

MSME Sector in India: State-wise Disparity Analysis

Shubham Laha¹, and Sebak Kumar Jana² 

¹ Research Scholar, Department of Economics, Vidyasagar University, Midnapore, West Bengal, India

² Professor, Department of Economics, Vidyasagar University, Midnapore, West Bengal, India

Correspondence should be addressed to Shubham Laha; lahalogy@gmail.com

Received: 28 January 2026;

Revised: 15 February 2026;

Accepted: 28 February 2026

Copyright © 2026 Made Shubham Laha et al. This is an open-access article distributed under the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT - The Micro, Small and Medium Enterprises (MSME) sector is becoming an important engine of growth, employment generation and diversification of the industrial base in India. The paper sheds light on the state-wise and intra-state disparities in MSME distribution, which is evidence of non-uniform industrial growth across the country. Employing enterprise shares, rank analysis, as well as Gini and Theil inequality indices and coefficients of variation, the study shows that MSMEs are highly concentrated in a limited number of economically developed regions with strong industrial ecosystems, infrastructure and financial accessibility. The findings also show that inequality increases with enterprise size and that the medium enterprises are more regionally concentrated, while micro enterprises have relatively high dispersion. These findings point to the fact that, while the sector has overall expanded, MSME development in India is regionally skewed and reinforces differences in industrialisation and economic opportunities.

KEYWORDS- MSME Sector, Regional Disparity, Industrial Development, Gini Coefficient, Coefficient of Variation, Enterprise Distribution, Inclusive Growth, India

I. INTRODUCTION

Over the past few decades, the Micro, Small and Medium Enterprises (MSME) sector has grown to become one of the most dynamic & vital sectors of the Indian economy. It is an important engine for economic and social development, as it fosters entrepreneurship and creates large-scale employment at a relatively low cost of capital after agriculture. MSMEs supplement industries that are large and hence, play a significant role in ensuring inclusive and balanced industrial development. The sector's reach has spread to many more sectors of the economy, delivering hundreds of products and services for both local and international demand. The ministry for micro, small and medium enterprises envisages a forward-looking and competitive ecosystem for MSMEs through the support of existing firms; innovation with new forefront technologies; as well as promoting new business formations, which would be achieved in collaboration with state governments and other such institutions[10].

MSMEs are globally known as the backbone of economic systems with their contribution becoming increasingly meaningful for India, accounting that approximately 29.6% of GDP, and playing a significant role in employment generation, exports, innovation and inclusive growth in general. The sectoral characteristics are even more important as a substantial portion of Indian enterprises function in the small and informal non-organised segments[12]. MSMEs are a vital part of the economy, contributing significantly to GDP, industrial production and export performance[7], and are often seen as an "engine of growth" in rural / semi-urban areas. However, the regional imbalances in MSME development in India are quite deep-rooted. Over the years, states like Maharashtra, Tamil Nadu and Gujarat have created a robust MSME ecosystem backed by improved infrastructure and policy frameworks, while others continue to grapple with challenges like poor access to finance and technological bottlenecks. These asymmetries are primarily due to variances in institutional backing, entrepreneurial culture, and regulatory environments at the state level [1] [8] [9].

Based on the data for investment and turnover in the MSME sector across India as presented in Table 1, it can be inferred that there is a complete and sustained growth of Micro, Small and Medium scale enterprises. Investment demand, as evident from total investment that increased sharply from ₹4,65,712.8 crore in 2020–21 (partial year), to ₹7,79,611.4 crore in 2021–22 and further to ₹8,72,212.5 crore in 2022–23 (till March 13), reflects rising capital infusion and growing entrepreneurial activity. Also, the total turnover almost doubled from ₹54,89,743 crore in 2020–21 to ₹1,02,54,765 crore in 2021–22 and further increased to ₹1,22,31,966 crore in 2022–23, respectively signifying healthy market performance and recovery. In the last two quarters, turnover has grown faster than investment, indicating improving MSME sector productivity and demand conditions, probably owing to pandemic-led economic revival, policy support and improved formalisation. The overall trend underlines a phase of accelerated growth and strong economic contribution of MSMEs in India.

