

Financial Performance and Working Capital Management of MSME Units: A Literature Review

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Abstract

This literature review examines the financial performance and working capital management practices of micro and small enterprises (MSMEs). It aims to synthesize existing research, identify key themes, and provide insights into the factors influencing financial performance and working capital efficiency in this sector. The review highlights the importance of effective financial management practices and the role of external factors such as market demand, economic policies, and access to finance.

1. Introduction

Micro, small, and medium enterprises (MSMEs) are integral to the economic fabric of many countries, especially in developing economies like India. In the financial year 2022, MSMEs contributed over 29% to India's gross domestic product (GDP), underscoring their critical role in the nation's economy. Moreover, MSMEs are a significant driver of employment and exports, making them indispensable to India's growth trajectory. Despite their importance, MSMEs face numerous challenges, particularly in managing working capital efficiently, which directly impacts their financial performance. Understanding these dynamics is vital as MSMEs navigate complex financial environments and strive for sustainability. The classification of MSMEs in India, revised in 2020, now includes micro-manufacturing and service units with investments up to 10 million Indian rupees and turnovers up to 50 million rupees. Small enterprises can have investments up to 100 million rupees and turnovers up to 500 million rupees, while medium enterprises can have investments up to 500 million rupees and turnovers up to 2.5 billion rupees. This reclassification aims to help MSMEs fully leverage government benefits without the fear of outgrowing their classification. However, some critics argue that the broad gap within the medium enterprise classification might lead to unfair competition. The majority of MSMEs, particularly microenterprises, operate informally, which further complicates financial management due to their limited access to formal finance and complex compliance requirements.

Working capital management (WCM) is a key area of concern for MSMEs. Recent studies have shown an inverted U-shaped relationship between WCM and profitability in Indian SMEs, indicating the existence of an optimal level of working capital that maximizes profitability (Ahangar, 2021; Altaf & Shah, 2017). Smaller firms, which constitute the majority of MSMEs, are especially sensitive to underinvestment in net operating working capital, making effective WCM strategies crucial. The size of a firm plays a moderating role in this relationship, with smaller firms showing greater sensitivity to underinvestment in net operating working capital (Lefebvre, 2020). In India, SMEs often employ informal WCM practices, relying on internal financing and lines of credit (Baker et al., 2019), and they primarily use cash conversion cycle and net working capital as key metrics for managing working capital. The impact of financial constraints is also significant, as more constrained firms tend to have lower optimal working capital levels (Altaf & Shah, 2017). Financial constraints also play a significant role, with more constrained firms having lower optimal working capital levels. In December 2021, the credit growth rate for MSMEs in India was 20.5%, though this figure was much lower during the COVID-19 pandemic, reflecting the sector's vulnerability to economic shocks.

The scope of this research is comprehensive, covering various dimensions of MSMEs, including their economic contributions, challenges in financial management, and the broader implications of their informal status. As of March 2024, microenterprises accounted for 97% of all registered MSMEs in India, highlighting the dominance of small-scale operations within the sector. The study also examines employment patterns, with MSMEs employing over 110 million people in India, predominantly in urban areas. The sector's significance is further illustrated by its contribution to manufacturing output, which was nearly 30 trillion Indian rupees in the financial year 2015. Additionally, this review explores the global context, drawing comparisons with MSMEs in other countries. For example, in Thailand, small enterprises account for 49% of MSME employment, while in Africa, 41% of MSMEs use digital payments daily. Such comparisons help contextualize the challenges and opportunities faced by Indian MSMEs on a global scale. The research also delves into the impact of non-performing assets (NPAs) on medium enterprises, which had an NPA rate of 16.8% as of March 2021, the highest among MSMEs. Hence, a thorough analysis of the financial performance and working capital management of MSME units, offering insights that can inform policy decisions and enhance the resilience and sustainability of this vital sector. By consolidating existing knowledge, identifying research gaps, and proposing future research directions, this study contributes to the broader discourse on MSME development in India and beyond. The micro and small enterprise (MSE) segment, plays a vital role in the economy of any country. Understanding the financial performance and working capital management of these units is crucial for their sustainability and growth. This literature reviews the financial performance and working capital management in MSME's with following aims:

- To review studies on Financial performance in MSME's and their WCM.
- To Identify the Methodologies used in determining the financial performance.
- To give direction for the future research

1.1. IMPORTANCE OF THE STUDY

MSMEs are critical in creating jobs, contributing to GDP growth, and fostering regional economic development. According to the Dun & Bradstreet (2017) report on leading MSMEs in India, access to finance is a significant challenge for the MSME sector and so the significant mismanagement in the finances of the small enterprises is also present. The MSME Census of 2006-07 highlighted that 87% of MSMEs lacked access to secure finance and often relied on internal sources such as friends or relatives for funding which ultimately gives the way for sophisticated financial management. The financial knowledge of managers of these enterprises also plays a crucial role in the provided problem. This lack of access to formal financial systems is primarily due to perceived credit risks associated with financing MSMEs, arising from issues like non-availability of valid invoices, inadequate accounting systems, and a lack of recognized buyers.

As reported in the annual MSME report for 2015-16, The sector, comprising 36 million units, employs over 80 million individuals and contributes approximately 8% to the Gross Domestic Product (GDP). It accounts for 45% of the total manufacturing output and 40% of the nation's exports. Despite their significant contributions, MSMEs face numerous bottlenecks, particularly related to accessing low-cost capital, maintaining financial discipline, and managing market fluctuations. The diversion of funds further exacerbates the economic viability of these units. Given these challenges, this research aims to provide valuable insights into the financial performance of the plywood units in the Perumbavoor cluster. By analyzing financial data over ten consecutive years, the study seeks to offer a comparative assessment that can help identify financial efficiencies and inefficiencies. This analysis is crucial for stakeholders, including unit owners, financial institutions, and policymakers, to facilitate well-informed decision-making and effectively execute strategies that enhance the financial health and sustainability of these units.

2. Methodology

A narrative or formal review encompasses the background and overview of a research topic through a summary based on its analysis. The text outlines the restrictions and suggests future avenues for investigation. A systematic review follows a strict methodology and selective criteria to determine its research questions. Systematic reviews enable the precise determination and evaluation of research paper quality, reduce bias, and enhance replicability. Systematic reviews have gained popularity and largely replaced traditional narrative reviews among scholars due to their superiority (Pae, 2015). Despite the formal narrative review being an evidence-based strategy,

it fails to generate scientific evidence. A meta-analysis is a statistical analysis of multiple research studies that demonstrates similar research designs (Akhter et al., 2019). The synthesis and critical appraisal of multiple studies within a particular context is aided significantly by systematic reviews (Akhter et al., 2019). A systematic review, rather than a meta-analysis, is the better choice for this study due to the risks of an incomplete dataset and compromised internal, external, construct, and statistical validity (Stone & Rosopa, 2017).

Using a systematic quantitative approach, this research mapped and reviewed the antecedents of franchisee performance. This approach systematically emphasizes consistent and logical literature research, elicitation, and integration in the reporting process. The PRISMA flowchart should reflect the number of studies included and excluded throughout the literature search process. Moher, Liberati, et al. (2009a) recommend the PRISMA checklist for ensuring good reporting and rationale when including articles in a systematic review, where this practice isn't standard in traditional literature reviews. A systematic quantitative review can aid in illuminating knowledge gaps by identifying and enumerating previously known research and shedding light on what remains unexplored. (Pickering & Byrne, 2014) A systematic review encompasses an extensive body of integrative research from multiple settings (Snilstveit et al., 2012).

2.1. Review Process:

The review process initiates by outlining the study's objectives and intentions, previously mentioned in the preceding section. The review protocol involves conducting a literature search on dependable databases using well-considered keywords and terms and adhering to predetermined screening standards according to the stated goals. We chose several databases including Scopus, but since many articles weren't available on Scopus, we also searched Google Scholar and the Open-Alex API. The Boolean operator "AND" was used to retrieve records containing all the specified search terms from the databases. To meet the demands of this systematic review, several inclusion criteria were applied.

Introductory search terms were employed in the title, abstract, or keywords. The search yielded more recent data due to not applying a specific timeframe. Further restrictions were imposed on the social science investigation, specifically within the business management discipline. Non-journal publications, like books reviews, conference papers, book chapters, and thesis, were excluded from the research databases in this review. The databases were searched using the terms "Financial Performance" and/or their combinations: "Working Capital Management," AND "MSME" OR "SME".

As of August 2024, the literature search from the publishers resulted in 96 research papers; 2 in the Scopus database, 50 in google scholar and 44 from Open Alex. Areas of studies such as financial performances, working capital management on MSME's were included in this study. 84 research papers were selected as suitable from 96 initially identified papers after eliminating duplicates. 57 articles were reviewed by two authors to meet the research requirements and eligibility. 34 articles met the inclusion criteria and were incorporated in this review, as figure 1 demonstrates.

2.2.Classification:

Researchers initiated study evaluation by creating a spreadsheet with applicable categories and subgroups for data input and retrieval from articles. The table encompasses details on Authors, Objectives, and Methodologies. The papers were categorized according to their focus on Financial analysis factors or working capital management factors. Examining the applied measure revealed different categories of Financial performance measuring scales. All articles underlying ideas and their relationships with various constructs were consolidated in one column for easier critical analysis. The method for classification was revised iteratively based on the findings of the review studies.

Fig 1. The literature review process, as described in 2009, is explained in the text. Moher et al. (2009a) published this study.

Articles Identified through Scopus, Google Scholar and Open-Alex API (n=96)
⇓
Articles after Duplicates (84) removed
⇓
Articles Screened (n=57) ⇒ Articles Excluded (n=27)
⇓
Full Text Articles assessed for eligibility (n=57) ⇒ Full Text Articles excluded with valid reasons (n=23)
⇓
Studies included for final literature review (n=34)

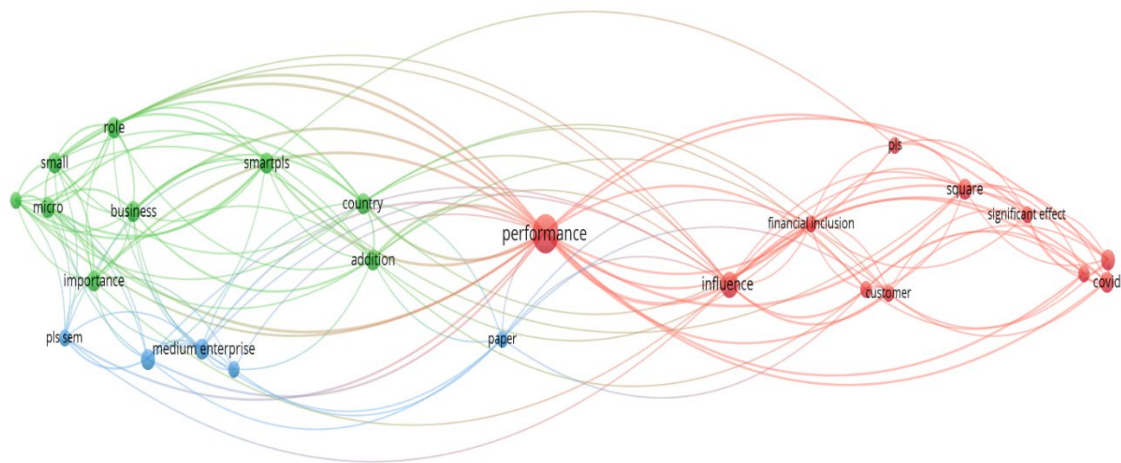


Figure 3. Bibliometric Coupling

Note: This figure was created using Vos Viewer and the Open Alex API, based on the terms 'Financial Analysis,' 'Working Capital Management,' and 'MSME'.

Table 1: Segmentation by categories and Sub-Categories(Variables)

Category	Variable	Studies
Financial Performance Variables	Profitability	Baskar (2019); Gjoni, Çela, Mlouk, & Marku (2022)
	Profitability	Gopi (2018); Silambarasan, Saranya & Raja (2022)
	Financial Efficiency	Rahman & Meera (2021)
	Financial Efficiency	Gupta, Raman & Tripathy (2023)
	Financial Health and Stability	Desta (2016); Yadav & Mishra (2021)
	Financial Health and Stability	Mousavi et al. (2020)
	Capital Structure	Ogbulu, Okanta & Turakpe (2018); Zulfiqar et al. (2021)
	Capital Structure	Singh & Singh (2021)
	Corporate Social Responsibility (CSR)	Pan, Sha, Zhang & Ke (2014); Pal (2017)
	Corporate Social Responsibility (CSR)	Devi et al. (2020); Okafor, Adeleye & Adusei (2021)
Working Capital Management Variables	Cash Conversion Cycle	Panigrahi (2017); Ahmad & Rana (2021)
	Cash Conversion Cycle	Tank & Dhadhal (2019)
	Inventory Management	Panigrahi (2017); Ahmad & Rana (2021)
	Inventory Management	Prajapati (2019); Silambarasan, Saranya & Raja (2022)
	Payables and Receivables	Kakakhel, Ilyas, Iqbal, & Afeef (2015); Singh & Singh (2021)
	Payables and Receivables	Panigrahi (2017); Prajapati (2019)

Overall Management	Working	Capital	Moghimi & Anvari (2014); Omrani, Jafari & Mansori (2019)
Overall Management	Working	Capital	Bandyopadhyay (2022)

Table 2: Segmentation by methodologies used.

Methodology

Integrated Fuzzy Model Combining TOPSIS and FAHP Techniques

Panel Data Analysis

Fixed and Random Effect Models

CAMEL Rating System

Regression Analysis

Financial Ratio Analysis

ANOVA (Analysis of Variance)

Studies

Moghimi & Anvari (2014); Omrani, Jafari & Mansori (2019)

Pan, Sha, Zhang & Ke (2014); Kakakhel, Ilyas, Iqbal, & Afeef (2015); Pal (2017); Singh & Singh (2021); Okafor, Adeleye & Adusei (2021)

Kakakhel, Ilyas, Iqbal, & Afeef (2015); Singh & Singh (2021)

Desta (2016); Yadav & Mishra (2021)

Kasbun, Teh & San Ong (2016); Demirel & Eskin (2017); Kumar & Subramanyam (2017); Devi et al. (2020); Zulfiqar et al. (2021)

Rao (2016); Naz, Ijaz & Naqvi (2016); Baskar (2019); Prajapati (2019); Tank & Dhadhal (2019); Silambarasan, Saranya & Raja (2022); Gjoni, Çela, Mlouk, & Marku (2022)

Rao (2016); Panigrahi (2017); Tank & Dhadhal (2019)

Fuzzy DEMATEL (Decision-Making Trial and Evaluation Laboratory)	Mousavi et al. (2020)
DEA (Data Envelopment Analysis)	Rahman & Meera (2021)
Dynamic Panel GMM (Generalized Method of Moments)	Bandyopadhyay (2022)
fsQCA (Fuzzy-set Qualitative Comparative Analysis)	Lassala, Orero-Blat & Ribeiro-Navarrete (2021)
Paired t-test	Gupta, Raman & Tripathy (2023); Nguyen (2022)

Table 3: Segmentation by Industry-wise studies

SME and Micro Enterprises	Ratio Analysis	Prajapati (2019); Tank & Dhadhal (2019); Silambarasan, Saranya & Raja (2022)
SME and Micro Enterprises	ANOVA (Analysis of Variance)	Tank & Dhadhal (2019)
SME and Micro Enterprises	Dynamic Panel GMM (Generalized Method of Moments)	Bandyopadhyay (2022)
SME and Micro Enterprises	Fixed and Random Effect Models	Singh & Singh (2021)
Banking Sector	CAMEL Rating System	Desti (2016); Yadav & Mishra (2021)
Banking Sector	DEA (Data Envelopment Analysis)	Rahman & Meera (2021)
Mining Industry	Panel Data Analysis	Pan, Sha, Zhang & Ke (2014)
Mining Industry	Regression Analysis	Kasbun, Teh & San Ong (2016)
Steel Industry	Financial Ratio Analysis	Rao (2016)
Cement Industry	Financial Ratio Analysis	Demirel & Eskin (2017); Baskar (2019); Naz, Ijaz & Naqvi (2016)

Cement Industry	ANOVA (Analysis of Variance)	Panigrahi (2017)
Cement Industry	Fuzzy DEMATEL (Decision-Making Trial and Evaluation Laboratory)	Mousavi et al. (2020)
Real Estate and Construction Sector	Paired t-test	Gupta, Raman & Tripathy (2023)
Real Estate and Construction Sector	Financial Ratio Analysis	Gjoni, Çela, Mlouk, & Marku (2022)
General Industry Analysis	fsQCA (Fuzzy-set Qualitative Comparative Analysis)	Lassala, Orero-Blat & Ribeiro-Navarrete (2021)
General Industry Analysis	Content Analysis and Regression Models	Okafor, Adeleye & Adusei (2021); Devi et al. (2020)

Table 4: Segmentation by County-wise studies

Country	Industry	Year of Study	Authors
Iran	Various Firms	2006-2009	Vahid, Elham, Mohsen, Mohammadreza (2012)
Nigeria	Manufacturing Firms	2007-2011	Ajao, Nkechinyere (2012)
Nigeria	Manufacturing Firms	2007-2011	Uremadu, Egbide, Enyi (2012)
Ethiopia	Cooperative Unions	2008-2012	Vallalnathan, Joriye (2013)

Ethiopia	Micro and Small Enterprises	2008-2012	Tirngo (2013)
Kenya	Tea Companies	2005-2012	Yegon, Kiprono, Willy (2014)
South Africa	SMEs	2008-2012	Enow, Brijlal (2014)
Spain	SMEs	1995-2009	Bonas-Caballero, Garcia-Teruel, Martinez-Solano (2014)
Brazil	Public Companies	1995-2009	De Almeida, Eid (2014)
United States	Various Companies	1982-2011	Aktas, Croci, Petmezas (2015)

The reviewed studies comprehensively analyze financial performance and working capital management (WCM) in diverse industries, employing multiple variables and methodologies. Researchers including Baskar (2019), Gjoni et al. (2022), Gopi (2018), and Silambarasan et al. (2022) have explored the impact of WCM on profitability. Rahman and Meera (2021), Gupta et al. (2023) focused on financial efficiency, while Desta (2016), Yadav and Mishra (2021), and Mousavi et al. (2020) studied financial health and stability. The studies by Ogbulu et al. (2018), Zulfiqar et al. (2021), and Singh and Singh (2021) explored the role of capital structure in their investigations. According to Pan et al. (2014), Pal (2017), Devi et al. (2020), and Okafor et al. (2021), CSR practices improve financial outcomes. Panigrahi (2017), Ahmad and Rana (2021), and Tank and Dhadhal (2019) analyzed the cash conversion cycle in WCM, while Prajapati (2019) and Silambarasan et al. (2022) evaluated inventory management (See Table 1). Kakakhel et al. (2015), Singh and Singh (2021), Moghimi and Anvari (2014), Omrani et al. (2019), and Bandyopadhyay (2022) evaluated payables and receivables using various methods such as integrated fuzzy models combining TOPSIS and FAHP (Moghimi & Anvari, 2014; Omrani et al., 2019), panel data analysis (Pan et al., 2014; Kakakhel et al., 2015; Pal, 2017; Singh & Singh, 2021; Okafor et al., 2021), and fixed and random effect models (Kakakhel et al., 2015; Singh & Singh, 2021). These studies employed a range of techniques including the CAMEL rating system, regression analysis, financial ratio analysis, and ANOVA. Additionally, Desta (2016), Yadav and Mishra (2021), Demirel and Eskin (2017), Zulfiqar et al. (2021), Rao (2016), Baskar (2019), and Panigrahi (2017), as well as Tank and Dhadhal (2019), are examples of researchers who applied these methods. The study employed advanced methods like Fuzzy DEMATEL (Mousavi et al., 2020), DEA (Rahman & Meera, 2021), dynamic panel GMM (Bandyopadhyay, 2022), fsQCA (Lassala et al., 2021), and paired t-tests (Gupta et al., 2023; Nguyen, 2022) (See Table 2).

In Table 3 one can see the cement, banking, mining, steel and MSME enterprise industries with the use of distinct analytical methodologies including integrated fuzzy models, CAMEL rating system, panel data analysis, financial ratio analysis, ANOVA, dynamic panel GMM, and fixed and random effect models were implemented. Paired t-tests and fsQCA were used in real estate and construction sectors analyses, as well as in general industry studies. The complexity of WCM (Workforce Cost Management) and financial performance analysis is highlighted by the extensive methodological diversity, emphasizing the significance of selecting fitting methodologies for each industry context's unique challenges and variables.

The Table 4 presents a comprehensive overview of studies conducted on working capital management (WCM) across various countries and industries over different periods. In Iran, Vahid et al. (2012) analyzed WCM across various firms from 2006 to 2009, focusing on metrics such as the average collection period and cash conversion cycle to evaluate their impact on business performance. In Nigeria, Ajao and Nkechinyere (2012) explored how WCM affects profitability

in manufacturing firms between 2007 and 2011 using multivariate analysis, while Uremadu et al. (2012) further examined the influence of specific WCM components, noting the contrasting impacts of the cash conversion cycle and accounts payable period on profitability. In Ethiopia, Vallalnathan and Joriye (2013) studied cooperative unions from 2008 to 2012, highlighting the positive effects of efficient WCM on profitability, while Tirngo (2013) focused on micro and small enterprises, identifying a positive link between accounts payable periods and profitability but negative associations with unsold goods and receivables. Kenyan tea companies were studied by Yegon et al. (2014) from 2005 to 2012, who found that certain WCM aspects, like the cash conversion cycle, negatively impacted financial performance. In South Africa, Enow and Brijlal (2014) examined SMEs from 2008 to 2012, identifying both negative and positive correlations between WCM components and profitability. Spanish SMEs were analyzed by Bonas-Caballero et al. (2014) from 1995 to 2009, revealing a concave relationship between WCM and profitability, indicating an optimal WCM level for maximizing profit. In Brazil, De Almeida and Eid (2014) investigated public companies from 1995 to 2009, concluding that increased working capital might diminish company value. Lastly, Aktas et al. (2015) studied various U.S. companies between 1982 and 2011, discovering that aligning WCM with an optimal level could enhance stock performance and overall company value.

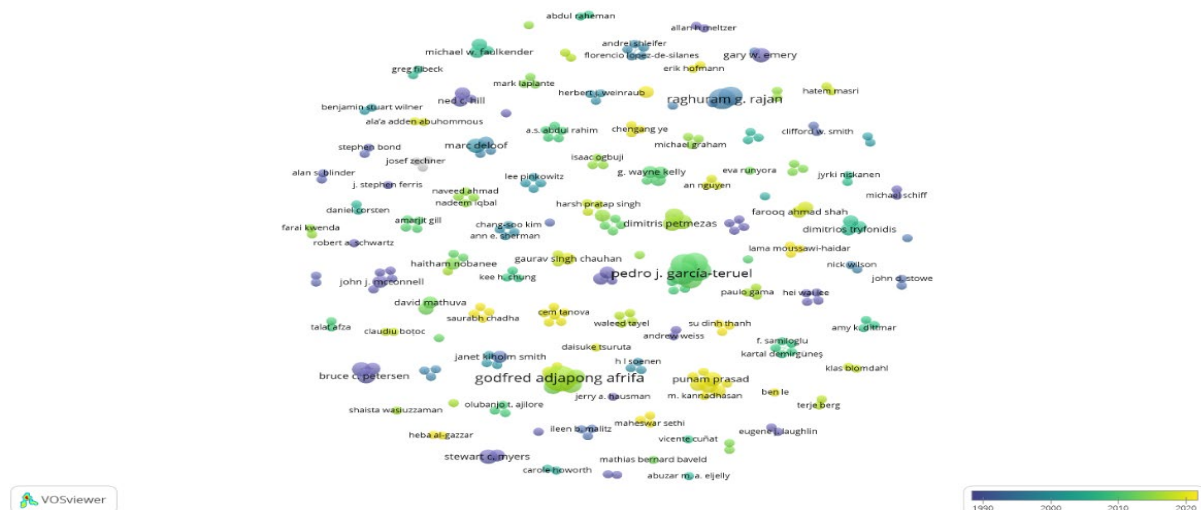


Figure 2: Bibliometric Co-Authorship occurrences

Note: This figure illustrates the co-authorship occurrences, where at least one author is involved in each paper. A total of 275 documents meet the threshold, resulting in the formation of 104 clusters. Among these, a minimum of 5 items per cluster leads to a final grouping of 9 clusters.

Here Fig 2. Shows the bibliometric analysis of co-authorship in the selected articles revealed a striking lack of connections, with only a few instances of collaboration among authors. This suggests a fragmented research community where researchers predominantly work in isolation. Such fragmentation could be attributed to the niche nature of the topics under study or the emerging status of the field. The absence of robust collaborative networks might limit the exchange of ideas and slow down the advancement of knowledge in this area. To address this, initiatives aimed at fostering collaboration, such as targeted conferences and research networks, could be highly beneficial.

