceptable value 0.5.

Fornell-Larcker criterion (1981) and cross loading are used to define the discriminant validity. It is used to identify the dissimilarity of the construct with others in the same model. In cross loading (table-3), all the bold values lies in the same construct and cross loadings are shown by non-bold values. On the other hand, values are in bold and are diagonal; represent the square root of AVE. The square root of AVE for indicators (E-WOM= 0.837, E-WOM quality= 0.799, E-WOM quantity= 0.841, purchase decision= 0.904 and sender's expertise= 0.78) are higher than the value of other latent variables (table-4). Figure-1 representing the four independent constructs (E=WOM, sender's expertise, E-WOM quantity and E-WOM quality) and one dependent constructs (purchase decision). The outer loadings already mentioned in table-2. The SRMR (Standardized root mean square residual) value was 0.058 which was below the favorable value (0.08) for model validation (Hu and Bentler, 1999).

Table-1 : Reliability Analysis/Convergent Validity

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
E-WOM	0.894	0.921	0.701
E-WOM quality	0.861	0.897	0.638
E-WOM quantity	0.797	0.879	0.708
Purchase decision	0.888	0.931	0.817
Sender expertise	0.85	0.817	0.609

Source : Author's Calculations.

Table-2 : Outer Loadings

	E-WOM	E-WOM quality	E-WOM quantity	purchase decision	sender expertise
EQUA1		0.645			
EQUA2		0.854			
EQUA3		0.87			
EQUA4		0.845			
EQUA5		0.757			
EQUANTITY1			0.892		
EQUANTITY2			0.833		
EQUANTITY3			0.796		
EWOM1	0.823				
EWOM2	0.839				
EWOM3	0.845				
EWOM4	0.876				
EWOM5	0.801				
PDEC1				0.919	
PDEC2				0.897	
PDEC3				0.895	
SENEXPP1					0.684
SENEXPP2					0.607
SENEXPP3					0.996

Source : Author's Calculations.

Table-3 : Cross Loadings

	E-WOM	E-WOM quality	E-WOM quantity	purchase decision	sender expertise
EQUA1	0.216	0.645	0.09	0.044	0.055
EQUA2	0.343	0.854	0.124	0.099	0.039
EQUA3	0.387	0.87	0.073	0.097	0.007
EQUA4	0.384	0.845	0.112	0.09	0.033
EQUA5	0.281	0.757	0.094	0.048	-0.019
EQUANTITY1	0.209	0.124	0.892	0.133	0.203
EQUANTITY2	0.213	0.098	0.833	0.101	0.273
EQUANTITY3	0.156	0.079	0.796	0.084	0.218
EWOM1	0.823	0.341	0.143	0.514	0.053
EWOM2	0.839	0.3	0.203	0.499	0.08
EWOM3	0.845	0.388	0.197	0.444	0.041
EWOM4	0.876	0.363	0.212	0.441	0.116
EWOM5	0.801	0.368	0.237	0.293	0.157

(Contd...)

PDEC1	0.491	0.078	0.086	**0.919**	0.019
PDEC2	0.497	0.077	0.129	**0.897**	0.053
PDEC3	0.473	0.122	0.139	**0.895**	0.059
SENEXPP1	0.075	0.052	0.262	0	**0.684**
SENEXPP2	0.085	0.054	0.203	0.006	**0.607**
SENEXPP3	0.096	0.025	0.264	0.051	**0.996**

Source : Author's Calculations.

Table-4 : Fornell and Lacker Criterion (1981)

	E-WOM	E-WOM quality	E-WOM quantity	purchase decision	Sender's expertise
E-WOM	**0.837**				
E-WOM quality	0.417	**0.799**			
E-WOM quantity	0.232	0.122	**0.841**		
purchase decision	0.539	0.102	0.13	**0.904**	
Sender's expertise	0.099	0.029	0.27	0.048	**0.78**

Source : Author's Calculations.

Figure-1 : Path Coefficient Model with 5000 Sub Samples using PLS-SEM 3
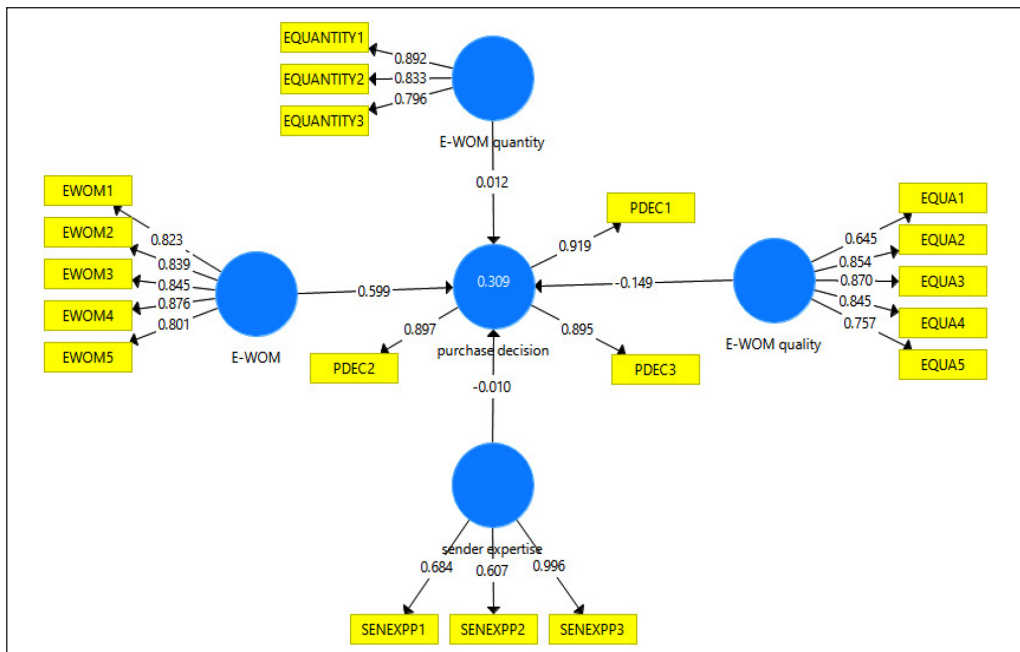
Source : Author's Calculations.

Discussion

WOM is an influencing source which eliminates the risk and provides experiences to customers. These experiences helps the consumer in their decision making process. The study examined the influence of E-WOM, E-WOM quality, sender's expertise and E-WOM quantity on smart phone purchase decision of the consumer. Total 4 hypotheses were formulated and PLS-SEM was used to get the results.

Table-5 : Hypothesizes Results

			t Statistics ($|O/STDEV|$)	p Values	Results
H_1	E-WOM purchase decision	->	16.667	0	Significant
H_2	E-WOM quality purchase decision	->	3.392	0.001	Significant
H_3	E-WOM quantity purchase decision	->	0.325	0.745	Not significant
H_4	Sender's expertise purchase decision	->	0.186	0.853	Not significant

Source : Author's Calculations.

Out of 4, H_1 (t = 16.667, p = 0) and H_2 (t = 3.392, p = 0.001) found significant and H_3 (t = 0.325, p = 0.745) and H_4 (t = 0.186, p = 0.853) found not significant. Results revealed that E-WOM quality (Lin et al., 2013; Alrwashdeh et al., 2019) and E-WOM (Zangeneh et al., 2014; Chatterjee, 2001; Torlak et al., 2014; Jailvand and Samiei, 2012) significantly influence purchase decision, whereas E-WOM quantity (Zangeneh et al., 2014) and sender expertise do not influence purchase decision of the consumer regarding smart phone.

Conclusion

E-WOM helps consumer to share their positive or negative comments about a service or product through internet (Hennig-Thurau et al., 2004). Consumer purchase process is affected by WOM. Findings revealed that sender expertise

and E-WOM quantity not significantly influence the purchase decision. E-WOM quality and E-WOM significantly influence the purchase decision of smart phone. Therefore, brands should focus on the E-WOM, as this is trending medium of sharing experiences and reviews about a service or product. The research only examined the E-WOM impact on purchase decision, further research can be conducted on moderation and mediation impact. The study can also carried out on different variables and in different geographical area.

References

Al Mana, A. M., & Mirza, A. A. (2013). The impact of electronic word of mouth on consumers' purchasing decisions. *International Journal of Computer Applications*, 82(9).

Alba, J. W., & Hutchinson, J. W. (1987). Dimensions of consumer expertise. *Journal of consumer research*, 13(4), 411-454.

Alrwashdeh, M., Emeagwali, O., & Aljuhmani, H. (2019). The effect of electronic word of mouth communication on purchase intention and brand image: An applicant smartphone brands in North Cyprus. *Management Science Letters*, 9(4), 505-518.

Balakrishnan, B. K., Dahnil, M. I., & Yi, W. J. (2014). The impact of social media marketing medium toward purchase intention and brand loyalty among generation Y. *Procedia-Social and Behavioral Sciences*, 148, 177-185.

Bickart, B., & Schindler, R. M. (2001). Internet forums as influential sources of consumer information. *Journal of interactive marketing*, 15(3), 31-40.

Brooks Jr, R. C. (1957). "Word-of-mouth" advertising in selling new products. *Journal of marketing*, 22(2), 154-161.

Cacioppo, J. T., & Petty, R. E. (1984). The elaboration likelihood model of persuasion. *ACR North American Advances*.

Chatterjee, P. (2001). Online reviews: do consumers use them?.

Chen, J., Teng, L., Yu, Y., & Yu, X. (2016). The effect of online information sources on purchase intentions between consumers with high and low susceptibility to informational influence. *Journal of Business Research*, 69(2), 467-475.

Cheung, C. M., & Thadani, D. R. (2010). The Effectiveness of Electronic Word-of-Mouth Communication: A Literature Analysis. *Bled eConference*, 23, 329-345.

Chevalier, J. A., & Mayzlin, D. (2003). The effect of word of mouth on sales: online book reviews. *NBER working paper no.* 10148.

Creyer, E. H., & Ross Jr, W. T. (1997). Tradeoffs between price and quality: How a value index affects. *Journal of Consumer Affairs*, 31(2), 280-302.

Dodds, W. B., Monroe, K. B., & Grewal, D. (1991). Effects of price, brand, and store information on buyers' product evaluations. *Journal of marketing research*, 28(3), 307-319.

Doh, S. J., & Hwang, J. S. (2009). How consumers evaluate eWOM (electronic word-of-mouth) messages. *Cyber psychology & behavior*, 12(2), 193-197.

Elseidi, R. I., & El-Baz, D. (2016). Electronic word of mouth effects on consumers' brand attitudes, brand image and purchase intention: an empirical study in Egypt. *The Business & Management Review*, 7(5), 268.

Fan, Y. W., Miao, Y. F., Fang, Y. H., & Lin, R. Y. (2013). Establishing the adoption of electronic word-of-mouth through consumers' perceived credibility. *International Business Research*, 6(3), 58.

Filieri, R. (2015). What makes online reviews helpful? A diagnosticity-adoption framework to explain informational and normative influences in e-WOM. *Journal of Business Research*, 68(6), 1261-1270.

Filieri, R., Raguseo, E., & Vitari, C. (2018). When are extreme ratings more helpful? Empirical evidence on the moderating effects of review characteristics and product type. *Computers in Human Behavior*, 88, 134-142.

Fischbein, M., & Ajzen, I. (1975). Belief, attitude, intention and behavior. *Addison-Wesley*.

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics.

Gilly, M. C., Graham, J. L., Wolfinbarger, M. F., & Yale, L. J. (1998). A dyadic study of interpersonal information search. *Journal of the academy of marketing science*, 26(2), 83-100.

Gupta, P., and Harris, J. (2010). How e-WOM recommendations influence product consideration and quality of choice: a motivation to process information perspective. *Journal of Business Research*, 63, 1041–1049.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice*, 19(2), 139-152.

Hennig-Thurau, T., Gwinner, K. P., Walsh, G., & Gremler, D. D. (2004). Electronic word-of-mouth via consumer-opinion platforms: what motivates consumers to articulate themselves on the internet?. *Journal of interactive marketing*, 18(1), 38-52.

Hosein, N. Z. (2012). Measuring the purchase intention of visitors to the auto show. Journal of management and marketing research, 9(1), 1-17.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, 6(1), 1-55.

Ismagilova, E., Dwivedi, Y. K., Slade, E., & Williams, M. D. (2017). Electronic word of mouth (eWOM) in the marketing context: A state of the art analysis and future directions.

Jacoby, J., & Hoyer, W. D. (1981). What if opinion leaders didn't know more? A question of nomological validity. *ACR North American Advances*, 8, 299-303.

Jalilvand, M. R., & Samiei, N. (2012). The impact of electronic word of mouth on a tourism destination choice. Internet Research.

Kim, D., Jang, S. S., & Adler, H. (2015). What drives café customers to spread eWOM?. *International Journal of Contemporary Hospitality Management*.

Krasnova, H., Hildebrand, T., Guenther, O., Kovrigin, A., & Nowobilska, A. (2008). Why participate in an online social network? An empirical analysis.

Ladhari, R., & Michaud, M. (2015). eWOM effects on hotel booking intentions, attitudes, trust, and website perceptions. *International Journal of Hospitality Management*, 46, 36-45.

Lamba, B., & Aggarwal, M. (2014). A study on influence of eWOM: Consumer buying behavior. *The International Journal of Business & Management*, 2(9), 237.

Lee, M. K., Shi, N., Cheung, C. M., Lim, K. H., and Sia, C. L. (2011). Consumer's decision to shop online: the moderating role of positive informational social influence. *Information Management*, 48, 185–191.

Lin, C., Wu, Y. S., & Chen, J. C. V. (2013). Electronic word-of-mouth: The moderating roles of product involvement and brand image. *TIIM 2013 Proceedings*, 43(2013), 39-47.

Marsha L. Richins and Teri Root-Shaffer (1988). The Role of Evolvement and Opinion Leadership in Consumer Word-Of-Mouth: an Implicit Model Made Explicit. *Advances in Consumer Research*, 15, 32-36.

Mitchell, V. W., & McGoldrick, P. J. (1996). Consumer's risk-reduction strategies: a review and synthesis. *International Review of Retail, Distribution and Consumer Research*, 6(1), 1-33.

Munnukka, J., Karjaluoto, H., & Tikkanen, A. (2015). Are Facebook brand community members truly loyal to the brand?. *Computers in Human Behavior*, 51, 429-439.

Nugroho, C. P., & Wuisan, D. (2021). The influence of social media usage, electronic word of mouth, and trust as a mediating variable towards purchase decision involvement on Zalora Indonesia. *Indonesian Digital Marketing Journal*, 1(1), 15-32.

Nunnally, JC, & Bernstein, IH (1994). Psychometric theory (3rd edition)

Park, C., & Lee, T. M. (2009). Information direction, website reputation and eWOM effect: A moderating role of product type. *Journal of Business research*, 62(1), 61-67.

Schiffman, L. G., & Kanuk, L. L. (2006). Consumer Behavior. *Pearson Prentice Hall*.

Soares, A. M., Pinho, J. C., & Nobre, H. (2012). From social to marketing interactions: The role of social networks. *Journal of Transnational Management*, 17(1), 45-62.

Teng, S., Khong, K. W., Chong, A. Y. L., & Lin, B. (2017). Examining the impacts of electronic word-of-mouth message on consumers' attitude. *Journal of Computer Information Systems*, 57(3), 238-251.

Torlak, O., Ozkara, B. Y., Tiltay, M. A., Cengiz, H., & Dulger, M. F. (2014). The effect of electronic word of mouth on brand image and purchase intention: An application concerning cell phone brands for youth consumers in Turkey. *Journal of Marketing Development and Competitiveness*, 8(2), 61.

Urbach, N., & Ahlemann, F. (2010). Structural equation modeling in information systems research using partial least squares. *Journal of Information technology theory and application*, 11(2), 5-40.