Table 1: Total Investment and Total Turnover in the MSME Sector in India

Year	Total Investment (In Rs. Crore)	Total Turnover (In Rs. Crore)
2020-21 (01-07-2020 - 31-03-2021)	465712.8	5489743
2021-22	779611.4	10254765
2022-23 (01-04-2022 - Till 13-03-2023)	872212.5	12231966

Source: Based on GOI [2]

The MSME sector in India is still plagued by numerous structural and emerging obstacles that impact its growth and competitiveness. Foremost among these are the perennial credit and liquidity gap, which keeps many enterprises out of formal finance because they do not meet high collateral requirements, while a “missing middle” problem prevents small and medium firms from accessing adequate scale-up capital, further exacerbated by delayed payments from large buyers that put pressure on their working capital. Simultaneously, rising global trade and supply chain challenges—such as tariff volatility and growing logistical costs resulting from geopolitical tensions—have impaired export-oriented MSMEs, particularly in labour-intensive sectors. A deepening digital and AI divide – where only larger firms can afford advanced technologies, compared to the small and medium-sized enterprises (SMEs) that serve them, which are often ill-equipped with technical skills – marginalises these SMEs from new opportunities that could positively change their balance sheets whilst leaving them vulnerable to escalating cyber-attacks. Finally, in spite of reforms such as Udyam Registration, the regulatory and compliance burden is significant, which takes away both time as well as resources that could have been used to pursue productive activity and collectively limits the potential in the sector.

This paper aims to analyse the state-wise disparity within the MSME sector in India. By examining the number of registered units. Addressing these gaps is essential for achieving the Government of India’s vision of an "Atmanirbhar Bharat" and ensuring that the benefits of industrial growth are equitably distributed across the federation.

II. LITERATURE REVIEW

The MSME sector has been widely acknowledged in the existing literature as a key driver of economic growth, employment and industrial development in India. Initial research stresses its position as the “engine of growth,” playing a significant role in GDP, exports, and entrepreneurship formation [13][14]. The potential of this sector in achieving broad-based economic growth and bridging regional disparities through promoting rural industrialization has also been emphasized [6] [10]. Additionally, MSMEs provide large-scale employment with lesser capital output compared to the organised sector, which leads to balanced income distribution and is regarded as a pillar for socio-economic development [11] [12]. The sector’s increasing contributions to innovation, diversification of economic activities and the strengthening linkages in domestic and global markets highlight that the sector continues to hold a central role in shaping India’s development paradigm[3] [5].

However, notwithstanding its substantial contributions, many studies indicate that the MSME sector is still facing enduring structural challenges and inequalities. Access to finance, technological constraints, inadequate infrastructure and regulatory complexities are still major barriers to its growth [4] [5]. Another contributing factor to operational inefficiency is the low ICT adoption, shortage of skilled manpower, weak market linkage, delayed payments, etc [3] [4]. Moreover, spatial disparities in the distribution and performance of MSMEs among different regions reflect uneven industrial growth and clusters of enterprises in developed areas [6]. The negative effects of external shocks, especially the COVID-19 pandemic, on micro, small and medium enterprises (MSMEs), as well as their economically vulnerable nature, have exposed the need for resilient policy measures towards MSME support [12]. So far, this literature suggests that with great potential for inclusive growth based upon MSMEs, there is a need to address structural bottlenecks and regional disparities in achieving balanced and sustainable development.

III. OBJECTIVES, METHODOLOGY AND DATA SOURCE

A. Objectives of the Study

The major objectives of the study are:

- To assess the pattern of distribution of MSMEs in India
- To assess the inequality of distribution of MSMEs in India

B. Methodology of the Study

The study is quantitative and analytical in nature. Descriptive statistics are used for state-wise distribution and ranking. Gini Coefficient and Theil’s index (Theil’s T) are used to measure inequality (0 = equality, 1 = inequality). Gini Coefficient:

$$G = \frac{\sum_{i=1}^n \sum_{j=1}^n |x_i - x_j|}{2n^2\mu}$$

Where:

G= Gini coefficient

n= Number of states

x_i, x_j =Number of MSMEs for states i and j

μ = Mean of the distribution

Theil Index (T) :

$$T = \frac{1}{N} \sum_{i=1}^N \left(\frac{y_i}{y} \ln \frac{y_i}{y} \right)$$

Where:

y_i =MSME value of state i

y =mean MSME across states

N= number of states

The Lorenz Curve is used for the graphical representation of disparity of MSMEs across states.

The coefficient of Variation (CV) used to measure dispersion across states.

C. Data Source

The analysis is based on secondary data collected from the website of the Ministry of Micro, Small & Medium Enterprises, Government of India [2].

IV. FINDINGS OF THE STUDY

The findings of the study have been presented in this section.