Table 5: Research Papers Investigated

Authors	Objective	Methodology	Findings	Contribution
Moghimi & Anvari (2014)	Evaluate the financial performance of Iranian cement companies	Integrated fuzzy model combining TOPSIS and FAHP techniques. Applied to eight Iranian cement firms listed on the Tehran Stock Exchange	Provided a performance ranking of the companies, indicating relative performance scores. Suggested that the method could be adapted to other sectors.	Introduced a novel methodological approach in performance evaluation, emphasizing adaptability to different industries.
Pan, Sha, Zhang & Ke (2014)	Explore the relationship between financial performance and CSR in the Chinese mining industry	Panel data analysis from 228 Chinese mineral companies (2010-2013). Regression analysis was used	Identified significant relationships between specific CSR issues and corporate financial performance (CFP). Supplier, customer, and environmental responsibilities often had negative impacts on CFP, while shareholder responsibility had a positive impact.	Highlighted the complex interaction between CSR and financial performance in the mining industry, with implications for stakeholders
Kakakhel, Ilyas, Iqbal, & Afeef (2015)	Investigate the impact of CSR on the financial performance of	Fixed and random effect models, with a preference for the fixed model based on the Hausman test. Analyzed data	Found a strong positive correlation between CSR and financial success, affirming the	Provided empirical evidence supporting the positive impact of CSR on financial

	Pakistani cement firms.	from 15 companies over 2008-2014	theoretical link between these variables.	performance in the cement industry.
Desti (2016)	Evaluate the financial performance of top African banking companies	Analysis of financial statements from 2012-2014. Used the CAMEL composite rating.	Banks showed strong ratings in capital adequacy and earnings ability but weaker ratings in asset quality, management quality, and liquidity. Overall rating was "Fair"	Suggested the periodic use of CAMEL ratings to improve resilience against market fluctuations.
Kasbun, Teh & San Ong (2016)	Examine the impact of sustainability reporting on financial performance in Malaysian public enterprises	Regression analysis linking sustainability reporting with financial success.	Positive association between sustainability reporting and financial performance, particularly in economic, social, and environmental dimensions.	Emphasized the importance of sustainability for enhancing business efficiency, despite challenges in implementation.
Rao (2016)	Assess the financial efficiency of Indian public sector steel companies.	Financial ratios and ANOVA used for analysis over a ten-year period (2006-2015).	Identified poor solvency and declining efficiency in generating returns for the companies.	Provided insights into the financial challenges facing public sector steel firms in India.
Naz, Ijaz & Naqvi (2016)	Investigate the financial performance of Pakistani cement companies.	Ratio analysis and model construction for predicting financial performance.	Positive correlation among several ratios with financial performance, except leverage. Identified key factors influencing financial outcomes.	Reinforced the importance of profitability, liquidity, and asset utilization in financial performance,

				while questioning the role of leverage.
Demirel & Eskin (2017)	Analyze the financial structure and environmental impact in the cement industry.	Financial ratio analysis of 16 cement firms on the Istanbul Stock Exchange (2011-2013).	Found strong correlations between financial ratios and emission levels, with certain financial metrics negatively impacting emissions.	Bridged the gap between financial structure and environmental considerations in the cement industry.
Kumar & Subramanyam (2017)	Assess shareholder value using MVA, EVA, and stock market returns in Indian cement companies.	Regression analysis and other statistical methods used on 20 companies (2005-06 to 2014-15).	EVA was identified as the most significant measure related to stock market returns. Ultra Tech Cement ranked highest.	Provided a comprehensive evaluation of shareholder value creation metrics, emphasizing EVA's importance.
Pal (2017)	Explore the impact of climate change policy on the Indian cement industry.	Panel data analysis (2010-2014) of production, energy intensity, and CO2 emissions.	Inverse relationship between energy intensity and production; positive correlation between CO2 emissions and production.	Highlighted the role of climate change policies in promoting efficient production in the cement sector.
Panigrahi (2017)	Assess the efficacy of working capital management in the	Analysis of 30 Bombay Stock Exchange-listed firms (2006-2015).	Positive correlation with outstanding debt days, negative with inventory and payable days. Suggested detrimental effects of	Challenged the conventional view of working capital management, proposing a nuanced

	Indian cement sector.		reducing the cash conversion cycle.	understanding of its impact on profitability.
Daryanto (2018)	Analyze the financial health of two Indonesian SOEs in the cement industry.	Financial ratio analysis (2011-2015).	Both SOEs exhibited healthy financial conditions, with specific ratings for key ratios.	Offered a detailed assessment of financial health in the Indonesian cement industry, emphasizing the strengths of SOEs.
Fogarassy (2018)	Investigate the impact of environmental accounting on financial performance in the cement sector.	Introduction of key performance indicators linked to a circular benchmarking model.	EA often driven by government regulation, with potential profitability enhancements in the industrial sector.	Provided a framework for understanding the intersection of environmental accounting and financial performance in the context of decarbonization.
Gopi (2018)	Analyze the financial results of Indian SMEs using the extended DuPont approach.	Analysis of ROE components in three cement companies (2006-2015).	Decline in ROE, with similar contributions of the five factors among the companies.	Demonstrated the utility of the extended DuPont approach in evaluating financial performance.
Ogbulu, Okanta & Turakpe (2018)	Investigate the impact of capital structure on financial	ARDL method applied to annual financial reports (2006-2015).	Mixed impacts of capital structure variables on financial performance indicators, with	Highlighted the complexity of capital structure decisions in

	performance in Nigerian cement companies.		control variables also playing a role.	the Nigerian cement industry.
Baskar (2019)	Analyze the profitability performance of JK Tyre & Industries Limited.	Financial analysis over ten years (2008-2009 to 2017-2018).	Unsatisfactory net profit-earning capacity but strong profitability in terms of ROE, ROA, and ROCE.	Identified key profitability challenges and strengths in the Indian tire industry.
Omrani, Jafari & Mansori (2019)	Assess the performance of Tehran Stock Exchange-listed cement companies.	Fuzzy model using FAHP and TOPSIS techniques.	Identified top-performing companies and provided insights for improving others.	Offered a structured approach for performance evaluation in the cement sector.
Prajapati (2019)	Analyze the financial performance of select SME companies in India.	Ratio analysis.	Satisfactory financial positions but identified areas for improvement in short-term solvency.	Provided practical insights into financial management challenges in Indian SMEs.
Tank & Dhadhal (2019)	Analyze profitability in Indian MSMEs.	Ratio analysis and ANOVA (2009-2018).	Notable variations in profitability metrics among selected companies.	Highlighted the diversity in financial performance within the MSME sector.

Devi et al. (2020)	Analyze CSR disclosures in Indian cement companies and their impact on financial performance.	Content analysis of annual reports and regression analysis (2012-2018).	Mixed relationships between CSR disclosures and financial performance.	Provided insights into the evolving role of CSR in financial performance in India.
Mousavi et al. (2020)	Analyze the financial performance of Iranian SMEs using a fuzzy DEMATEL approach.	Fuzzy DEMATEL for evaluating the influence of financial and non-financial factors.	Provided a holistic view of factors affecting financial performance.	Offered a comprehensive methodology for evaluating SME performance in Iran.
Rahman & Meera (2021)	Investigate the financial performance of Islamic banks in Malaysia.	DEA method applied to five Islamic banks over a ten-year period (2010-2019).	Positive correlation between CSR and financial success, affirming the theoretical link between these variables.	Provided empirical evidence supporting the positive impact of CSR on financial performance in the cement industry.
Singh & Singh (2021)	Explore the role of leverage in determining financial performance in Indian MSMEs.	Fixed and random effect models applied to data from 50 companies (2009-2018).	Leverage negatively impacts financial performance, emphasizing the importance of debt management.	Reinforced the importance of financial prudence in the MSME sector, particularly concerning leverage.

Yadav & Mishra (2021)	Examine the financial health of Indian public sector banks using CAMEL analysis.	Analysis of 19 banks (2016-2020).	Strong financial positions, with variations in specific CAMEL components.	Provided a comprehensive assessment of public sector banks' financial health.
Ahmad & Rana (2021)	Evaluate the impact of working capital management on profitability in Indian MSMEs.	Ratio analysis and panel data analysis (2010-2019).	Positive impact of efficient working capital management on profitability, particularly in inventory management.	Reinforced the importance of working capital management in ensuring MSME profitability.
Zulfiqar et al. (2021)	Investigate the impact of capital structure on financial performance in the Pakistani cement industry.	Regression analysis of 15 companies (2010-2019).	Positive relationship between equity and financial performance, negative relationship with debt.	Offered insights into capital structure decisions in the Pakistani cement sector.
Lassala, Orero-Blat & Ribeiro-Navarrete (2021)	Examine the financial success of indexed firms concerning the pursuit of Sustainable Development Goals (SDGs)	Applied fsQCA method using data from the IBEX 35 stock market index in Spain.	The study identified configurations where SDGs and financial performance were related. Interestingly, companies not implementing SDGs historically achieved better financial performance, with some configurations showing	Provided a nuanced understanding of the relationship between SDGs and financial success, challenging the notion that SDGs universally contribute

			that the absence of SDGs led to a strong return on equity (ROE). Conversely, others indicated that SDGs were associated with lower ROE.	to better financial outcomes.
Okafor, Adeleye & Adusei (2021)	Investigate the connection between financial performance and corporate social responsibility (CSR) spending among top 100 U.S. tech companies	Content analysis and regression models were employed to evaluate CSR's impact on financial performance.	The study found a positive correlation between CSR spending and financial performance, with increased CSR spending being associated with higher revenue and profitability.	Reinforced the argument that CSR activities can lead to enhanced financial outcomes, particularly in revenue and profitability in the tech industry.
Bandyopadhyay (2022)	Investigate the relationship between capital infusion and various performance criteria in public sector banks in India.	Dynamic panel generalized method of moments (GMM) was used to analyze data from 21 public sector banks over nine years.	Capital infusion programs significantly impacted the performance of Indian public sector banks by meeting regulatory capital adequacy requirements, positively influencing market capitalization, and improving net interest margins.	Demonstrated the importance of capital infusion in enhancing the financial stability and performance of public sector banks, highlighting the critical role of government interventions.

Gjoni, Çela, Mlouk, & Marku (2022)	Analyze factors affecting the financial success of Albanian construction enterprises.	The study employed financial measures like profitability, debt, and liquidity ratios, with ROA as the predictor, analyzing data from 100 construction firms (2018-2020).	Positive correlations were found between financial ratios (except for leverage ratio, which had a negative correlation) and financial success.	Offered insights into the key financial indicators that drive success in the Albanian construction industry, with a particular emphasis on managing leverage.
Nguyen (2022)	Investigate the impact of the COVID-19 pandemic on the financial performance of Vietnamese logistics businesses listed on the stock market.	The study used the Wilcoxon signed rank test to compare financial ratios from 2019 and 2020 across 114 logistics companies.	The study found a decline in financial efficiency, including returns on assets, receivable turnover, and leverage, due to the pandemic's negative effects on supply chains, export activities, and international transportation.	Provided a detailed account of how the pandemic adversely affected the financial performance of logistics companies in Vietnam, highlighting vulnerabilities in global supply chains.
Silambarasan, Saranya & Raja (2022)	Analyze the financial performance of the UltraTech cement industry using the DuPont Model.	Financial data from 2012 to 2021 was analyzed, focusing on the equity multiplier, return on equity, and net profit margin.	The company's financial performance showed a positive trend, though the study recommended focusing on improving asset turnover.	Offered a detailed case study of a major cement company, demonstrating the utility of the DuPont Model in assessing financial health and providing actionable

				recommendations for improvement.
Zhou, Liu & Luo (2022)	Explore the relationship between sustainable development, ESG performance, financial performance, and company market value in Chinese listed companies.	Analyzed ESG rating data from 2014 to 2019, with financial performance serving as a mediating variable.	Improvements in ESG performance positively influenced company market value, with operational capacity mediating this relationship, especially for state-owned listed companies.	Provided evidence of the positive impact of ESG performance on market value, highlighting the role of financial and operational capacities as mediators.
Gupta, Raman & Tripathy (2023)	Investigate the impact of mergers and acquisitions (M&A) on financial performance in the building and real estate sectors.	Employed paired t-test analysis on data from 2011 to 2020.	M&A led to significant improvements in liquidity, profitability, and efficiency ratios, supporting the synergy theory.	Affirmed the benefits of M&A in the real estate and construction sectors, particularly in improving financial performance through enhanced synergy.

3. Areas and Themes Explored

3.1. Financial Performance of MSME

Financial performance always serves as a vital indicator of a company's success, demonstrating its capacity to produce profits, control expenses, and maintain operational stability over time. Some researchers have already highlighted the unique financial challenges faced by MSMEs, including limited access to formal credit, high borrowing costs, and vulnerability to economic fluctuations (Beck, Demirguc-Kunt, & Maksimovic, 2005). These challenges are often exacerbated by macroeconomic factors such as inflation, interest rates, and fiscal policies that directly impact the financial health of MSMEs (Chittenden, Hall, & Hutchinson, 1996). Financial effectiveness of MSMEs would fluctuate due to external economic factors and internal management practices. For example, economic events like demonetization might have significantly impacted MSMEs' financial metrics such as profitability, liquidity, and solvency (Shah, 2017). Moreover, the economic slowdown during the COVID-19 pandemic is expected to have further strained the financial performance of these enterprises.

Identifying specific patterns in financial performance over time can provide insights into the cyclical nature of business operations, the impact of economic policies, and the effectiveness of management strategies. Research has shown that financial performance patterns may get influenced by both internal factors, such as management efficiency and innovation, and external factors, such as market demand and regulatory changes (Love & Roper, 2015).

3.2. Working Capital Management of MSME

Working capital management is vital for the daily operations of MSMEs, influencing their liquidity, operational efficiency, and overall financial stability. Effective working capital management ensures that businesses can meet their short-term obligations and continue operations without financial stress (Deloof, 2003). However, MSMEs often struggle with working capital management due to factors such as irregularity in maintaining cash flows, delay in payments, and very limited access to credit (Garcia-Teruel & Martinez-Solano, 2007). The effective working capital management practices—such as optimizing inventory levels, managing receivables, and negotiation in favorable credit terms with suppliers—have a direct and positive impact on the financial performance of MSMEs. Some studies have already demonstrated that poor working capital management can lead to liquidity issues, increased borrowing, and even business failure, particularly in the MSME sector (Lazaridis & Tryfonidis, 2006). Therefore, understanding the industry type, its working and improving these practices is crucial for enhancing the financial health of MSMEs.

3.3. MSME and Taxation

The implementation of the Goods and Services Tax (GST) in India in 2017 marked a substantial transformation in the nation's tax system, with the objective of establishing a cohesive and integrated market by replacing multiple indirect taxes with a single tax. While GST was expected to simplify tax compliance and reduce the tax burden, its impact on MSMEs has been a subject of debate. Some studies suggest that GST has led to better cash flow management and increased transparency, while others highlight challenges such as higher compliance costs and cash flow disruptions (Mukherjee, 2019). GST, by altering the tax landscape, has had a profound impact on how MSMEs manage their working capital and sales. The introduction of GST required businesses to adapt to new tax filing requirements and payment timelines, which could influence their cash flow and working capital cycles. For example, the need to pay GST on goods and services before receiving payment from customers might have strained the cash flows of MSMEs, particularly those with limited access to credit (Poddar, 2018). On the other hand, the input tax credit mechanism under GST could have potentially improved cash flow by reducing the tax burden on inputs. Therefore, the relationship between GST and MSME financial performance is multifaceted and warrants detailed investigation.

4. Discussion and Synthesis

The literature highlights the diverse approaches and methodologies employed in analyzing financial performance across different industries, with a notable focus on the MSME Sector. A recurring theme is the impact of CSR and environmental considerations on financial outcomes, with mixed results indicating the complex nature of these relationships. Additionally, the role of capital structure and working capital management emerges as critical factors influencing financial performance, particularly in MSMEs and the cement sector. While some studies emphasize the positive impact of CSR on financial performance (Kakakhel et al., 2015; Pan et al., 2014), others present a more nuanced view, with certain CSR activities potentially harming financial outcomes (Devi et al., 2020). The methodologies also vary significantly, ranging from fuzzy logic models (Moghimi & Anvari, 2014; Omrani et al., 2019) to traditional ratio analysis (Daryanto, 2018; Prajapati, 2019), reflecting the diversity in research approaches. The literature presents diverse perspectives on financial performance across different industries, from construction to logistics and public sector banks. A recurring theme is the impact of external factors, such as CSR, SDGs, and capital infusion, on financial outcomes. Studies like those by Lassala et al. (2021) and Zhou et al. (2022) challenge the conventional wisdom that sustainable practices universally enhance financial performance, offering nuanced insights into when and how these practices contribute to or detract from financial success. While some studies (e.g., Okafor et al., 2021) highlight the positive impact of CSR and sustainable practices on financial performance, others (e.g., Lassala et al., 2021) present a more complex picture, suggesting that the absence of such practices can sometimes lead to better financial outcomes. The methodologies vary significantly, with studies

employing techniques ranging from content analysis and regression models to advanced methods like dynamic panel GMM and fsQCA, reflecting the diversity in research approaches.

This analysis provides a comprehensive overview of the current state of research in financial performance evaluation, with a focus on the cement industry and related sectors. It offers valuable insights into the factors influencing financial outcomes, while also highlighting areas for further exploration, such as the long-term impact of CSR and environmental policies on financial performance.

The findings from the reviewed studies demonstrate that WCM plays a critical role in determining corporate performance across different contexts. However, the relationship between WCM and profitability is complex and varies depending on factors such as industry, firm size, economic environment, and specific WCM components.

For instance, while the cash conversion cycle is often negatively associated with profitability, other components like accounts receivable and inventory turnover periods can have either positive or negative impacts depending on the context. This suggests that there is no one-size-fits-all approach to WCM, and firms must tailor their strategies to their specific circumstances to optimize performance. Additionally, the studies highlight the importance of not only managing WCM efficiently but also understanding the optimal levels of WCM that maximize profitability without compromising liquidity. This is particularly evident in the findings from Spanish SMEs and U.S. companies, where there is a clear turning point beyond which further investment in working capital becomes detrimental to profitability.

4.1 Research Gap

The existing literature on working capital management in MMSMEs is widely scattered and lacks consistency, indicating that the systematic and organized literature in this area is still lacking (Phan et al., 2005). Assessment of working capital and measuring financial performance is a complicated affair, owing to the proliferation of scholarly studies and literature in the field of financial management. There are several other compelling justifications for the significance of pursuing studies in this domain. They are given as under:

Firstly, in addition to the aforementioned reasons, a substantial body of research and studies exists that have examined the financial performance of industrial units utilizing appropriate metrics aligned with the aims outlined in their respective research endeavors (Nobanee, 2009; Padachi, 2006; Rahman and Nasr2007). This research study focuses on addressing a research gap by expanding the evaluation of financial performance and identifying the common financial management practices within a specific industrial cluster. Secondly, the preceding examination of empirical research demonstrates that writers have approached the analysis in many ways across

several levels (Shin and Soenen, 1998; Padachi, 2006). These diverse methodologies make understanding of working capital management indicators and their dynamics a complicated issue. Although they have played a significant role in the proliferation of scholarly works pertaining to this subject matter throughout the years. The primary elements contributing to the variation in outcomes may be attributed to the many methodologies employed in measuring variables such as profitability, liquidity, solvency, efficiency, and so forth. In a similar notion Numerous researches have been conducted to examine the financial performance, including a range of components that contribute to comprehending both structural and non-structural variables that delineate the financial well-being of the firms (Ranjith, 2008 and Wu, 2001). Therefore, this research provides a clear and systematically organized research methodology for analyzing financial and non-financial data to interpret results. Thirdly, there is a scarcity of research examining the impact of GST on magnitude of sales, return on investment, and the allocation and appropriation of profits and financial performance. A comprehensive examination of the available literature reveals that there is a lack of specific information on this topic. This research gap was thoroughly filled through this investigation. Fourthly, as previous researches conducted on the link between performance and business profitability in this industrial cluster do not offer definitive guidance (Ramachandaran and Janaki Raman, 2009), the literature review and field study conducted in the Perumbavoor industrial cluster in Ernakulam District, Kerala, have identified a gap in knowledge that warrants additional investigation about financial performance and its associated practices. Hence, the current study aims to address this void by examining the correlation between financial performance indicators and company profitability within the observed entities. Fifthly, To the best of our understanding, no research has been undertaken in the state of Kerala, where industrial clusters are located. According to a report by the Department of Industries, Government of Kerala, the plywood cluster in Perumbavoor is the largest cluster of its kind in the state. Therefore, there is a dire need to conduct a research in this sector. The working capital management practices needs to be explored in this cluster, moreover the impact of GST on sales in this cluster is also explored in this study which was not investigated in previous researches. Further, this study employs analysis based on both primary and secondary data obtained directly from respondent organizations is an important research contribution as many studies in this area are perception based taking opinions only from the respondents.

Finally, the previous researches in this area lacks methodological robustness, to fill this research gap this research employs both financial analysis and statistical analysis and drawn results from both methods.

5. Conclusion and Future Research Directions

This review highlights the critical role MSMEs play in driving economic growth globally, with a specific focus on India. MSMEs foster entrepreneurship, enhance skills, and support the

development of economies like Poland. The MSMED Act of 2006 in India has significantly boosted MSMEs, proving their importance not only in developing economies but also in advanced ones. However, despite their potential, MSMEs often struggle due to poor working capital management (WCM). Issues like irregular cash flow, delayed payments, and limited access to credit hinder their financial performance. Effective WCM practices—such as optimizing inventory, managing receivables, and securing favorable credit terms—are vital for the smooth functioning of these enterprises.

The review also identifies external challenges, including limited access to formal credit, high borrowing costs, and economic fluctuations like inflation and interest rates. For example, events such as India's demonetization impacted MSMEs' profitability, liquidity, and solvency. GST reform, though designed to simplify taxation, has had mixed effects on MSMEs, with some benefiting from improved cash flow, while others face higher compliance costs. A key finding is that both micro and small units experience similar challenges but differ in their WCM strategies. Small units tend to adopt more structured approaches due to their larger financial capacity, whereas micro units are more flexible. Access to finance remains a significant obstacle, with micro units particularly vulnerable due to their smaller scale.

5.1 Directions for Future Research

- **Working Capital Management (WCM) Practices:** Further research could explore the development of tailored WCM strategies for MSMEs, especially micro units, focusing on tools that enhance cash flow stability and improve access to credit.
- **Impact of GST on MSMEs:** More studies are needed to investigate the long-term effects of GST on MSME working capital and sales performance, particularly in terms of cash flow and compliance costs.
- **Credit Accessibility:** Research should focus on the role of alternative financing options, such as fintech solutions, to address MSMEs' limited access to formal credit and explore the effectiveness of informal lending systems.
- **External Economic Factors:** Investigating the impact of macroeconomic changes like inflation, interest rates, and policy shifts (such as demonetization) on MSME financial health could provide insights into how MSMEs can better navigate economic fluctuations.
- **Comparative Studies:** Future studies could compare MSME financial practices across developing and developed economies to identify global best practices in WCM and credit management.

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**The impact of cultural distance and political risk on SMEs’
internationalization strategies:
The case of SMEs in the UAE and Lebanon**

Walid Slaiby and Fadia Matta

ABSTRACT

This paper aims to study the effects of cultural distance and political risk on the Middle East international SMEs’ choice of entry mode to the foreign target markets relative to their resource commitment. The SMEs were studied from two countries – the United Arab Emirates (UAE) and Lebanon. The market entry could be either through non-equity entry modes (exports and contractual agreements) or equity entry modes (shared and full ownership/control of foreign direct investments).

The respondents of this study were owners and managers of UAE and Lebanese international SMEs. We obtained primary data through a survey using a semi-structured questionnaire. We studied the attitudes of SME owners and managers by using a quantitative method, statistically analyzing the responses using a one-sample T-test and the Spearman correlation coefficient.

The findings show that when cultural distance is high between UAE / Lebanon and the host country, the SMEs tend to prefer less commitment in terms of financial resources. Therefore, the contingency approach suggests that high cultural distance leads investors to favor entry modes with greater flexibility, enabling easy dissolution in the event of failure. When looking at how political risk affected the choice of entry mode for UAE and Lebanon's small and medium-sized businesses into international markets, it seemed that these businesses would rather commit fewer resources and limit their financial loss in case they fail. This supports the Transaction Cost Theory, which says that foreign investors are unwilling to commit many resources in a high political risk environment. In addition, the research findings confirm the contingency approach since both UAE and Lebanon SMEs tend to choose non-equity entry modes to have a flexible position to be able to dissolve their commitment when they face unfavorable changes in environmental conditions. Furthermore, the results show that UAE and Lebanon SMEs don’t seem to agree with choosing high-commitment full ownership/control FDI as an entry mode in a high-political-risk context. The originality of this research is its emphasis on UAE and Lebanon SMEs’ internationalization strategies and how these companies with limited resources could build on key success factors for developing their businesses in new markets.