Wang, S., Cunningham, N. R., & Eastin, M. S. (2015). The impact of eWOM message characteristics on the perceived effectiveness of online consumer reviews. *Journal of Interactive Advertising*, 15(2), 151-159.

Yan, X., Wang, J., & Chau, M. (2015). Customer revisit intention to restaurants: Evidence from online reviews. *Information Systems Frontiers*, 17(3), 645-657.

Zhang, Z., Ye, Q., Law, R., & Li, Y. (2010). The impact of e-word-of-mouth on the online popularity of restaurants: A comparison of consumer reviews and editor reviews. *International Journal of Hospitality Management*, 29(4), 694-700.

Impact of Consumer Ethnocentrism on the Attitude towards Global vs Local Products

SHASHI YADAV AND RAJENDRA PRASAD

Abstract :

Purpose – *The study aimed to determine the impact of ethnocentric tendency on attitude formation towards global versus local products and to determine the moderating role of gender on this relationship.*

Design/Methodology/Approach – *To achieve this aim, a quantitative study was undertaken with 156 responses collected from self-administered questionnaires from Delhi-NCR using convenience sampling. CETSCALE measured consumer ethnocentrism (product category-electronics) on a 5-point Likert scale. CFA, regression, and t-test were performed for analysis.*

Findings – *Indians exhibited an average ethnocentric attitude toward evaluating global vs local products. The difference between the attitudes of high and low ethnocentric respondents was marginally significant. Gender didn't influence the respondents' attitudes towards global vs local products, and there is no statistical difference between the ethnocentrism levels of both gender.*

Research Limitations– *The present study was limited to the Delhi-NCR region of India and considered only one product category, electronics. Only one moderating variable (Gender) was considered.*

Originality/Value – *The findings of this study enriched the existing pool of knowledge by helping marketers make consumer ethnocentric tendencies a psychographic segment variable while planning marketing strategies. Marketers could also formulate strategies that include a Positive Country Image like 'Indians buy MADE IN India goods' to promote domestic goods, especially, among the highly ethnocentric segment of society.*

Keywords : Ethnocentrism, COO, Attitude, Global Products.

Shashi Yadav, Research Scholar, School of Management Studies, IGNOU, New Delhi, Shashiy247@gmail.com 0000-0003-0769-0887.

Dr. Rajendra Prasad, Assistant Professor, School of Management Studies, IGNOU, New Delhi, rajendraparasad@ignou.ac.in

Introduction

Globalization reforms have allowed the world to witness numerous brands and products reach its surface. Reduction in tariffs, decrease in import duties and the globalized influence of organizations such as the World Trade Organisation (WTO) and International Monetary Fund (IMF) have paved the way for this change. This progressive shift has led to many structural changes in the Indian market, such as increased competition, increased availability of products in terms of quantity and quality and increased awareness among consumers. Regarding Domestic Product (GDP), India ranks sixth with a GDP of 2,946.06 billion $ and a growth rate of 9.50 %, making it Asia's third-largest economy after China and Japan. (IMF, World Economic Outlook, October 2021). Seeing this strong position in India, every global company wants to market its products. In India, the middle class constitutes 600 million people (Biswas, 2015). With increasing global culture, consumers have a basket full of local versus global products to choose from. Shopping experiences that were earlier restricted to local names are now coming to a global place. Resultant, consumers experience a paradox of choice. Even on global platforms, the debate on 'local vs. global' is ongoing, and top world leaders are discussing this issue.

Especially in India, much more focus is being given to the 'MADE IN INDIA' campaign to encourage people to purchase Made in India Products. The COVID-19 pandemic has accelerated this process. Thus, it is apparent that preferences of Indians are changing and now they are making their decisions wisely after considering the complex information set. Past literature has clearly documented that consumer ethnocentrism accounts for attitude formation towards domestic vs. overseen products (Bawa, 2004). Consumer Ethnocentrism (CE) is a distinctive market area of ethnocentrism, which is a key element of the country of origin (COO) image. CE refers to the beliefs held by consumers about the appropriateness and morality of purchasing global product (Shimp & Sharma, 1987); whereas Attitude means the degree to which a person has a positive or negative outlook for an object (Ajzen, 1991)

In the literature, there are few studies on ethnocentrism, specifically in the Indian context. Therefore, the present study has precisely taken ethnocentrism to investigate how it helps Indians evaluate domestic and overseas products. This study also investigates whether gender has a moderating role in the relationship between CE and attitude formation towards local vs. global products. Therefore, the present study is pioneering in this regard. The present study's findings will enrich the existing pool of knowledge by helping marketers make consumer

ethnocentric tendencies a psychographic segment variable while planning marketing strategies. Marketers can also formulate strategies that include a Positive Country Image like 'Indians buy MADE IN India goods' to promote domestic goods, especially among the high ethnocentric segment of society.

The rest of the paper is presented this way; In the first section, a literature review is presented and research hypotheses are developed. The following section discusses the research methodology in detail. The next section includes the results and analysis, followed by discussion and conclusion. The next section presents the theoretical and managerial implications. The last section ends with the limitations and scope for further research.

2. Review of Literature and Research Hypotheses

2.1. Consumer Ethnocentrism

Consumer ethnocentrism (CE) was first discussed by Sumner (1906) as a sociological construct stating that one's own group is superior and all others are inferior. Thereafter, Balabanis and Diamantopoulos (2004) explained ethnocentrism as a broad construct representing a worldview in which one's own group is at focus and all else is measured and valued in relation to it. According to Sumner's theory, ethnocentrism is more related to we-group feelings, wherein the in-groups are at the center and the outgroups are appraised concerning it. Sumner emphasizes the importance of ethnocentrism's two-fold structure: a negative outlook toward out-groups and a positive outlook for in-groups. The criteria by which other groups are judged are set by in-groups. Social identity theory explains ethnocentrism as the relationship between in-groups and out-groups.

Shimp and Sharma (1987) define ethnocentrism as a trait-like aspect of an individual's personality which incorporates consumer beliefs about the aptness and morality of acquiring overseas products. They established CETSCALE to assess customers' ethnocentric inclinations while buying foreign vs. American-made products. The CETSCALE consists of Likert-type statements in which individuals describe the severity of their disagreement. CETSCALE has been tested in many countries and with a variety of goods and has been determined to have good reliability and validity (Good & Huddlestone, 1995) Past researchers have proven the CETSCALE's uni-dimensionality, discriminant validity, factor structure invariance, and nomologic validity (Netemeyer, 1991).

Furthermore, the impact of CE is influenced by the degree of development of one's own nation. Wang & Chen (2004) observed that consumers in industrialized countries value native items more than imported products, resulting in a greater influence of CE on purchasing the former and rejecting the latter. In developing nations, on the other hand, customers view imported items coming from advanced countries as superior to their home items. Domestic goods are preferred when customers have a strong feeling of patriotism or love for their country (Wall *et al.*, 1991), when their country is endangered by imported goods (Papadopoulas & Heslop, 1993), when product serviceability is simple to obtain (Han & Terpstra, 1988), and when the consumer is unfamiliar with other countries' products (Alder *et al.*, 1993).

2.2. Consumer Ethnocentrism and Attitude

CE is a consumer's personality attribute that affects his attitude towards local vs. global products (Lee *et al.*, 2003). CE is believed to have a negative effect on attitudes toward foreign products (Bawa, 2004; Kwak *et al.*, 2006) and, bias towards purchasing foreign products (Klein *et al.*, 2006; Netemeyer *et al.*, 1991).

If seen from ethnocentric lens, high ethnocentric consumers appraise domestic products more favourably (i.e., in groups) than foreign ones (i.e., outgroups) (Shankarmahesh, 2006) While, less ethnocentric takes into account the product' goodness over its origin (Shimp & Sharma, 1987). Ethnocentric consumers evaluate a product based on moral perceptions that are beyond the functional roles of a product (Yagci, 2007).

According to social identity theory, highly ethnocentric consumers associate domestic products with pride and attachment and keep foreign products in contempt. Apart from patriotism or love for the country (Wall *et al.*, 1991), serviceability could be a factor in locally-made goods (Han & Terpstra, 1988). Moreover, Bianchi & Mortimer (2015) and Fernandez-Ferrin *et al.* (2018) find that CE influences consumers' attitudes toward global vs. local products. Nationalism is also believed to be one factor influencing attitudes toward domestic products (Olsen *et al.*, 1993). In some cases, it was considered that buying imported products was inappropriate because of problems with the nation (Shoham & Gavish, 2016).

H01 : CE positively influences Indians' purchase attitudes towards global vs. local products.

H02 : There is no significant difference between the attitudes of high and low ethnocentric respondents towards global vs. local products

2.3. Ethnocentrism and Gender

Ma et al. (2020) found that demographic factors also influence CE levels. Women appraise domestic products more favourably than men do, indicating that they are more ethnocentric than their counterparts. Studies have also shown that, given a choice between domestic and foreign products, females usually opt for domestic goods over overseas products (Bawa, 2004; Balabanis *et al.,* 2002)

H03 : There is a significant difference between the ethnocentrism of Males and Females.

3. Research Methodology

3.1. Pre-Testing and Pilot Study

A pretesting was conducted on five respondents while drafting the questionnaire to determine whether the respondents were obtaining the intended meanings of the statements or not. After making the full questionnaire, a pilot study was conducted to investigate the reliability and content validity of the constructs. For content validity, the questionnaire was sent to a few experts in the domain area and the statements were reframed after incorporating their suggestions. The questionnaire was then sent to 55 respondents who were requested to complete and review it. The value of Cronbach's alpha, a benchmark used to test reliability, was .811 above the specified limit of .70 (Hair, 2013).

3.2. Objectives of the Paper

The aims of the present study are as follows :

1.   To ascertain the impact of ethnocentrism on Indians' purchase attitudes towards global vs. local products.

2.   To examine whether there is any significant difference between the attitudes of high and low ethnocentric respondents towards global vs. local products.

3.   To identify whether there is any significant difference between the ethnocentrism of Males and Females

4.   To know how many consumers check the COO tag before buying a product.

3.3. Sampling and Data Collection

To achieve the above-mentioned aims, quantitative research was conducted in which 250 self-administered questionnaires (data collection tool) were distributed to respondents, out of which 159 successfully responded. Of these,

three questionnaires were not completed; and were discarded. The questionnaire was designed using Google Forms and was circulated online (using email ids and online academic groups) and offline (using hard copies). Offline respondents were mainly from the NCR geographical region, particularly Gurgaon and Delhi. The Delhi-NCR region was chosen for this study, as Delhi is one of the biggest metropolitan cities in India. In Delhi, people from almost every state of India, come and live here, making it mini-India. Non-probability sampling (convenience sampling) was used to collect responses. Care was taken that all the respondents should be over 18 years of age, use electronic devices, and have some source of income (population of the study). Three product categories were chosen, namely, TV, mobile phones, and laptops to represent the most of the consumer electronics sector (IBEF, 2020). Specifically, electronics is considered a high-involvement product and, in its purchase, a significant amount of time, energy, and money are involved. In addition, it is a familiar product to which every segment of society can easily relate.

3.4. Questionnaire and Measurement

The questionnaire was initially designed in English with language translations wherever required. It consists of four parts: The first part asks for socio-demographic details such as age, gender, income, education qualification, and occupation. The second part measures the ethnocentrism level of consumers using the CETSCALE (adapted scale) (Shimp & Sharma, 1987) on 22 statements on a five-point Likert scale with endpoints strongly agree (1) to strongly disagree (5). The third part measures consumers' attitudes towards global vs. local products on characteristics such as value for money, quality, status and esteem, technology country-of-origin credibility, innovativeness, reliability, durability, performance, functionality, and engineering (Roth & Romeo, 1992; Terpstra & Han, 1988). The fourth part measures whether respondents look for the COO tag while purchasing a product or not. The analysis was performed using CFA in IBM-AMOS (23), regression and t-test in IBM-SPSS (23), and Microsoft Excel (2016).

Literature was extracted using databases such as Emerald, Sage, Science Direct, Wiley Online, Taylor & Francis, and Springer. Primary data was collected from July 2023 to September 2023. The questionnaire took approximately 15 minutes to complete.

4. Analysis and Results

4.1. Socio-demographic Profile

The socio-demographic profile of respondents is shown in Table-1.

Table-1 : Demographic Profile of Respondents

Descriptive	Frequency (n=156)	(%)
Gender		
Male	72	46.2
Female	84	53.8
Age (years)		
Below 20	26	16.7
20-30	98	62.8
30-40	24	15.4
40-50	7	4.5
50-60	1	.6
Above 60	0	0
Occupation		
Student	72	46.2
Working	62	39.7
Non-Working	10	6.4
Self-employed	8	5.1
Others	4	2.6
Income (in Rs)		
Below 20k	83	53.2
20k-40k	24	15.4
40k-60k	22	14.1
60k-80k	17	10.9
Above 80k	10	6.4
Educational qualifications		
Secondary	0	-
Senior Secondary	30	19.2
Graduate	75	48.1
Post- Graduate	41	26.3
Higher Studies	10	6.4

Source : Author's Calculations.

The participation rate of males (46.2%) and females (53.8%) was almost equal; most respondents were relatively young, 80% were below the age of 30. Students and working class constitute 86% of the survey. Most respondents (53%) had income below 20k as they were mainly students. Graduates or post-graduates constituted 75% of the sample, indicating well-educated respondents.

4.2. Reliability and Validity

Reliability is a measure of the constructs' internal consistency. Construct reliability was analysed using Cronbach's alpha and composite reliability (CR). For each construct in the study, Cronbach's alpha > .70 and CR were also > 0.70 benchmark (Hair *et al.*, 2022; Islam *et al.*, 2021d). Hence, construct reliability was found to be significant for each construct. Convergent validity was estimated using CR and Average Variance extracted (AVE) (Iglesias *et al.*, 2019; Pervan *et al.*, 2018). The AVE values were > 0.50 and the CR values were also above 0.7. Thus, convergent validity was established. The results are summarized in Table-2a.

Table-2a : Cronbach Alpha, CR and AVE statistics

Constructs	No. of Items	Alpha(α)	CR	AVE
ET	22	.914	.862	.502
AT	11	.824	.879	.512

Discriminant validity using HTMT ratio is also analysed. All the figures were < .85 (Ahmed *et al.*, 2022; Henseler *et al.*, 2015). Hence, discriminant validity was well established. Table-2 b. summarizes the results:

Table-2b : Discriminant Validity

	CE	AT
CE		
AT	.225	

4.3. Descriptives

The mean rating of CET-SCALE (Mean = 2.5, SD = .590) used for measuring ethnocentrism on a 5 Likert scale revealed mixed results, some respondents were more ethnocentric while others had an average score.

A total of 22 statements of ethnocentrism were asked, the most salient results are as follows: 87% of respondents agree on Buy Indian-made products. Keep India working (15, mean= 1.76, SD=.683). 91% of respondents believed 'Purchase of Indian products gives a boost to local MSMEs and Micro Industry' (20, mean= 1.74, SD=.678). Similarly, 85% of respondents had an opinion that Buying home country products makes us self-reliant in all aspects in the long run (21, mean= 1.92, SD=.832) and last but not least 89% respondents argue that Buying Indian products make Indian economy prosper' (22, mean= 1.82, SD=.712). Refer Table no. 3 for CETSCALE statements.

The mean of respondents' attitudes towards global vs. local products (mean = 3.12, SD = .583) reveals that respondents are marginally more inclined toward global products than local ones. A total of 11 statements measuring attitude were asked whose most salient results are as follows: Global products were evaluated more favourably than local ones in all characteristics except for worth of money (9, mean 2.9, Agreement level 35%). Characteristics that exhibited the most prominent differences in attitude were technology (Q1, mean 3.41, agreement level 78%), engineering (Q4, mean 3.28, Agreement level 78%) and innovations (Q8, mean 3.28, Agreement level 76%) global products are rated more than local ones. Refer table no. 4 for Attitude statements.