In below Table 2 shows that MSMEs are spread very unevenly across Indian states, and highly concentrated in a few economically advanced regions. Over all categories, Maharashtra dominates the figures accounting for the highest share — 15.56% of total MSMEs and an even

greater share — 18.71% medium enterprises — suggesting a robust industrial base in the state Uttar Pradesh (10.56%), Tamil Nadu (8.81%), Gujarat (6.42%) and Rajasthan (6.70%) are the other large contributors with significant shares across micro, small and medium enterprises. In contrast, smaller states and union territories like Lakshadweep, Ladakh and Andaman and Nicobar Islands contribute an insignificant amount due to limited industrial development. Delhi has a relatively low share (2.28% of the national total) but disproportionately high representation in small (5.81%) and medium-sized (7.46%) enterprises, implying a more capital- and service-intensive MSME structure there than in other states. Balance in contribution across categories is also to be seen for West Bengal and Telangana. When viewed as a table, it highlights the stark regional discrepancies where industrially developed MSME states dominate all segments of enterprises, while less-developed regions trail in every business class.

Table 2: State-Wise Percentage of MSMEs in India in 2026

	Micro (Nos. = 46627473)	Small (Nos. = 491064)	Medium (Nos. = 37042)	Total (Nos. =47155579)
ANDAMAN AND NICOBAR ISLANDS	0.040	0.032	0.011	0.040
ANDHRA PRADESH	4.432	3.476	2.659	4.421
ARUNACHAL PRADESH	0.065	0.079	0.051	0.065
ASSAM	2.320	1.371	1.425	2.309
BIHAR	4.329	2.458	1.598	4.307
CHANDIGARH	0.133	0.258	0.359	0.134
CHHATTISGARH	1.535	1.709	1.963	1.537
DELHI	2.235	5.811	7.462	2.277
GOA	0.191	0.230	0.213	0.191
GUJARAT	6.369	11.065	11.460	6.422
HARYANA	3.001	4.705	4.778	3.020
HIMACHAL PRADESH	0.573	0.526	0.567	0.572
JAMMU AND KASHMIR	1.314	0.655	0.583	1.307
JHARKHAND	1.711	1.208	0.964	1.705
KARNATAKA	5.515	6.448	6.215	5.526
KERALA	2.339	2.641	2.084	2.342
LADAKH	0.031	0.023	0.008	0.031
LAKSHADWEEP	0.003	0.000	0.000	0.003
MADHYA PRADESH	5.110	4.056	3.223	5.098
MAHARASHTRA	15.559	15.246	18.706	15.558
MANIPUR	0.274	0.086	0.049	0.271
MEGHALAYA	0.123	0.085	0.089	0.123
MIZORAM	0.080	0.044	0.022	0.079
NAGALAND	0.105	0.036	0.043	0.104
ODISHA	3.004	2.052	1.647	2.993
PUDUCHERRY	0.135	0.136	0.165	0.135
PUNJAB	3.443	3.461	3.337	3.443

RAJASTHAN	6.709	5.570	4.489	6.696
SIKKIM	0.046	0.033	0.035	0.046
TAMIL NADU	8.822	8.025	7.656	8.813
TELANGANA	3.984	4.136	4.849	3.986
THE DADRA AND NAGAR HAVELI A~D	0.060	0.187	0.364	0.061
TRIPURA	0.256	0.144	0.127	0.255
UTTAR PRADESH	10.584	8.245	7.216	10.557
UTTARAKHAND	0.962	0.826	0.745	0.960
WEST BENGAL	4.609	4.937	4.838	4.613
India	100	100	100	100

Source: Based on GOI [2]

From Table 3 on state-wise ranks of MSMEs in India, we can see that there is a highly uneven distribution across regions, with the concentration of enterprises emerging in only a few economically developed states. Maharashtra consistently retains the top position (rank 1) across micro, small, medium & total MSMEs followed by Uttar Pradesh and Tamil Nadu suggesting strong industrial base & ecosystem supportive to industry. Gujarat, Karnataka, Rajasthan and West Bengal are other top states that enjoy relatively high MSME rankings owing to diversified growth in various MSME categories. At the opposite end of the

spectrum, multiple northeastern and union territories such as Lakshadweep, Ladakh, Andaman and Nicobar Islands, and Arunachal Pradesh take up lower positions that indicate less industrialization along with weaker enterprise engagement. Surprisingly, in states like Delhi, small and medium enterprises fare well while micro units lag behind which indicates an overall advanced enterprise structure. Examining it broadly, the table demonstrates pronounced regional disparities regarding MSME distribution, with industrially developed states dominating while poorly developed and remote regions trail far behind.