Keywords: Foreign Direct Investment, Cultural Distance, Political Risk, Entry mode choice, Resources commitment, UAE SMEs, Lebanese SMEs.

1. INTRODUCTION

The last few decades have seen significant changes in the economic environment, with globalization leading to the need for Small and Medium Enterprises (SMEs) to invest in international markets. The choice of the most suitable entry mode to a foreign market is a critical strategic decision that an enterprise must adopt during the internationalization process. The process of taking a company that mostly serves a local market and expanding it globally is known as internationalization. The different types of entry modes or strategies of internationalization are identified here as: exporting, franchising, contractual agreements, licensing, shared ownership, strategic alliances or foreign portfolio investments, and full ownership/control through foreign direct investments or FDIs (Shaker et al, 2000).

The strategic choice of entry mode to foreign countries depends on the existing uncertainty in the target country. Cultural Distance (CD) between the enterprise home country and the target country, and Political Risk (PR) in the target country, have traditionally been the most commonly used variables in the search of a foreign market entry mode (Samiee, 2013; Beugelsdijk et al., 2018, Ali et al. 2021). Buegelsdijk et al. (2018) discussed the effects of cultural distance on key strategic decisions in the process of internationalization of companies. They argued that small and medium-sized businesses are less likely to expand to highly culturally distant locations. Majocchi, Valle, and D'Angelo (2015) used accounting data from 403 Italian SMEs to suggest that political risks have a direct impact on the economic performance of small and medium-sized businesses.

Despite many scholars studying the importance of cultural distance and political risk factors in internationalization and expansion of SMEs, the existing literature has not resolved the controversies over how the *type of entry mode* adopted by SMEs, is influenced by Cultural Distance and Political Risk (PR) factors during the process of internationalization. There are no existing studies showing the exact relationship between entry modes adopted by SMEs and the Political risk and Cultural Distance factors in the target country.

This paper studies the impact of Cultural Distance and Political Risk on the UAE and Lebanon SMEs' internationalization strategies and their choice of entry modes to foreign markets. The entry mode choice is one of the most critical strategic decisions for companies in pursuit of global expansion, specifically for the SMEs. The presence of the UAE and Lebanon diaspora spread worldwide constitutes support for such SMEs seeking expansion to host countries with varied cultural factors.

Middle East SMEs have received less attention from past international strategic studies compared to large enterprises' comparable strategies. Due to their size, SMEs tend to interact differently with their environment. Compared to large multinational enterprises (MNEs), SMEs have specific characteristics that are likely to influence their choice of foreign market entry. This is interpreted in terms of the level of commitment to the target market, on how to deal with risks in the host country, and the controllability of that foreign market's activities.

There is also a striking lack of studies on internationalization strategies and entry mode choices of SMEs from developing countries in general and from UAE and Lebanon in particular. This study aims to fill the gaps within empirical literature on the topic at hand by analyzing the effects of both variables (Cultural Distance and Political Risk) separately on non-equity and/or equity entry mode choices or in interaction when considering solely the case of equity entry modes (shared vs full ownership/control FDI).

2. LITERATURE REVIEW

The study analyzes the different types of entry modes that small and medium-sized enterprises use for international expansion. Entry mode has been defined as “an institutional arrangement for organizing and conducting international business transactions” (Root, 1987). Fuchs (2022) discussed functional and institutional market entry strategies that companies adopt according to their needs and capabilities.

Functional market entry modes are controlled from home country locations, whereas institutional market entry modes are carried out from host country locations. When a firm chooses to enter a foreign market, its choice of entry mode reflects its degree of resource commitment in this market (Hill, Hwang and Kim, 1990), the risks it will take and the level of control it has over its activities in the host country (Anderson and Catignon, 1986).

Entry modes are also classified into non-equity entry modes and equity entry modes according to the share of equity held by the foreign investor (Brouthers and Nakos, 2002, 2004). These two categories differ about the investments required and the level of control. The non-equity entry modes including exports and contractual agreements, require lower levels of control and resource commitment (Anderson & Catignon, 1986) than foreign direct investments (FDI) which represent equity entry modes and comprise Joint Ventures (with shared ownership) and wholly owned subsidiaries (with full ownership) (Brouthers, Hennart, 2007).

2.1. Contingency Theory and Transaction Costs Theory

Contingency theory is an organizational theory that explains how contextual factors have the ability to affect the relationship between dependent and independent variables. Also known as a situational approach theory, contingency theory can influence employee behavior, effectiveness, decision-making, and motivation. Contingency theory holds that instead of one right way to manage a company or make decisions, the optimal path of action in a situation is contingent upon the combination of external and internal factors (Hofer, 1990). In a specific phase of an organization's activities, contingent leaders are flexible in their approach, choosing and altering their strategies to suit changing conditions. In case of internationalization, a number of factors must be considered within a situational context, as stated by the contingency approach, so every SME will have its own unique insights and decision-making.

Transaction Cost Theory was proposed by Williamson (1981) to show that whether activities would be internalized in a firm, or would occur within the market, would depend on transaction costs. Transactions are broadly understood as transfer of goods or services across industries and interfaces, and according to the Transaction cost theory, when transaction costs are high, activities would be internalized in a firm. When transaction costs are low, buying goods or services on the market would be the preferred option. Three dimensions were identified to characterize transactions in a firm - uncertainty, frequency and asset-specificity (Greve and Argote, 2015). In the internationalization process of SMEs, transaction cost theory helps determine the total costs of making transactions, including costs of planning and sales or after-sales.

In the context of SMEs and performance or market entry, Williamson's (1981) theory of transaction costs is associated with the management, governance, and enforcement of transactions, focusing on the design of post-transaction governance structures within SMEs to mitigate expected transactional or contractual risks.

This paper will elaborate on the importance of transaction cost theory and contingency theory to understand how these theories could explain market entry and internationalization of SMEs in the UAE and Lebanon.

2.2 Cultural Distance impact on resource commitment and entry mode choice

Cultural distance is a concept widely used to strategize the internationalization process in business. Cultural distance is defined as “the difference in cultural values between two countries” that could help or hinder the global expansion of businesses (Beugelsdijk & Mudambi, 2013; Shenkar, Luo, & Yeheskel, 2008).

Cultural distance influences the degree of commitment associated with the entry strategy. However, the arguments found to support a positive or negative relationship between both dimensions are quite conflicting (Quer, Claver, and Rienda, 2007; Schwens, Eiche, and Kabst, 2011), and the empirical evidence identifying this matter turns out to be inconclusive (Lopez-Duarte and Vidal-Suarez, 2010).

Additionally, based on the resource dependency perspective, when cultural distance increases, the investor may search for support locally to share and/or reduce risks and facilitate product entry into the target market. According to Azofra and Martinez (1999) and Chen and Hu (2002), the investor may seek support locally to mitigate risks and facilitate the product's entry into the target market. He would further seek access to more information, knowledge, and contacts, as well as acquire management skills relevant to the local context (Pak and Park, 2004). To operate effectively, the foreign firm may also need to gain access to resources in the host market. Therefore, it will rely on the local partner (Anand and Delios, 1997; Quer et al., 2007), who will provide appropriate know-how and experience (Padmanabhan and Cho, 1996).

Furthermore, the local partner "closes the cultural gap" between both countries and, due to its familiarity with the host country's culture, assists the foreign investor in terms of control, coordination, local employee management, and distribution network development (Lopez-Duarte, Vidal-Suarez, 2010). Sharing management responsibilities with this partner will reduce overall operation costs (Brouthers and Brouthers, 2001). In this case, in an FDI context, the foreign enterprise will prefer an equity joint venture to a wholly owned subsidiary.

Empirical verification has confirmed the inverse relationship between cultural distance and the degree of commitment to the entry mode. Generally, high cultural distance seems to have a deterrent effect on international trade (Boisso and Ferrantino, 1997).

As cultural distance increased, firms entering the US market chose joint ventures over full-commitment wholly owned subsidiaries, according to Kogut and Singh (1988). Quer, Claver, and Riendain (2007), in their study on Spanish companies, and Xu, Hu, and Fan (2011), through their research on Chinese enterprises, have demonstrated that when cultural risk increases, firms prefer a low-commitment entry mode. However, research questions these results, and further arguments show that a greater cultural distance between home and host country could lead to using entry modes that imply a high level of resource commitment.

On the one hand, when cultural distance is high, it becomes simply more difficult to attain complete and accurate information about a partner (Chang et al. 2012). In such a context, finding a suitable local partner is hard due to the differences in values, norms, and behavior rules. By choosing to

invest through a wholly owned subsidiary entry mode, the foreign investor will not necessarily be cooperating with a partner whose norms, values, and rules relative to decision and behavior are not well known or understood (Lopez-Duarte and Vidal-Suarez, 2010). On the other hand, transferring proprietary expertise to a local partner generates high transaction costs (Wang and Schaan, 2008). In order to avoid these costs, as well as the negotiation and enforcement of cooperative agreements related to joint ventures, firms might choose to invest through wholly owned subsidiaries (Contractor and Kundu, 1998; Brouthers and Brouthers, 2001). Thus, the centralization of decision-making reduces communication costs and absorbs uncertainties (Klein, Frazier, and Roth, 1990; John and Weitz, 1988).

The foreign investor may then prefer an entry mode with a high resource commitment (high-ownership entry mode). Empirically, Schwens, Eiche, and Kabst (2011) have demonstrated in their research on German SMEs that firms with high proprietary expertise tend to prefer equity-based entry modes with a high commitment level over non-equity modes when cultural distance is high. Other studies have also shown similar results. Padmanabhan and Cho (1996) found that Japanese firms tend to choose wholly-owned subsidiaries in culturally distant countries. Erramilli, Agarwal, and Kim (1997) examined Korean firms and found a significant correlation between high cultural distance and higher resource commitment, as well as control equity entry modes.

Anand and Delios (1997) demonstrated that Japanese firms were more likely to choose wholly owned subsidiaries in culturally distant markets than in Asian markets. Shane (1994) showed that when cultural distance is large, US firms in foreign markets prefer high-control entry modes over contractual agreements. Finally, Chen and Hu (2002), studying Chinese firms, found that they tend to select a high control mode in the same context.

Despite the failure of Tihanyi et al. (2005) and Morschett et al. (2010) to find a significant relationship between cultural distance and entry mode, the empirical evidence regarding the impact of cultural distance on entry mode selection reflects the two opposing proposals. The existence of contradictory results gives rise to the "CD paradox," as it is known in the literature. (Brouthers and Brouthers, 2001). This allows us to generate our first hypothesis:

H1: When Cultural Distance is high, UAE and Lebanese SMEs tend to prefer lower commitment non-equity entry modes (exports and contractual agreements) over high resource commitment equity entry modes (shared ownership/control FPI¹, or full ownership/control FDI).

¹ Foreign Portfolio Investment where management control is out of UAE SME's hands.

2.3. Political risk impact on entry mode choice

International business risk that is often seen as political or geopolitical risk. Assessing political risk is critical to all global enterprises, including SMEs.

As global economies continue to embrace free market policies, firms with foreign operations increasingly rely on risk-adjusted returns, so unexpected political events, changes in governments, changes to regulatory measures, conflicts, social unrest, instability, or terrorism reinforce the importance of political risk assessment by SMEs, especially for the internationalization process. Lou (2009) suggested that political risk can be measured both qualitatively and quantitatively.

Similar to cultural distance, political risk acts as an external uncertainty factor influencing the level of resource commitment and the choice of entry mode. Hilmersson, Sandberg, and Hilmersson (2015) identified a highly positive relationship between the perceived uncertainty in the internationalization process and the political turbulence in the market. As previously discussed for cultural distance, there are two opposing perspectives on the relationship between political risk and the level of resource commitment, which ultimately determines the entry mode the internationalizing firm chooses. (Quer, Claver, and Rienda, 2007).

Higher political risk may be associated with a low-commitment entry mode. The first argument supporting this view, which is based on transaction costs theory [1], asserts that political risk and related uncertainty can result in significant costs when internalizing international transactions through FDI (Buckley and Casson, 1976, 1998; Anderson and Gatignon, 1986). Therefore, in such a context, foreign investors are not willing to commit many resources by choosing FDI as their entry mode (Pak and Park, 2004). The second argument (using the contingency approach) [2] relates to the need for a foreign firm in a high-risk target country to have a flexible position and be able to change its decision or dissolve its commitment without significant losses when it faces unfavorable changes in environmental conditions. The firm will then prefer entry modes based on low investment and lack of ownership (Gatignon and Anderson, 1988; Kim and Hwang, 1992).

In line with this same point of view, another argument notes that the higher the political risk, the more difficult it is for the firm to gather and organize enough information to successfully establish a high level of FDI. Finally, in high-risk environments, the foreign firm will not be able to generate enough resources internally to carry out a full-commitment entry mode alone. It will need to share the risk with a partner who will help reduce the firms' exposure to the risk and access more knowledge about the market (argument in line with the resource dependency perspective) [3]. (Azofra and Martinez, 1999; Brouthers, 2002).

Finally, in order to protect their know-how, firms with proprietary expertise prefer to internalize their specific international activities. In a country with high political risk, intellectual property rights protection is very weak, as there is no evident political or legal support for those rights. In fact, piracy can expose property rights, patents, trademarks, brands, and copyrights without any legal protection (Luo, 2001). Therefore, when political risk is high, SMEs with proprietary expertise may internalize their transactions and choose equity-based entry modes with high commitment in order to safeguard their know-how, as demonstrated by Schwens, Eiche, and Kabst (2011).

Despite the existence of these two opposite theoretical approaches, empirical evidence supporting the second point of view is not so abundant (Taylor et al., 2000). Studies on the effect of political risk on the choice of entry mode produced conclusive results, proving that foreign investors prefer joint ventures over wholly owned subsidiaries in countries with a high level of political risk. (Zhao et al., 2004; Hill, Hwang, and Kim, 1990; Agarwal and Ramaswami, 1992; Kim and Hwang, 1992; Erramilli and Rao, 1993; Aulakh and Kotabe, 1997; Delios and Beamish, 1999; Arora and Fosfuri, 2000; Delios and Henisz, 2000; Henisz, 2000; Shrader, Oviatt, and McDougall, 2000). This leads us to generate our second hypothesis:

H2: When Political Risk is high, UAE and Lebanese SMEs tend to prefer lower commitment non-equity entry modes (exports and contractual agreements) over high resource commitment equity entry modes (shared ownership/control FDI, full ownership/control FDI)

2.4. Interaction effect of political risk and cultural distance

The cultural distance paradox and the fact that there is contradictory evidence about how external uncertainty affects entry mode choice come from the fact that most studies have looked at the effects of political risk and cultural distance on entry mode separately. (Lopez-Duarte and Vidal-Suarez, 2013). These studies have ignored the moderating or intensifying effect that each one might have on the other. However, Agarwal (1994) and Brouthers and Brouthers (2001) have mentioned the existence of an interaction between both variables. Other studies by Slangen and Tulder (2009) and Quer, Claver and Rienda (2012), have discussed how both political risk and cultural distance jointly impact decision-making in the internationalization process of companies.

Even when analyzing the role of this interaction effect, two opposite proposals exist. Some researchers argue that when both political risk and cultural distance increase, firms tend to choose an entry mode that provides full control over their international investment projects. This is

because a high entry mode, such as a wholly owned subsidiary, can absorb external uncertainty, lower communication costs by centralizing decision-making power (Brouthers and Brouthers, 2001), and prevent partner opportunistic behavior (Sutcliffe and Zaheer, 1998). Other researchers state that, in such a context, firms might prefer an entry mode that ensures flexibility, less resource commitment, and sharing risk with a local partner familiar with the host country's formal and informal environment. (Lopez-Duarte and Vidal-Suarez, 2013).

Some research in this context, has been done on entry modes, that have represented the external uncertainty of multinational enterprises (MNEs). SMEs confront uncertainties in foreign nations, during the internationalization process, either as political risk level or as cultural distance from host countries (Slangen and Tulder, 2009). Slangen and Tulder (2009), discussed how cultural distance represents both internal and external uncertainties in informal environments, and political risk addresses only an aspect of the formal international business environment. However, external uncertainty is an indicator of the political and social governance of a nation. Quer, Claver and Rienda (2012) studied the internationalization strategies of Chinese multinationals and argued that although political risk may not be a major deterrent for Chinese companies that seek to do business in foreign nations, foreign direct investments or FDI or presence of other Chinese companies, is a factor that is considered during the decision-making, and nations that attract FDI are assessed positively as target countries for expansion.

Empirical studies aiming to analyze the interaction effect of political risk and cultural distance on entry mode choice are quite rare. The study undertaken by Agarwal (1994) showed no results, while the study by Brouthers and Brouthers (2001), showing preference for wholly owned subsidiaries, is not reliable due to the restrictive sample chosen. Xu, Hu, and Fan (2011) discovered that Chinese firms typically opt for high-commitment and control entry modes, like wholly owned subsidiaries, when political risk and cultural distance are high. However, their research results, derived from a small sample and limited to Chinese enterprises, do not lend themselves to generalization.

However, Lopez-Duarte and Vidal-Suarez (2013) have conducted research on Spanish companies investing in 27 countries with different cultural and political environments. They have demonstrated that political risk plays a moderating role in the influence of cultural distance over entry mode choice. In fact, in an environment characterized by both high political risk and cultural distance, foreign firms prefer to invest through joint ventures rather than through wholly owned subsidiaries. In this context, foreign investors prefer entry modes that offer low resource commitment, high flexibility, and allow risk sharing with a local partner. At this point, a third hypothesis emerges:

H3: Considering the choice of equity entry mode, when Political Risk is high and Cultural Distance increases, UAE and Lebanese SMEs prefer to invest through shared ownership/control FPI (Joint venture) over full ownership/control FDI (Wholly owned subsidiary)

2.5 Hypotheses of this Study.

The three hypotheses for this study are as follows:

H1: When Cultural Distance is high, UAE and Lebanese SMEs tend to prefer lower commitment non-equity entry modes (exports and contractual agreements) over high resource commitment equity entry modes (shared ownership/control FPI[1], or full ownership/control FDI).

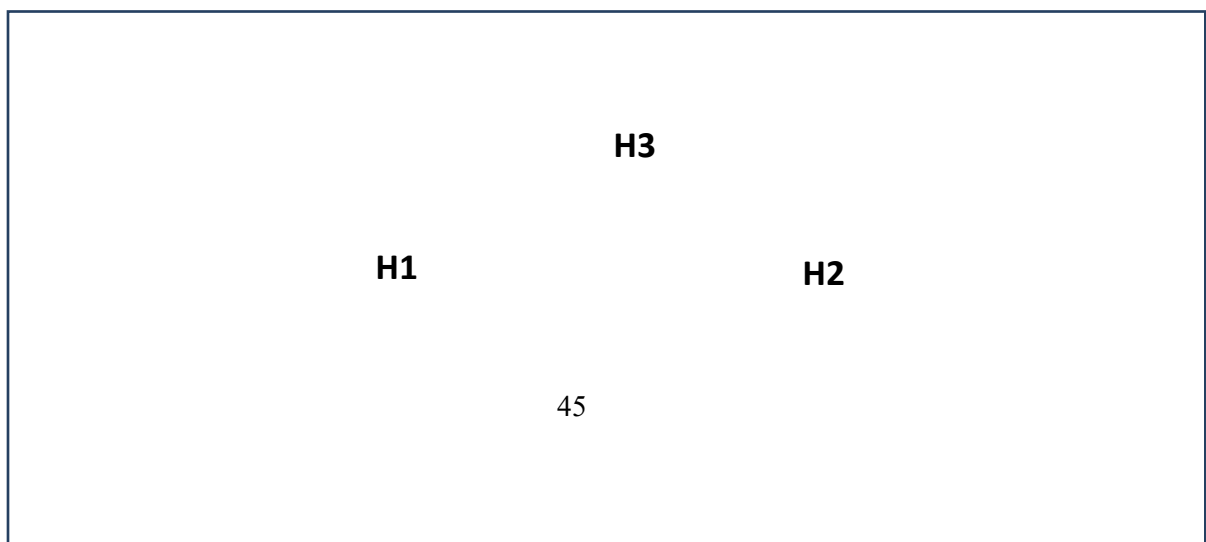
H2: When Political Risk is high, UAE and Lebanese SMEs tend to prefer lower commitment non-equity entry modes (exports and contractual agreements) over high resource commitment equity entry modes (shared ownership/control FPI, full ownership/control FDI)

H3: Considering the choice of equity entry mode, when Political Risk is high and Cultural Distance increases, UAE and Lebanese SMEs prefer to invest through shared ownership/control FPI (Joint venture) over full ownership/control FDI (Wholly owned subsidiary)

3. METHODOLOGY

The conceptual framework of this research is presented in this section, along with the development of research hypotheses. This research framework is structured on four main constructs as illustrated in Figure 1:

1. Cultural Distance
2. Political Risk
3. Non-Equity Entry Modes
4. Equity Entry Modes



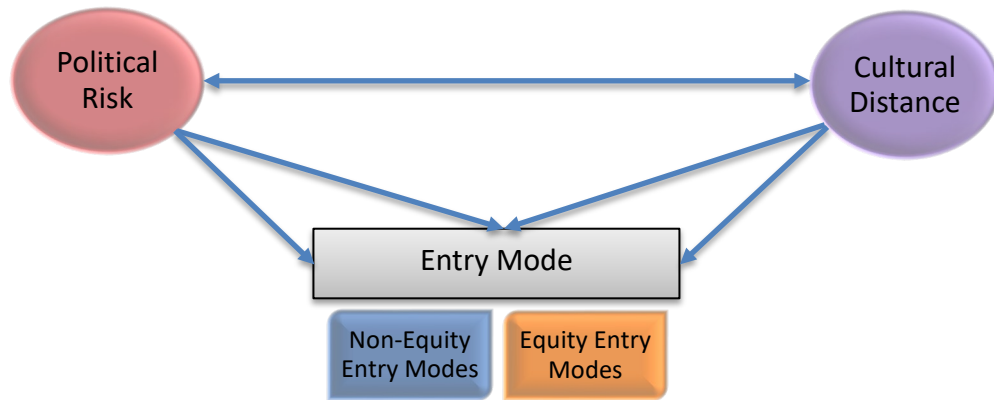


Figure 1: The conceptual framework of the research

3.1 *Research Methodology*

The study examines the impact of Cultural Distance and Political Risk on the internationalization strategies of UAE and Lebanese SMEs. It uses a quantitative method to measure the relationship between entry mode and two independent variables: Political risk and Cultural distance. The study identifies two entry modes: equity and non-equity. Equity entry modes involve exports, contractual agreements, shared ownership/control foreign portfolio investments, and full ownership/control foreign direct investments, requiring increasing resource commitment. Non-equity entry modes involve exports, franchising and contractual agreements, requiring lower commitment. Equity entry modes require high resource commitment.

A pilot study was conducted on a small group of owners and managers to test the questionnaire's efficacy and avoid potential pitfalls. The questionnaire had a few initial questions on eligibility criteria, which were used to ensure that only qualified candidates responded to the questionnaire. Following responses to the initial questions on eligibility, 40% of respondents were found to be eligible and others were eliminated from the study. Among 200 surveys sent to identified SMEs in the UAE and Lebanon, 80 were finally selected, and 50% of the respondents were from Lebanese SMEs and the other 50% were from UAE SMEs. Only owners, managers, executives at the C-suite level and company directors were eligible to participate in the study. Analysis techniques include Spearman's rank-order correlation, one sample "T" Test, and the Kruskal-Wallis Test. The study finds that data on UAE SME internationalization strategies is scarce, adding value to the reference literature.

3.2 Data Collection

A sample of 200 UAE and Lebanese international SMEs registered with the UAE and Lebanon Ministry of Economy and Trade were randomly selected from a list of SMEs. The names and contact details of these SMEs were obtained from publicly available data with the UAE and Lebanon Ministries of Economy and Trade. The survey aimed to gather information and identify the respondents and related SMEs, and the SME owners' and managers' email addresses and telephone numbers were also obtained from the local business directory.:

The questionnaire was sent to these SMEs with targeted respondents consisting of company owners, CEOs, General Managers, and export managers or country directors. The sampling technique used was **selective sampling** of respondents, as only the highest-level managers and executives were eligible to respond to the questionnaire. The questionnaire was administered to respondents who were primarily owners, CEOs, General Managers, country directors and/or export managers.