4.4. Cluster Analysis

The 22 statements of CET-SCALE were used to determine the possibility of customer clusters with varying CE levels. After implementing hierarchical cluster analysis, a rapid clustering approach (k-means cluster analysis) was used, to identify two clusters (high ethnocentric and low ethnocentric).

For both hierarchical and k-means techniques, information on the distribution of customers in the clusters is produced using a nominal variable (cluster membership variable). Finally, two clusters were chosen, the first cluster had 73 respondents (46% of N), the and second cluster had 86 respondents (54% of N). Table-3 presents the cluster analysis results for the 22 CETSCALE statements.

Table-3 : Mean, Std Deviation and Significant Differences of Clusters, CETSCALE (N=156)

Table-3. Mean, Std Deviation and Significant Differences of Clusters, CETSCALE (N=156)

CETSCALE Cluster		Mean	Std. Deviation	T test t	sig.
1. Indians should always buy Indian-made products instead of imports.	1	2.92	.824		
	2	1.84	.703	8.819	0.000
2. Only those products that are unavailable in India should be imported	1	2.72	.988		
	2	1.99	.791	5.005	0.000
3. There should be very little trading or purchasing of goods from other countries unless out of necessity	1	3.38	.976		
	2	2.24	.809	7.993	0.000
4. Curbs should be put on all imports.	1	3.46	1.093		
	2	2.59	.963	5.310	0.000
5. Foreigners should not be allowed to put their products in Indian market.	1	4.14	.515		
	2	3.08	1.039	8.338	0.000
6. We should buy from foreign countries only those products that we cannot obtain within our own country.	1	3.06	1.120		
	2	1.89	.522	8.089	0.000
7. Indian products, first, last and foremost.	1	2.97	.894		
	2	1.89	.790	8.056	0.000
8. Purchasing foreign made products is un-Indian.	1	4.25	.788		
	2	3.10	1.049	7.651	0.000
9. A real Indian should always buy Indian-made products.	1	4.11	.747		
	2	2.54	1.094	10.671	0.000
10. It is always best to purchase Indian products.	1	3.30	.901		
	2	2.00	.822	9.366	0.000
11. It may cost me in the long-run but I prefer to support Indian products.	1	2.77	.898		
	2	2.02	.805	5.577	0.000
12. Purchasing Indian products is showing love for India.	1	3.24	1.007		
	2	1.88	.826	9.137	0.000
13. Buying Indian products is a matter of pride.	1	2.90	.958		
	2	1.83	.741	7.900	0.000

(Contd...)

14. Indian products should be purchased as we trust them.	1	2.86	.899	6.776	0.000
	2	1.96	.736		
15. Buy Indian-made products. Keep India working.	1	2.06	.715	5.434	0.000
	2	1.51	.546		
16. It is not right to purchase foreign products, because it puts Indians out of jobs.	1	3.48	.843	6.879	0.000
	2	2.42	1.089		
17. We should purchase products manufactured in India instead of letting other countries get rich off us.	1	2.70	.852	4.964	0.000
	2	2.02	.875		
18.. Indian should not buy foreign products, because this hurts Indian business and causes unemployment.	1	3.28	.814	8.322	0.000
	2	2.16	.863		
19. Foreign products should be taxed heavily to reduce their entry in India.	1	3.42	.905	8.073	0.000
	2	2.24	.918		
20. Purchase of Indian products gives boost to local MSMEs and Micro Industry.	1	1.73	.675	-.189	0.850*
	2	1.75	.684		
21. Buying home country products make us self-reliant in all aspects in long run.	1	2.20	.980	3.847	0.000
	2	1.69	.599		
22. Buying Indian products make Indian economy prosper.	1	2.07	.743	4.206	0.000
	2	1.61	.616		

*Note. *p value significant if <0.05*

Every statement of CETSCALE shows a significant difference between the two clusters (p<0.05) except statement 20 'Purchase of Indian products gives boost to local MSMEs and Micro Industry' with p= .850 (>0.05). This indicates that both clusters show a significant difference on each statement of CETSCALE and on the overall CE construct. Table-4 shows the results of the cluster analysis of the 11 attitude statements:

Table-4 : Mean, Std Deviation and Significant Differences of Clusters, CETSCALE (N=156)

Table-4. Mean, Std Deviation and Significant Differences of Clusters, CETSCALE (N=156)

ATTITUDE Clusters		Mean	Std. Deviation	T-test t	sig.
1. Foreign electronic goods are high on technology than domestic electronic goods.	1	3.55	.907	1.624	.106*
	2	3.30	1.027		
2. Foreign electronic goods are high in quality than domestic electronic goods.	1	3.27	.910	2.027	.044
	2	2.95	1.005		
3. Foreign electronic goods have high functionality than domestic electronic goods.	1	3.38	.884	1.895	.060*
	2	3.10	.978		
4. Foreign electronic goods are high in engineering than domestic electronic goods.	1	3.31	.888	.258	.796*
	2	3.27	.987		
5. Foreign electronic goods have high performance than domestic electronic goods.	1	3.31	.950	2.652	.009
	2	2.91	.941		
6. Foreign electronic goods are more durable than domestic electronic goods.	1	2.97	.941	1.131	.260*
	2	2.80	.943		
7. Foreign electronic goods are more reliable than domestic electronic goods.	1	3.07	.976	1.470	.144*
	2	2.85	.914		
8. Foreign electronic goods are more innovative than domestic electronic goods.	1	3.41	.935	1.427	.156*
	2	3.19	.976		
9. Foreign electronic goods are worth more value for money than domestic electronic goods.	1	3.10	1.030	1.217	.225*
	2	2.90	1.052		
10. Foreign electronic goods have more Status and esteem than domestic electronic goods.	1	3.14	1.018	-.002	.999*
	2	3.14	1.042		
11. Foreign electronic goods have more Country of Origin (COO) creditability than domestic electronic goods.	1	3.10	.864	.838	.403*
	2	2.98	.933		

Note. *p value significant if <0.05

All the statements show insignificant results as p > 0.05 except 'Foreign electronic goods are high in quality than domestic electronic goods (p=.044(<0.05))' and 'Foreign electronic goods have high performance than domestic electronic goods (p=.009(<.05))'. This indicates that the overall attitude and its statements differ significantly for each cluster.

4.5. Hypotheses Testing

The independent variable ET significantly predicted AT (Dependent variable) $(F (1,155) = 13.137. p<0.001)$, indicating that ET significantly influences AT $(b=.280, p<0.001)$. Hence, H1 was supported. However, the effect size $(r = .280)$ was low, accounting for 7.8% (R^2) of variance. Table-5 summarizes the results:

Table-5 : Regression

Hypothesis	Regression weights	Beta Coefficient	R^2	F	p-value	Hypothesis Supported
H1	ET→AT	.280	.078	13.137	0.000	Yes

*Note. *p<0.05. ET: Ethnocentrism, AT: Attitude*

An independent sample t-test shows marginal differences $(t (155) = 2.26, p = 0.025)$ in the mean scores of high and low ethnocentric respondents. The mean score for CL1 $(M = 3.237, SD = .574)$ was higher than that for CL2 $(M = 3.028, SD = .577)$. The magnitude of mean difference (mean difference = .209, 95% CI .027 to .391) was found not that significant. However, H3 was supported at $p< 0.05$. Also, the effect size $(r = .1786)$ was small, accounting for only 3.19 % of the variance. The results are shown in Table-6.

Table-6 : Differences between Attitudes of High and Low Ethnocentric Respondents

					Levene's Test for Equality of variances		t-test for Equality of Variances				95% CI of difference	
		N	Mean	SD	F	Sig	t	df	Sig(2-tailed)	Mean Difference	Lower	Upper
ET	CL1	71	3.237	.574								
	CL2	86	3.028	.577	.422	.517	2.26	155	.025	.209	.027	.391

*Note. *p<0.05. AT: Attitude, CL1: High Ethnocentric cluster, CL2: Low Ethnocentric cluster*

An independent sample t-test was conducted to test the hypothesis. In Levene's test for equality of variances, the p-value < .05, so equal variance not assumed row was considered. No significant differences $(t (136) = 1.964, p = 0.52)$ were observed in the mean scores. The mean score for males $(M = 2.63, SD = .650)$ was higher than that of their female counterparts $(M = 2.44, SD = .526)$. The magnitude

of mean difference (mean difference = .188, 95% CI -.0013 to .377) was not significant. Hence H5 was not supported. Results are shown in Table-7.

Table-7 : Differences between Ethnocentrism of Males and Females

		Levene's Test for Equality of variances				t-test for Equality of Variances						
		N	Mean	SD	F	Sig	t	df	Sig(2-tailed)	Mean Difference	95% CI of difference	
											Lower	Upper
ET	M	72	2.63	.650								
	F	84	2.44	.526	5.55	.020	1.964	136	0.52	.188	-.0013	.377

*Note. *p<0.05. ET: Ethnocentrism, M: Males, F: Females*

On being asked 'Whether you see country of origin (COO) tag before purchasing a product or not' 89 respondents said YES, 28 respondents said NO, and the rest 40 said MAYBE, indicating that majority of the sample do see the COO tag.

5. Discussion and Conclusion

The ethnocentrism level of Indian consumers on CET-SCALE (Sharma & Shimp, 1987) showed a mean value of 2.53, revealing average findings, that is, respondents are neither too high nor too low on the CE level (see Table 3). Similar results were proposed by Balabanis and Diamantopoulos (2004), where a high ethnocentrism level leads consumers to prefer locally manufactured products but not necessarily boycott international products, possibly because they belong to a developing economy. This can be a learning lesson for companies that, while forecasting the success or failure of their products, they should not solely depend on consumer ethnocentrism levels of target markets, especially in a country like India.

Certain characteristics (technology, quality, engineering, durability, reliability, etc.) of the product were asked to measure the attitude of the respondents towards the global vs. local product on a five-point Likert scale. A mean rating of 3.12 shows a bit skewed preference for foreign products (details are shown in Table 4). The possible reason behind such an average attitude may be the developing state of the home country (India). Chen & Wang (2004) confirmed that consumers from advanced countries exhibit more favourable attitudes

towards local products in comparison to foreign products. The opposite is the case in developing countries like India, wherein consumers perceive overseas products (especially those from economically advanced nations such as the U.S. and UK) as superior to their domestic products, and sometimes they associate products from more advanced countries with status and prestige.

A cluster analysis was performed to allocate the sample into two clusters. The first cluster (Mean= 3.047, SD=.339, n=73, 46% of N) was named high ethnocentrism and the second cluster (Mean= 2.102, SD=.369, n=86, 54% of N) was named low ethnocentrism (refer Table 3). Every statement of CETSCALE shows a significant difference between the two clusters (p<0.05) except statement 20 'Purchase of Indian products gives boost to local MSMEs and Micro Industry' with p= .850 (>0.05) (see Table 4). This indicates that both clusters significantly differ on each statement of CETSCALE and the overall CE construct. All the attitude measuring statements show insignificant results as p> 0.05 except 'Foreign electronic goods are higher in quality than domestic electronic goods (p=.044(<0.05))' and 'Foreign electronic goods have higher performance than domestic electronic goods (p=.009(<.05))'. This indicates that the overall attitude and its statements differ significantly for each cluster.

The first hypothesis was tested using the regression technique to ascertain the impact of ethnocentrism on Indians' purchase attitudes towards global vs. local products. P=0.000 (<.005) shows that hypothesis was supported (see Table 5), hence ethnocentrism has an impact on the purchase attitude of Indians towards global vs. local products. The findings indicate that highly ethnocentric Indians show a domestic country bias for locally made products. However, the effect size (r = .280) was low, accounting for 7.8% (R^2) of variance. Literature shows that consumers' ethnocentric tendencies have greater power to explain consumer purchasing behaviour than other members of the marketing mix (Wright & Watson, 2000). The same results were substantiated by a study by Shimp & Sharma (1987), where CE a positively impacted consumer choice between global and local products.

The second hypothesis was tested using a t-test to determine whether there was any significant difference between the attitudes of high and low ethnocentric respondents towards global vs local products. As P= 0.025 marginally less than .005 shows no significant difference between the attitudes of high and low ethnocentric respondents towards global vs. local products. However, this hypothesis was supported (refer Table-6). The effect size (r = .1786) was low, accounting for 3.19% (R^2) of variance. The opposite results were found in the

literature wherein consumers who show a higher level of ethnocentrism evaluate foreign products in accordance with their effect on their nation. They believed that purchasing imported products is unpatriotic as it leads to massive unemployment and resultant harm to the domestic economy. In the present study, the results are not significant possibly because India is a developing economy and the respondents (both high and low ethnocentric) believe that the products originating from a foreign country are of better quality in terms of durability, technology, and engineering as they come from a more advanced country (Shimp & Sharma, 1987). In their study, Sternquist & McLain (1991), found more ethnocentric consumers tend to purchase more domestic-made products than low ethnocentric consumers.

The third hypothesis was tested using a t-test to determine whether there was a significant difference between the ethnocentrism of Males and Females. P= 0.52(> .005) shows that the hypothesis was not supported, indicating that there was no significant difference between the ethnocentrism of Males and Females (Table 7). Additionally, the effect size (r = .166) was low, accounting for 2.8% (R^2) of variance. The studies by Caruana (1996), Good & Huddleston (1995) and McLain & Sternquist (1991) were also in line with the results of the present study, where there was no significant relationship between gender and ethnocentrism was found. However, the findings contradict those of Good & Huddleston (1995) and Sharma *et al*. (1995) where the magnitude of consumer ethnocentrism is higher for women than for men. The probable argument for the findings would be increasing cosmopolitisation in India and increasing educational levels among Indian females.

6. Implications

In the present study, on theoretical grounds demographics (gender) were not found to be a considerable factor in the determination of CE in the Indian context, therefore other elements of ethnocentric tendency (social-psychological, economic and political factors (Shankarmahesh, 2006) could be tested and examined. India is continuously going on a path of progression and development embracing global culture and modernization. Therefore, economic and socio-psychological antecedents could be more capable of explaining Indians' ethnocentrism levels.

The present study offers several managerial implications. First, consumer ethnocentrism provides useful insight to understand the rationale behind consumers' choice of global vs. local products, especially when there is a

moderate level of ethnocentrism among Indians, where one segment of consumers prefers local products whereas others do not care about distinction. The findings indicate that ethnocentrism levels differ for all consumers (Josiassen *et al.*, 2011). Marketers must be very careful that their promotions do not provoke nationalistic feelings, posing a serious challenge to them. The preconception toward foreign goods is a barrier for many global marketers, but simultaneously acts as a catalyst for many local manufacturers. Particularly for Indian manufacturers who are facing fierce competition from other international marketers, this study will aid in framing consumer ethnocentric tendencies as a psychographic segment variable while planning marketing strategies. They should focus more on the aspects of 'technology, engineering and innovation' to make their products equally compatible globally. They can formulate strategies that include a Positive Country Image like 'Buying Indian Products, Keep India Working' to promote domestic goods, especially among the high ethnocentric segment of society.

7. Limitations and Future Research Direction

The present study has several limitations, such as the small sample size, which makes the study less generalizable. The small sample size did not adequately represent Indian population with various demographic profiles. Additional mediators and moderators should be considered in the future to strengthen the reliability and validity of the results. The results may vary in rural or semi-developed areas, where educational level, income status and familiarity with foreign products differ. Further research is needed to investigate the effect of ethnocentrism on attitude formation toward global vs. local products using other sets of products or with a bundle of products. Multiple countries could be taken for comparison, especially those that are culturally, politically, and economically different from India.