Table 3: State-Wise Rank of the Number of MSMEs in India

	Micro	Small	Medium	Total
ANDAMAN AND NICOBAR ISLANDS	34	34	34	34
ANDHRA PRADESH	9	12	13	9
ARUNACHAL PRADESH	31	30	29	31
ASSAM	16	18	18	16
BIHAR	10	15	17	10
CHANDIGARH	27	23	24	27
CHHATTISGARH	19	17	15	19
DELHI	17	6	4	17
GOA	25	24	25	25
GUJARAT	5	2	2	5
HARYANA	14	9	9	13
HIMACHAL PRADESH	22	22	22	22
JAMMU AND KASHMIR	20	21	21	20
JHARKHAND	18	19	19	18
KARNATAKA	6	5	6	6
KERALA	15	14	14	15
LADAKH	35	35	35	35
LAKSHADWEEP	36	36	36	36
MADHYA PRADESH	7	11	12	7
MAHARASHTRA	1	1	1	1
MANIPUR	23	28	30	23

MEGHALAYA	28	29	28	28
MIZORAM	30	31	33	30
NAGALAND	29	32	31	29
ODISHA	13	16	16	14
PUDUCHERRY	26	27	26	26
PUNJAB	12	13	11	12
RAJASTHAN	4	7	10	4
SIKKIM	33	33	32	33
TAMIL NADU	3	4	3	3
TELANGANA	11	10	7	11
THE DADRA AND NAGAR HAVELI A~D	32	25	23	32
TRIPURA	24	26	27	24
UTTAR PRADESH	2	3	5	2
UTTARAKHAND	21	20	20	21
WEST BENGAL	8	8	8	8

Source: Based on GOI [2]

Figure 1 , Figure 2 and Figure 3 show respectively the Lorenz curve for Micro, Small and Medium enterprises in India