The data used in the analysis was thus gathered from a representative sample of selected participants and responses to a self-administered questionnaire were quantitatively measured on a five-point Likert scale. The survey was uploaded on Google Docs and sent via email and messages, as clickable links to the 200 selected owners, executives, and managers. Among these 200 SMEs that were contacted, 100 were from UAE, and 100 were from Lebanon, 80 completed questionnaires were finally selected for the study, of which 40 were from executives of UAE SMEs, and the remaining 40 were respondents from Lebanon SMEs. Interviews and further completion of the questionnaire were conducted in the respondents' offices, that were primarily based in Dubai and Beirut. The survey was conducted over three months in the summer of 2022. The questionnaire is divided into five sections: an introductory paragraph, five close-ended questions for Profile Data, and hypotheses testing, and three other sections on:

- *Cultural Distance* effects on entry mode choice, to test H1
- *Political Risk* effects on entry mode choice, to test H2
- *Interaction effects* of Cultural Distance and Political Risk, to test H3

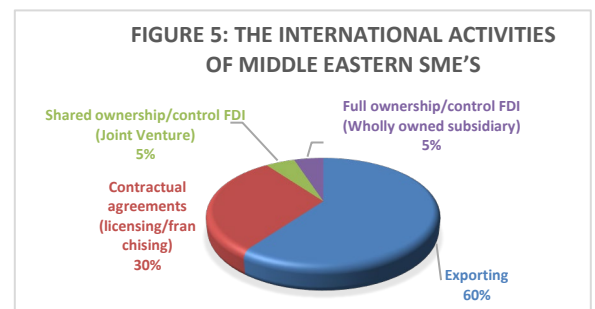
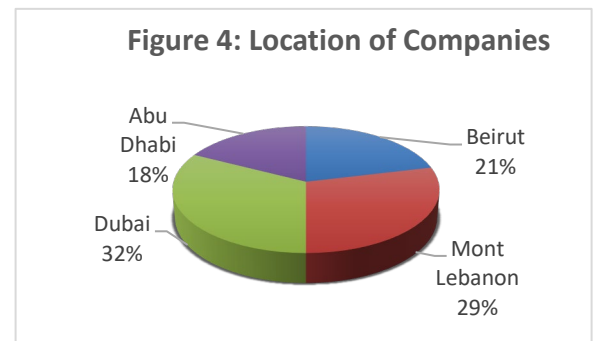
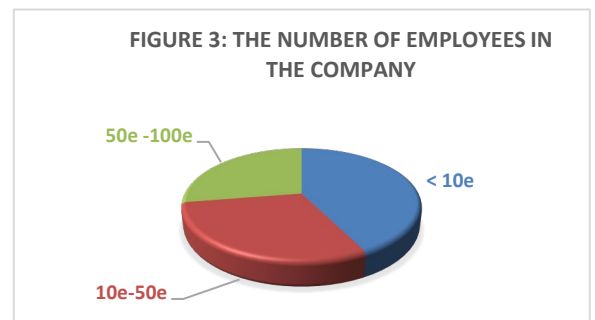
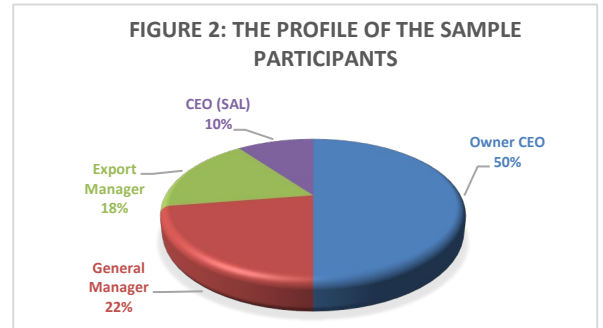
4. FINDINGS AND DISCUSSION

The characteristics of the sample are summarized in Figure 2. A total of 80 completed questionnaires were collected from executives and managers of Dubai and Beirut from the 200 questionnaires sent. This translates to an overall response rate of 40%. As for the profile of the respondents, 50% were Business owners, 22% were General Managers, 18% were export managers, and 10% were CEOs of Anonymous companies, based both in UAE and Lebanon.

As for the size of participating firms, figure 3 shows that approximately 43% of the firms employ less than 10 employees, 30% employ between 10-50 employees and almost 23% of the sample firms employ more than 50 employees, satisfying the criterion of small and medium-sized enterprises.

Figure 4: gives the frequency distribution of the SMEs' owners and managers along with their percentage according to the location of their SME. The result shows that 21% of the respondents have their SMEs in Beirut and 29% in Mount Lebanon, while the remaining 32% are in Dubai and 18% in Abu Dhabi UAE.

When the SMEs' owners and managers were asked a multiple-response question about the international activities their SME is involved in, more than one response was chosen. The results in Figure 5 show that exporting is the



activity the Middle Eastern SMEs have considered the most with 60% of the cases. Shared ownership/control FPI had the lowest percentage; 5%.

4.1 Cultural Distance effect on entry mode choice

This section deals with the correlation between the main statements relative to the Cultural Distance variable as reflected in Table 1.

Table 1: Spearman Test for CD statements

Independent Variable	Dependent Variable	r	P-value
V6: High CD – Commit less resources	Non-equity entry mode	0.395	0.012
V7-V8: High CD – Limit Financial Loss / Easy Withdrawal	Equity entry mode	-0.077	0.638

The Independent variables are High Cultural Distance and commitment of lower resources for a dependent variable non-equity entry mode and High Cultural Distance and limiting financial loss with easy withdrawal capabilities for a dependent variable Equity-based entry mode. The correlation considered between High CD reflects the preference of respondents to commit less in financial resources and their combined statement represents their preference for non-equity entry mode choice in high cultural distance context. Since the p-value of 0.012 is < 0.05 , there is a significant correlation between the two variables. The $r = 0.395 > 0.3$ means that this correlation is positive and medium. When the score for Q6 increases (respondents tend more toward an agreement that they prefer to commit less in financial resources when CD is high), and the score for the combined statement “Non-equity entry mode choice in high CD context” increases (respondents tend more toward an agreement that they prefer to choose non-equity entry modes in this same context). However, the correlation between high CD and equity entry mode is relatively minor ($r = -0.077$) which means that the strength of the association is insignificant and the direction is negative with P-value = $0.638 > 0.05$ reflecting a non-significant correlation.

4.1.1 Validation of Hypothesis H1

To validate hypothesis H1, we need an agreement on statements V6, V7, and V8, and a disagreement or neutrality on statements V9 and V10. Statistically, if we perform the T-test on statements V6, V7, and V8, the mean should exceed 3.5 to indicate agreement. Then, the alternative hypothesis is $H1: \mu > 3.5$, and the null hypothesis is $H0: \mu \leq 3.5$. As for V9 and V10, the mean should be lower than 3.5 for disagreement or neutral. In that case, the alternative hypothesis is $H1: \mu < 3.5$, and the null hypothesis is $H0: \mu \geq 3.5$.

For V6, as shown in Table 2, the mean is $3.88 > 3.5$, and the mean difference is 0.38. Given that the P-value is less than 0.05, we reject H0 and support H1. The mean value for V7 is $3.40 < 3.5$, and the mean difference is -0.10. Given the P-value of $0.27 > 0.05$, we accept H0 and reject H1. The mean value for V8 is $3.73 > 3.5$, and the mean difference is 0.23. Given the P-value of $0.11 > 0.05$, we accept H0 and reject H1. Although the V8 mean is higher than 3.5, it is not statistically significant because the P-value > 0.05 . The mean value for V9 is $3.43 < 3.5$, and the mean difference is -0.08. Given the P-value of 0.34, which is greater than 0.05, we accept H0 and reject H1. Here again, although the mean of V9 is lower than 3.5, it is not statistically significant as the P-value > 0.05 . The mean value for V10 is $3.43 < 3.5$, and the mean difference is -0.08. Given the P-value of $0.33 > 0.05$, we accept H0 and reject H1. Although the V10 mean is lower than 3.5, it is not statistically significant because the P-value > 0.05 .

The above results show that only one out of the five statements for the main hypothesis H1 has statistical support. Therefore, the hypothesis “*When Cultural Distance is high, UAE and Lebanese SMEs tend to prefer lower resource commitment and non-equity entry modes (exports and contractual agreements) over high resource commitment and equity entry modes (shared ownership/control FPI, full ownership/control FDI)*” cannot be validated.

Hypothesis H1 or the impact of Cultural Distance on decision-making during the internationalization process of UAE and Lebanese SMEs is not validated from the findings.

Table 2: T-test results for H1

	Variable	Mean	T	P-value (1 tailed)	Mean Difference	Lower bound	Upper Bound	H0	H1
V6	High CD – Commit less resources	3.88	2.39	0.01	0.38	0.11	0.64	$\mu \leq 3.5$	$\mu > 3.5$
V7	High CD – Limit Financial Loss	3.40	-0.61	0.27	-0.10	-0.38	0.18	$\mu \leq 3.5$	$\mu > 3.5$
V8	High CD – Easy withdrawal	3.73	1.23	0.11	0.23	-0.08	0.53	$\mu \leq 3.5$	$\mu > 3.5$
V9	High CD – Share risk with local partner	3.43	-0.43	0.34	-0.08	-0.37	0.22	$\mu \geq 3.5$	$\mu < 3.5$

V10	High CD – Control Foreign Direct Investment	3.43	-0.44	0.33	-0.08	-0.36	0.21	$\mu \geq 3.5$	$\mu < 3.5$
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4.2 Political Risk effect on entry mode choice

This section deals with the correlation between statements relative to the Political Risk variable as shown in Table 3.

Table 3: Spearman Test for Political Risk Statements

Independent Variable	Dependent Variable	r	P-value
V11. High political Risk –less commitment to financial resources	Non-equity entry mode	0.71	0.000
V11. High political Risk –less commitment to financial resources	Equity entry mode	0.145	0.373

The Independent variables are High Political Risk and less commitment to resources for a dependent variable non-equity entry mode and High Political Risk and less commitment to resources for a dependent variable Equity based entry mode.

The correlation between statement V11 and the others shows that respondents would rather commit less money, and the relationship between statements V12 and V13 shows that they would rather choose a non-equity entry mode in a situation with a high political risk. Since the P-value is $0.000 < 0.05$, there is a significant correlation between the two variables. The $r = 0.71 > 0.5$ indicates that the correlation is positive and large. When the score for Q11 increases (respondents tend more toward an agreement that they prefer to commit less in financial resources when PR is high) the score for the combined statement “Non-equity entry mode choice in high PR context” increases (interviewees tend more toward an agreement that they prefer to choose non-equity entry modes in this same context). On the other hand, the correlation between statement V11 and the combined statement V12-V13 represents their preference for equity entry mode in a high political risk context. The $r = 0.145$ means that the direction is positive, but the strength of the association is small. However, because the P-value is $0.373 > 0.05$, the correlation is not significant.

4.2.1 Validation of hypothesis H2

To validate hypothesis H2, we need agreement on statements V11, V12, and V13 and disagreement or neutrality on statements V14 and V15. Statistically, if we perform a T-test on statements V11, V12, and V13, the mean should exceed 3.5 to indicate agreement. Then, the alternative hypothesis is $H_2: \mu > 3.5$, and the null hypothesis is $H_0: \mu \leq 3.5$. As for V14 and V15, the mean should be lower than 3.5 for disagreement or neutral. Here, the alternative hypothesis is $H_2: \mu < 3.5$, and the null hypothesis is $H_0: \mu \geq 3.5$.

According to Table 4, the mean value for V11 is 4.05, which is greater than 3.5, and the mean difference is 0.55. We reject H_0 and support H_2 , given that the P-value is less than 0.05. The mean value for V12 is $4.20 > 3.5$, and the difference is 0.70. We reject H_0 and support H_2 , given that the P-value is less than 0.05. The mean value for V13 is between 4.05 and 3.5, resulting in a mean difference of 0.55. Given that the P-value is less than 0.05, we reject H_0 and support H_1 . The mean value for V14 is between 3.58 and 3.5, with a mean difference of 0.08. Given the P-value of $0.34 > 0.05$, we accept H_0 and reject H_1 . The mean value for V15 is $2.98 < 3.5$, and the mean difference is -0.53. Since the P-value is $0.00 < 0.05$, H_0 is rejected and H_2 is supported.

The above results statistically prove four of the five statements, supporting H_2 . In this case, the hypothesis “*When Political Risk is high, UAE and Lebanese SMEs tend to prefer lower commitment non-equity entry modes (exports and contractual agreements) over high resource commitment equity entry modes (shared ownership/control FPI, full ownership/control FDI)*” has a greater statistical significance and can be validated.

Hypothesis H_2 or the impact of high political risk in decision-making during the internationalization process, is thus validated by the study findings.

Table 4: T-test results for H2

	Variable	Mean	t	P-value (1 tailed)	Mean Difference	Lower bound	Upper Bound	h_0	h_1
V11	High PR – Commit less resources	4.05	3.28	0.00	0.55	0.27	0.83	$\mu \leq 3.5$	$\mu > 3.5$
V12	High PR – Limit Financial Loss	4.20	5.38	0.00	0.70	0.48	0.92	$\mu \leq 3.5$	$\mu > 3.5$

V13	High PR – Easy withdrawal	4.05	4.11	0.00	0.55	0.32	0.78	$\mu \leq 3.5$	$\mu > 3.5$
V14	High PR – Share risk with local partner	3.58	0.43	0.34	0.08	-0.22	0.37	$\mu \geq 3.5$	$\mu < 3.5$
V15	High PR – Control Foreign Direct Investment	2.98	-2.80	0.00	-0.53	-0.84	-0.21	$\mu \geq 3.5$	$\mu < 3.5$

4.3 Interaction Effect of Cultural Distance and Political Risk

In this section, we study the correlation between statements relative to the interaction of both Cultural Distance and Political Risk considering only equity entry modes as shows in Table 5.

Table 5: Spearman Test for CD & PR statements

Variable 1	Variable 2	r	P-value
V16. Considering equity entry modes, when both Political Risk and Cultural Distance are high, company prefers to commit less in financial resources	Shared ownership/control FPI choice in high CD & PR context	0.351	0.03
V16. Considering equity entry modes, when both Political Risk and Cultural Distance are high, company prefers to commit less in financial resources	Full ownership/control FDI choice in high CD & PR context	-0.391	0.01
Shared ownership/control FPI choice in high CD & PR context	Full ownership/control FDI choice in high CD & PR context	-0.25	0.12

In this section, the interaction effects of high Political Risk and Cultural Distance are considered in cases of shared ownership FPI and full ownership FDI choices.

The relationship between statement V16 and the others shows that respondents want to spend less money, and the relationship between statements V17 and V18 shows that they want to share ownership and control when entering a country with a lot of cultural distance and political risk.

Since the P-value is equal to $0.03 < 0.05$, the correlation between the two statements is significant. The $r = 0.351 > 0.3$ indicates a positive and medium correlation. When the score for Q16 increases (respondents tend more toward agreement that they prefer to commit less in financial resources when both CD & PR are high), the score for the combined statement “Shared ownership/control FPI choice in high CD & PR context” increases (interviewees tend more toward agreement that they prefer to choose Shared ownership/control FSI entry mode in this same context).

However, the relationship between statement V16 and the combination of statements V19 and V20 has been looked into. This shows that they want full ownership and control of the FDI choice in a high CD and PR situation. The $r = -0.391$ indicates that the association's strength is small and its direction is negative. When the score for Q16 increases (respondents tend more toward agreement that they prefer to commit less in financial resources when both CD & PR are high), the score for the combined statement “Full ownership/control FDI choice in high CD & PR context” decreases (interviewees tend more toward disagreement that they prefer to choose Full ownership/control FDI entry mode in this same context). However, the P-value of $0.01 < 0.05$ reflects a significant correlation.

Finally, Table 5 shows the results of the correlation study between the two combined statements. Since $r = -0.25$, the correlation is negative and small. (When the score for the combined statement “Shared ownership/control FPI choice in high CD & PR context” increases i.e. respondents tend more toward an agreement that they prefer to choose Shared ownership/control FPI entry mode in this context; the score for the combined statement “Full ownership/control FDI choice in high CD & PR context” decreases i.e. respondents tend more toward disagreement that they prefer to choose Full ownership/control FDI entry mode). In this case, the correlation is not significant because the P-value is $0.12 > 0.05$

4.3.1 Validation of Hypothesis H3

To validate hypothesis H3, we need an agreement on statements V16, V17, and V18 and a disagreement or neutrality on statements V19 and V20. In terms of statistics, if we perform a T-test on statements V16, V17, and V18, the mean should exceed 3.5 to indicate agreement. Then, the alternative hypothesis is $H3: \mu > 3.5$, and the null hypothesis is $H0: \mu \leq 3.5$. As for Q19 and Q20, the mean should be lower than 3.5 for disagreement or neutral. In this case, the alternative hypothesis is $H3: \mu < 3.5$, and the null hypothesis is $H0: \mu \geq 3.5$.

Table 6 shows that the mean value for V16 is 4.03, which is greater than 3.5, and the mean difference is 0.53. Given that the P-value is less than 0.05, we reject H0 and support H3. The mean

value for V17 is $3.60 > 3.5$, and the difference is 0.10. Given the P-value of 0.24, which is greater than 0.05, we accept H0 and reject H3. Although the mean is higher than 3.5, it is not statistically significant as the P-value is > 0.05 . The mean value for V18 is $3.70 > 3.5$, and the difference is 0.20. Given the P-value of 0.10, which is greater than 0.05, we accept H0 while rejecting H3. Although the mean is higher than 3.5, the difference is not enough to be statistically significant. The mean value for V19 is $3.03 < 3.5$, and the mean difference is -0.48. Given that the P-value is between 0.00 and 0.05, we reject H0 and support H3. The mean value for V20 is $3.18 < 3.5$, and the mean difference is -0.33. Given a P-value of 0.02 greater than 0.05, we reject H0.

According to the above results, three statements out of five statistically support the main hypothesis H3. However, the unproven statements, V17 and V18, pertain to the respondent's attitude towards the choice of shared ownership/control FPI as an entry mode, which remains unconfirmed. Therefore, the hypothesis “*Considering the choice of equity entry mode, when both Political Risk is high and Cultural Distance increases, UAE and Lebanese SMEs prefer to invest through shared ownership/control FPI (Joint venture) over full ownership/control FDI (Wholly owned subsidiary)*” cannot be validated.

Hypothesis H3 or the interaction effects of Cultural Distance and Political Risk and their impact on Shared or Full ownership or FDI in a foreign country, cannot be validated from the study.

Table 6: T-test results for H3

	Variable	Mean	t	P-value (1 tailed)	Mean Difference	Lower bound	Upper Bound	h0	h1
V16	High CD & PR – Commit less resources	4.03	4.53	0.00	0.55	0.27	0.83	$\mu \leq 3.5$	$\mu > 3.5$
V17	High CD & PR – Limit Financial Loss	3.60	0.73	0.24	0.70	0.48	0.92	$\mu \leq 3.5$	$\mu > 3.5$
V18	High CD & PR – Easy withdrawal	3.70	1.31	0.10	0.55	0.32	0.78	$\mu \leq 3.5$	$\mu > 3.5$
V19	High CD & PR – Share risk with local partner	3.03	-2.86	0.00	0.08	-0.22	0.37	$\mu \geq 3.5$	$\mu < 3.5$

V20	High CD & PR – Control FDI	3.1 8	- 2.2 1	0.00	-0.53	-0.84	-0.21	$\mu \geq$ 3.5	$\mu <$ 3.5
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5. IMPLICATIONS AND CONCLUSION

The results showed that SMEs do not seek to commit less in terms of financial resources, refuting the Transaction Cost Theory, which states that investors choose entry modes with lower resource commitment to deal with additional information and transaction costs. Moreover, SMEs do not withdraw easily from the market in case of problems through choosing non-equity entry modes. Therefore, the contingency approach, which proposed that when cultural distance is high, investors prefer entry modes allowing higher flexibility so that they can be easily dissolved in case of failure to adapt to the environment, was not confirmed in the present study. Instead, SMEs tend to choose equity entry modes in high cultural distance context, sharing risk with a local partner familiar with the local culture through shared ownership/control FDI. They may also prefer to have a high resource commitment level and full control over their investment through full ownership/control FDI.

When considering the impact of political risk on UAE and Lebanese international SMEs' entry mode choice, it appears that SMEs prefer to commit less in terms of resources and limit their financial loss in case of failure, confirming the Transaction Cost Theory. The research findings confirm the contingency approach, as UAE and Lebanese SMEs tend to choose non-equity entry modes to have a flexible position to dissolve their commitment when they face unfavorable changes in environmental conditions.

However, the findings regarding the interaction effect of both high cultural distance and political risk on equity entry mode choice are not quite conclusive. It was found that the studied SMEs prefer to commit less in terms of resources and refute the choice of full ownership/control FDI as a means to absorb external uncertainty. The results did not confirm the choice of shared ownership/control FDI to ensure flexibility and risk sharing with a local partner, as demonstrated in previous studies.

Thus, from the three hypotheses tested, Political Risk is a significant factor considered during the decision-making process in the internationalization strategies of UAE and Lebanese SMEs.

Cultural Distance and the interaction of political risk and cultural distance were not found to be significant factors in decision-making, during the expansion choices of the chosen SMEs. Although the study provides significant insights on the factors that affect the internationalization strategies of SMEs in the Middle East, and particularly SMEs in UAE and Lebanon, the study is limited in its scope as it lacks generalizability due to the small sample size of 80 respondents. However, the study fills a major gap in the literature related to the internationalization process of Middle Eastern SMEs, particularly based in the UAE and Lebanon, and shows how Political Risk and Cultural Distance or the interaction of these two factors, play a significant role in the decisions related to the internationalization strategies adopted by these SMEs.

In conclusion, the research findings have implications for owners and managers of UAE and Lebanese SMEs planning to go international, emphasizing the need to develop a flexible organization to ride with political risk and uncertainty in the formal and informal environment of the foreign target country.

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WOMEN AND THE REALITIES OF THE GLASS CEILING: INVESTORS' PERSPECTIVE

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Abstract: In the present times when issues pertaining to women, their societal and corporate roles and talks inclusion have hogged the limelight, a reality check of the roles and challenges of women is an absolute necessity. The study draws its distinctive character from being a perceptual study of the investors, who put their money into a company and ultimately translate corporate inclusion, if at all, into their investment decisions. The investors' perceptions with regards to women were analysed to conclude that advances were being made in mental and societal inclusion of women, yet a lot still remains unaccomplished. The clichéd roles pertaining to rearing children and family responsibilities still are perceived to be women's restricted area, though women have been recorded to break the societal and self-imposed barriers to take the fight to success and corporate excellence. The glass ceiling still remain though has noticeable cracks in it.

Keywords: Gender challenges, Glass ceiling, Investment decision, Social inclusion, Resource based theory

1. INTRODUCTION

Economic growth and development remain the ultimate objective for which every economy aspires and toils. Creation of a balanced society offering equal opportunities for all irrespective of the gender, caste, religion remains a natural consequence of growth and development. In an economy like India which is touted to be next superpower, balance and equality assume all the more importance as skewed flight is neither sustainable nor just. In the pursuit of social and financial inclusiveness, equality of opportunities and decision making is imperative. This equality in participation not only lends credibility and sustainability to the growth model but also creates a healthy prosperous society. One of the major impediments in this growth spree remains the age-old and clichéd glass ceiling. The fairer sex has always strived hard to garner its share or opportunities in the male dominated society in in various walks of life. Unfortunately, this gender biasedness is not only all pervasive but also ubiquitous. Women since times immemorial have had to either stifle their professional aspirations or fall prey to the vicious traps weaved in the society which has also found it hard to accept women at equal footing.

Discrimination and exclusion have been pervasive in varying dimensions, in diverse fields and almost at all levels. Be it in the pretext of caste system, financial wellbeing, haves and have-nots

or skin color, administrations have not been able to level the play field completely. Discriminatory practices have known the Indian lands from the times immemorial which have been brought to record in the epic writings as well. Amongst those excluded, women have continued to be victimized by exclusionary practices in almost all fields. Glass ceiling, gender biasness, gender divide or call it by whatever name, women are still struggling to get their due. In the Indian lands with rich heritage and high reverence for women and female power, where females are worshipped as Goddesses, revered as source of life, it is indeed painful to realize the women continue to struggle in the cobwebs created by the male dominated society. Instances of discrimination against women, implicit and explicit impediments in social, religious, political and corporate life continue to keep these ladies to the margins denying them the center stage. This all, in the face of huge strides of progress, glory and global dominance taken by India whereby world acknowledges the clout of the developing economy.

Initiatives have been taken in India to put women at par with men in various fields. Be it quotas in political institutions, panchayati raj institutions, the fight for entry of women in traditional places of worship, merit based long due entry in armed forces and flying of fighter planes, the mandatory quotas on boards of companies as prescribed by the Companies Act, 2013 to name a few.

In Indian context, the indisputable glory and status call for more responsibility to grow and sustain on the strong pillars of equality, inclusion and fairness. With social inclusion being the buzzword in growing times and India hoarding the strong potential to grow, can the avoidable and manageable biases not be avoided? The study is motivated by the growth trajectory of the Indian economy juxtaposed against the evident imbalances especially against women and their potential to restrict the benefits due to a robust economy like India. In the backdrop of growing awareness on indispensability of inclusionary practices and policies, the study intends to capture the perceptions of investors regarding the role of men and women in Indian society, challenges faced by Indian women and their influence on investment decisions. With an intent to gauge the perceptions of investors with regards to women and their challenges, the study is an attempt to paint a realistic picture of Indian women amidst the tall claims of gender equality: social and financial.