A stronger socio-demographic profile of respondents might be useful for generalizing the findings. Conjoint analysis can be used to investigate local and global products with a complex set of characteristics. The FsQCA approach can be used to ethnocentrism phenomenon quantitatively. For a better understanding, a full-fledged model consisting of antecedents, moderators, and possible outcomes of ethnocentrism could be tested in a different setting.

8. References

Ahmed, R., Đtreimikienë, D., & Streimikis, J. (2022). The Extended UTAUT Model and Learning Management System during COVID-19 : Evidence from PLS-SEM and Conditional Process Modeling. *Journal of Business Economics and Management, 23 (1)*, 82–104.

Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behavior and Human Decision Processes, Vol. 50*, pp. 179-211.

Ajzen, I. (2005). The theory of planned behaviour : Reactions and reflections. *Psychology and Health, Vol. 26*, pp. 1113–1127.

Alder, D., Hoyer, W., & Crowley, A. (1993). Country of origin, perceived risk and evaluation strategy. *Advances in Consumer Research, Vol. 20*, pp. 678- 83.

Balabanis, G., & Diamantopoulos, A. (2004). Domestic country biaCountry-of-origin effects, and consumer ethnocentrism : A multidimensional unfolding approach. *Journal of the Academy of Marketing Science, Vol. 32 No. 1*, pp. 80-95.

Balabanis, G., & Siamagka, N. (2022). A meta-analysis of consumer ethnocentrism across 57 countries. *International Journal of Research in Marketing, 39(3)*, 745-763.

Balabanis, G., Mueller, R., & Melewar, T. (2002). The human values' lenses of country of origin images. *International Marketing Review, Vol. 19*, pp. 582–610.

Bawa, A. (2004). Consumer ethnocentrism: CETSCALE validation and measurement of extent. *VIKALPA, Vol. 29 No. 3*, pp. 43-54.

Bianchi, C., & Mortimer, G. (2015). Drivers of local food consumption: a comparative study. *British Food Journal, Vol. 117 No. 9*, pp. 2282-2299.

Biswas, S. (2015, November 15). Is India's middle class actually poor?. India.

Caruana, A. (1996). The effects of dogmatism and social class variables on consumer ethnocentrism in Malta. *Marketing Intelligence & Planning, Vol. 14 No. 4*, pp. 39-44.

Durvasula, S., Andrews, J., & Netemeyer, R. (1997). A cross-cultural comparison of consumer ethnocentrism in the United States and Russia. *Journal of International Consumer Marketing, Vol. 9 No. 4*, pp. 73–93.

Fernandez-Ferrin, P., Calvo-Turrientes, A., Bande, B., Artaraz-Minon, M., & Galan-Ladero, M. (2018). The valuation and purchase of food products that combine local, regional and traditional features: the influence of consumer ethnocentrism. *Food Quality and Preference, Vol. 64 No. 1*, pp. 138-147.

Good, L., & Huddleston, P. (1995). Ethnocentrism and the Eastern European consumer: Are feelings and intentions related?. *International Marketing Review, Vol. 12 No. 15*, pp. 35– 48.

Hair Jr, J., Hult, G., Ringle, C., & Sarstedt, M. (2013). *A primer on partial least squares structural equation modeling (PLS-SEM).* Sage Publications.

Hair, J., Hult, G., Ringle, C., & Sarstedt, M. (2022). *A premier on Partial Least Square Structural Equation Modeling (PLS-SEM)* (3rd ed.). Thousand Oakes, CA: Sage.

Han, C., & Terpstra, V. (1988). Country-oforigin effects for uni-national and bi-national products. *Journal of International Business Studies, Vol. 19 No. 2*, pp. 235-55.

Henseler, J., Ringle, C., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science, Vol. 43 No. 1*, pp. 115-135.

Iglesias, O., Markovic, S., & Rialp, J. (2019). How does sensory brand experience influence brand equity? Considering the roles of customer satisfaction, customer affective commitment, and employee empathy. *Journal of Business Research, Vol. 96*, pp.343-354.

Islam, T., Ahmed, I., Usman, A., & Ali, M. (2021d). Abusive supervision and knowledge hiding: the moderating roles of future orientation and Islamic work ethics. *Management Research Review, Vol. 44 No. 12*, pp. 1565-1582.

Josiassen, A., Assaf, A., & Karpen, I. (2011). Consumer Ethnocentrism and Willingness To Buy. *International Marketing Review, Vol. 28 No. 6*, pp. 627-646.

Kaynak, E., & Kara, A. (2002). Consumer perceptions of foreign products: An analysis of product-country images and ethnocentrism. *European Journal of Marketing, Vol. 36 No. 7/8*, pp. 928-49.

Klein, J., Ettenson, R., & Krishnan, B. (2006). Extending the construct of consumer ethnocentrism: When foreign products are preferred. *International Marketing Review, Vol. 23 No. 3*, pp. 304–321.

Kwak, H., Jaju, A., & Larsen, T. (2006). Consumer ethnocentrism offline and online: The mediating role of marketing efforts and personality traits in the United States, South Korea, and Italy. *Journal of the Academy of Marketing Science, Vol. 34 No. 3*, pp. 367–385.

Lee, W., Hong, J., & Lee, S. (2003). Communicating with American consumers in the post 9/11 climate: An empirical investigation of consumer ethnocentrism in the United States. *International Journal of Advertising, Vol. 22 No. 4*, pp. 487–510.

Ma, J., Yang, J., & Yoo, B. (2020). The moderating role of personal cultural values on consumer ethnocentrism in developing countries: The case of Brazil and Russia. *Journal of Business Research, Vol. 108 No. 1*, pp. 375-389.

McLain, S., & Sternquist, B. (1991). Ethnocentric consumers: Do they 'buy American'?. *Journal of International Consumer Marketing, Vol. 4 No. 1/2*, pp. 39-47.

Netemeyer, M., Durvasula, S., & Lichtenstein, D. (1991, August, 28). A Cross-National Assessment of the Reliability and Validity of the CETSCALE,. *Journal of Marketing Research, Vol. 28*, pp. 320-27.

Olsen, J., Granzin, K., & Biswas, A. (1993). Influencing consumers' selection of domestic versus imported products: implications for marketing based on a model of helping behavior. *Journal of the Academy of Marketing Science, Vol. 21 No. 4*, pp. 307-21.

Papadopoulas, N., & Heslop, L. (1993). Product and country images: Impact and role in international marketing. *The Haworth Press Inc*, pp. 3-38.

Pervan, M., Curak, M., & Pavic Kramaric, T. (2018). The influence of industry characteristics and dynamic capabilities on firms' profitability. *International Journal of Financial Studies, Vol. 6 No. 1*, pp. 4.

Roth, M., & Romeo, J. (1992). Matching product category and country image perceptions: A framework for managing country-of-origin effects. *Journal of International Business Studies, Vol. 23 No. 3*, pp. 477-97.

Shankarmahesh, M. (2006). Consumer ethnocentrism: An integrative review of its antecedents and consequences. *International Marketing Review, Vol 23 No. 2*, pp. 146-172.

Sharma, S., Shimp, T., & Shin, J. (1995). Consumer ethnocentrism: A test of antecedents and moderators. *Journal of the Academy of Marketing Science, Vol. 23 No. 1*, pp.26–37. doi:10.1007/bf02894609

Shimp, T., & Sharma, S. (1987, August). Consumer ethnocentrism: construction and validation of the CETSCALE. *Journal of Marketing Research, Vol. 24*, pp. 280-9.

Shoham, A., & Gavish, Y. (2016). Antecedents and buying behavior consequences of consumer racism, national identification, consumer animosity, and consumer ethnocentrism. *Journal of International Consumer Marketing, Vol. 28 No. 5*, pp.296-308.

Steenkamp, J., & Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research. *Journal of Consumer Research, 25 No. 1*, pp. 78-90.

Sumner, W. (1906). *Folkways : The sociological importance of usages, manners, customs, mores, and morals.* New York: Ginn & Co.

Wall, M., Liefeld, J., & Heslop, L. (1991, Spring). Impact of country of origin cues on consumer judgements in multi-cue situations: A covariance analysis. *Journal of the Academy of Marketing Science, Vol. 19*, pp. 105-13.

Wang, C., & Chen, Z. (2004). Consumer ethnocentrism and willingness to buy domestic products in a developing country setting : testing moderating effects. *Journal of Consumer Marketing, Vol. 21 No. 6*, pp. 391-400.

Watson, J., & Wright, K. (2000). Consumer ethnocentrism and attitudes towards domestic and foreign products. *European Journal of Marketing, Vol. 34 No. 9/10*, pp. 1149-66.

Yagci, M. (2001). Evaluating the Effects of Country-of-Origin and Consumer Ethnocentrism : A Case of a Transplant Product. *Journal Of International Consumer Marketing, Vol. 13 No. 3*, pp. 63.

Status of Women Education and Empowerment and Importance of the Implementation of NEP 2020 in Tripura – A Review

CHALANTIKA LAHA SALUI AND GANGA PRASAD PRASAIN

Abstract : *Women's status is usually associated with education, and more significantly, education is considered as a means of empowering women. The current essay attempts to assess the state of gender disparity in Tripura's educational system using a range of metrics based on secondary sources. The enrolment in schools and colleges has steadily increased over the past few decades, with a sign of gender equality in basic education all over the state. But, a prominent rate of drop-out of the female students after the elementary level has come out in the data analysis. The causes and trend of such drop-outs have been illustrated district-wise through spatial representation. In search of the causes, available basic facilities for female students in schools have also been taken under surveillance. According to a questionnaire survey, implementing the National Education Policy, 2020 and pursuing its fundamental objectives can support women empowerment and higher education in Tripura.*

Keywords :   Gender Disparity, Enrolment, Drop-out, Survey, National Education Policy, 2020, Women Empowerment.

Introduction

Educated women in a society build the backbone for an educated next generation. India got intellectual and educated women from ancient times but it was limited to a very narrow section of the society. For the holistic development of a society, building strong and educated future generation are to be ensured through the

Chalantika Laha Salui, Corresponding Author, Tripura University, E-mail: chalantikal@gmail.com Ph : 9903894231.

Prof. Ganga Prasad Prasain, Tripura University, E-mail: gangaimphal@gmail.com, Ph : 9612158167.

women of present generation (Singh & Arora, 1999). Therefore, a spread of education all over the women of the society is essential.

Education has been a human right ever since the Universal Declaration of Human Rights was adopted in 1948. A commission on the status of women was established by the UN Economic and Social Council (ECOSOC) with the sole purpose of advancing gender equality and women's empowerment. The Fourth World Conference on Women, held in Beijing in 1995, placed special emphasis on issues like women's access to education and the reduction of poverty. During the UN Literacy Decade (2003–2012), World Development Report (2012) on Gender Equality and Development emphasised on how progress in women's education must go hand in hand with progress in their rights and societal voice (Bhat, 2015).The success of children in school and afterwards is largely dependent on mothers' involvement in education, according to a recent OECD (Organisation for Economic Co-operation and Development) research. According to a 2013 UN Population Fund survey, educated mothers value health care and are more likely than fathers to affect their children's scholastic success.

It has been accessed that a further year of schooling for girls was found to reduce infant mortality by 5% to 10% (Herz & Sperling, 2004), with the association being strongest in low-income nations. However, giving girls one more year of education than the norm increases their future income by 10% to 20%. According to Herz & Sperling, educated women have better opportunity to earn higher income, engage in community life and decision-making, and are better knowledgeable about health hazards like HIV and AIDS (Alva & Desai, 1998, Mirowsky & Ross, 2017) that may affect both themselves and their children.

Gender parity is an entitlement. Too many women are still held back by gender prejudice, which also holds back the rest of the world (Babu & Suhasini, 2022). A blueprint for advancement that is sustainable and leaves no one behind may be found in the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs), which were adopted by world leaders in 2015. SDG-4 Ensures inclusive and equitable quality education and promote opportunities for lifelong learning for everyone and eliminate gender gaps in education by 2030.

As per census of India, a person aged seven years and above who can both read and write in any language, is treated as 'literate'. Literacy rate statistics considers a very low threshold of education status in India (Jain et. al., 2017). So, even if, the census of India declares a growing overall literacy rate from 8.9% in 1951 to

29.8% in 1981 to 64.6% in 2011, we should take into account the overall enrolment and continuation of the students in elementary, secondary and higher education (Table-1) too without any gender biasness. Retention rate of students is very important to measure the overall education scenario of the society (Vij et. al., 2014).

Table-1 : Indian Education System

Education	School/Level	Grades	Age	Years
Primary	Elementary School	1 to 8	6 to 14	8
Secondary	Secondary School	9 to 12	14 to 18	4
Tertiary	First University Degree (Bachelor's)	12 to 15	-	3
Tertiary	First University Degree (Engineering & Technology)	12 to 16	-	4
Tertiary	Second University Degree (Master's)	15 to 17	-	2
Tertiary	Doctoral Degree	17 to 22	-	5

Communities, countries, and the world are developed by promoting girls' education. Girls who complete their education are more likely to have long, happy lives and are less likely to get married young. They improve their own and their families' futures, earn more money, and participate in decisions that most directly impact them (Konar & Chakraborti, 2008; Mahanta & Nayak, 2013). Girls' education increases economies and reduces inequality (Patel, 1998; Manga, 2015). It promotes the development of more stable, robust societies where all people, especially boys and men, have the opportunity to realise their full potential.

Going to school is only a dream for many girls and young women in India. There are some stigmas associated with the education of women and girls, which leads to significant unrealized human potential, gender inequity, and a complicated web of economic stagnation, poverty, ill health, and gender-based violence in the nation (Dutta & Ghosh, 2002; Sinha, 2009; Gupta, 2012; Singh, 2016).

In Tripura state (Map-1), where female population is sharing almost the same population strength as male, literacy rate is good enough (82.73%) for females as compared to 92% of the male literacy. It's a good value compared to Indian average female literacy rate (2011) of 65.46%. As per 2011 census data, Tripura state won the 6th position among all states and union territories of India.

Map-1 : Left (A) shows District Boundary (4 Nos.) before 2012
Right (B) shows District Boundary (8 Nos.) after 2012
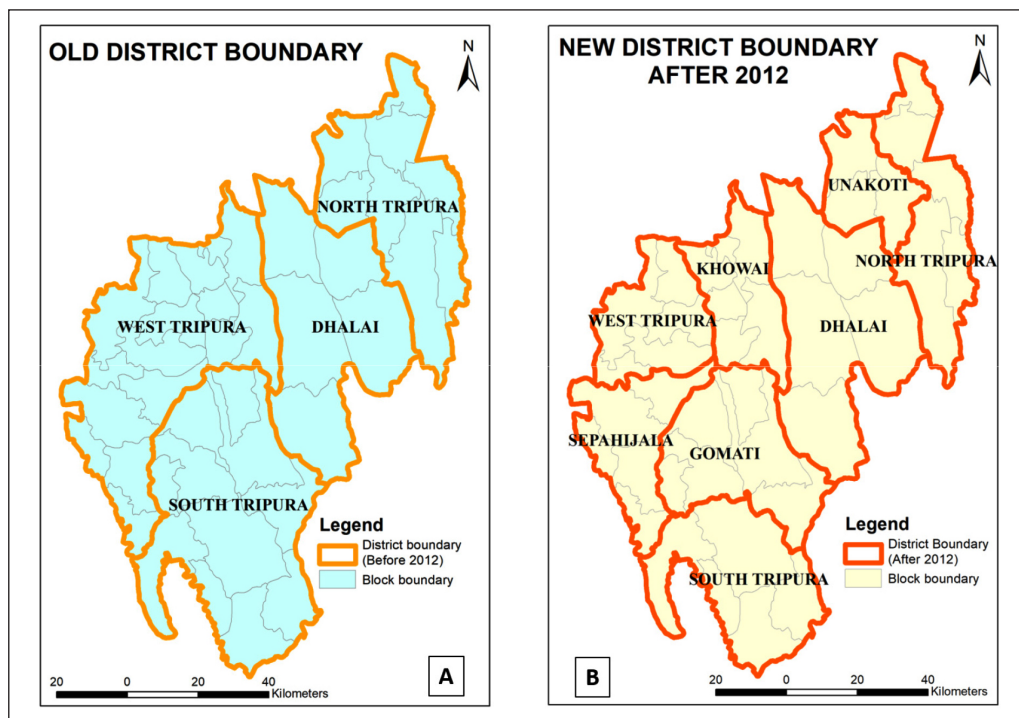
The ratio of boy and girls' students as well as aged female literacy is good enough all over Tripura (Chakraborty, 2008; Das, 2019). Except Dhalai, all other districts are having adult female literacy rate of 50% and more (Sinha & Sinha, 2013). In 2020, National Education Policy (NEP) was framed by Govt. of India and Govt. of Tripura has also initiated various programs to spread the concept. So, existing education status gender-wise and administration-wise needs to be analysed, so that, the NEP 2020 and other educational development missions can be strategically planned for successful implementation.