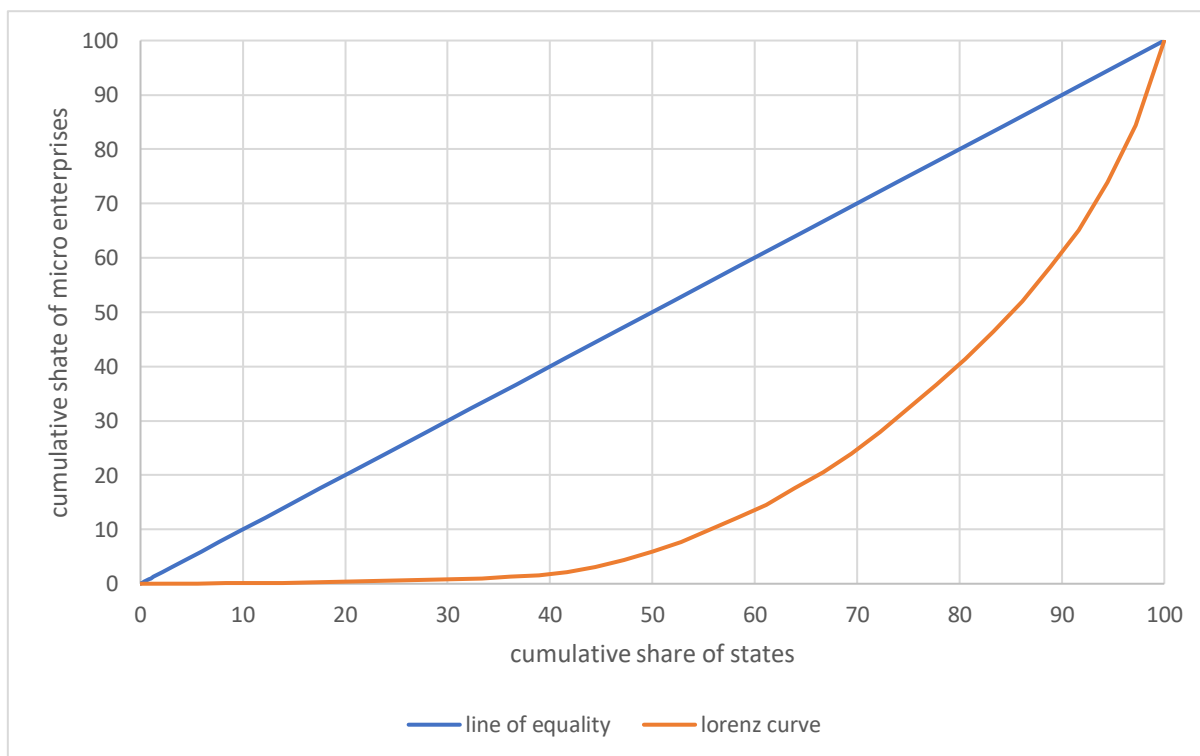


Figure 1 : Lorenz curve for micro enterprises in India

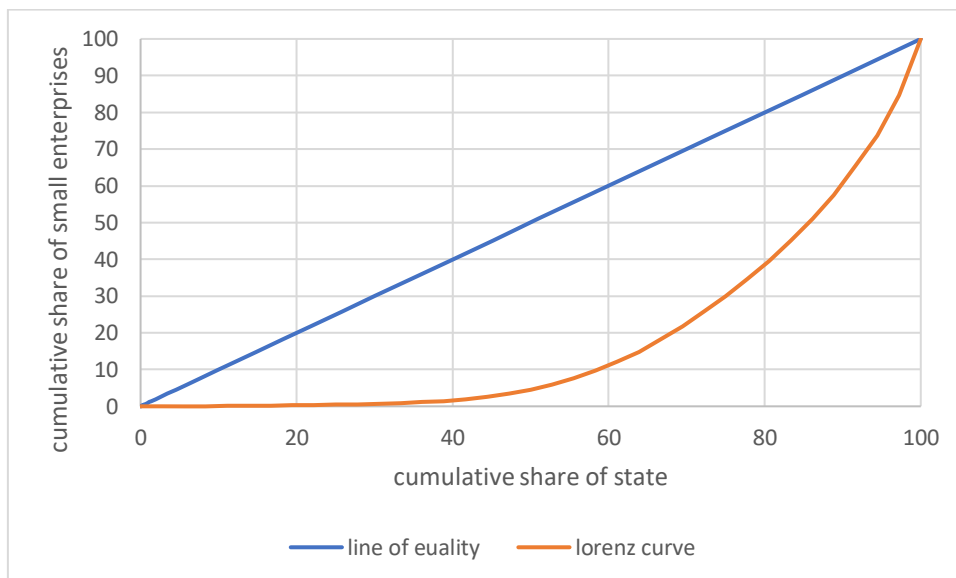


Figure 2 : Lorenz curve for small enterprises in India

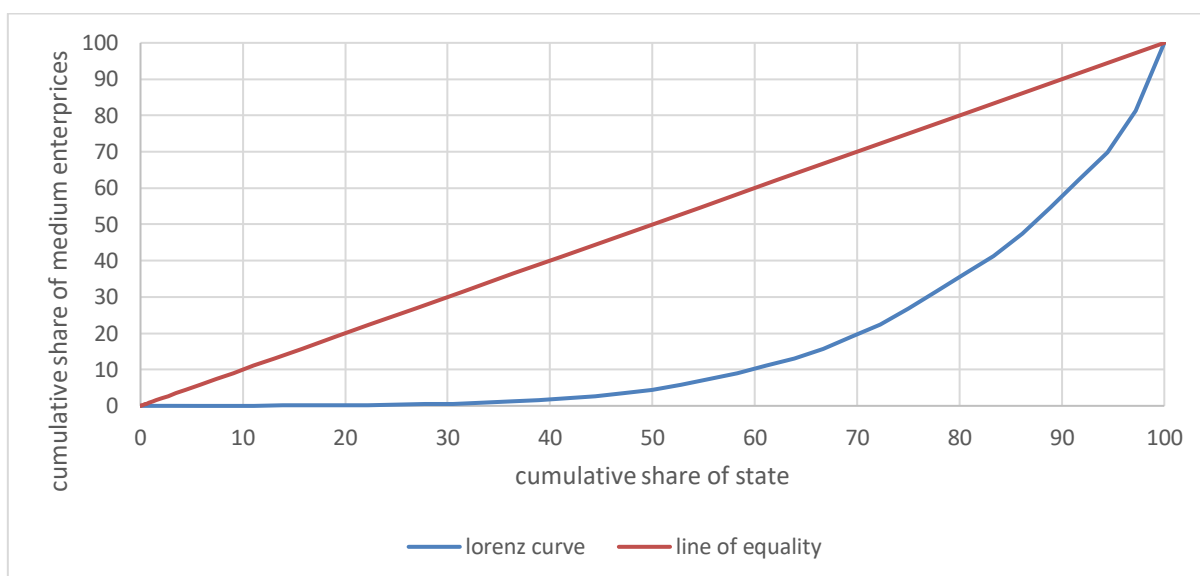


Figure 3 : Lorenz curve for medium enterprises in India

The overall Gini coefficients of enterprise distribution for all categories in the MSME sector as presented in Figure 4, clearly suggest a high level of inequality among the sectors, where as we move from micro to medium enterprise, inequality increases. Particularly, considerable concentration exists in micro enterprises (0.6125), however, inequality exists between the small (< 50) enterprises (0.6298) and medium (< 250) enterprises (with the highest

Gini index value of 0.6537). This pattern indicates that medium enterprises are the most unevenly distributed — probably absorbed into a few states or locations, while micro enterprises distribute far more proportionally. In summary, Gini values increase across firm sizes on average, indicating greater regional concentration and inequality of access to capital, infrastructure and industrial ecosystems with increasing firm size.