2. THEORETICAL BASIS

The theoretical underpinnings which highlight the role of women in carrying out governance functions provide a basis for study of association between performance and gender diversity. These

include the agency theory and resource dependency. Agency theory suggests that a more diverse team of principals may ensure better monitoring of managers (agents), as diversity increases board independence (Randoy, Thomsen and Oxelheim, 2006). The proponents of agency theory intend to reduce agency costs through alignment of interests of managers and shareholders by effective monitoring through an efficient and effective board. Gender diversity on the corporate boards can help enhance effectiveness which in turn can lead to good performance, as a result of wider perspectives and more exhaustive decision-making process. The positive influence of diversity as a result of more effective monitoring function has been analysed in prior research studies in different contexts: measuring the impact through various accounting measures (Krishnan and Park, 2005, Jurkus, Park and Woodard, 2007), through audit function (Carter et al, 2007) and the similar kinds.

The resource dependence theory views women (diversity) as one of the important instruments in the hands of management to access the various resources critical to firm's success available in the external environment (Johnson, Daily and Ellstrand, 1996). More diverse board will help draw the essential strategic fit with the dynamic and complex business culture. A gender diverse board could benefit from a greater understanding of its customers (Carter, Simkins and Simpson, 2003) and from a wider and in depth knowledge of the industry or choice of access to finance, also will help tap more information sources though sometimes at the expense of less decisiveness (Randoy, Thomsen and Oxelheim, 2006).

There is an additional view to support the gender diversity on corporate boards i.e. the resource based view. It propagates that corporate performance is strongly influenced by physical, organizational and human resources that are available to management (Barney, 1991) and undoubtedly these must be valuable, rare, have imperfect imitability and no strategically equivalent substitutes. Gender diversity and balance between both genders can become a source of competitive advantage (Watson, Kumar and Michaelson, 1993; Farewell and Hersch, 2001), provided that each gender contributes to management in a different and complementary way.

Corporate sector contributes profusely to the economic development of the country and in building up a healthy and equitable society. The businesses do not operate in vacuum rather share a relationship of interdependency and mutual exchange with the society. They strongly affect and are affected by developments, notions and ideas of the society. Through business activities and

initiatives, the larger objective of a socially inclusive and healthy society can be hastened and smoothed.

Inclusion: societal and corporate, has been acknowledged as the stepping stone to sustainable growth and development world over. Countries in their pursuit of excelling and growing in the competitive times have been trying all tricks in the book to achieve that competitive edge and also sustain it to qualify as world leaders. Exclusionary practices where on one side are regarded as discriminatory, also throw a spanner in the wheels of economic and social development. When talks of equality are abound, are revered as indispensable and supported by evidence to lead to numero uno position, global economies are getting prepared to adopt inclusion till the last mile. With international agencies like World Bank, OECD, UNESCO and UN explicitly chartering the roads to inclusivity and embarking on a regime of making all a part of growth journey at micro and macro levels, nations do not have much to choose from in terms of policies. Hence, the case for comprehending the role of women and their challenges becomes pertinent.

3. METHODOLOGY

The primary objective of the study is to comprehend the perceptions of the common investor with respect to the women and their roles and challenges in Indian context. To gauge the perception of investors, data has been collected in a span of about five months (November, 2022 to March 2023) from a well-balanced sample in terms of gender, age, income and investment experience of the respondent.

The population for the study was the investing community across India spanning across different demographic categories. Adopting purposive and judgement sampling, responses to questionnaire-based survey have been gathered from 400 respondents. Of these 60 questionnaires were found to be unfit for analysis on account of incomplete questions (29), multiple options where one was needed (23) and bias of neutrality (8). The final analysis has been done with respect to 340 respondents where responses were complete in all respects.

For analysis of the data appropriate statistical techniques have been used to justify the objective of the study and draw meaningful conclusions from the analysis. Calculation of simple frequencies and percentages, rankings and chi-square test for association have been used for different aspects of the survey. *The Chi-Squared Test of Association allows the comparison of two attributes (i.e. qualitative variables) in a sample of data to determine if there is any relationship between them.*

The idea behind this test is to compare the observed frequencies with the frequencies that would be expected if the null hypothesis of no association / statistical independence were true.

3.1 Sample profile

An attempt was made to include diverse investors in the survey: diversity on account of gender, educational qualification, monthly income and experience in investing. These were identified as important attributes of the investor profile which can impact their perceptions and considerations while making investment and their beliefs about role and contribution of women towards society in general and corporate boards specifically.

a) **Qualification:** Across gender, the sample for study was distributed as 192 males (56.5%) and 148 females (46.5%) who also were diverse with respect to qualifications and monthly income. In the sample, post graduates constituted the highest percentage accounting for 42.1% (143) of the total sample followed by graduates who were 73 of the totals of 340. Amongst the undergraduate respondents (17), females were larger in number as is case for the highest qualification of doctorate. Females, as revealed by the sample, did not lag behind on account of qualifications and this, hence, does not hold ground as a reason for denial of equal opportunities to them. Doctorate females accounted for almost 20% of the female sample size while this percentage was mere 11% for males. Post graduate female investors were 40% of all females and the proportion of professional investors was a good 15% affirming stance of no dearth of qualified females.

Insert Table 1 Here

This association of gender with qualification of the respondents was also checked with the help of chi-square statistic ($\chi^2= 10.9$; p value 0.027) which was found to be significant at 5% level of significance establishing that highest qualification of investor was statistically significantly different across gender.

b) **Monthly income:** Income, undoubtedly, is an important determinant and influencer of investment decision by investors. An effort was made to gauge the monthly income of the respondent across five income categories to correlate it with basis of decision making of the investors. Distribution of respondents across different income categories was balanced in the sample with 25% of investors earning more than Rs. 1,00,000 per month, 27% in the category of 50,000-1,00,000, 23% earning less than 25,000 and 24% in the income bracket of 25,000-50,000. These income classifications however, were found to differ across gender groups wherein clearly women were found to lie in the lower income brackets.

Women in the higher income bracket (more than Rs. 75,000 per month) constituted mere 21% of the total female sample which stood in stark contrast to 44% of all males in this high-income group. On the outset, this seems to be loosely pointing towards the widely talked about ubiquitous pay-gaps and denial of equal financial and professional status to women.

Insert Table 2 Here

The differences across male and female respondents with respect to monthly income were also found to be statistically significant when examined through chi-square test ($\chi^2= 23.0$; p value <0.001). Sample statistics confirm the differences across gender groups with respect to income earned by them establishing that there lies a significant difference in monthly income across gender.

c) **Investment experience:** Investors' experience in terms of number of years they have been investing in corporate securities was examined to understand their perspective vis-à-vis their investment decisions and considerations involved therein.

A large percentage of the sample (68% approx.) was new investors with experience in the corporate investment less than 5 years. Government driven policy initiatives to make capital markets an attractive investment option for the investing community have resulted in attracting investors' money and attention towards these investment options. Female investors were in low numbers in higher experience categories highlighting the hitherto restrictive and conservative approach of females while making investments in corporate securities. These differences, however, were found to be significant at only 10% level of significance ($\chi^2= 8.24$; p value 0.083) which establishes the association across gender and investment experience as loosely significant.

Insert Table 3 Here

4. RESULTS AND FINDINGS

4.1 Perceived roles of men and women in society: Role of men and women in society seem to be divided more so in Indian society. These role differences emerge more from Indian mindsets, where women and their prime responsibilities were acknowledged to be centered around household, kitchen and child rearing jobs. The professional responsibilities and those relating to management of funds remain undoubtedly a man's area. If it related to kitchen and household chores or nurturing children or any of their needs, women were expected to assume it as their prime duty and undiluted priority. However, with changing times and mindset, tall claims of women empowerment and efforts towards breaking the glass ceiling, it is expected that societal expectations with respect to role of men and women in different walks of life would also change.

Investors' responses with regard to their thinking relating to which of the specified roles could be performed better by men or women or both were recorded. Nine different roles were identified which were attempted to cover prime areas in routine life. The responses were classified according to gender of investor to understand the male and female orientations with respect to different roles and their perceptions regarding ability of men and women to perform them. For further statistical emphasis, chi-square test of association was performed to determine if there is any association between the responses of males and females with respect to each of the identified roles.

Kitchen and household jobs, as the clichéd mind set goes, were found to be still regarded as the prime responsibility of females and surprisingly amongst both genders of investors – males as well as females. These responsibilities were perceived to lie far beyond the work area of males as confirmed by the low frequencies (3.6% for males and 2.7% for females). With more and more women stepping out of their homes for career driven aspirations, need of sharing such responsibilities is becoming inevitable. It was found that with respect to domestic chores, response to the option “both” (as to who can perform the role better) was respectable (29% for males and 33% for females) indicating the inevitability of participation of men given the professional commitments of today's women.

Insert Table 4 Here

The association of male and female perceptions gender for kitchen and household jobs lack statistical significance indicating no significant association with respect to these roles (chi-square value of 0.76). Kitchen jobs still are regarded as the primary duty of women in Indian society even in today's transformed times. Another primary role of women lies with respect to motherhood and associated responsibilities of raising children and meeting their different needs. The results again highlighted that it is etched in all mindsets that children should remain a priority of women and what men do as fathers is far above essential. Built upon the Indian value system and image of ideal women, this role is perceived unanimously as better performed by women appearing more like their core competence. Women seem to acknowledge their prime responsibilities as domestic work driven by their upbringing in a patriarchal culture. Maintaining social relations and interactions exhibit similarity of opinion of males and females as well. No significant differences across gender have been observed for the role pertaining to social interactions where in higher frequency lies for “both” (58%) indicating that this has not been recognized as a domain area for either males or females and both can do it successfully. On probing further, higher percentage of

responses were noted for females (34% approximately) leading to conclude that females vis-à-vis males are better at social relations and interactions.

Consistency in responses of male and female respondents was also noted for political activities which are acknowledged as the forte of men. Investors were found to be of the opinion that men have the finer sensibilities to handle and contribute to political activities (52%). Though males were acknowledged to be deft in handling political affairs yet the option that both men and women can handle political matters also garnered support of more than 40% of investors. Homogeneity in responses of males and females is confirmed by the insignificance of results of chi-squared test of association. Similarly, no association was observed for the role pertaining to stress management where the options of women and both men and women have responses of 40% of respondents each. Stress management is perceived more as a situational trait emanating from experiences and preferences rather than from gender based biological characteristics. Males and females seemed to have similar stance, which failed the test of statistical association and hence responses of males and females with respect to better stress management were homogeneous (associated).

Relationships through chi-square test of association were recorded for roles relating to management of funds and business decision making. 37.5% of male respondents believed that men could manage funds better while only 23% of females acknowledged men as better fund managers. Females according to 16.7% of males could effectively manage funds but larger numbers of females (21%) regarded their fairer sex as better managers of funds and finances. 45% of males and 56% of females believe that sound financial management can be ensured by both. Results clarified that males did hold reservations with respect to female ability to manage financial issues while women reposed faith in financial abilities of females. These differences in mindset, indicative of male dominance especially in financial and critical matters was confirmed of its statistical significance through the values for chi-square test.

Very similar results were noted for the role of business decision making where again men seemed to believe that critical business decisions could be better arrived at and implemented by males (46%). Women, on the other hand, underrated men on this and casted their vote for “both” (almost 63%) defying the male notion that women are less capable to make business decisions. Women seemed to no longer support the age-old belief of restricted capabilities of women rather believe that empowered women of today are capable to compete with men and make sustainable decisions relating to business issues. Responses culled from the survey emphasized that women differed

significantly from men in context of the role relating to leading work teams and social work as well. For these roles also, men regarded people of their gender (males) as better suited than females while females held different opinion as lower percentage of them believed that men are better suited for the role (20% for leading work teams and 10% for social work). “Both” as a response option was chosen by larger number of females in comparison to males emphasizing that women of today, do not just believe in women power but also have faith in their abilities to perform better in areas which were hitherto regarded as male dominated domains.

Various roles in the society pertaining to household, children, fund management, business decision making, political activities, social welfare etc were put together and responses of sampled investors were sought. When compared on the basis of gender, it was found that men and women respondents did differ with respect to the suitability of the two for these roles. Males and females were found to hold similar opinions on roles like kitchen and household and taking care of children. With respect to roles relating to business decision making, leading work teams and social work significant associations, statistically confirmed through application of chi-square test of association, were recorded. These indicated the changing mindsets especially of women, who seemed to be defying and denying the traditional restrictions on roles which women can assume in society. Women investors and their responses advocated their ability and intention to participate equally with men in all jobs unshackling the traditional mindsets. It seemed that with changing times, women were moving beyond the clichéd role and starting to take on all responsibilities head on with a winning attitude.

4.2 Perceived challenges of inequality combatted by Indian women: For this, first the respondents were asked about the ubiquitous challenges which women in India are known to be facing. It meant to understand the extent and spread of these challenges in different walks of life like legal rights, occupational choices, property rights, pay gap, opportunities for leadership positions, board directorships and the like. Respondents were asked about these different areas and their feelings regarding the extent of inequality prevalent in society which posed challenges for women. This was expected to provide input for better insights into the real position of women and gravity of situation vis-à-vis age-old challenges which seem to hinder their growth and empowerment.

Respondents were required to express their perceptions about women facing challenges pertaining to different aspects of routine life. Their thinking was captured through a 5 point scale ranging from “not at all” on one extreme to “very much” on the other. Total scores for each issue relating

to women were calculated by taking the product of frequency of each source and assigned weight (-2: no/not at all; -1: I don't think so/not really; 0: Perhaps/undecided; 1: I think so/Somewhat; 2: Yes/very much). On the basis of total scores then, ranks were assigned: 1 for the component having highest score, 2 for second highest and so on with the lowest score getting the lowest rank, 12 in this case.

Insert Table 5 Here

For the total sample of 340 respondents, the overall score and rankings demonstrated the feelings of investors that women faced most severe challenges of inequality in occupational choices. It was with respect to occupational choices that society and its members were perceived to be headstrong as to what jobs fall exclusively in the ambit of men where women cannot penetrate owing to their physical, biological, physiological and emotional characteristics. The issue of property rights was found as next issue where women in India had to fight odds against them. Senior leadership positions and economic benefits had next highest score conveying that women experienced restricted entry to the senior leadership positions and had to forego professional and economic benefits because of gender differences prevalent in the Indian society.

Insert Table 6 Here

Access to credit and provisions of legal rights were lowest in the rung which could be attributed to the growing emphasis on women laws and protection and an effort to empower women. However, the real benefit of these empowerment initiatives in letter and spirit cannot be fathomed in the real sense as the fruits they bear are yet to be tasted. Overall scores and relative ranks of different issues highlight that efforts taken by regulators, policy holders and activists, seemed to have worked in education sector, health provisions, financial facilities, legal protection but failed to trickle down to issue of property rights, economic benefits, senior positions in work environment and occupational preferences.

Being a gender sensitive and gender related issue; the segregation and comparison of scores across gender was considered very pertinent. Responses for male and female investors were same for the first and second highest scores and related ranks. Both male and female respondents were of the belief that women face challenges primarily with respect to choice of occupation and property rights. Female investors felt that promotions and incentives in job were the next area where biases against women were common while this factor for males was 9th in importance. The perspectives are undeniably based on experiences and hence were found to differ according to the situations

faced and as it is rightly said that only the bearer knows where the shoe pinches. Women, from times immemorial, combating the differential treatment have been waging losing battles to command equality for work done. The issue related to political activities as an area of inequality have taken rank 4 for the male investors while for women it has a low rank of 11 (from a total of 12 ranks). Political activities were not regarded as an area where gender biases were prevalent while males regard it as an important area where inequalities existed. This difference in ranks for political activities emerged due to differences in choices of males and females and low number of women in active politics.

The growing emphasis in Indian lands on boosting women participation and the reverberating slogans of women equality were found in areas like grant of credit, health provisions and protection of legal rights and hence these lie low on total score for both males and females.

For the issues where women combat challenges, in spite of slight differences across gender, qualification and income of respondents, occupational choices, property rights and senior leadership positions emerge as the areas where serious challenges of inequality are perceived to be faced by women. However, access to credit and provision of legal rights were identified as areas where minimal inequalities against women were perceived to exist.

4.3 Influence of presence of women at different levels in company on investment decision: Next, the respondents were requested to record their thoughts with respect to influence of women presence at different levels in corporate hierarchy from CEO level to the shop floor level. Intention was to understand if the level in the corporate hierarchy makes a difference to kind of contributions (positive, negative or no influence) women bring with their presence. Purpose was also to check that if women as team members affect decision in a certain way, does that affect differ with position they occupy in a company.

Insert Table 7 Here

Results highlighted that contribution of women in different positions across the organizational hierarchy was not perceived to contribute negatively as supported by low frequency of responses. Overall response to the women contribution is positively concentrated, more so in the senior and higher levels where percentage of positive response was more than 50%. It was observed that at the shop floor and floor levels, a large majority of investors feel that women presence had no influence making these as gender neutral positions. Women and their finer sensibilities and

capabilities were found to add to the performance and overall influence of an organization when they assumed senior, decision making and strategic positions like that of a CEO and board member. Attempt was made to explore the differences of these responses to women contribution at different organizational levels across gender. The chi-square values together with their p-values were compiled to arrive at conclusions in the table. Results clarified that differences in responses of the investors across gender with respect to contribution of women were insignificant for all levels, right from the shop floor level to the CEO. This emphasized that males and females do not statistically differ in their perception about that women presence, and they believe that women largely contribute positively to organizational performance.

Responses lead to the interpretation that influence of women as negative is a very limiting case among the sampled investors. Contribution is believed to be positive or no effect which is found to differ not just with respect to different operating levels within the organization but also across qualification and income of the investors.

5. CONCLUSION

The present study is motivated by the growing chatter about the progression of women in society and corporate settings with their contributions and positions being regarded as pertinent for corporate growth and investment decisions. The investors' perceptions are attempted to be recorded to see how the investors evaluate the role of women in society, their roles vis-a-vis men and challenges women face in Indian set up. The hackneyed "glass ceiling" and its realities over the years as comprehended by common investors is intended to be recorded and analysed to understand the true positions of women. In this context, with the help of representative and demographically distributed sample, perceptions of investors with respect to role of men and women in society and challenges of women were culled.

Various roles in the society pertaining to household, children, fund management, business decision making, political activities, social welfare etc were put together and responses of sampled investors were sought. When compared on the basis of gender, it was found that men and women respondents did differ with respect to the suitability of the two for these roles. Males and females were found to hold similar opinions on roles like kitchen and household and taking care of children. With respect to roles relating to business decision making, leading work teams and social work significant associations in responses of males and females, statistically confirmed through application of chi-square test of association, were recorded. These indicated the changing mindsets

especially of women, who seemed to be defying and denying the traditional restrictions on roles which women can assume in society. Women investors and their responses advocated their ability and intention to participate equally with men in all jobs unshackling the traditional mindsets. It seemed that with changing times, women were moving beyond the clichéd role and starting to take on all responsibilities head on with a winning attitude. For the issues where women combat challenges, in spite of slight differences across gender, property rights and senior leadership positions emerge as the areas where serious challenges of inequality are perceived to be faced by women. However, access to credit and provision of legal rights were identified as areas where minimal inequalities against women were perceived to exist.

Respondents were requested to record their thoughts with respect to influence of women presence at different levels in corporate hierarchy from CEO level to the shop floor level. Intention was to understand if the level in the corporate hierarchy makes a difference to kind of contributions (positive, negative or no influence) women bring with their presence. Responses lead to the interpretation that influence of women as negative is a very limiting case among the sampled investors. Contribution is believed to be positive or no effect which is found to differ not just with respect to different operating levels within the organization but also across qualification and income of the investors.

It is concluded certain societal roles, like kitchen and household chores and taking care of children are still regarded as women's citadel while participation of women in hitherto male dominated areas is also increasing. Also, women's presence in different rungs of the corporate ladder is looked at positively and is perceived to be progressive yet there still remains a large tract of road which is untravelled. The glass ceiling still seems to exhibit Teflon like ability in Indian settings yet deep incisions and cracks are evident. The road to equality has started to be traversed but still there are miles to go.

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Table 1: Qualifications of respondents across gender

HIGHEST QUALIFICATION	GENDER		
	Male	Female	Total
Under graduate	5	12	17
Graduate	46	27	73
Post Graduate	85	58	143
Professional	34	22	56
Doctorate	22	29	51
Total	192	148	340

Table 2: Monthly income of respondents across gender

Monthly income	GENDER		Total
	Male	Female	
Less than Rs. 25,000	35	42	77
Rs 25,000 to Rs. 50,000	39	43	82
Rs. 50,000 to Rs. 75000	31	32	63
Rs. 75,000 to Rs. 1,00,000	22	11	33
More than Rs. 1,00,000	65	20	85
Total	192	148	340

Table 3: Investment experience of respondents across gender

How long you have been investing in corporate securities?	GENDER		Total
	Male	Female	
Less than a year	60	65	125
1-5 years	66	44	110
5-10 years	26	21	47
10- 15 years	19	7	26
More than 15 years	21	11	32
Total	192	148	340

Table 4: Frequencies (and percentages) according to gender for role of men and women and chi square (p-values) values

ROLE	MALE			FEMALE			TOTAL			Chi value (p-value)
	Men	Women	Both	Men	Women	Both	Men	Women	Both	
Kitchen and household jobs	7 (3.6)	129 (67.2)	56 (29.2)	4 (2.7)	95 (64.2)	49 (33.1)	11 (3.3)	224 (65.8)	105 (30.9)	0.76 (0.68)
Taking care of children	5 (2.5)	118 (61.6)	69 (35.9)	5 (3.4)	87 (58.8)	56 (37.8)	10 (2.9)	205 (60.3)	125 (36.8)	0.35 (0.84)

Management of funds	72 (37.5)	32 (16.7)	88 (45.8)	34 (23)	31 (20.9)	83 (56.1)	106 (31.2)	63 (18.5)	171 (50.3)	8.23 (0.02)
Business decision making	89 (46.4)	11 (5.7)	92 (47.9)	39 (26.4)	16 (10.8)	93 (62.8)	128 (37.6)	27 (7.9)	185 (54.4)	15.02 (0.00)
Maintaining social relations and interactions	13 (6.8)	66 (34.4)	113 (58.8)	11 (7.4)	51 (34.5)	86 (58.1)	24 (7.1)	117 (34.4)	199 (58.5)	0.06 (0.97)
Leading work teams	57 (29.7)	24 (12.5)	111 (57.8)	31 (20.9)	31 (20.9)	86 (58.2)	88 (25.9)	55 (16.2)	197 (57.9)	6.15 (0.04)
Social work	33 (17.2)	50 (26.0)	109 (56.8)	15 (10.1)	51 (34.5)	82 (55.4)	48 (14.1)	101 (29.7)	191 (56.2)	4.97 (0.08)
Political activities	100 (52.1)	11 (5.7)	81 (42.2)	77 (52)	9 (6.1)	62 (41.9)	177 (52.1)	20 (5.9)	143 (42)	0.02 (0.99)
Stress management	38 (19.8)	63 (32.8)	91 (47.4)	26 (17.6)	60 (40.5)	62 (41.9)	64 (18.8)	123 (36.2)	153 (45)	2.162 (0.34)

Note: Figures in parenthesis in columns of male, female and both indicate gender wise percentages and in chi-square column indicate the p-values to highlight statistical significance

Table 5: Total score and ranks for perception about women combating challenges of inequality

ISSUE	Total Score	Rank
Provision of legal rights	99	11
Educational opportunities	126	8
Economic benefits	138	4
Occupational choices	223	1
Promotions and incentives in job	134	5
Access to credit	64	12
Corporate directorships	132	7
Senior leadership positions	159	3
Property rights	181	2
Health and survival provisions	105	10
Political opportunities	121	9
Gender pay gap	133	6

Table 6: Gender wise total score and ranks for perception about women combating challenges of inequality

ISSUE	Male Score	Rank	Female Score	Rank
Provision of legal rights	8	11	91	8
Educational opportunities	42	5	84	9
Economic benefits	36	7	102	5
Occupational choices	92	1	131	1
Promotions and incentives in job	22	9	112	3
Access to credit	0	12	64	12
Corporate directorships	37	6	95	7
Senior leadership positions	50	3	109	4
Property rights	69	2	112	2
Health and survival provisions	22	10	83	10
Political opportunities	44	4	77	11
Gender pay gap	34	8	99	6

Table 7: Frequencies of effect of presence of women at different levels in company and chi square values according to gender

Level	Positively	Negatively	No influence	Chi square value (p-value) (gender)
CEO	170 (50%)	21 (6.2%)	149 (43.8%)	3.222 (0.2)
Board Member	186 (54.7%)	18 (5.3%)	136 (40%)	1.953 (0.377)
Senior Level	182 (53.5%)	16 (4.7%)	142 (41.8%)	3.849 (0.146)
Middle Manager	153 (45%)	30 (8.8%)	157 (46.2%)	3.403 (0.182)
Supervisor level	145 (42.6%)	28 (8.2%)	167 (49.1%)	1.690 (0.43)
Shop floor level	116 (34.1%)	41 (12.1%)	183 (53.8%)	1.163 (0.393)

MAPPING INDIA'S COMMODITY EXPORT NETWORK: SECTORAL INTERCONNECTEDNESS AND BEHAVIOR AT TAIL DISTRIBUTION WITH LEADING ECONOMIES

Musthafa KS, Muhammed Mikhdad KG, and Amina Kurikkal Madathil Musthafa

Abstract

This study investigates the interconnectedness of India's commodity export with thirteen major global economies from 2000 to 2023, employing the quantile-quantile connectedness approach. The analysis, illustrated through an extensive network graph, highlights significant imbalances and dependencies across three economic indicators, particularly in extreme distribution scenarios across various export categories. Our findings reveal convoluted non-linear and multiscale interdependencies that elucidate global economic behaviour, especially in India's bilateral trade relationships. Economic Policy Uncertainty (EPU), Consumer Price Index (CPI), and Producer Price Index (PPI) of destination countries have decisive role export network, alongside key export categories such as Petroleum, Agriculture, Ores, and Manufacturing, underscore India's pivotal role within the global commodity export network. Furthermore, Principal Component Analysis (PCA) is utilized to consolidate economic variable outcomes into a singular, interpretable metric for each commodity category. These results underscore the significance of extreme economic conditions and tail dependencies in shaping policy, with critical implications for international trade and economic strategy. This study's methodological and sector-specific insights offer valuable guidance to policymakers and economists in understanding global economic interdependence and crafting more resilient trade and economic policies.