Objectives of the Study

This study was aimed at analysing the statistics on whole education scenario of Tripura and the status and prospect of women in the education system of the state. It also emphasises the weaknesses of the systemareas where the government should look into. Not only the strategic areas but also the administrative areas where more planning is required. Therefore, it's an initiative

to access the status of educational development in Tripura and prospect to achieve SDG-4 by 2030. For overall empowerment of the women, this study tried to identify the strength and weak points, so that a holistic reviewing and reformation can be attempted for the whole state.

Data and Methodology

The present study is based on secondary data on education system collected from the department of education of Tripura. All these data and information have been analysed by using various parameters. Besides, it also incorporated primary data in the form of questionnaire survey in the cause of drop-out and students' reaction on the implementation of National Education Policy, 2020. As NEP-2020 promotes the SDG-4, the study tries to assess how far this NEP-2020 can help to minimize school drop-out and rechannelling drop-outs to main education system. The questionnaire was filled up by 64girls' students from various schools of 8 districts. Random samples were taken i.e. 8 students from each of the 8 districts were selected.

The questionnaire format (Table-2) was as below:

Table-2 : Questionnaire Sample

STUDENT NAME:		DATE:
SCHOOL:		
DISTRICT:		
Q. No.	**Question**	**Answer**
1.	Drop-out cause –	Financial/Marriage/Employment/ School Infrastructure
2.	Do you know about NEP 2020?	Yes / No
3.	Do you think that study in your mother tongue can prevent school drop-out?	Yes / No / No Idea
4.	Do you like to go for studying Indian culture, history and knowledge tradition?	Yes / No / No Idea
5.	Do you think that environmental science should be there in the syllabus?	Yes / No / No Idea
6.	Do you prefer practical based education system?	Yes / No / No Idea
7.	Do you prefer to have skill-based/vocational trainings along with your traditional syllabus?	Yes / No / No Idea
8.	Do you dream to be financially independent?	Yes / No / No Idea
9.	Do you want your school to take you for environmental excursions?	Yes / No / No Idea

Result and Discussions

According to Tripura State's literacy statistics, gender bias in education is not a problem in any of the districts. Boys and girls register in school at almost the same rates across all districts (Table-4). The number of schools varies according to the districts' geographic location and population density. Table-3 shows the availability of educational services in terms of individual service area as well as population to be served. The analysis in this case is constrained by the lack of data from the 2021 census. With this restriction, it is clear that the West Tripura district has the lowest service area for each school and the Dhalai district has the highest.

This suggests that Dhalai district has the lowest density of schools, while West Tripura district has the highest density. On the other hand, West Tripura has the largest population-to-school ratio due to its high population density, while Dhalai has the lowest. As a result, the Dhalai district's educational infrastructure needs to be maintained. North Tripura and Gomati district have low school densities as 773 and 719 students are served by each school there respectively.

Table-3 : District-wise Number of Students per School in 2021

District	*Area*	*No. of Govt. Schools (2021)*	*per school serving area*	*Population (2011 census)*	*School / population*
West Tripura	942.55	701	1.34	917534	1309
South Tripura	1534.2	667	2.30	433737	650
Dhalai	2400.00	881	2.72	377988	429
North Tripura	1444.5	538	2.68	415946	773
Sepahijala	1044.78	657	1.59	484233	737
Khowai	1005.67	499	2.02	327391	656
Gomati	1522.80	608	2.50	436868	719
Unakoti	591.93	378	1.57	277335	734

*Source: https://tripuratourism.gov.in/people

This paper is trying to analyse predominantly female education status of Tripura. The ratio of girls' enrolment in school education as well as higher education were taken into account. Though the number of female enrolments is varying in various districts, the enrolment of male and female is almost in equal ratio in all

the districts with varying number of schools. This is well matched with the total male and female population ratio for the districts (Chart-1). It shows a very less gender biasness in education sector all over the state indicating a prospective development scenario of the state in near future. Keeping pace with the population density, the female enrolment in school is highest in West Tripura.

Table-4 : District-wise School Enrolment in the Session 2021-22

District	*No. of Govt. Schools*	*Total Enrolment - Boys*	*Total Enrolment - Girls*
West Tripura	701	87632	85535
South Tripura	667	42358	41221
Dhalai	881	40666	40076
North Tripura	538	42752	43512
Sepahijala	657	46299	45117
Khowai	499	28164	27812
Gomati	608	42602	41752
Unakoti	378	28842	29522

Source : Directorate of Secondary Education, Education(School) Dept. Government of Tripura

Chart-1: Shows District-wise and Gender-wise Enrolment in School in the Session 2021-22
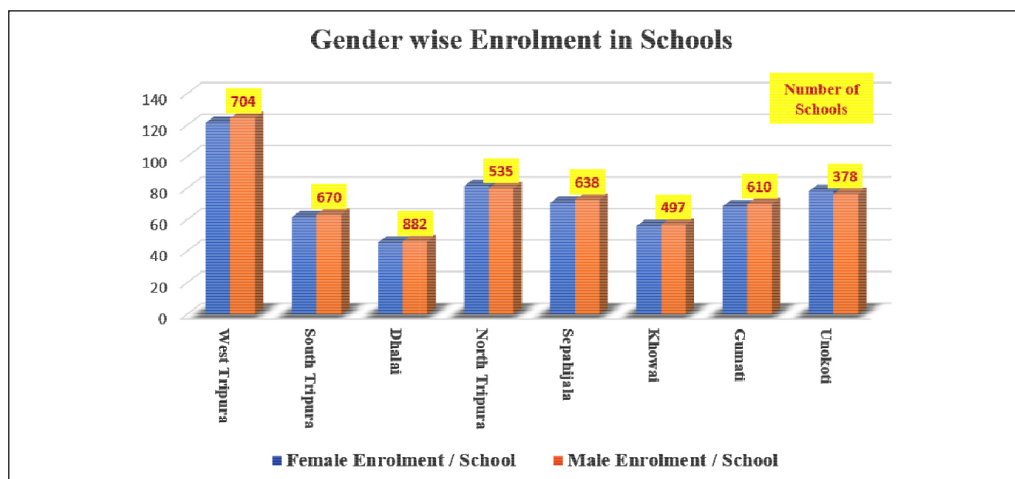
Source : Directorate of Secondary Education, Education(School) Dept. Government of Tripura

Maximum number of schools are present in Dhalai district as it's the largest district in Tripura in terms of geographical area. Each school serves the lowest number of population (429). Number of female school enrolment per school on an average is also lowest at Dhalai district (45). Comparative to this, a prominent variation is seen in West Tripura district. Here, the male and female studentsenrolment per school is 124 and 121 respectively. The other districts having a better enrolment rate are North Tripura, Sepahijala, Unokoti. On the other hand, districts other than Dhalai where a better planning is required are Khowai and South Tripura.

**Table-5 : District-wise College Enrolment in the Session 2021-22**

District	*2021-22*		
	Male	**Female**	**No. of Colleges**
West Tripura	10343	11324	6
Khowai	2988	2657	2
Dhalai	1683	1486	3
Unokoti	1971	2048	2
North Tripura	4061	3708	2
Sepahijala	2814	2048	2
Gumati	3050	2639	2
South Tripura	3770	2843	3

Source : Directorate of Secondary Education, Education(School) Dept. Government of Tripura

In case of higher education too, the gender equality can be noticed. Only concern is, the total number of student enrolment has come down significantly. In West Tripura district and Unokoti, the female enrolment is more. In urbanised West Tripura district with various other options, boys' students also opt for technical or professional job-oriented studies after their school level. There is significant drop of female student enrolment after school level due to marriage mostly. This is more prominent in Sepahijala and South Tripura districts (Chart -2). In 2022, 6 new colleges were established. Swami Dhananjay Das Kathiababa Mission College, Sri Aurobindo General Degree College (English Medium), Jirania Law College, GDC Old Agartala, GDC Panisagar and Milestones Institute of Pharmaceutical Sciences Gomati. In 2023, three more colleges were established. Those were North-East Institute of Nursing Sciences, Agartala Government

Nursing College and Govt. Dental College, IGM. In spite of drastic downfall of gender wise enrolment in higher education compared to school education, a positive growth of enrolment number can be seen from 2012 to 2022 as well-identified in chart -3. Girls' enrolment number has increased in a very significant rate. It's a very prospective sign for the state. For post-graduation, 2 govt. universities are there, one state (Maharaja Bir Bikram University) and one central universities (Tripura University). Major GDC are affiliated to Tripura University. In 2022-23, the total enrolment in Tripura University, in PG was 3466, out of which 1500 male and 1966 female. For Ph.D in various disciplines, 373 male and 262 female students are enrolled. But, this general data can't be taken in terms of representing the enrolment status of the students of Tripura as there are huge number of students in PG and Ph.D from other states of India.

Chart-2 : Shows the Changing Female Enrolment in Colleges of 8 Districts of Tripura

Source : https://highereducation.tripura.gov.in
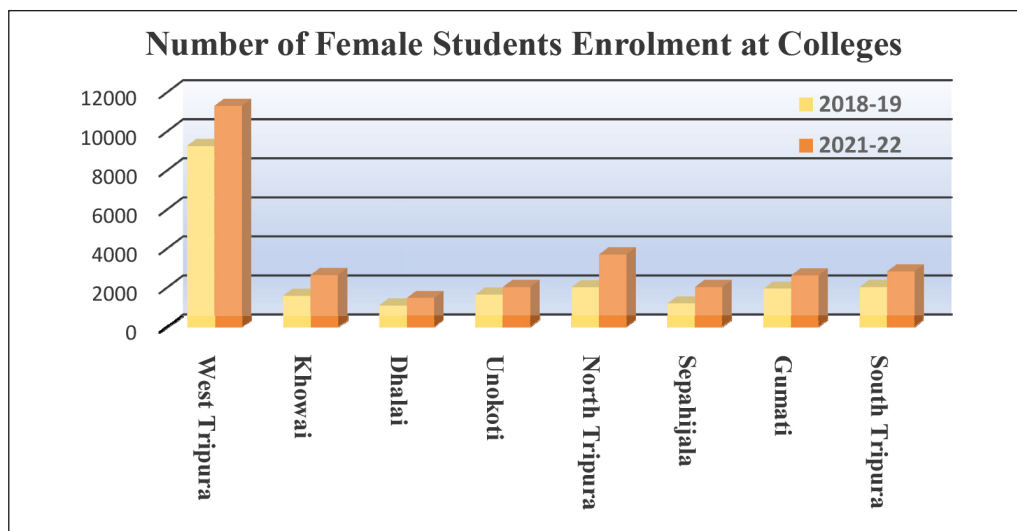
Besides these two government universities, there are many private universities as well as NIT Agartala. Here also enrolment is all India based though a percentage is reserved for the state. As a whole, a major percentage of female students who go for higher education, mainly are enrolled in MBB and Tripura University.

Chart-3 : Shows Trend of Female Enrolment in Colleges of 8 Districts of Tripura during 2012-22

Source : https://highereducation.tripura.gov.in
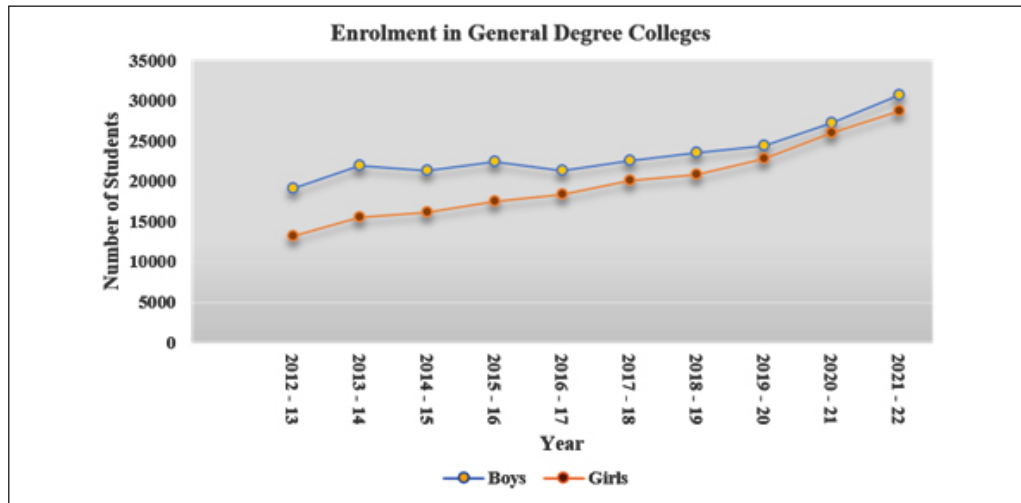
Female enrolment in colleges have increased from 2018-19 to 2021-22 in all the districts. The rate of increase is significantly high in West Tripura and North Tripura district. In North Tripura, after the establishment of another degree college in 2022, this rate is expected to increase further.