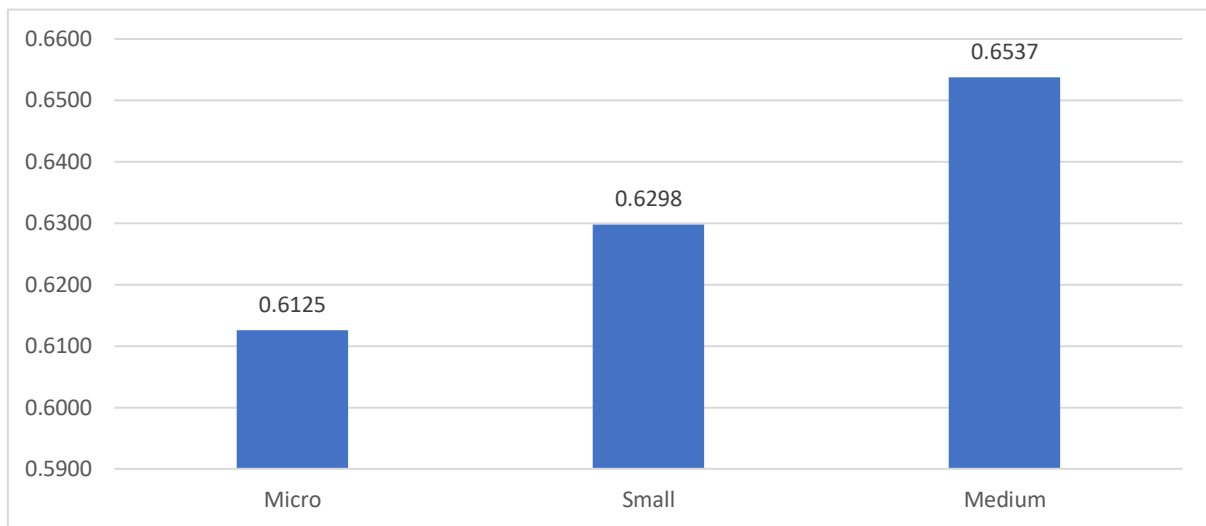


Figure 4: Gini Inequality across enterprise types of MSME in India

The Theil Index values in Figure 5 reveal significant levels of inequality in the distribution of MSMEs across Indian regions, with this inequality increasing by enterprise size. From the medium enterprises data, the highest inequality (0.8037) can be seen, suggesting that more than 80% of medium firms are concentrated in a few states or regions. Next comes small enterprises (0.7359), which also show significant regional imbalance, though not as pronounced. Micro enterprises (0.6770) show a lower degree of inequality comparatively, indicating a common and diffuse

national presence. The aggregate MSME segment (0.6768) is in close resemblance with the micro category, as it indicates the overwhelming predominance of micro establishments over the total MSME composition. Indeed, the findings show a strong pattern of regional concentration for larger firms, suggesting that they do not grow and disperse as they do but rather coalesce, indicating uneven development by industry and obstacles to firm growth, but also their dispersion.