JEL CODE: C01, C02, F14, F15, F41, F42

Keywords: Quantile-Quantile Connectedness, Economic Interdependence, Network Graphs, Merchandise Trade, Global Economies, Non-Linear Interconnections, Export Network

Introduction

Understanding India's economic interdependencies and connectedness to major global economies is essential to make informed international trade policy decisions and strategic choices. Especially in extreme market conditions, correlation and cointegration analyses often fail to capture the full scope of these relationships. This study employs a quantile-quantile connectedness approach to analyse India's economic ties with major global economies, such as the US, China, Germany, Japan, and ten others, addressing a gap in the literature. The research reveals non-linear interconnections that conventional methods often overlook. Studying India's economic relationships with other major economies is essential, especially considering its growing influence on the global stage. These relationships influence trade, financial stability, and economic policies in India and globally.

Objectives of the Study

1. To examine India's relationships with major global economies across three key economic indicators and export sectors by conducting Economic Interdependency Analysis using quantile-quantile connectedness approach
2. To emphasize Non-linear and tail dependencies on these economic relationships to better understand extreme market conditions.

Considering these stated objectives, we will first examine the previous studies conducted on connectedness and economic integration.

Literature Review

The literature review shows several ways to study economic connectedness. Traditional correlation and cointegration analyses may not fully capture quantile relationship complexity, but they are informative. Quantile regression and connectedness measures now capture tail dependencies and non-linear relationships better. Quantile coherency method captures general dependence structures in economic time series that traditional methods miss. This method effectively evaluates joint distribution in the frequency domain, revealing tail risks in financial markets (Baruník & Křehlík, 2018). High-quantile regression for time series data with tail dependence allows study of the asymptotic theory of high-quantile regression estimators under serial dependence, improving economic variable tail behaviour insights.(Xu et al., 2020) The Multiscale Quantile Correlation Coefficient (MQCC) measures tail dependence in financial time series by integrating multiscale analysis with quantile correlation to assess correlation strength across quantiles, revealing tail behaviour asymmetries across financial markets (Xu et al., 2020). Quantile-based connectedness measures have also been used in volatile markets like cryptocurrency. (Bouri et al., 2021) show that these measures are more connected than mean-based measures during extreme events, emphasizing the importance of tail dependencies for dependency assessment in such markets.

Studies have stressed interconnectedness in trade and financial markets. (Bekhet, 2009) found that mean intermediate coefficient totals per sector and intermediate transaction percentages help measure economic connectedness in Malaysia. (Raddant & Kenett, 2021) analysed stock dependencies from 15 countries, showing the importance of the US and Germany and the rising importance of the energy and materials sectors, providing a global economic dependency view.

The Global Industrial Value Chain Network (GIVCN) model simulates and measures economic competitive advantages and weaknesses using input-output (IO) tables and network theory. This model accurately depicts intermediate goods flows between industrial sectors, showing global value chain resource competition.

The GIVCN model framework is represented as a directed and weighted graph:

$$G = (V, E, W)$$

V denotes the set of nodes, each representing an industrial sector within a country.

E represents the set of directed edges, indicating the trade flows between sectors.

W is the set of weights assigned to each edge, corresponding to the trade volumes of intermediate goods.

In this context, the nodes V can be defined as $V = \{v_1, v_2, \dots, v_n\}$, where each node v_i represents an industrial sector. The directed edges E are defined as $E = \{(v_i, v_j) \mid v_i, v_j \in V\}$, representing the trade flows from sector v_i to sector v_j . The weights W are given by $W = \{w_{ij} \mid (v_i, v_j) \in E\}$, where w_{ij} denotes the trade volume from sector v_i to sector v_j .

The competitive strength of an industrial sector i against another sector j is quantified through the following formula:

$$w_{ij} = \frac{1}{w_j} \sum_{l=1}^N \frac{w_{li} w_{lj}}{w_l}$$

w_{ij} is the competitive strength of sector i relative to sector j .

w_j is the total trade volume associated with sector j .

w_{li} represents the trade volume from sector l to sector i .

w_{lj} represents the trade volume from sector l to sector j .

w_l denotes the total trade volume associated with sector l .

In empirical applications, the GIVCN model simulates trade scenarios and their effects on national competitive advantages and weaknesses. The model can assess how economic shocks and policy changes propagate through the global value chain, affecting economies' competitiveness

Some of the interesting characteristic of GIVCN models are:

Degree Centrality: The degree centrality for each node v_i is calculated as:

$$\text{deg}(v_i) = \sum_{j=1}^n A_{ij}$$

where $\text{deg}(v_i)$ represents the total number of connections (both incoming and outgoing) for sector i .

Weighted Degree Centrality: The weighted degree centrality incorporates the trade volumes:

$$\text{wdeg}(v_i) = \sum_{j=1}^n W_{ij}$$

Betweenness Centrality: Betweenness centrality measures the extent to which a sector lies on the shortest paths between other sectors:

$$\text{bet}(v_i) = \sum_{s \neq v_i \neq t} \frac{\sigma_{st}(v_i)}{\sigma_{st}}$$

where σ_{st} is the total number of shortest paths from sector s to sector t , and $\sigma_{st}(v_i)$ is the number of those paths that pass through v_i .

Closeness Centrality: Closeness centrality measures the average length of the shortest path from a sector to all other sectors in the network:

$$\text{clo}(v_i) = \frac{1}{\sum_{j=1}^n d(v_i, v_j)}$$

where $d(v_i, v_j)$ is the shortest path distance between sectors i and j .

By employing these detailed mathematical formulations and network metrics, the GIVCN model provides a comprehensive and technically rigorous approach to analyzing the competitive dynamics and interconnectedness within the global industrial landscape. (Guan et al., 2018) Additionally, the dimensions of economic dependency through international trade, external debt, and foreign investment, tested using

confirmatory factor analysis in developing countries, challenge established theoretical arguments and highlight the interconnected nature of economic dependency. (Huang & Slomczynski, 2003) Developed a framework to rank jurisdictions based on trade size and interconnectedness using data from the IMF's Direction of Trade Statistics. This study highlighted the overlap between systemically important trade and financial jurisdictions, providing essential insights for policymakers. The conceptual exploration of economic connectedness further emphasizes the importance of network theory and the interconnected nature of economic systems. (Moten, n.d.) discuss the limitations of traditional macroeconomic models, advocating for network science to better predict and explain economic events.

(Emmert-Streib et al., 2017a) provide a computational analysis of economic and financial networks, offering methods to quantify structural properties and network complexity. The study introduces advanced methods for capturing the complexities of economic dependencies using quantile coherency and tail risk measures. Quantile coherency assesses the dependence structure in the frequency domain, providing critical insights into how economic variables behave under extreme conditions. This method goes beyond traditional correlation by focusing on tail dependencies, which are essential for understanding the impact of rare but significant economic events.

Quantile regression models, particularly high-quantile regression, have been shown to effectively capture tail dependencies. The asymptotic theory of high-quantile regression estimators under serial dependence allows for a more accurate depiction of the extreme behavior of economic variables. This is mathematically represented as:

$$\widehat{\beta}_q = \arg \min_{\beta} \sum_{t=1}^T \rho_q(Y_t - X_t' \beta)$$

where (ρ_q) is the check function for the (q) th quantile. The check function is defined as:

$$\rho_q(u) = u(q - I(u < 0))$$

where $(I(\cdot))$ is the indicator function. This formulation is crucial for capturing the nuances of economic relationships that traditional methods often overlook.

The quantile function $(Q_Y(\tau|X = x))$ for a given quantile (τ) can be written as:

$$Q_Y(\tau|X = x) = X' \beta(\tau)$$

Thus, the high-quantile regression model is specified as:

$$Y_t = X_t' \beta(\tau) + \epsilon_t, \quad \tau \in (0,1)$$

where (ϵ_t) is the error term. Network analysis provides a robust framework for understanding economic interconnectedness. (Emmert-Streib et al., 2017b) emphasize the use of centrality measures, such as degree centrality, betweenness centrality, and eigenvector centrality, to identify key nodes in economic networks. These measures help pinpoint which countries or sectors hold significant influence within the global economic landscape.

For instance, the eigenvector centrality of a node (i) in an adjacency matrix (A) is given by:

$$v_i = \frac{1}{\lambda} \sum_j A_{ij} v_j$$

where (λ) is the largest eigenvalue of the matrix. This measure not only considers the number of connections a node has but also the quality of those connections, thus providing a deeper insight into the economic significance of each node.

The degree centrality ($C_D(i)$) of a node (i) is given by:

$$C_D(i) = k_i = \sum_j A_{ij}$$

Betweenness centrality ($C_B(i)$) measures the extent to which a node lies on paths between other nodes:

$$C_B(i) = \sum_{s \neq i \neq t} \frac{\sigma_{st}(i)}{\sigma_{st}}$$

where (σ_{st}) is the total number of shortest paths from node (s) to node (t), and ($\sigma_{st}(i)$) is the number of those paths that pass-through node (i). Additionally, closeness centrality ($C_C(i)$) is given by:

$$C_C(i) = \frac{1}{\sum_j d(i, j)}$$

where ($d(i, j)$) is the shortest path distance between nodes (i) and (j). These measures collectively provide a comprehensive view of the centrality and importance of nodes in an economic network. The multiscale quantile correlation coefficient (MQCC) integrates quantile regression with multiscale analysis, allowing for a comprehensive assessment of tail dependencies across different time scales. Hynes et al. (2021) emphasize the necessity of adopting a new economic paradigm that focuses on resilience and interconnectedness. The COVID-19 pandemic highlighted the fragility of interconnected systems and underscored the need for resilience in the face of systemic shocks.

After reviewing the econometric methodology in this paper, we justify our variable selection, Using prices received by farmers in return for the products they deliver, at a stage as close as possible to the farm's exit (Almadani et al., 2021), the producer price index accurately reflects farmer prices. According to the IMF (2004), for many agricultural products, the prices collected should be 'farm gate' prices—that is, the per unit prices received by the farmer for each product sold as it leaves the farm. The PPI accurately reflects farm economics with this approach. Value-added producer price indices should be weighted averages of output and intermediate input price indices. For understanding inflation dynamics and economic extrema, this method provides a more complete view of value added at each production stage.

In (Su et al., 2016) it has been shown that, the bootstrap panel Granger causality analysis shows that the PPI significantly affects the CPI. This supports the moderate inflation model, which states that PPI variables cause CPI variations via Granger causality. Hungarian PPIs are Granger causally influenced by CPIs. These findings help policymakers in these countries focus harder on the Producer Price Index when targeting inflation. Monetary policies that target both CPI and PPI inflation generate larger welfare losses than those that do not. Cost of production reflects opportunity cost of raw inputs and intermediate goods because final goods and services demand their production inputs. This is affected by final goods and service demand. This shows how CPI affects PPI, showing how these economic indicators are linked.

The EPU index measures fiscal and monetary policy uncertainty. This novel measure of policy uncertainty uses newspaper articles on topics thought to increase uncertainty. According to the EPU index, media coverage of economic uncertainty increases uncertainty (Čižmešija & Škrinjarić, 2021). Research shows the EPU significantly affects US financial market volatility. It also increases volatility in government-dependent sectors like healthcare, defence, and construction. Increased EPU reduces US industrial production, investment, and employment. In probit models, EPU predicts US recessions. Aside from the US, EPU has significant effects on the euro area (Čižmešija & Škrinjarić, 2021). Because of higher borrowing costs, firms adopt more conservative policies during high EPU (Çolak et al., 2017; Jens, 2017;

Kelly et al., 2016; Pástor & Veronesi, 2013). Accordingly, firms decrease their investments in capital (Gulen & Ion, 2016), postpone or cancel their initial public offerings (IPOs)(Çolak et al., 2017), reduce their merger and acquisition (M&A) activities (Bonaime et al., 2018; Nguyen & Phan, 2017), adopt more cautious payout policies (Panousi & Papanikolaou, 2012; Walkup, 2016), and increase their cash reserves (Demir & Ersan, 2017; Phan et al., 2019; Zhao & Park, 2017) Occasionally, these effects are asymmetric (Gupta et al., 2019; Hassan et al., 2018; Istiak & Alam, 2019). In the Indian financial market, EPU's volatility may make investing unfavourable. As confirmed by the DCC-MGARCH model, EPU volatility over time will affect macroeconomic variables (Bagchi et al., 2023).

Data Description

The data used in this study consist of three economic indicators namely Economic Policy Uncertainty (EPU), Consumer Price Index (CPI), and Producer Price Index (PPI). The countries considered include the USA, China, Germany, Japan, the UK, France, Italy, Canada, Russia, Brazil, Korea, Australia, and Mexico. The export categories include Petroleum (PET), Agriculture (AG), Ores (ORE), Manufacturing (MAN), and Others (OTH).

Export Categories

The export data is categorized into five main sectors, representing exports from India to the selected countries:

Petroleum: This sector includes crude oil and petroleum products. It consists of crude oil, refined petroleum products, lubricants, and other petroleum gases. These commodities form the backbone of India's energy-related exports, catering to the global demand for fuel and related products.

Agriculture: A broad sector, it contains various products. Key subcategories include cashew, cashew nut shell liquid, castor oil, cereal preparations, coffee, cocoa products, cotton raw including waste, floriculture products, fresh fruits and vegetables, fruits/vegetable seeds, groundnuts, and guar gum meal. Each of these subcategories highlights India's rich agricultural diversity and its capacity to supply a wide range of raw and processed food products to international markets.

ORE: This sector contains various types of mineral ores essential for industrial purposes, including iron ores, copper ores, and aluminum ores. These minerals are critical for the manufacturing and construction industries, making them significant export commodities for India.

Manufacturing: This sector includes a diverse range of manufactured goods. Notable subcategories are machinery, vehicles, electronics, textiles and apparel, chemicals, and pharmaceuticals. These products showcase India's growing industrial base and its ability to produce complex and high-value items that meet global standards.

Others: This sector captures all other export categories not specifically listed in the aforementioned sectors. It includes leather products, handicrafts, gems and jewelry, furniture, toys and games.

Data Sources and Collection

Data for the EPU index was obtained from policyuncertainty.com. CPI and PPI data were sourced from the Federal Reserve Economic Data (FRED). Export data for each sector was obtained from the CMIE Economic Outlook database. For missing data, relevant national and international databases, including countries' respective central banking databases, were used to ensure data consistency and reliability.

Data Span and Frequency

The data spans from 2000 to 2023, with a monthly frequency. For the earlier years where monthly data was not available, we used the monthly shares of yearly data from later years to estimate the earlier monthly data, thereby capturing seasonal characteristics. The comprehensive datasets used in this study ensure a robust analysis of economic interconnectedness and provide a reliable basis for the quantile-quantile connectedness analysis conducted in this study.

Methodology

This section describes the methodology used to analyze the economic connectedness between India and other major economies. The process involves making the time series data stationary, performing quantile-quantile connectedness analysis, and constructing network graphs to visualize the results.

Stationarity and Differencing

Ensuring that the time series data is stationary is crucial for conducting accurate time series analysis. To test for stationarity, we use the Augmented Dickey-Fuller (ADF) test.

The ADF test is used to check for the presence of a unit root in the time series. The null hypothesis (H_0) of the ADF test states that the time series has a unit root (is non-stationary), while the alternative hypothesis (H_1) is that the series is stationary. The ADF test regression model is given by: where (ΔX_t) is the first difference of (X_t), (α) is a constant term, (βt) is a time trend, (γ) is the coefficient of (X_{t-1}), and (δ_i) are the coefficients of the lagged differences (ΔX_{t-i}), and (ε_t) is the white noise error term.

$$\Delta X_t = \alpha + \beta t + \gamma X_{t-1} + \sum (\delta_i \Delta X_{t-i}) + \varepsilon_t$$

If the p-value obtained from the ADF test is greater than 0.05, indicating non-stationarity, we difference the series (d) times until stationarity is achieved. The differenced series ($X_t^{(d)}$) after (d) differencing operations is given by:

$$X_t^{(d)} = \Delta^d X_t = (1 - L)^d X_t$$

where (L) is the lag operator.

Quantile-Quantile Connectedness Analysis

To analyze the connectedness between economic indicators and export categories across countries, we employ quantile-quantile connectedness. This involves comparing specific quantiles of the time series data for different countries and indicators.

Given two time series (X_t) and (Y_t), and a set of quantiles ($Q = \{q_1, q_2, \dots, q_n\}$), the quantile-quantile connectedness is calculated as:

$$Cq(X, Y) = \{(q_i, X(q_i), Y(q_i)) \mid q_i \in Q\}$$

where ($X_{(q_i)}$) and ($Y_{(q_i)}$) are the (q_i)-th quantiles of the series (X_t) and (Y_t), respectively.

For each pair of quantiles, the connectedness is determined by the differences in their values. The average connectedness between two series is computed as the mean of the absolute differences across all quantiles.

$$AverageConnectedness(X, Y) = \frac{1}{n} \sum |X(q_i) - Y(q_i)|$$

This provides a summary measure of connectedness by averaging the absolute differences in quantile values. By focusing on specific quantiles, we can identify how extreme values in one series relate to extreme values in another. The choice of quantile-quantile analysis is justified by its ability to reveal dependencies that are not apparent in traditional mean-based analyses. This method allows for the detection of asymmetries in the relationships between variables, highlighting the tail behaviors that are crucial for understanding risks and co-movements during periods of economic stress or market turbulence.

Firstly, we identify the relevant quantiles for the time series data. Commonly used quantiles include the 0.05, 0.25, 0.50, 0.75, and 0.95 levels, which correspond to the lower tail, lower quartile, median, upper

quartile, and upper tail of the distribution, respectively. These quantiles are selected to capture a range of behaviors from extreme low values to extreme high values. Next, we compute the quantile values for each time series at these specified quantiles. This involves sorting the data and identifying the values that correspond to each quantile. Once the quantile values are determined, we calculate the connectedness at each quantile level using the absolute differences between the corresponding quantile values of the two series. Finally, we aggregate these connectedness measures to obtain the average connectedness, which provides a single summary measure of the overall degree of connectedness between the series. This aggregated measure is useful for comparing the connectedness across different pairs of series and for identifying general patterns of interdependence in the data. By employing this quantile-quantile connectedness approach, we can gain deeper insights into the economic relationships between indicators and export categories across countries. This method not only highlights the central tendencies but also illuminates the tail dependencies.

Network Graph Construction

To visualize the economic connectedness between India and other major economies, we employ a range of graph-theoretic measures and algorithms. These measures are crucial for understanding the connectivity, centrality, and overall efficiency of the network. Below are the detailed steps and mathematical formulations used in this construction.

Path-Based Measures

The average path length ($\bar{d}(G)$) is calculated as:

$$\bar{d}(G) = \frac{1}{n(n-1)} \sum_{i \neq j} d(i, j)$$

where (n) is the number of nodes in the graph (G). This metric provides insights into the overall efficiency of the network in terms of information or economic shock propagation.

Node and Edge Definition

To visualize the economic connectedness between India and other major economies, we construct a network graph ($G = (V, E)$), where:

- V represents the set of countries.
- E represents the set of edges, indicating the connectedness between India and other countries.

The weight of each edge is determined by the average connectedness value between India and another country, defined as: $w_{India,C} = \text{Average Connectedness}_{India,C}$

Here, $\text{Average Connectedness}_{India,C}$ is the mean of the absolute values of the quantile connectedness results, capturing the degree of connectedness between the economic indicators and export categories of India and other countries.

Spring Layout Algorithm

The spring layout algorithm is employed to position the nodes in the network graph. This algorithm minimizes the overall energy of the system, where nodes repel each other, and connected nodes attract each other proportionally to their edge weights. The positions (p_i) of the nodes are found by minimizing the energy function:

$$E = \sum_{(i,j) \in E} k_{ij} (|p_i - p_j| - l_{ij})^2 + \sum_{i \neq j} \frac{c}{|p_i - p_j|^2}$$

- (k_{ij}) represents the spring constant (or weight of the edge).

- (l_{ij}) denotes the rest length of the spring (the desired distance between nodes).
- (c) is a constant repulsion factor.

Principal Component Analysis (PCA)

The first principal component (PC1), which captures the maximum variance, is given by:

$$PC1_i = a \cdot EPU'_i + b \cdot CPI'_i + c \cdot PPI'_i$$

where (a) , (b) , and (c) are the coefficients determined by the PCA, representing the loadings of each variable on the first principal component, and (EPU'_i) , (CPI'_i) , and (PPI'_i) are the normalized values for country (i) .

To ensure that all PCA scores are non-negative, we shift the PCA scores by subtracting the minimum score: where $\min(PC1_j)$ is the minimum PCA score across all countries.

$$PC1'_i = PC1_i - \min(PC1_j)$$

Result and Discussion

From the heatmap and network diagram, we can interpret several key points. First, we need to examine the trade volume with specific countries and determine whether these align with India's deterministic role in their imports. We must also assess the synchronization of our economic and financial systems with these countries. This involves analyzing particular economic indicators and identifying which export sectors are most influenced by these indicators. For example, the Economic Policy Uncertainty (EPU) of oil-producing countries may significantly affect the petroleum sector, while the Producer Price Index (PPI) of ore-consuming countries could impact the manufacturing and heavy industry sectors in countries like China. Similarly, the Consumer Price Index (CPI) may influence sectors oriented towards consumption goods exports. These analyses will help us understand the interconnectedness and dependencies in India's export network.

(Insert Figure 0-1 here)

(Insert Figure 1-1 here)

The heatmap shows that at the 0.25 quantile, connectedness values are usually negative or low, indicating that declining CPI increases agricultural exports. USA has a significant negative value of -23. In the lower tail of the distribution, a lower CPI is associated with an increase in exports, possibly due to price competitiveness. At the 0.50 quantile, the USA and China have positive connectedness (6.1 and 0.8, respectively). Connectivity increases significantly at the 0.75 quantile for the USA (35), China (17), and Japan (17). The USA has a remarkable 140 value at the 0.95 quantile, followed by China at 77, suggesting stronger interconnectedness under extreme conditions, likely caused by synchronized economic cycles or global market shocks.

Country-specific variations show that the US has large negative values at lower quantiles and large positive values at the highest quantile. This indicates extreme connectedness fluctuations. China, Germany, and Japan are more connected at higher quantiles, reflecting stronger agricultural sector CPI influences. China and the US have significant results at higher quantiles, demonstrating their robust connectedness values. The network graph shows strong agricultural sector CPI interdependencies with the US, China, and Germany. Mexico and Brazil, farther from India in the graph, have weaker connections. Higher quantiles of agricultural sector CPI interconnectedness indicate that extreme economic conditions like inflationary pressures or global market shocks significantly affect it. With large agricultural exports and imports, the US and China show their economic and trade ties to India. This interconnectedness suggests that inflationary pressures and price competitiveness in one country can affect others, especially through trade and economic policies.

The heatmap shows how 13 major global economies' CPIs affect India's manufacturing sector exports across quantiles. Lower quantiles show that lower CPIs in these countries increase Indian exports. This suggests that lower inflation boosts these countries' purchasing power, making Indian goods more appealing. If the US or China has lower inflation, they can import more cheap Indian manufactured goods,

boosting India's exports. The positive connectedness at higher quantiles indicates that India exports more to these countries with higher CPIs. Strong economic activity and high consumer demand in these countries may explain this despite higher inflation. Even with rising prices, Germany and Japan demand high-quality Indian automotive parts and electronics during economic growth. This shows India's manufacturing sector's ability to meet global demand in changing economic conditions.