Chart-4 : shows Year-wise Change of Girls' Student Enrolment in Different Level of Education
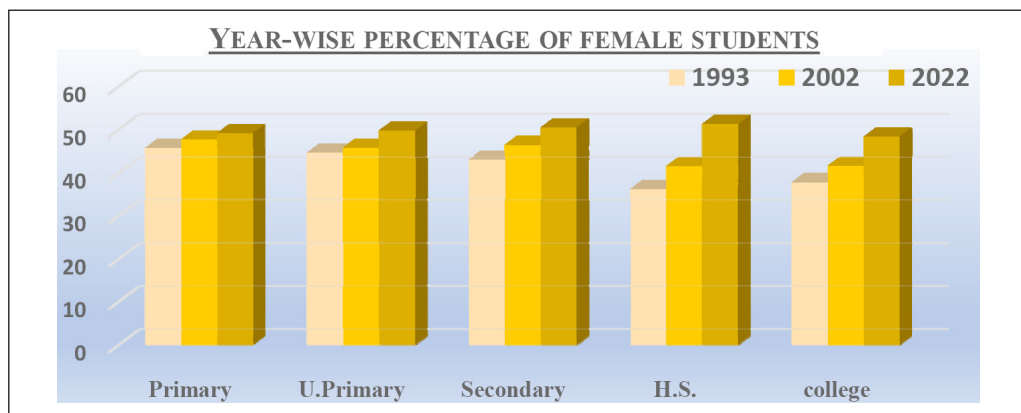
Source: Directorate of Secondary Education, Education(School) Dept. Government of Tripura
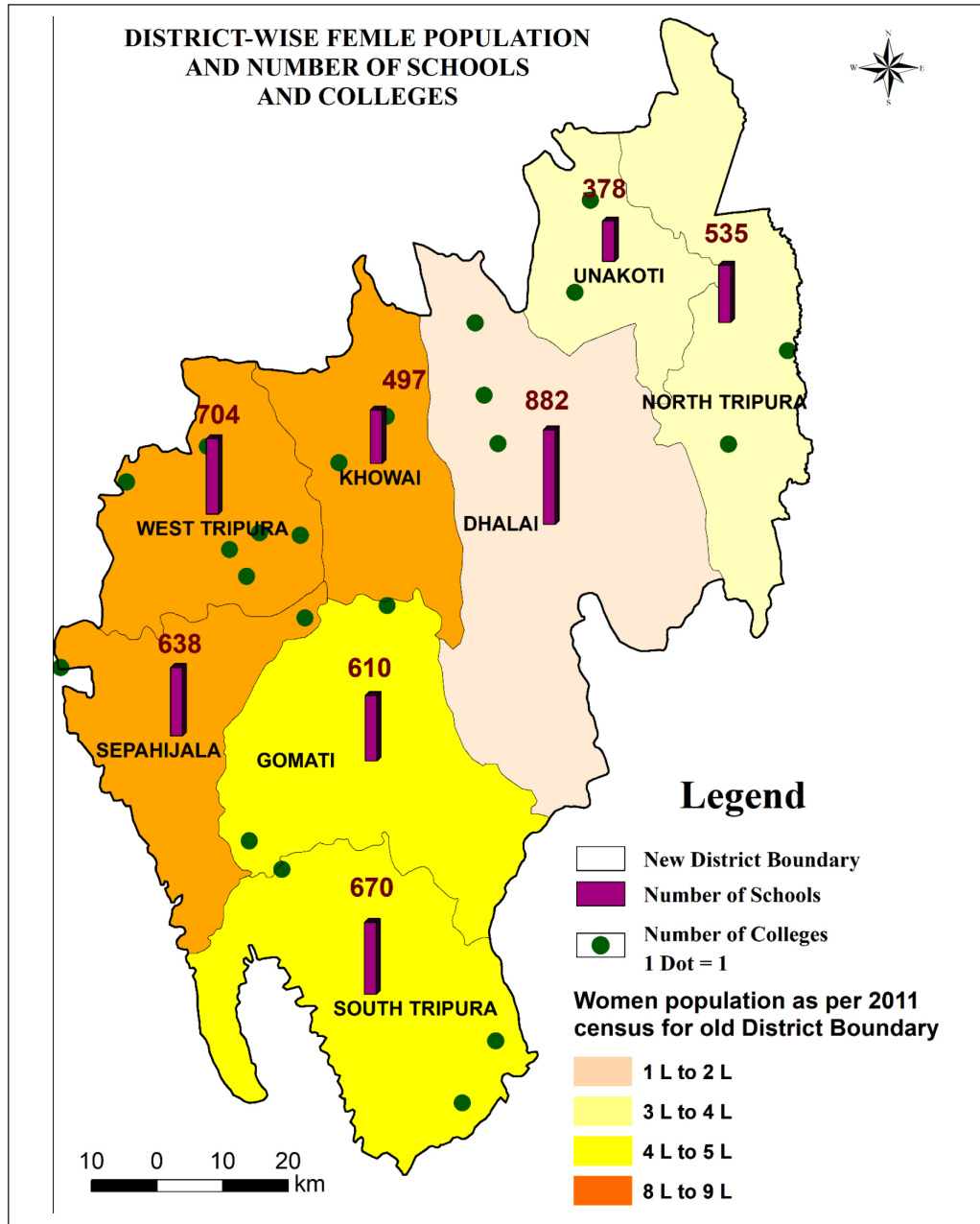
A positive initiative has been taken for female education where total of 85 schools have been set up for girls only. Out of which 11 junior basic schools, 13 senior basic schools, 24 high schools and 37 higher secondary schools are established all over Tripura as per 2021 (Source: Statistics Section, DSE). As per the data (chart- 4), from 1993 to 2022, there is an increase in percentage of female students to total students in each of the level of education for the whole state. But the percentage has a maximum increase in higher secondary (chart-5). Many students after higher secondary education can go for preparation of government jobs or go for various other earning sources. Others girl students are now getting motivated for professional courses too. Hence, it's a very good sign of social awareness towards women education and empowerment.

**Chart-5 : Shows the Percentage Change of Female Student Enrolment in Different Levels**
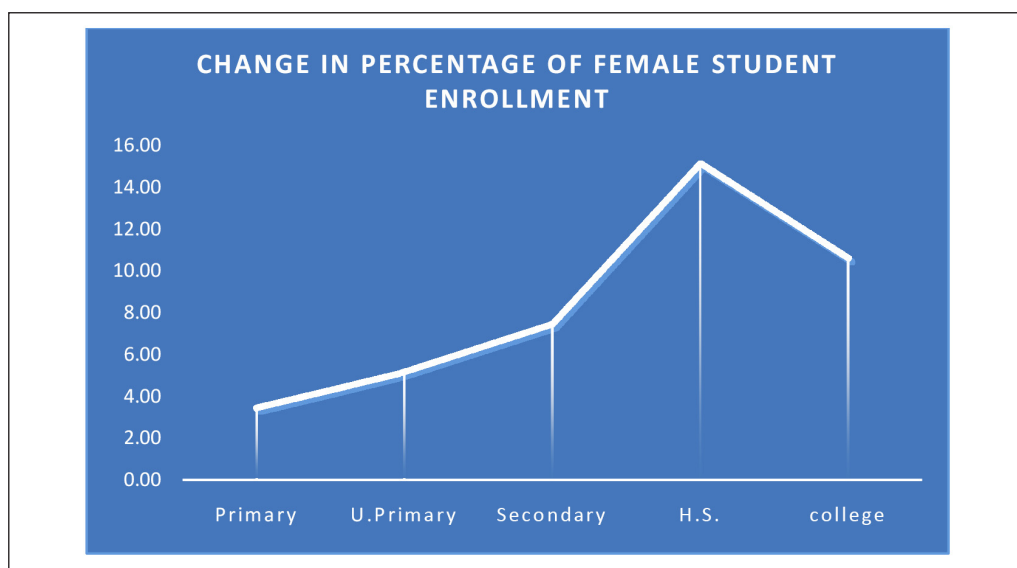
Population census data is available up to 2011 when the number of districts were 4 only. So, the new district-wise education infrastructure statistics has been put on the old population data (Map-2). It can be seen that as compared to the high women population, number of schools and colleges are low in Khowai and Sepahijala. Out of all the schools, higher secondary schools are more in West Tripura (Chart-6). North Tripura districts have all schools of higher secondary level. Schools up to only junior basic level are more at Dhalai and Unakoti. Whereas, schools up to senior basic level only are more available at

Map-2 : Shows the Relation between Female Population, Number of Schools and Colleges

DISTRICT-WISE FEMLE POPULATION AND NUMBER OF SCHOOLS AND COLLEGES

378
535
UNAKOTI
497
704
882
NORTH TRIPURA
KHOWAI
WEST TRIPURA
DHALAI
638
610
SEPAHIJALA
GOMATI
670
SOUTH TRIPURA

Legend

New District Boundary
Number of Schools
Number of Colleges
1 Dot = 1

Women population as per 2011 census for old District Boundary

1 L to 2 L
3 L to 4 L
4 L to 5 L
8 L to 9 L

10   0   10   20
km

Khowai, Sepahijala and West Tripura districts. Percentage of schools up to H.S level is good at West Tripura, North Tripura, South Tripura and Unakoti districts. This is a major cause of drop-out of girl students in schools, as in some cases, they need to travel long to get a school of next level.

Chart-6 : Shows Types of Schools in Districts of Tripura in 2018-19
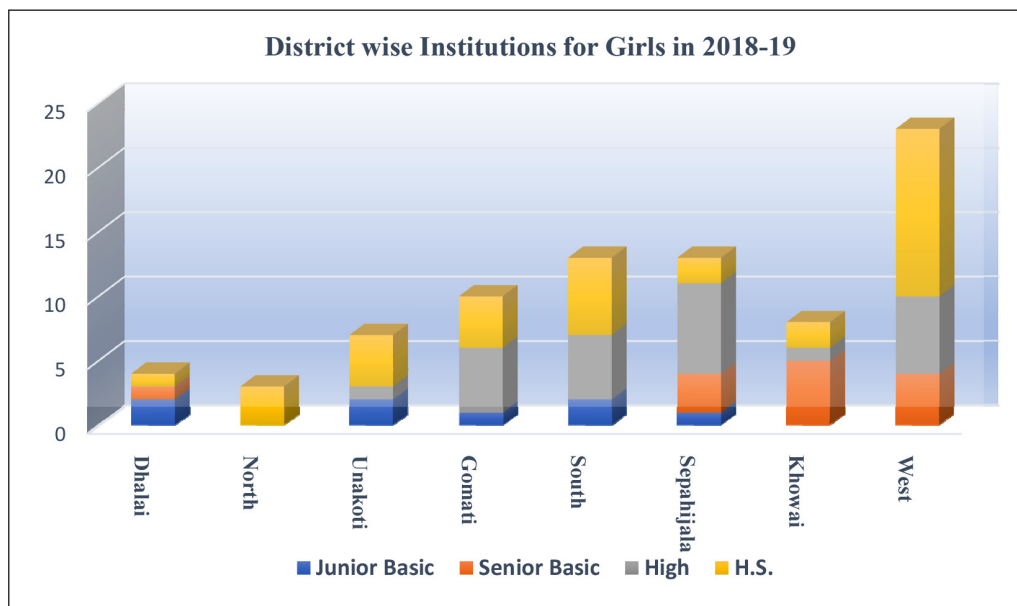
*Source : Directorate of Secondary Education, Education(School) Dept. Government of Tripura*

Table-6 : District wise Availability of Girls' Toilet in Schools, 2019

Type of Facility	Dhalai	North	Unakoti	Gomati	Khowai	South	Sepahijala	West	Total
Total No of Schools	100	116	90	129	111	168	170	221	1105
Girls' toilet	100	115	89	129	111	168	169	217	1098

*Source : https://socialwelfare.tripura.gov.in/node/576*

Girls' student enrolment in any school needs some basic secured infrastructure for females among which hygiene is an important one. Female toilet availability is a must in all the schools where, girls' student enrolment is open. But, unfortunately, in West Tripura district, 4 number of schools are not having this facility. In Sepahijala district also, 1 school has still pending to build. For North Tripura and Unakoti districts also, one school in each district needs not built toilet for girls (Table- 6). It's also preferable to employ some female teachers to give some mental comfort to girls' students. Most of the schools follow this. A good percentage of female teachers have been appointed in schools of all the districts. The ratio of girls' students should be synchronised with the ratio of female teachers. In elementary level (Chart-7), the percentage of girls' students are much higher than the percentage of female teachers. So, there is a need for recruiting more female teachers as well as non-teaching staffs. But, in secondary and higher education sector, the female teacher availability is sufficient in all the districts (Chart-8, 9).

Chart-7 : Shows Female Student and Female Teacher Ratio in Elementary Level, 2019
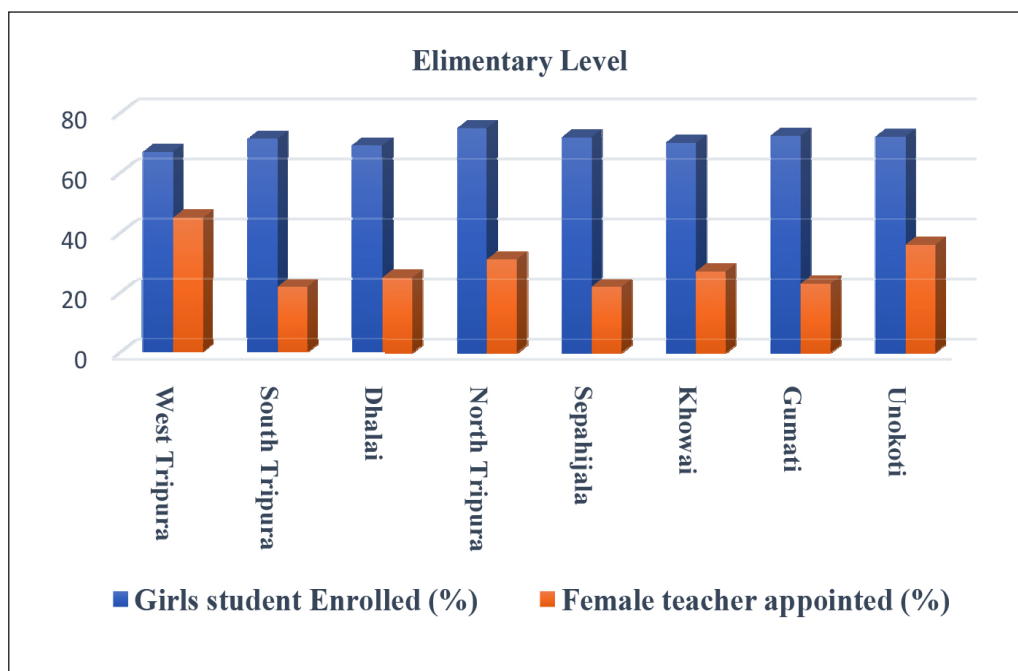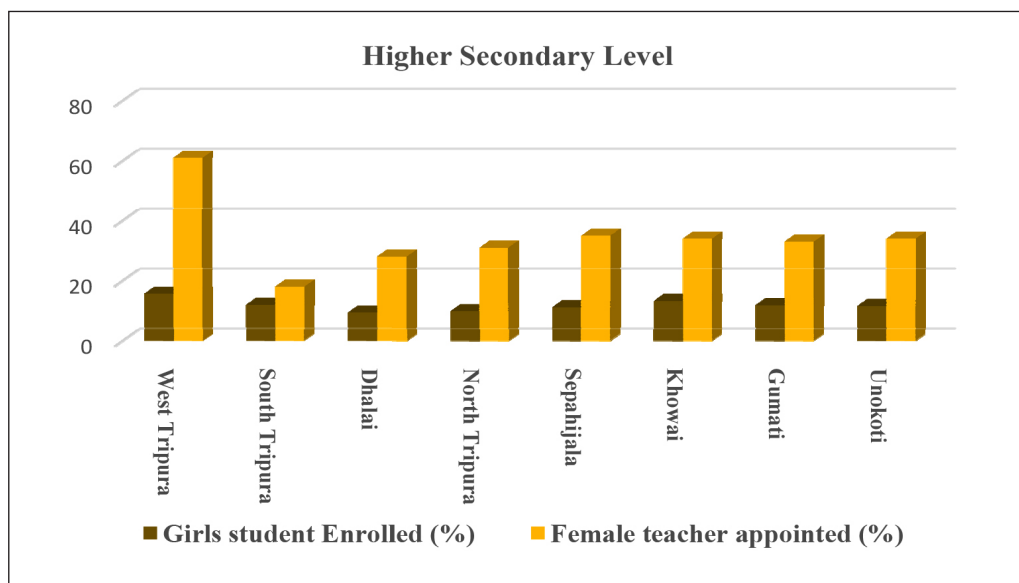
Chart-8 : Shows Female Student and Female Teacher Ratio in Secondary Level, 2019
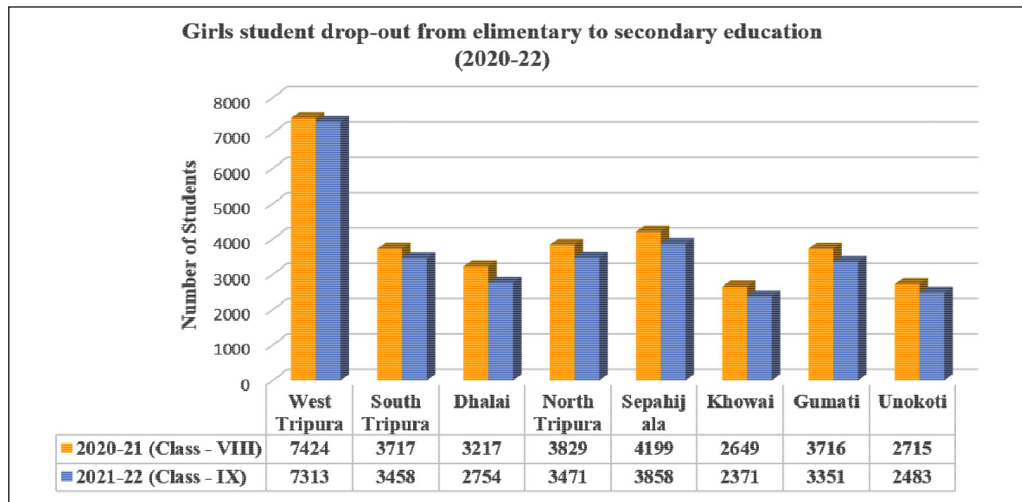

