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MSMEs and Economic Transformation: An Empirical Study of Income Growth in Bodoland Territorial Region, Assam

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Abstract
This study investigates the transformative role of Micro, Small, and Medium Enterprises (MSMEs) in driving income generation within the Bodoland Territorial Region (BTR) of Assam, encompassing five districts: Udalguri, Baksa, Tamulpur, Chirang, and Kokrajhar. A survey of 370 registered MSMEs reveals a substantial upward shift in income levels over time. Initially, 67.29% of enterprises operated within low-income brackets (below Rs. 200,000), while currently, 69.45% fall within the mid-income ranges (Rs. 200,001 to Rs. 600,000), signaling strong economic progression. Statistical analyses—including Chi-square tests, paired t-tests, and correlation analysis ($r = 0.785$, $p = 0.000$)—confirm the significance of this income growth and underscore a robust positive trend across the sector. These findings suggest that MSMEs are evolving from subsistence operations to sustainable business models, playing a pivotal role in regional development. The study recommends targeted policy support, including enhanced credit access, regulatory simplification, digital infrastructure, and market integration, to sustain and accelerate this positive trajectory.
Keywords: *MSME, BTR region, Chi Square, Trend, Credit.*

INTRODUCTION

Small and Medium Enterprises (SMEs) and start-ups play a crucial role in fostering economic development by generating employment opportunities and driving income growth. As key drivers of innovation, competition, and industrial diversification, these enterprises contribute significantly to national and regional economies (Acs et al., 2017). According to the International Labour Organization (ILO), SMEs account for over 70% of total employment worldwide, highlighting their importance in job creation and economic stability (ILO, 2020). Similarly, start-ups, particularly in technology-driven industries, have disrupted traditional job markets and introduced new employment opportunities through entrepreneurship and digital transformation (Acs & Audretsch, 2019).

The link between SMEs, start-ups, and income generation is evident as these enterprises provide sustainable livelihoods and contribute to household earnings. Studies indicate that countries with a thriving SME sector experience higher GDP growth rates and lower unemployment levels (Beck et al., 2005). Furthermore, start-ups foster economic mobility by creating high-paying jobs, increasing innovation, and attracting investment capital (Schumpeter, 1942). Despite these benefits, SMEs and start-ups often face challenges such as financial constraints, regulatory hurdles, and market competition, which can hinder their full potential in job creation and income generation (Carree & Thurik, 2010).

This study examines the role of SMEs and start-ups in job creation and income generation, exploring their economic impact, challenges, and future prospects. By understanding their contribution to labor markets and economic development, policymakers and stakeholders can implement strategies to support and sustain their growth.

LITERATURE REVIEW

1. The Role of SMEs and Start-Ups in Job Creation

Small and Medium Enterprises (SMEs) and start-ups are widely recognized as key drivers of employment generation. According to the World Bank (2022), SMEs account for about 90% of businesses and more than 50% of global employment. Studies indicate that young start-ups, particularly those in high-growth industries, contribute disproportionately to new job creation compared to established firms (Sedláček & Sterk, 2020). Ayyagari, Demirgüç-Kunt, and Maksimovic (2017) found that SMEs contribute more to net

employment growth than large corporations, particularly in emerging economies where formal job opportunities are limited.

Moreover, SMEs and start-ups have been found to bridge employment gaps by fostering workforce inclusion. Recent studies suggest that these enterprises provide employment opportunities for underrepresented groups, including women and youth, thereby reducing social inequalities (ILO, 2021). For example, research by De Kok, Deijl, and Veldhuis-Van Essen (2021) found that SMEs account for 70% of new job opportunities in developing economies, particularly in service and manufacturing sectors.

2. SMEs, Start-Ups, and Income Generation

SMEs and start-ups also play a crucial role in income generation and economic mobility. According to a report by the Organisation for Economic Co-operation and Development (OECD, 2023), economies with a strong SME sector experience higher per capita income and GDP growth. SMEs and start-ups foster wealth distribution by offering competitive wages and expanding economic opportunities, particularly in rural and semi-urban regions (Beck, 2021).