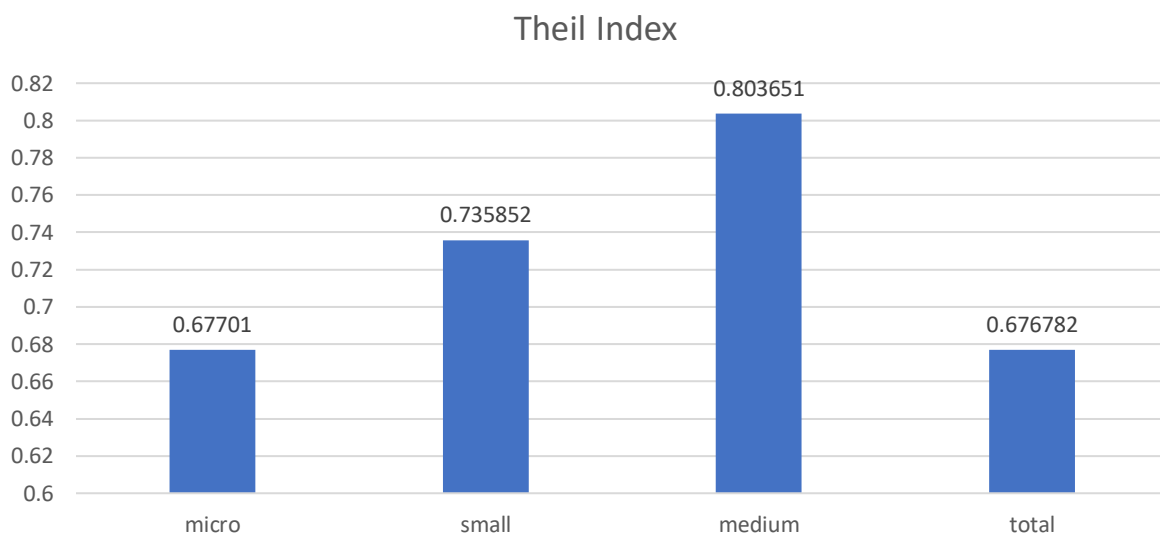


Figure 5: Theil Inequality across enterprise types of MSME in India

The coefficient of variation in Table 4 shows significant inter-district variations in the distribution of MSME enterprises across Indian states and indicates that inter-district variability remains highest for medium enterprises and lowest for micro enterprises. States like Arunachal Pradesh, Chhattisgarh, Karnataka, Telangana and West Bengal have very high coefficients — particularly for medium enterprises — which indicates strong industrial concentration of such units at the district level and uneven regional industrial development. In comparison, states like Goa, Kerala and Delhi see a comparatively less variation

implying a more even spatial distribution of MSMEs. The high variation in large and industrially advanced states like Gujarat, Maharashtra, Tamil Nadu and Uttar Pradesh is both a reflection of their willingness to industrialise as well as the imbalance between different parts of the state. Micro enterprises characteristically exhibit relatively lower coefficients for most of the states that re affirms their extensive coverage even in less developed districts as compared to medium and small enterprises which are mainly concentrated across space. The overall pattern

indicates a continued regional imbalance in the distribution of MSMEs, with the higher enterprise categories showing

more clustering than the micro sector, which maintains an even distribution.

Table 4: Coefficient of variation in the number of enterprises among the districts for the states of India

	Medium	Micro	Small	Total
ANDAMAN AND NICOBAR ISLANDS	1.732	1.244	1.634	1.247
ANDHRA PRADESH	1.225	.424	1.008	.427
ARUNACHAL PRADESH	4.092	1.611	2.536	1.623
ASSAM	2.296	.640	1.827	.644
BIHAR	1.921	.711	1.187	.713
CHANDIGARH
CHHATTISGARH	3.298	1.16	2.260	1.174
DELHI	.623	.507	0.572	.506
GOA	.483	.290	0.242	.289
GUJARAT	1.924	1.544	1.782	1.549
HARYANA	1.530	.595	1.024	.602
HIMACHAL PRADESH	1.848	.639	1.181	.641
JAMMU AND KASHMIR	1.557	.771	1.474	.773
JHARKHAND	1.535	.884	1.338	.887
KARNATAKA	3.198	1.332	2.405	1.346
KERALA	1.146	.468	0.804	.470
LADAKH	1.414	.351	0.844	.355
LAKSHADWEEP
MADHYA PRADESH	2.260	.964	1.734	.970
MAHARASHTRA	2.065	1.049	1.585	1.053
MANIPUR	1.944	1.335	1.921	1.336
MEGHALAYA	1.861	.955	1.714	.960
MIZORAM	2.467	1.665	2.344	1.669
NAGALAND	3.131	1.177	2.800	1.183
ODISHA	1.848	.726	1.160	.728
PUDUCHERRY	1.521	1.533	1.466	1.533
PUNJAB	1.723	.857	1.632	.864
RAJASTHAN	2.632	1.414	2.060	1.42
SIKKIM	1.856	.859	1.602	.865
TAMIL NADU	2.117	.743	1.600	.751
TELANGANA	3.366	1.114	2.407	1.129
THE DADRA AND NAGAR HAVELI A~D	.903	.932	0.840	.927
TRIPURA	1.818	.549	1.427	.554
UTTAR PRADESH	1.997	.777	1.395	.781
UTTARAKHAND	1.630	1.157	1.483	1.159
WEST BENGAL	2.767	.654	1.640	.657

Source: Based on GOI [2]