(Insert Figure 0-2 here)

(Insert Figure 1-2 here)

Strong connections with the US, UK, and China reflect interdependencies driven by complementary economic strengths and large trade volumes. The US's demand for affordable consumer goods matches India's manufacturing capabilities, fostering a strong trade relationship. India trades high-value goods like machinery and pharmaceuticals with the UK, which thrive in different economic conditions. Weaker ties to Mexico and Russia suggest growth and diversification. Less intensive trade relationships or different economic cycles may benefit from these weaker links. India can boost its exports by identifying manufacturing sectors that meet these countries' economic needs. Leveraging trade agreements and economic cooperation can also expand Indian exports, reducing dependence on a few major economies and mitigating global economic risks.

(Insert Figure 0-3 here)

(Insert Figure 1-3 here)

At lower quantiles, CPI reductions in these countries increase Indian ore exports. Lower inflation in these economies boosts their purchasing power, making Indian ores like iron ore and bauxite more cost-effective. For instance, lower inflation in China makes its extensive infrastructure and manufacturing projects more viable, leading to higher imports of cost-effective raw materials from India, boosting India's ore export volumes. At higher quantiles, the positive connectedness indicates that India exports more to these countries with higher CPIs. These economies have strong industrial demand and economic activity despite rising inflation. A strong German industrial sector may demand high-quality ores to maintain production despite higher CPI. The need for raw materials like ores to maintain industrial output despite rising prices highlights India's strategic role as a key supplier to advanced economies expanding economically.

Deep interdependencies with China stem from their large industrial sectors' raw material needs. For instance, China relies on imported ores for manufacturing and construction, highlighting the importance of Indian exports. India provides a reliable raw material supply to the US manufacturing sector, fostering a strong trade relationship due to complementary economic needs. An important note here is that we don't have a statistically significant deterministic role with countries in an overall level other than China based on CPI - ore sector quantile analysis.

(Insert Figure 0-4 here)

(Insert Figure 1-4 here)

At the 0.95 quantile, the USA has a significant connectedness value of 24, indicating high interconnectedness with other countries during economic extremes. Similarly, France, Germany, and Japan have high connectedness values at higher quantiles (10, 5.4, and 5.9), suggesting significant spillover effects during volatile periods. Canada and Italy have lower quantile connectedness values, indicating a lower CPI - OTH sector influence in stable and extreme economic conditions due to their economic size, trade volume, and financial market integration.

The heatmap shows how CPI changes affect India's petroleum exports. Lower quantiles show that lower CPIs in major economies increase Indian petroleum exports, reflecting price competitiveness and

global energy demand dynamics. Higher quantiles indicate a different trend, where higher CPIs correlate with increased exports, suggesting robust demand despite inflationary pressures in these economies.

(Insert Figure 0-5 here)

(Insert Figure 1-5 here)

The extreme 0.95 quantile of the heatmap of CPI - PET sector connectedness across countries and quantiles shows a statistically significant interconnectedness, indicating robust synchronization among economies in response to global petroleum uncertainties. The volatility of global oil prices, which affects these countries' consumer price indices, drives this synchronization. India, a major processed petroleum exporter, is highly connected to Brazil and the US at this quantile. This is likely due to India's large petroleum byproduct exports to these countries, strengthening trade links. Mexico and Russia's minor role in India's petroleum trade and Russia's self-reliance in the petroleum sector reduce India's dependence on external markets like India during extreme economic conditions, reducing its connection with them.

(Insert Figure 0-6 here)

(Insert Figure 1-6 here)

The network graph shows that most countries are close to India, indicating that petroleum price volatility affects everyone. This proximity does not imply India's deterministic role in these economies, but highlights shared vulnerabilities and responses to global oil price movements. In the network graph, the USA, China, and Brazil cluster around India due to their economic sensitivity to petroleum price fluctuations, which affects their consumer price indices. Russia and Mexico are farther away due to self-sufficiency or lower economic integration with India's petroleum sector. This detailed analysis shows that India's petroleum trade has a major impact on some countries but not others.

The US, UK, and France have significant negative connectedness at 0.25 quantile, indicating competitive pricing boosts agricultural exports at lower PPI levels. USA and China moderately balance producer prices and export volumes at 0.50 quantile. USA, China, and Japan have stronger links between PPI and agricultural exports at 0.75 quantile. USA (140) and China (77) show increased interconnectedness under extreme conditions like inflation or market shocks at 0.95 quantile. China's consistent quantile connection reflects global market integration, while the US agricultural sector PPI is sensitive to producer price extremes. Germany and Japan have stronger extreme quantile connections, indicating economic conditions strongly influence their agricultural PPIs.

(Insert Figure 0-7 here)

(Insert Figure 1-7 here)

The network diagram shows strong PPI interdependencies between India, the US, China, and Germany, suggesting that these nations' economies affect India's agriculture. Mexico and Brazil are less connected, indicating less PPI influence. Due to synchronized economic cycles, shocks in one country affect global markets, affecting agricultural PPI interconnectedness. These findings demonstrate the complexity and interdependence of global agricultural markets, showing how producer prices in one country affect and are affected by global economic conditions.

Country-specific trends show that the US manufacturing sector PPI is sensitive to both low and high producer price extremes, reflecting large quantile-level connectedness fluctuations. Germany and Japan are more connected at higher quantities, suggesting their manufacturing sectors are more affected by extreme economic conditions. PPI interdependencies between India and the US, Germany, and the UK indicate strong manufacturing economic ties, as shown in the network diagram. Mexico and Brazil have weaker connections, suggesting PPI has less influence. Higher connectedness values at the 0.95 quantile indicate that extreme economic conditions significantly affect manufacturing PPI interconnectedness.

(Insert Figure 0-8 here)

(Insert Figure 1-8 here)

(Insert Figure 0-9 here)

(Insert Figure 1-9 here)

We leave it to the readers to make similar interpretations for other sets of heatmaps and network diagrams to determine which countries are interconnected with India and at what coefficient level. The influence of each country's economic indicators on India's merchandise exports can be assessed by examining the statistical significance of the connections. As previously mentioned, the color of the edges in the heatmap indicates statistical significance: green edges represent statistically significant connections, while red edges indicate non-significant connections.

(Insert Figure 0-10 here)

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(Insert Figure 0-15 here)

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Table 1 - Differentiation Required for making series stationary

Country	EPU	CPI	PPI	PET	AG	ORE	MAN	OTH
USA	0	2	1	1	1	1	1	1
China	1	0	0	1	1	1	1	1
Germany	1	1	1	0	1	1	1	1
Japan	0	1	1	1	1	1	1	1
UK	1	1	1	1	1	1	1	1
France	1	1	0	1	1	0	1	1
Italy	0	0	0	1	1	1	1	1
Canada	1	1	1	0	1	1	1	1
Russia	1	0	0	1	1	2	1	0
Brazil	0	0	1	0	1	0	1	1
Korea	0	2	0	1	1	1	1	1
Australia	0	1	0	1	1	0	1	1
Mexico	1	2	1	0	1	1	1	0

Table 2 - EPU – Average Connectedness Value of Each Sector

Country	EPU - AG	EPU - MAN	EPU - ORE	EPU - OTH	EPU - PET
Australia	111.28	127.32	128.79	92.37	130.63
Brazil	58.33	189.05	185.6	152.07	189.72
Canada	46.01	43.66	47.12	28.11	46.96
China	25.98	12.52	7.07	37.79	37.28
France	15.98	32.64	42.89	80.62	41.26
Germany	40.14	37.27	43.56	63.47	42.15
Italy	124.17	123.7	127.22	84.92	127.46
Japan	99.94	109.62	114.16	89.86	116.42
Korea	165.22	173.07	174.72	160.29	175.42
Mexico	23.17	22.13	23.14	20.37	22.55
Russia	67.59	60.08	66.95	44.0	67.07
UK	27.85	27.34	37.1	70.79	36.07
USA	131.04	122.25	158.25	416.02	153.13

Table 3 - CPI - Average Connectedness Value of Each Sector

Country	CPI- AG	CPI- MAN	CPI- ORE	CPI- OTH	CPI- PET
Australia	20.26	5.94	2.45	54.72	0.94
Brazil	131.24	1.05	4.0	43.82	0.49
Canada	1.24	3.36	0.1	19.41	0.12
China	12.29	25.72	42.65	76.03	0.97
France	28.48	12.35	1.62	123.01	3.13
Germany	3.99	7.43	0.4	107.44	1.85
Italy	4.42	7.34	1.38	88.9	1.32
Japan	24.2	16.39	6.83	52.84	2.13
Korea	15.18	4.16	1.43	25.05	0.37

Mexico	0.16	0.88	0.14	40.17	1.54
Russia	0.95	7.07	0.56	23.53	0.29
UK	10.34	10.85	1.11	108.92	2.11
USA	33.5	49.28	2.59	499.48	9.33

Table 4 - PPI - Average Connectedness Value of Each Sector

Country	PPI-AG	PPI-MAN	PPI-ORE	PPI-OTH	PPI-PET
Australia	19.9	5.5	2.01	54.26	0.76
Brazil	131.16	0.68	3.89	43.2	0.45
Canada	1.13	3.07	0.44	19.11	0.29
China	9.43	22.5	38.99	72.36	2.71
France	28.45	12.32	1.43	122.98	3.1
Germany	3.86	7.39	0.38	107.41	1.82
Italy	4.22	7.17	1.18	88.73	1.12
Japan	24.08	16.26	6.7	52.72	1.99
Korea	14.86	3.84	1.11	24.73	0.07
Mexico	0.57	0.64	0.56	39.92	1.03
Russia	1.31	6.65	0.73	23.02	0.35
UK	10.11	10.64	0.93	108.71	1.88
USA	32.15	47.94	1.27	498.13	7.99

Agriculture Sector

The PCA-based connectedness scores for the agriculture sector reveal a distinct hierarchy among India's global economic partners. The United States emerges as the most connected country, with a PCA score significantly higher than other nations. This result underscores the critical role of the USA in India's agricultural trade network, driven by substantial bilateral trade agreements and a high volume of agricultural exports and imports. Following the USA, China and Japan hold the second and third positions, respectively, but their scores are notably lower, indicating a secondary level of economic engagement compared to the USA.

(Insert Figure 2-1 here)

Manufacturing Sector

In the manufacturing sector, the PCA scores again highlight the United States as the top economic partner for India, reinforcing its central role in the global manufacturing supply chain. France, the United Kingdom,

and Germany also show considerable connectedness, reflecting the strong economic ties between India and these European economies. The significant presence of these countries in the manufacturing sector indicates India's integration into global manufacturing networks, particularly with advanced economies known for their technological advancements and industrial outputs.

(Insert Figure 2-2 here)

Ores Sector

The ores sector presents a different dynamic, with China leading the list of connected countries. China's high PCA score is indicative of its substantial demand for raw materials and ores, essential for its expansive industrial sector. Mexico and the United Kingdom follow China, suggesting their significant roles in global trade networks for ores and minerals. These results highlight the strategic importance of mineral resources in China's economic relationship with India and underscore the critical supply chain linkages with Mexico and the UK.

(Insert Figure 2-3 here)

Others Sector

(Insert Figure 2-4 here)

In the 'Others' sector, which includes a variety of miscellaneous goods and services, the United States once again stands out with the highest connectedness score. This consistent top ranking across multiple sectors underscores the broad-based economic engagement between India and the USA. Brazil and Japan are the next most connected countries, reflecting their diversified economic interactions with India. These results highlight the multifaceted nature of economic relationships in the 'Others' sector, encompassing a wide range of industries and services.

Petroleum Sector

The petroleum sector exhibits a unique pattern, with Brazil achieving the highest PCA score, followed by the United States and Japan. Brazil's leading position can be attributed to its significant exports of oil and gas, as well as technological exchanges in biofuels. The prominence of the USA and Japan in this sector is supported by their advanced technology and substantial trade volumes in petroleum products. These findings highlight specific commodity-based interactions that shape India's economic relationships in the petroleum sector. The PCA-based connectedness scores across different sectors give a full picture of how India's economy is linked to the world's biggest economies. The United States' consistent top spot in a number of areas shows how important it is to India's trade and economic networks. China's leadership in the ores sector shows how its economy is based on resources, while Brazil's prominence in the petroleum sector shows how important it is in trade based on commodities. Overall, these results show how important it is to keep a variety of business relationships. India should keep working to strengthen these ties through its trade and economic policies, which will help both countries grow and be more resilient to changes in the world economy. This analysis gives policymakers sector-specific information that can help them find strategic partners and set priorities for economic engagements based on the strengths and needs of each sector. These complex viewpoints are necessary to promote long-term economic growth and strengthen India's position in the global economy.

(Insert Figure 2-5 here)

Further Discussion

A Sankey diagram for visualizing the trade flow from India in each sector to these countries would be informative to provide an overview of the connectedness in volume and monetary values.

Sankey Diagram of India's Exports to Top 13 Global Economies

(Insert Figure 3 here)

The Sankey diagram visualizes India's total exports to its top 13 global trading partners, with percentages representing each country's share of India's overall exports. The United States, accounting for 41.99% of India's exports, is the largest importer, driven primarily by manufactured goods, reflecting strong industrial and consumer demand. China, with 12.48%, significantly imports ores, aligning with its vast manufacturing needs. Germany (6.87%) and the United Kingdom (8.03%) are notable European importers, indicating strong trade ties and demand for diverse Indian goods. Japan (5.20%), Brazil (3.80%), and South Korea (3.50%) feature prominently, showcasing substantial imports driven by both industrial and consumer demands. Brazil's imports include a notable share of petroleum products. Australia (2.91%), France (4.11%), Italy (1.78%), and Canada (2.09%) illustrate India's broad reach across developed economies, reflecting diversified trade relationships. Russia (1.95%) and Mexico (2.22%) highlight India's penetration into emerging markets, indicating a range of exported goods meeting specific market needs.

Conclusion

By mapping India's commodity export network, this study revealed the complex economic factors that drive its trade relationships. The quantile-quantile connectedness approach and PCA analysis have revealed these relationships, revealing both typical patterns and crucial tail dependencies during extreme economic events. We found that India's export ties are heavily influenced by its major trading partners' economies. EPU, CPI, and PPI affect export sectors, revealing India's trade vulnerabilities and opportunities. The PCA-based connectedness scores also showed how different countries influence different sectors.

The US is India's key partner due to its dominance in multiple sectors. China's lead in ores shows its role as a major raw material consumer, while Brazil's in petroleum shows the importance of commodity-based trade. The Indian economic future depends on its ability to adapt to the global market. India can build strategic partnerships, diversify its export base, and strengthen its global economic leadership by proactively addressing the interdependencies found in this study.

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Figures

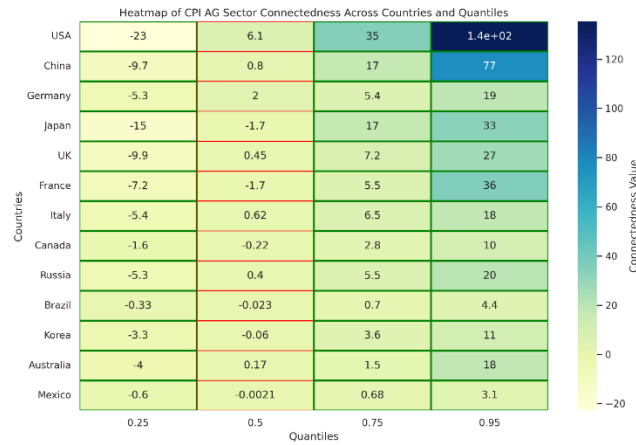


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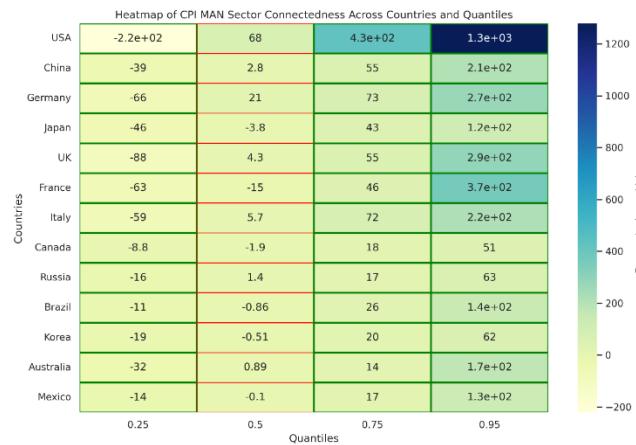


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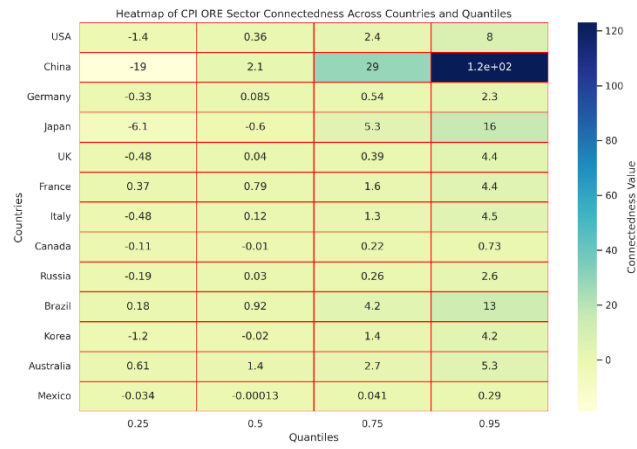


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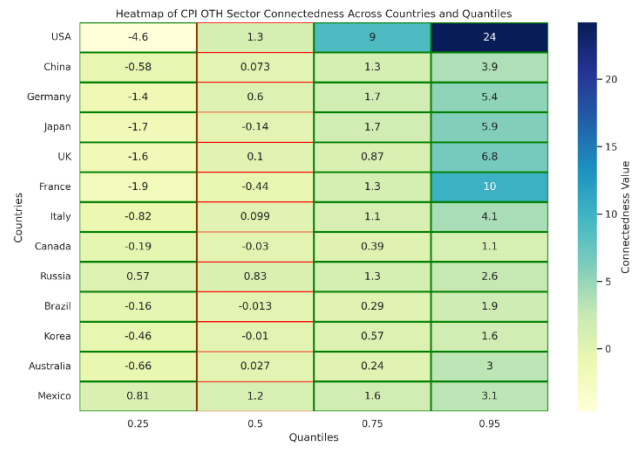


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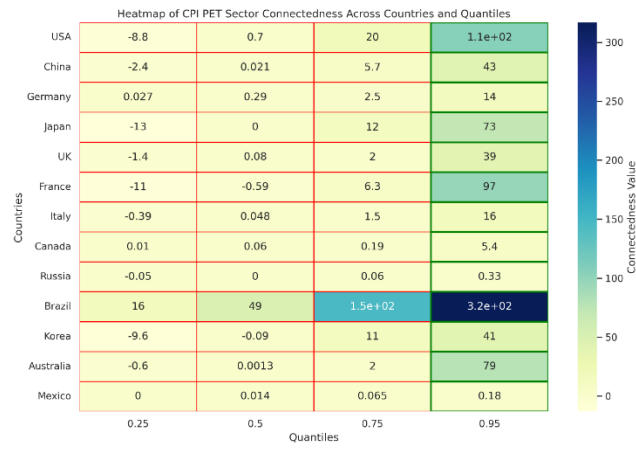


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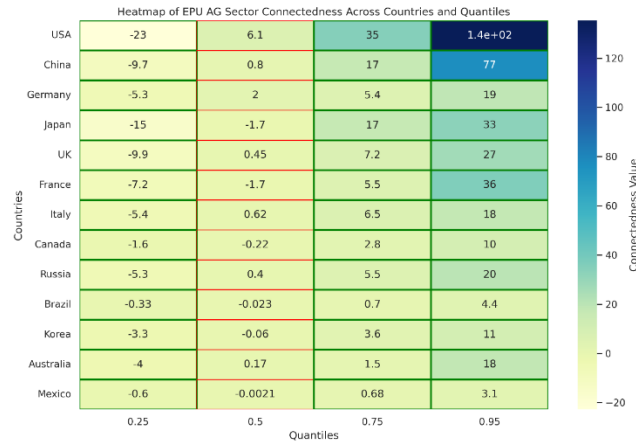


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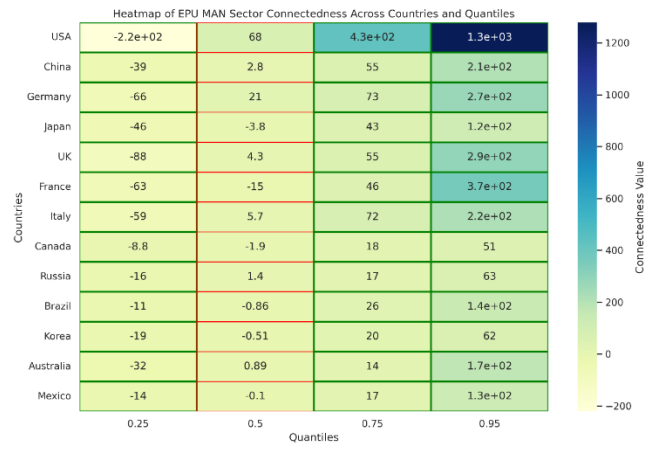


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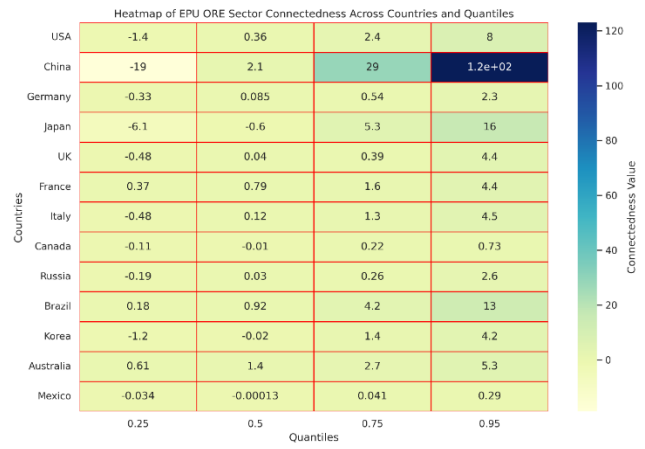


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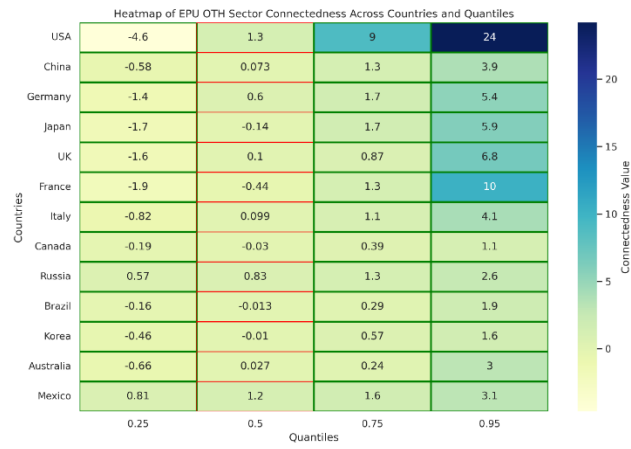


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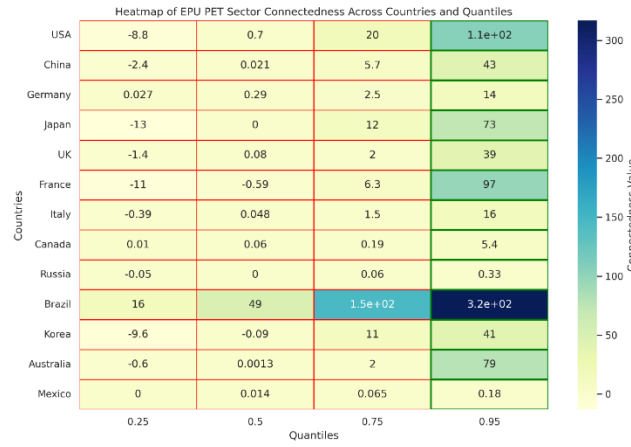


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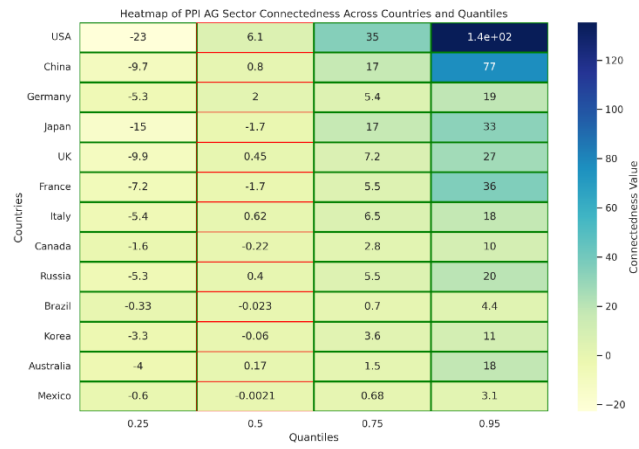