Secondary Level

■ **Girls student Enrolled (%)**   ■ **Female teacher appointed (%)**
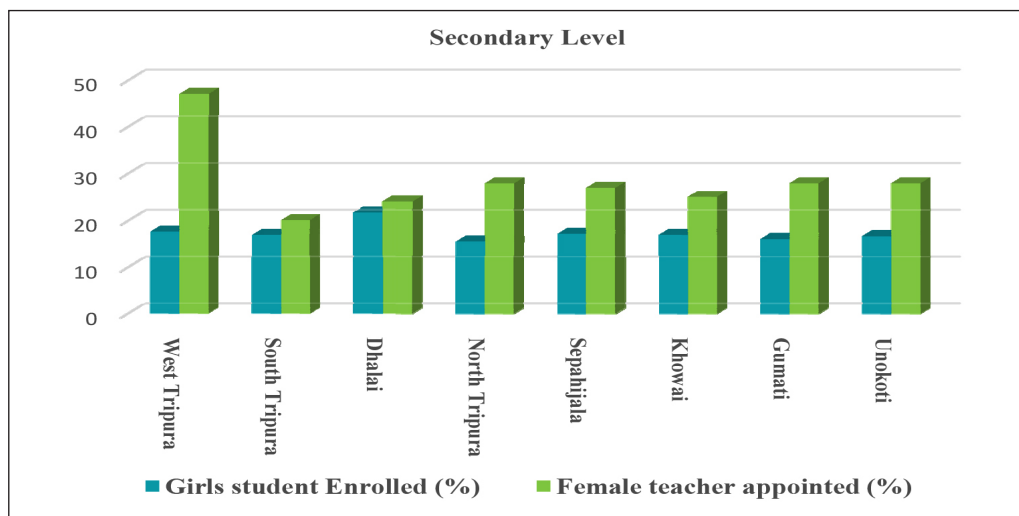
Chart-9 : Shows Female Student and Female Teacher Ratio in H.S Level, 2019

Higher Secondary Level

■ **Girls student Enrolled (%)**   ■ **Female teacher appointed (%)**

Source (Chart-7,8,9) : Girls' student enrolment data from Department of Education for 2021-22 and source of female teacher is Economic Review 2018-19.

But, in spite of all these infrastructures, the problem of girls drop-out in every level of education is very significant. It is a common practice in all the districts. the rate is comparatively lower at urbanised West Tripura district than other districts (Chart-10).

Chart-10 : Shows Drop-out of Students from Class-VIII to Class-IX in 2020-21

Girls student drop-out from elementary to secondary education (2020-22)

	West Tripura	South Tripura	Dhalai	North Tripura	Sepahijala	Khowai	Gumati	Unokoti
2020-21 (Class - VIII)	7424	3717	3217	3829	4199	2649	3716	2715
2021-22 (Class - IX)	7313	3458	2754	3471	3858	2371	3351	2483

Source : Directorate of Secondary Education, Education(School) Dept. Government of Tripura.

Chart-11 : Shows Percentage of Drop-outs from Class-VIII to Class-IX in 2020-21 and 2021-22
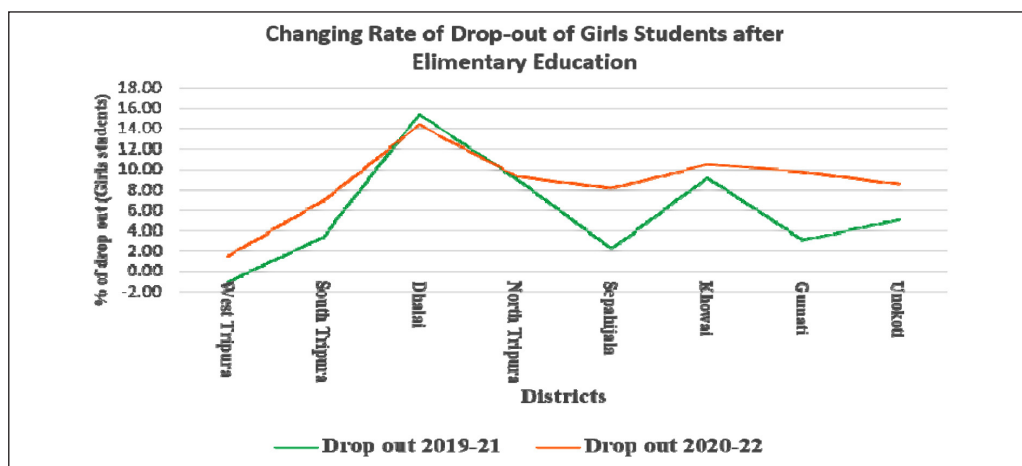
Changing Rate of Drop-out of Girls Students after Elimentary Education

Drop out 2019-21   Drop out 2020-22

Source : Directorate of Secondary Education, Education(School) Dept. Government of Tripura.

Chart- 11 shows very prominently the drop-out rate of girls' student from class VIII to Class IX in the schools of different districts of the state during the session 2019-21 and 2020-22. The data on the number of girls who were in class VIII but did not take admission for class IX were analysed for 2019-21 batch and the next 2020-22 batch. Its showing that, for every district except Dhalai, the drop-out percentage from class-VIII to class-IX increased from 2019-21 to 2020-22 batch. The maximum increase in drop-out percentage was in Gumati district (6.78%), followed by Sepahijala district (5.90%). Though, the change of drop-out percentage was negative in Dhalai district, actually the percentage data from each batch was very high compared to other districts. Such high drop-out rate can be also seen in districts like Khowai, North Tripura, Gumati etc. (around 10%).

Table-7 : Boys' and Girls' Students Drop-out Number from Batch 2020-21 to 2021-22

|	Class 5-6 Boys	Class 5-6 Girls	Class 8-9 Boys	Class 8-9 Girls	Class 10-11 Boys	Class 10-11 Girls
West Tripura	50	118	158	111	563	-628
South Tripura	-55	115	303	259	268	393
Dhalai	610	421	548	463	2	-16
North Tripura	439	320	480	358	216	103
Sepahijala	422	144	181	341	472	656
Khowai	170	318	239	278	40	24
Gumati	216	91	412	365	313	511
Unokoti	166	196	326	232	26	12

Source : Directorate of Secondary Education, Education (School) Dept. Government of Tripura.

*** Positive values are showing the drop-outs while negative values showing new student admission.

The trend of drop-out in different levels of school education is well identified in Table-7. In lower primary level i.e. after class-V, number of girls drop-out is less than boys, mostly in rural backward districts like Dhalai, Sepahijala, Gumati and North Tripura. After the elementary education also, girls drop-out is comparatively less prominent in this batch except Sepahijala district. But, after secondary education, girls drop-out was prominent in South Tripura, Sepahijala and Gumati districts. Here, a hidden factor is that, a huge number of girls

students took new admission in class-XI in West Tripura district. Actually, after secondary examination many girls' students has come to Agartala city for higher secondary in search of better facility in the capital city. But a large number of boys left school at the same time at West Tripura district as most of them used to choose technical or other non-traditional form of education.

**Chart-12 : Shows Percentage of Drop-outs from Class-VIII to Class-IX in 2020-21 and 2021-22**
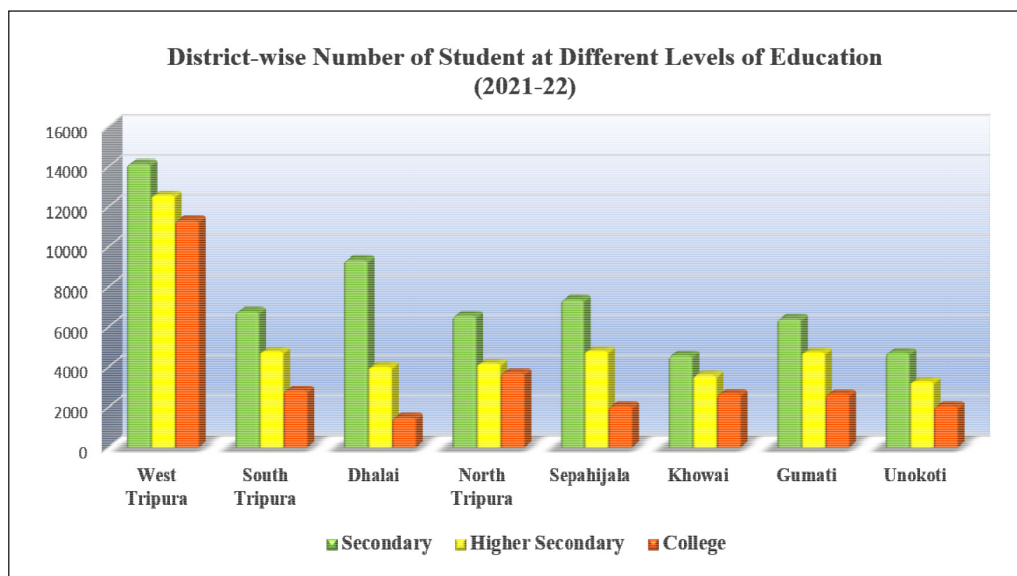
District-wise Number of Student at Different Levels of Education (2021-22)

Source : Directorate of Secondary Education, Education(School) Dept. Government of Tripura.

In case of enrolment scenario of girls' students' enrolment in secondary, higher secondary and college education level, also a decreasing trend in prominent in all the districts (Chart- 12). After clearing the elementary level of education, a high rate of drop-out after 10th exam is very prominent in all the districts, specially Dhalai, followed by Sepahijala, North Tripura. Though the same kind of diminishing female student strength can also be seen in urbanized West Tripura district, the gross number of students are higher due to a comparatively large number of schools and colleges available there. So, this analysis is giving a very clear picture on which districts are to be given special attention to minimise the school drop-out of girls. A comparative spatial representation of total number of girls students in each education level has been represented in Map-3. The elementary level is giving a high value because it's giving the total of 8 batches

of students, whereas, secondary and H.S are giving total of 2 batches each and college level is showing number for only one batch.

Map-3 : Shows District-wise Total Female Enrolment in each Level of Education

District wise Girls student enrolment 2021–22
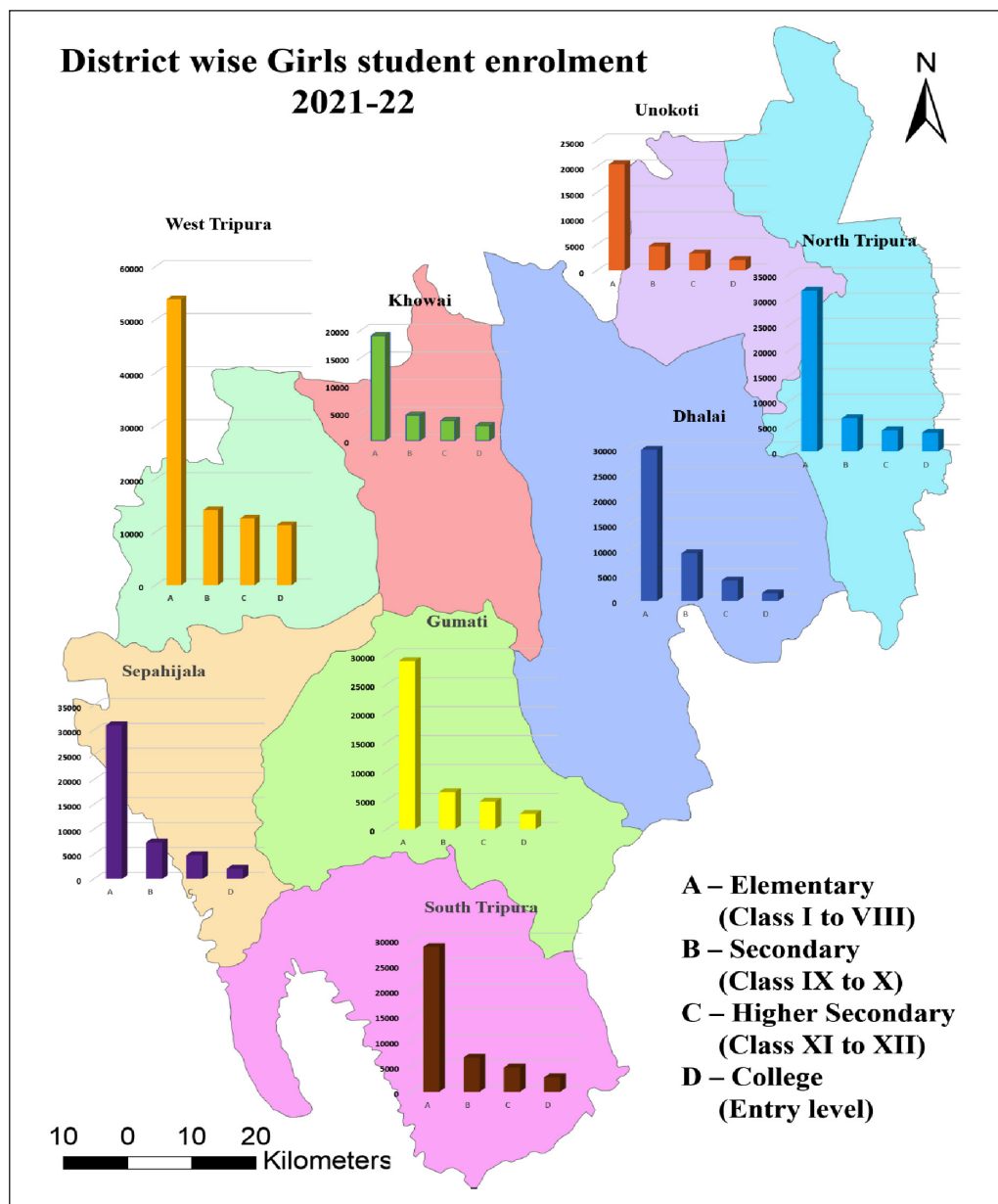
Causes of Drop-out of Female Students in Tripura

There are multiple reasons- social, cultural, economic, political and so on for the drop-out of girls' students in the state similar to the causes all-over India. Social factors like early marriage, restriction on girls based on social norms, household chores managed by young girls, gender differences in home and society, division of family responsibilities after the death of the elderly family member etc. force girl students to leave their studies. Lack of comfortable infrastructurefor girl student also affect,although in the state of Tripura, this problem is negligible.Expenditure on education and in some cases a long distance to school as well as female health have made the girls students to leave school education in various districts of Tripura.

Status of Various Women's Education-Welfare Programs in Tripura

Various awareness programs under Beti Padhao and Beti Bachao mission have been conducted. In primary education, all over the state, a gender un-biasness is very prominent.Government and NGOs actively worked on the prevention of child marriage. Parents are seen celebrating the birth of their girl child.Special hostel facility has been arranged for working women at Agartala which should be extended in other towns too. Scheme for Adolescent Girls is active as the scheme revised in March,2018,now extended to all 8 districts for providing supplementary nutrition and life skills to 11-14 years age adolescent girls. According to ministry of Education, Govt. of India Saakshar Bharat Mission report, only Dhalai district has female adult literacy rate less than 50% (45.69%). So, the status is better than all other North-East Indian states.