V. CONCLUSION

The analysis clearly establishes that the MSME sector in India remains characterised by significant regional and spatial imbalances across states and within districts. A limited number of economically advanced states dominate enterprise distribution across all categories, fueled by stronger industrial ecosystems, better infrastructure and easier access to finance, as less developed and remote regions continue to fall far behind. Specifically, the inequality measures show that the Gini coefficients for micro to medium enterprises are increasing and unevenly distributed, indicating that larger firms are becoming concentrated in specific regional clusters, signifying imbalanced access to capital, technology, and markets. Likewise, the COV further accentuates that small and medium enterprises within the state are concentrated in various districts, while micro enterprises are distributed more evenly. All these findings taken together signify that despite the overall growth of the MSME sector, its development is highly unbalanced, and this underscores already existing regional inequalities in industrialisation and economic opportunities.

Given these disparities, policy interventions need to focus on building a more inclusive and regionally balanced MSME development. It is also important to address credit availability beyond the traditional lending on collateral, especially with SMEs in emerging markets and to improve SPLa (short payment lists) as per the long cash flows. By fostering the growth of enterprises in lagging areas through targeted infrastructure development, cluster-based industrial policies and enhanced connectivity, regional disparities can be mitigated. Furthermore, increased utilization of affordable technology and capacity-building efforts are imperative to close the digital divide and boost competitiveness. Easing regulatory frameworks and decentralising industry support systems would further bubble MSME development around the country. In conclusion, a coordinated and region sensitive approach to policy for MSMEs is needed to ensure that they become a more equitable and resilient engine of India's economic growth.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

REFERENCES

1. R. K. Das, *Regional Industrialization and the MSME Landscape: A Decade of Transition*. Oxford: Oxford University Press, 2025
2. Government of India, *UDYAM Registration (MSME Registration)*, Ministry of Micro, Small and Medium Enterprises,. Available from: <https://msme.gov.in/>
3. D. T. Hattiangbire and P. Harkal, "Challenges and future prospects for the Indian MSME sector: A literature review," *Journal of Management and Entrepreneurship*, vol. 16, no. 1, 2022. Available from: <https://doi.org/10.70906/20221601013021>
4. P. Khatri, "A study of the challenges of the Indian MSME sector," *IOSR Journal of Business and Management*, vol. 21, no. 2, pp. 5–13, 2019. Available from: <https://tinyurl.com/nu862fpk>
5. A. Kumari, "India's MSME sector: A comprehensive review of challenges and opportunities," *International Journal for*

6. *Multidisciplinary Research*, vol. 6, no. 1, pp. 1–9, 2024. Available from: <https://tinyurl.com/nu862fpk>
6. P. Manna and T. Mistri, "Status of micro, small and medium enterprises (MSME) in India: A regional analysis," *IOSR Journal of Humanities and Social Science*, vol. 22, no. 9, pp. 72–82, 2017. Available from: <https://tinyurl.com/4exc6n85>
7. Ministry of Micro, Small and Medium Enterprises, *Annual Report 2023–24*. Government of India, 2024. Available from: <https://msme.gov.in>
8. S. Mukherjee, "Spatial inequality in Indian manufacturing: The role of small enterprises," *Journal of Development Economics & Policy*, vol. 12, no. 3, pp. 45–62, 2023. Available from: <https://doi.org/10.4324/9781003460626>
9. A. Sarkar and P. Sharma, "Credit accessibility and MSME growth: A comparative study of Indian states," *Indian Journal of Finance*, vol. 16, no. 8, pp. 22–38, 2022. Available from: <https://doi.org/10.1080/10911359.2025.2503439>
10. P. M. Selvam, "Role and performance of MSME sector in India," *Research Explorer*, vol. IX, no. 3, pp. 31–35, 2021. Available from: <https://tinyurl.com/493859wh>
11. M. O. Shetty and G. Bhat, "A performance analysis of Indian MSMEs," *International Journal of Applied Engineering and Management Letters*, vol. 6, no. 2, pp. 197–216, 2022. Available from: <https://doi.org/10.5281/zenodo.7112375>
12. A. Singh, "MSMEs sector in India: Current status and prospect," *International Journal of Innovative Research in Engineering & Management*, 2021. Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3912748
13. D. S. Srivastava, "Role of MSME sector in Indian economy: A study with special reference to Gujarat," *Pacific Business Review International*, vol. 13, no. 3, 2020. Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3755792
14. P. Zanjurne, "Growth and future prospects of MSME in India," *International Journal of Advanced Engineering, Management and Science*, vol. 4, no. 8, pp. 608–614, 2018. Available from: <https://doi.org/10.22161/ijaems.4.8.5>