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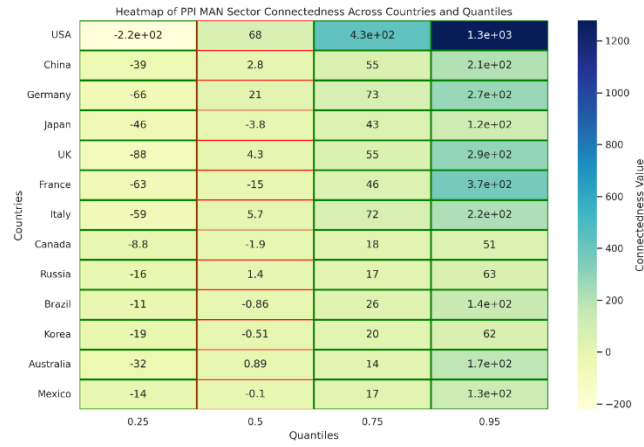


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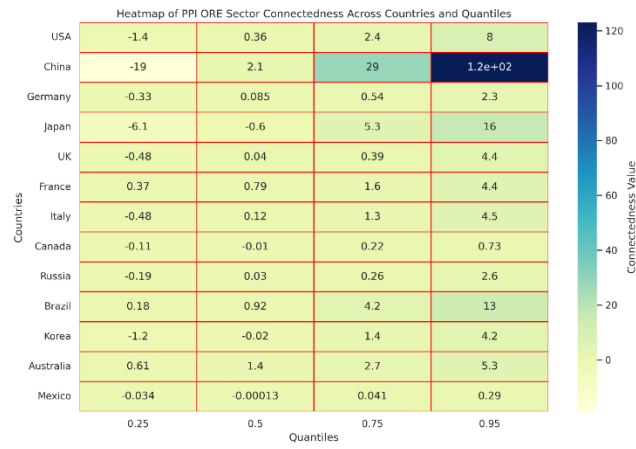


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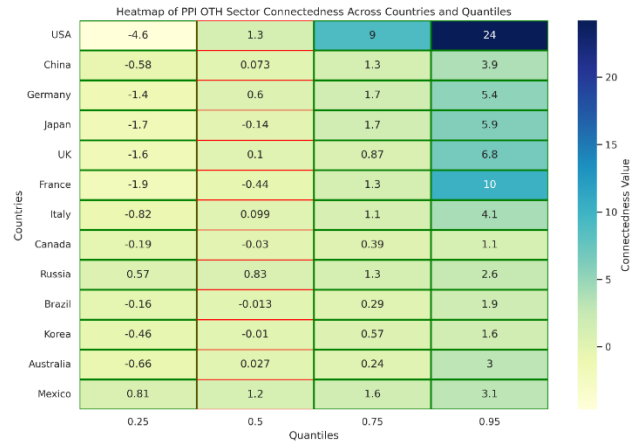


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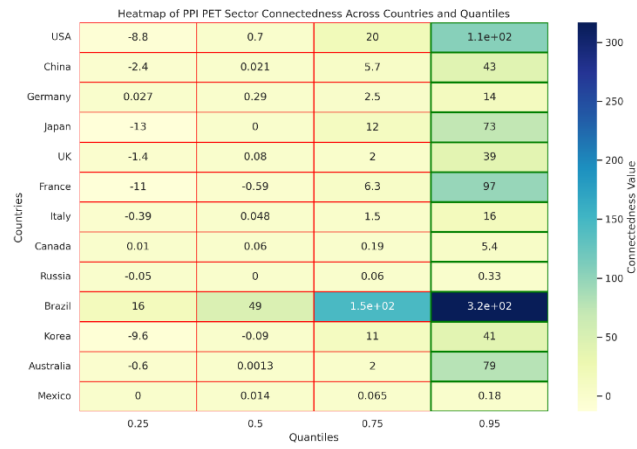


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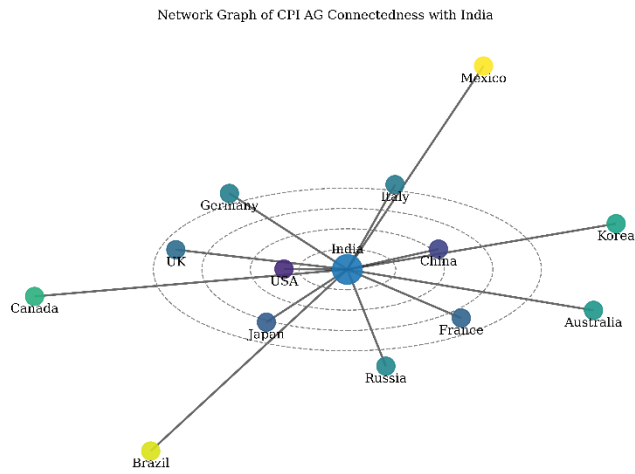


Figure 1- 1

Network Graph of CPI MAN Connectedness with India

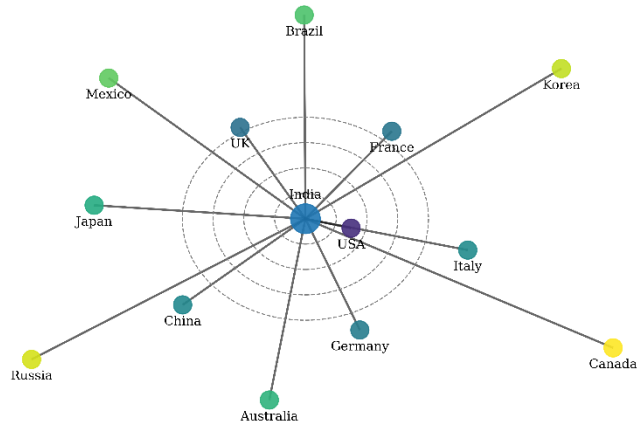


Figure 1- 2

Network Graph of CPI ORE Connectedness with India

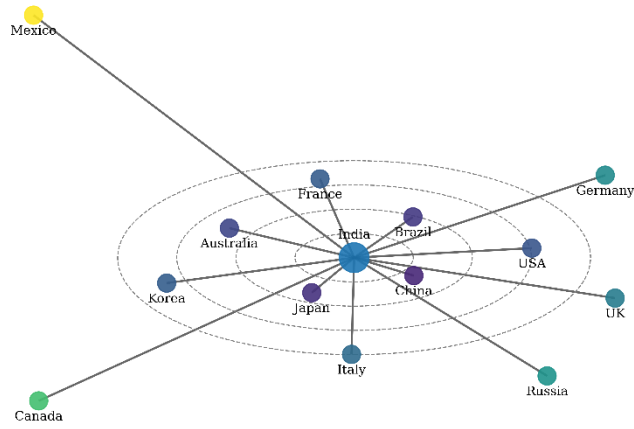


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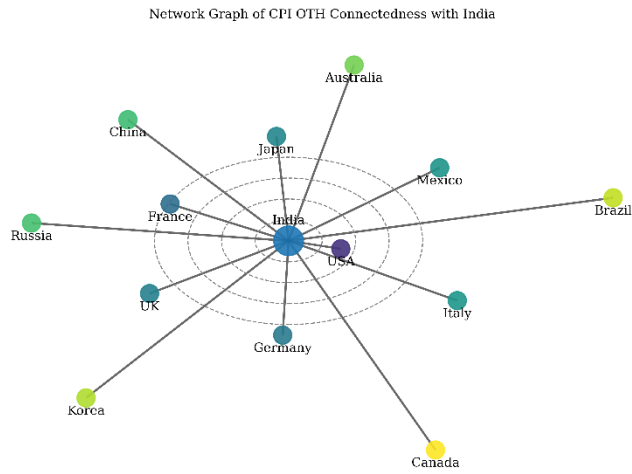


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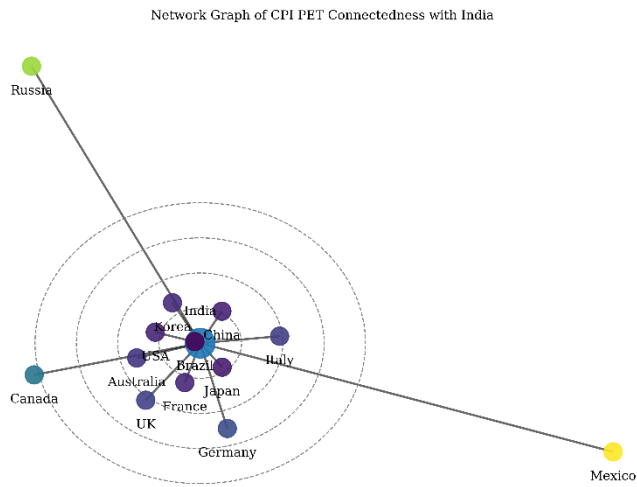


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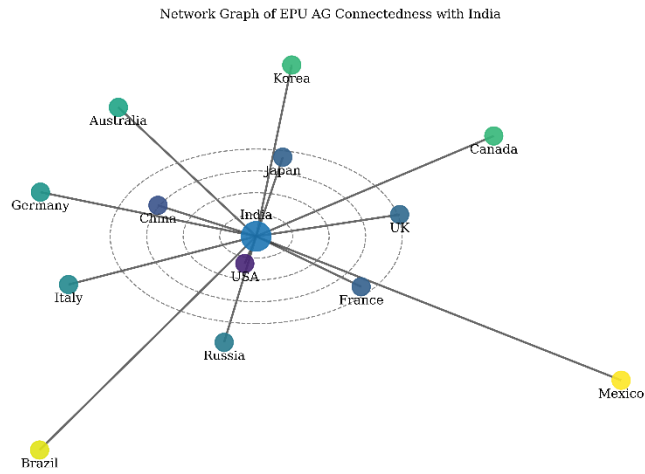


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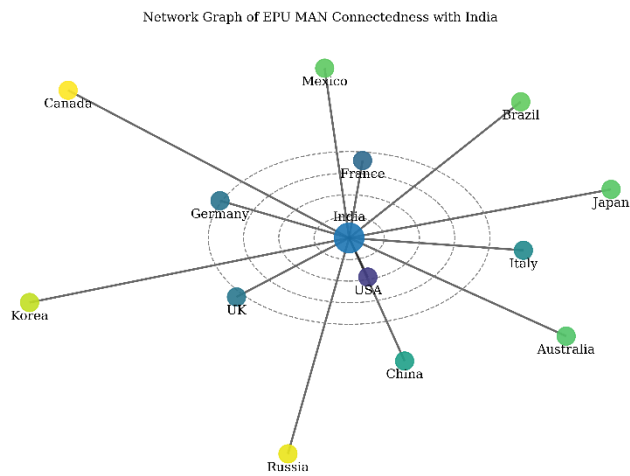


Figure 1- 7

Network Graph of EPU ORE Connectedness with India

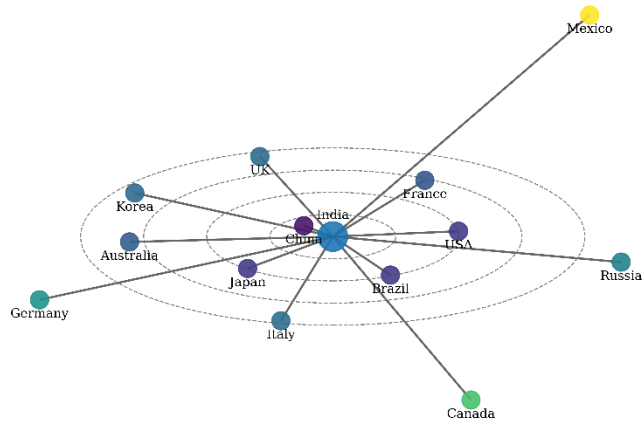


Figure 1- 8

Network Graph of EPU OTH Connectedness with India

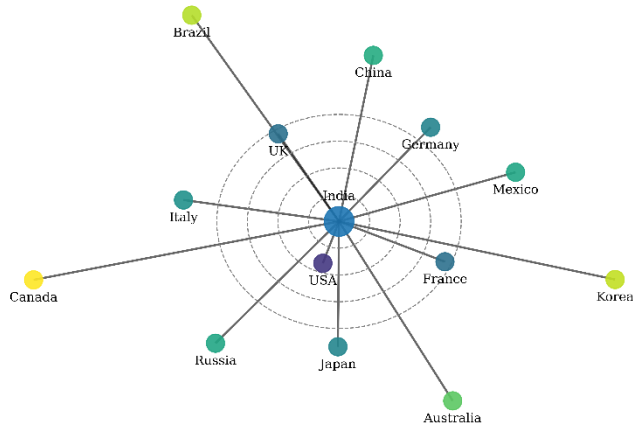


Figure 1- 9

Network Graph of EPU PET Connectedness with India

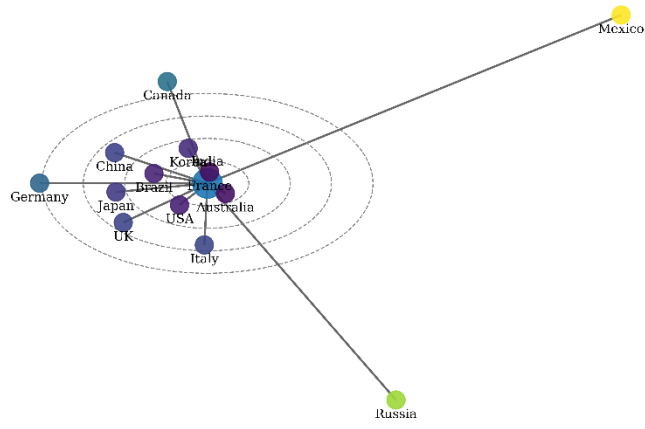


Figure 1- 10

Network Graph of PPI AG Connectedness with India

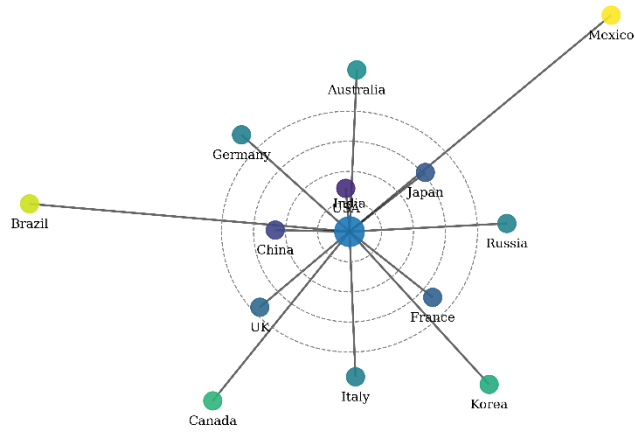


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Network Graph of PPI MAN Connectedness with India

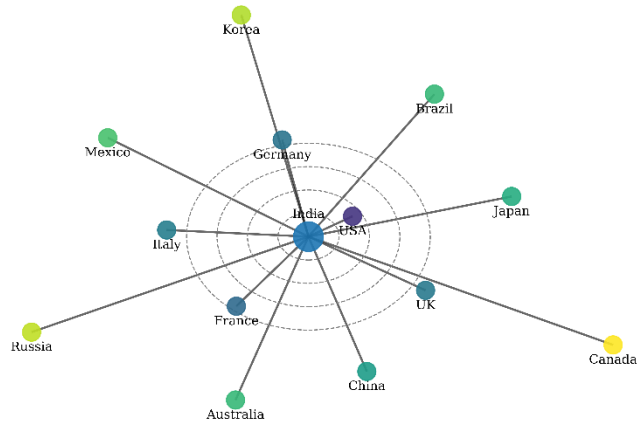


Figure 1- 12

Network Graph of PPI ORE Connectedness with India

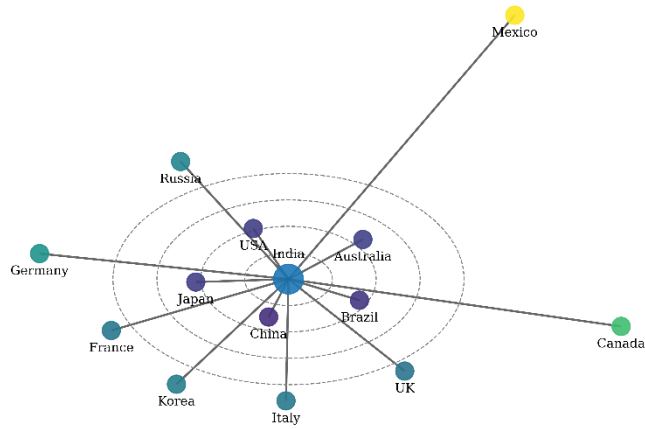


Figure 1- 13

Network Graph of PPI OTH Connectedness with India

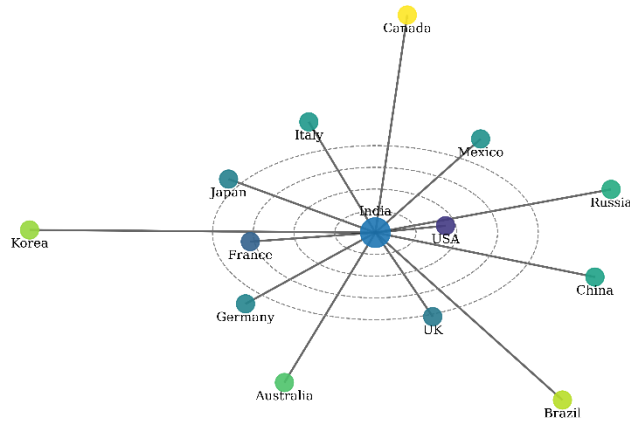


Figure 1- 14

Network Graph of PPI PET Connectedness with India

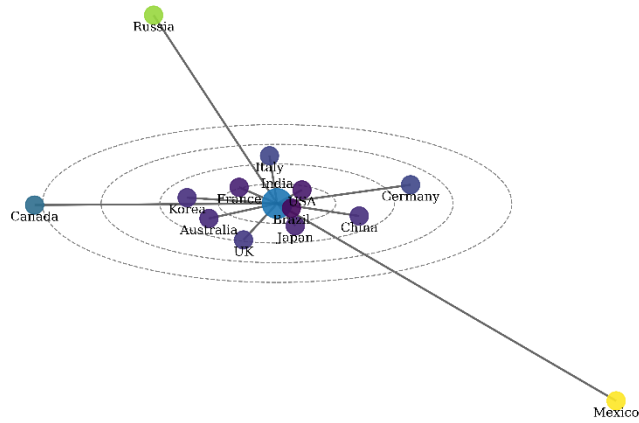


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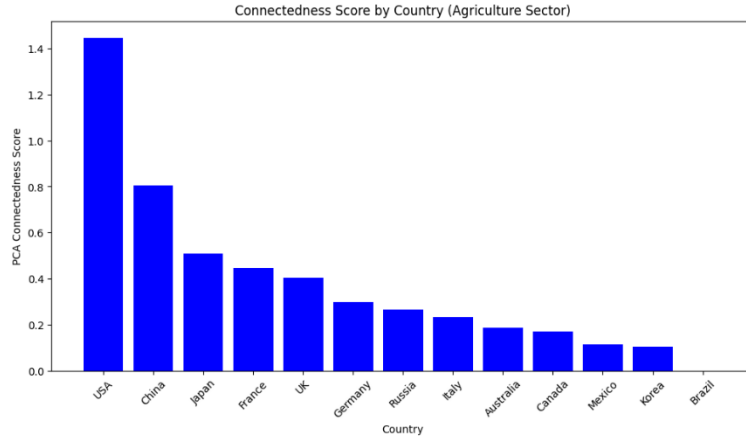


Figure 2- 1

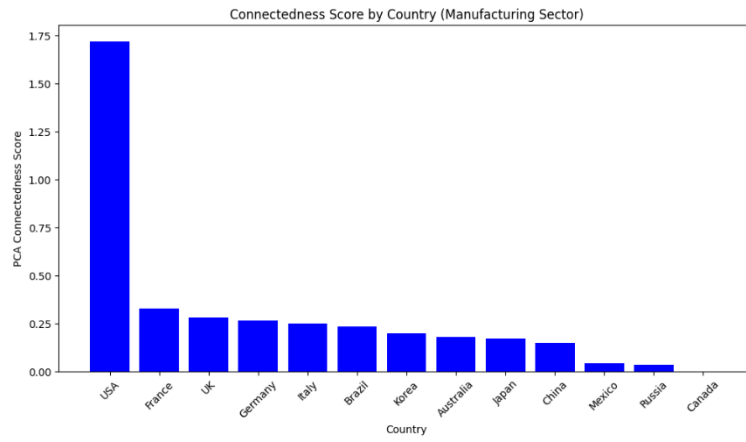


Figure 2- 2

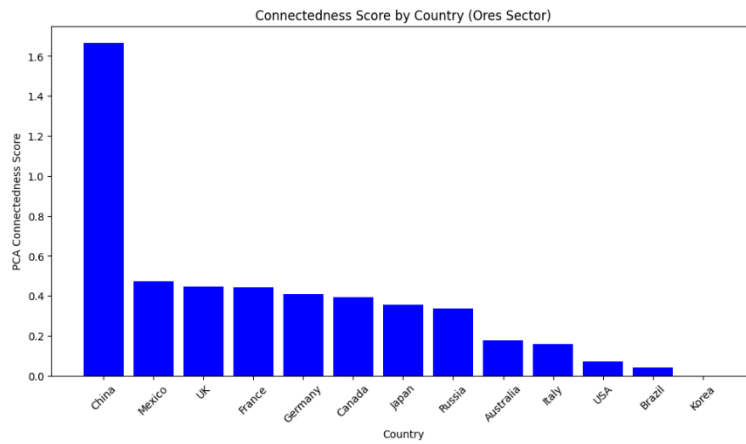


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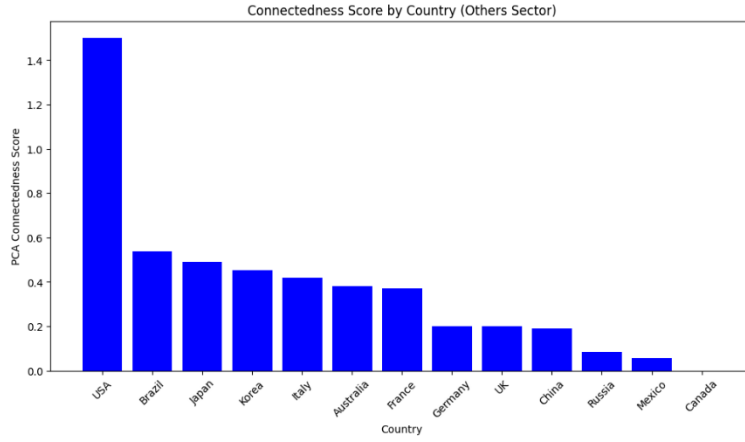


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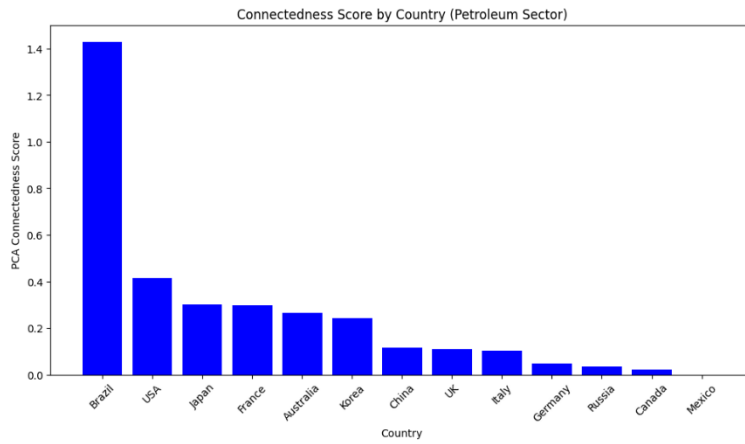


Figure 2- 5

Sankey Diagram: India's Exports to Top 13 Global Economies by Sector Share

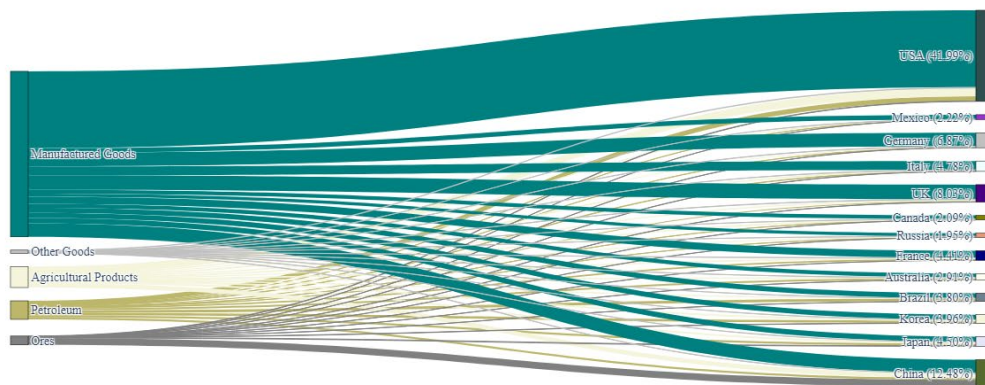


Figure 3