NEP Questionnaire Survey Response Analysis

On the probable causes of girls' students drop-out from school at different levels (Chart-13), the maximum response was given on financial issue and early marriages. In few urbanized districts, employment and earning for family is also a cause. In districts like Dhalai, School infrastructure favourable for girls, is also an affecting factor. Chart-14 shows the response pattens for all other 8 questions of the questionnaire, which were mainly based on the awareness on NEP 2020. Unfortunately, only 25% school students have heard about NEP-2020. The bright side is that all of the samples, students want to be financially independent in life. There are many obstacles to force many of them to drop their dreams. The survey responses can conclude that, if NEP-2020 can be implemented successfully, it can enlighten some alternative and optional paths to reach their dreams.

**Chart-13 : Shows Response Frequency on Probable cause of
Drop-out of Girls' Students**
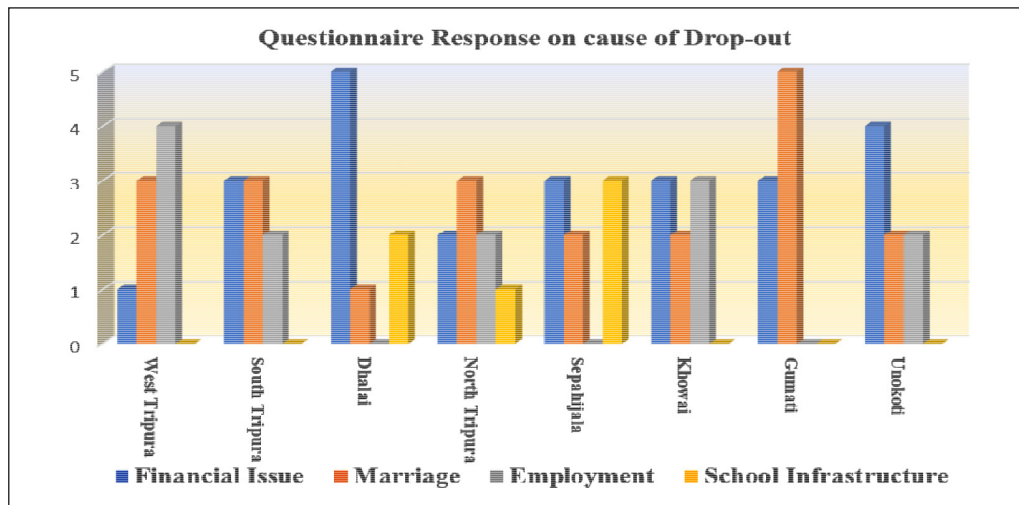
Conclusion and Suggession

Tripura is one of the fastest developing states of North-Eastern India in the field of education. Education in Tripura is provided by both public and private sector. Literacy rate in Tripura has been upward trending and is much higher than the Indian average both in male and female literacy. The best side of education in Tripura in gender equality in basic education. Mostly the strength of girls' and boys' students are at equal percentage in all parts of Tripura. females are more likely to reach their potential, exercise their human rights, and contribute to society if education for females is improved. Girls who receive an education will make great strides in closing the gender gap. Giving girls pertinent disaster education in a classroom setting can improve their understanding of how to respond to climate change while promoting sustainable development in their communities. Additionally, they can support the resiliency of their communities and families. But in some districts, the infrastructures should be reviewed and remodelled to motivate girls' education both formal and non-formal education system such as community education, adult education, lifelong education and second-chance education. Motivational facilities should be decentralized to all the districts. Districts like Dhalai, North Tripura, Unokoti, Gomati should be taken under special consideration for development. Girls' school drop-out causes are to be analysed district-wise and alternative schemes should be implemented

Chart-14 : Shows Questionnaire Response Statistics
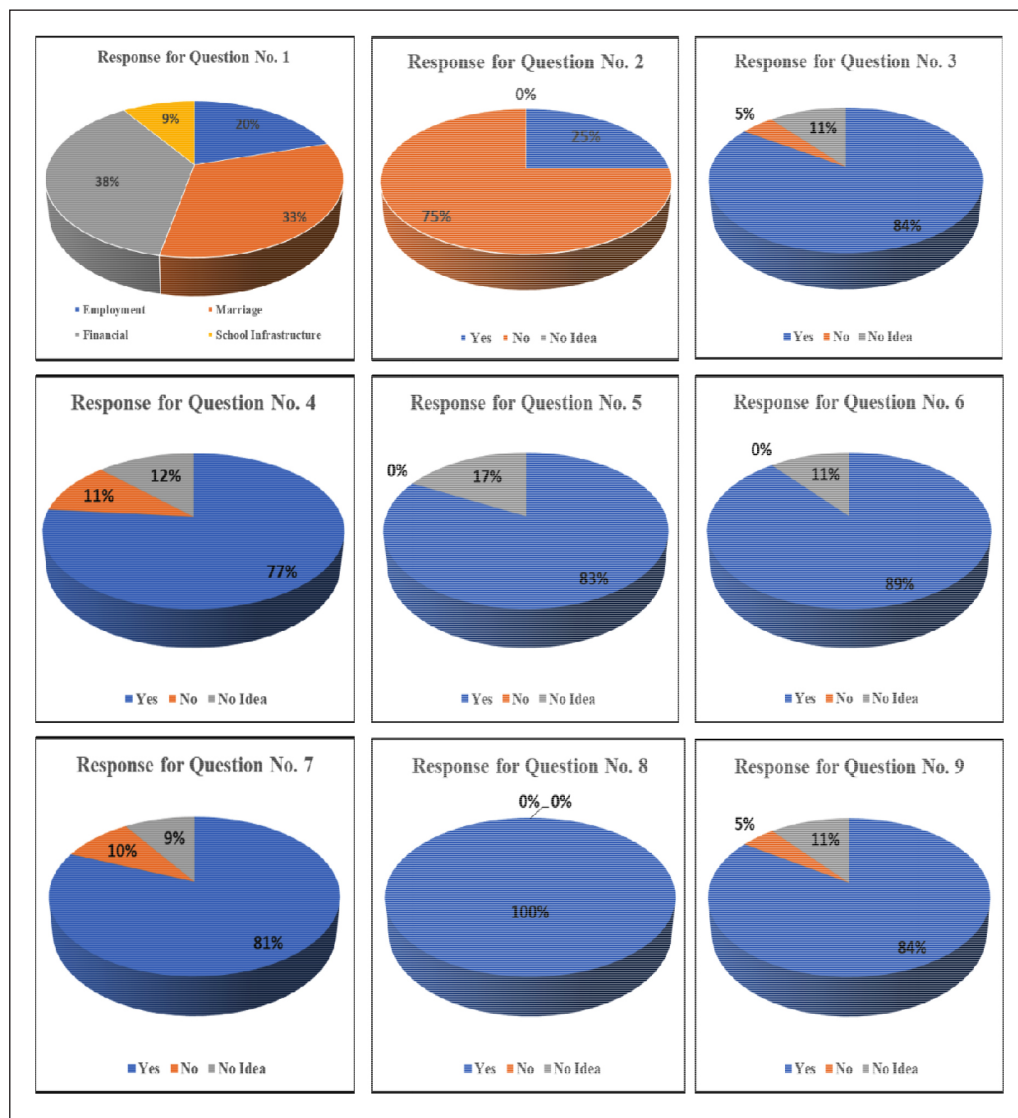
to bring down the drop-out rate. Not only traditional but also vocational and skill-based education should be encouraged in all the states. The growth in women employment and women entrepreneurship can be seen in all the minor industrial database for all districts. Hence, a prosperity in the women perception for being self-dependent is prominent in the state. This huge growth potential

and be more stimulated by the New NEP 2020.

NEP 2020 provides for setting up a Gender Inclusion Fund (GIF) to build the nation's capacity to provide equitable quality education for all girls as well as transgender students. As NEP 2020 very clearly says for equitable and quality education for girls' children under Samagra Siksha Abhiyan. Various interventions have been targeted for providing quality education to girls which include opening of new schools, distribution of free uniform and text books to girls up to class – VIII, appointment of additional teachers, construction of quarters in remote areas etc. NEP 2020 gives emphasis for full utilization of fund for high quality education starting from primary class to university education. If NEP 2020 is fully implemented, the quality of girls' education shall improve very fast in the state of Tripura. This will certainly trigger the overall development of the state.

References

Alva, S. & Desai, S. 1998. Maternal education and child health : Is there a strong causal relationship? Demography. Vol. 35, No.1, pp.71-81.

Babu, T.N. & Suhasini, N. 2022. Entrepreneurship : Problems & Prospects. In A.K.Publications. New Delhi.

Bhat, R.A. 2015. Role of Education in the Empowerment of Women in India. Journal of Education and Practice. Vol.6, No.10, pp.188-192.

Chakraborty. K.S. 2008. Empowerment and status of women in Tripura. In Akansha Publishing House. New Delhi.

Das. I. 2019. Status of Women: North Eastern Region of India versus India, International Journal of Scientific Research & Growth. Vol.3, pp.1-8.

Dutta, S.K. & Ghosh, D.K. 2002.Gender responsive budgeting in India: Trends and Analysis, InAkansha Publishing House. New Delhi.

Gupta. N. 2012. Women Undergraduates in Engineering Education in India : A Study of Growing Participation, Gender, Technology and Development. Vol.16, No.2, pp.153-176.

Herz, B. & Sperling, G.B. 2004. What works in girls' education: evidence and policies from the developing world. In Washington DC : Council on Foreign Relations.

Jain, P., Agarwal, R., Billaiya, R. & Devi, J. 2017. Women Education in Rural India. International Journal of Social Sciences and Humanities, pp.21-26.

Konar, D.N. & Chakrabarti, S. 2008. Developmental Issues of North East India, In Akansha Publishing House. New Delhi.

Mahanta, B. and Nayak, P. 2013. Gender Inequality in North East India, PCC Journal of Economics and Commerce, Vol.7, pp.1-13.

Manga, B.V.L.A. 2015. Empowering women through education, focus on Saakshar Bharat Mission.In Akansha Publishing House. New Delhi.

Mirowsky, J. & Ross, C.E. 2017. Education, social status and health, In Routledge, New York, USA.

Patel, I.1998. The Contemporary Women's Movement and Women's Education in India. International Review of Education. Vol. 44, pp.155–175.

Singh, S. & Arora, A. 1999. Education and Women Empowerment. In Association of Indian Universities, New Delhi.

Singh, K. 2016. Importance of Education in Empowerment of Women in India, Motherhood International Journal of Multidisciplinary Research & Development. Vol.1, No.1, pp.39-48.

Sinha, T.K. 2009. Education for rural development. InAuthorspress. Delhi.

Sinha, H. & Sinha, S. 2013.Women in North-East India, status, empowerment & development perspectives. In Akansha Publishing House. New Delhi.

Vij, M., Bhatia, M. & Pandey, S. 2014. Women's studies in India, A journey of 25 years. In Rawat Publications, New Delhi.

https://socialwelfare.tripura.gov.in/node/576

https://www.education.gov.in/hi/sites/upload_files/mhrd/files/upload_document/SaaksharBharat_Decmber.pdf

https://tbse.tripura.gov.in/

https://schooleducation.tripura.gov.in/

https://elementaryeducation.tripura.gov.in/notice

https://highereducation.tripura.gov.in/

https://sseducation.tripura.gov.in/

https://ecostat.tripura.gov.in/

https://tripura.gov.in/demographics#:~:text=According%20to%202011%20census %2C %20the,52.89%20percent%20of%20the%20whole.

https://www.censusindia.co.in/states/tripura

https://censusindia.gov.in/nada/index.php/catalog/43015

https://tripuratourism.gov.in/people

Office Bearers of ICA 2024

Prof. Ajay Kumar Singh
President – ICA, Senior Professor, Head & Dean
Department of Commerce, Faculty of Commerce
and Business, Delhi School of Economics
University of Delhi, Delhi

Prof. W. K. Sarwade
Immediate Past President – ICA
Pro Vice Chancellor
Dr. BAM University, Aurangabad

Prof. M. Jayappa
Executive Vice President – ICA
Former Principal, RBANMS First Grade College
Usloor, Banglore

Dr. Kuldeep Sharma
Secretary – ICA
Chairman Board of Studies in Trade,
Transport and Industry, University of Mumbai

Prof. N. K. Jha
Joint Secretary – ICA
Dean, Faculty of Commerce
Head & Director
Department of Applied Economics & Commerce
Patna University

Prof. D. Chennappa
Managing Editor, Indian Journal of Commerce
Treasurer – ICA
Head, Department of Commerce
Osmania University, Hyderabad

Conference Secretary

Prof. K. S. Thakur
Hon'ble Vice-Chancellor
Govind Guru Tribal University,
Banswara

Joint Conference Secretary

Prof. K. K. Dave
Hon'ble Vice-Chancellor
PAHER University, Udaipur

75th ALL INDIA COMMERCE CONFERENCE

October 18 - 20, 2024

Topic	Chairperson	Co-Chairperson
Seminar: Viksit Bharat @ 2047		
Seminar: Viksit Bharat @ 2047: Role of Commerce and Management	**Dr. S. G. Hundekar** Professor Dept. of Studies in Commerce, Karnatak University, Dharwad- 580 003, Karnataka	**Dr. Krishn Awatar Goyal** Professor Business Finance and Economics, Faculty of Commerce & Management Studies, Jai Narain Vyas University, Jodhpur - 342001, Rajasthan
Technical Sessions		
I: Road Map for Commerce and Management Education in Digital Era	**Dr. Kamini Shah** Professor Dean, Faculty of Business Studies, Sardar Patel University, Vallabh Vidyanagar, Dist. Anand, Gujarat	**Dr. Divakar Jha** Associate Professor University Department of Commerce and Business Administration, Lalit Narayan Mithila University, Darbhanga- 846008, Bihar
II: Indian Knowledge System and Future of Management	**Dr. Kinnarry Thakkar** Professor Department of Commerce, University of Mumbai, Kalina, Santacruz (E), Mumbai-400098	**Dr. Anshul Sharma** Professor Director, RPIIT Technical and Medical Campus (under Kurukshetra University, Kurukshetra), Karnal-132001, Haryana
III: Changing Role of HR in VUCA World	**Dr. S. S. Mahajan** Professor Dean & Head, Department of Commerce, Shivaji University, Kolhapur-416004.	**Dr. K. Krishna Chaitanya** Professor University College for Women, Department of Commerce, Koti, Hyderabad
IV: Artificial Intelligence: Opportunities and Challenges	**Dr. R. Ramachandran** Professor Department of Commerce, Annamalai University-Deputed Thanthai Periyar Government Arts & Science College(Autonomous),Tiruchirappalli-620023, Tamilnadu	**Dr. S. Prakash** Associate Professor Shri Ram College of Commerce, University of Delhi, Delhi- 110007
MMSRA		
Empirical Researches in the field of Rural Development, Employment and Entrepreneurship	**Dr. Shailendra Singh Bhadouria** Professor Head, Department of Commerce, Ex-Dean Faculty of Commerce and Management, Indira Gandhi National Tribal University, (A Central University) Amarkantak- 484887, MP	**Dr. Khumukcham Tomba Singh** Professor Head, Department of Commerce and Formerly, Dean of Student's Welfare, Manipur University (A Central University), Canchpur- 795005, Manipur
SMICARSA		
Professor Samiuddin Memorial ICA Research Scholars Award Session	**Dr. Balwinder Singh** Professor University School of Financial Studies, Guru Nanak Dev University, Amritsar-143005, Punjab	**Dr. Elizabeth Mathews** Professor C. K. Thakur Arts, Commerce and Science College, (Autonomous), New Panvel