Innovative start-ups, particularly those in technology, finance, and digital services, contribute to high-income employment. Research by Audretsch and Belitski (2021) highlights that start-ups in the digital economy generate more sustainable and higher-paying jobs than traditional SMEs. Additionally, the gig economy, largely driven by digital start-ups, has emerged as a new source of income, providing flexible work opportunities for millions (Nambisan et al., 2022).

However, despite their contributions, SMEs and start-ups face challenges in achieving stable income generation. For instance, financial constraints and limited access to markets often prevent them from reaching their full potential (Klapper, Lewin, & Quesada Delgado, 2022). Government support programs, such as tax incentives and small business grants, have been identified as effective tools to enhance SME income levels (World Economic Forum, 2023).

3. Challenges Faced by SMEs and Start-Ups in Job Creation and Income Growth

Despite their potential, SMEs and start-ups face several challenges that hinder their role in job creation and income generation. Financial constraints remain a significant barrier, as access to credit and investment is often limited for small businesses (Beck & Demirgüç-Kunt, 2021). Research by Levine and Rubinstein (2022) indicates that high-interest rates and complex loan conditions restrict SMEs from scaling their operations.

Regulatory burdens also affect SMEs and start-ups. Djankov et al. (2021) found that excessive bureaucracy, complex tax structures, and inconsistent business regulations negatively impact SME growth. Furthermore, market competition from larger corporations creates difficulties for small businesses to establish themselves and retain employees (Acs et al., 2023).

In addition, digital transformation has created both opportunities and challenges for SMEs. While digital tools can improve business efficiency and market reach, many SMEs lack the necessary infrastructure and skills to fully leverage technological advancements (European Commission, 2022). This digital divide particularly affects small businesses in developing economies, where access to technology remains limited (UNCTAD, 2023).

4. Policy Interventions and Future Directions

To support SMEs and start-ups in overcoming these challenges, governments and international organizations have introduced various policy interventions. The World Bank (2023) emphasizes the importance of financial inclusion programs, such as microfinance and venture capital funding, to enhance SME access to capital. Similarly, the OECD (2023) highlights the role of entrepreneurship education and training programs in strengthening business skills and innovation capabilities among SMEs.

Recent studies also point to the growing importance of digital transformation in SME success. Nambisan (2022) argues that investments in digital tools, e-commerce platforms, and cloud computing can significantly improve SME efficiency and income generation. Furthermore, public-private partnerships have been identified as essential for fostering an entrepreneurial ecosystem, ensuring SMEs receive adequate market support and technological assistance (World Economic Forum, 2023).

Future research should focus on emerging trends such as artificial intelligence (AI) in SME operations, sustainable business models, and the role of blockchain technology in improving SME financing. Additionally, studies should explore how policies promoting gender-inclusive entrepreneurship can further enhance job creation and income equality (ILO, 2023).

Objective

The primary objective of this study is to empirically assess the impact of Micro, Small, and Medium Enterprises (MSMEs) on income generation in the Bodoland Territorial Region (BTR) of Assam. Specifically, the study aims to:

1. Analyze changes in income levels among MSMEs over time.
2. Identify the distributional shift in income brackets and growth trends.
3. Examine the statistical significance of these income changes using quantitative methods.
4. Explore the factors contributing to economic transformation within the MSME sector in the region.

RESEARCH METHODOLOGY

This study adopts a quantitative research approach based on primary data collected through structured questionnaires and interviews with MSME owners across the five districts of the Bodoland Territorial Region—Udalguri, Baksa, Tamulpur, Chirang, and Kokrajhar. A total of 370 registered and actively functioning MSMEs were selected through purposive sampling to ensure regional and sectoral representation.

The collected data were analyzed using a combination of statistical tools:

- **Descriptive statistics** were used to understand the income distribution at the beginning and at the current stage of enterprise operation.
- **Chi-square tests** (goodness-of-fit and test of independence) were employed to examine the significance of shifts in income levels over time.
- A **paired sample t-test** was used to compare the mean income of MSMEs at two time points, determining whether the changes were statistically significant.
- **Pearson's correlation coefficient** was calculated to assess the relationship between initial and current income levels.

Income Generation of MSMEs

To examine the impact of MSMEs on income generation in BTR region, data related to the levels of income generated by MSMEs "at the beginning" period and "at the present" have been collected, tabulated, and analyzed as shown in Table: 1 below.

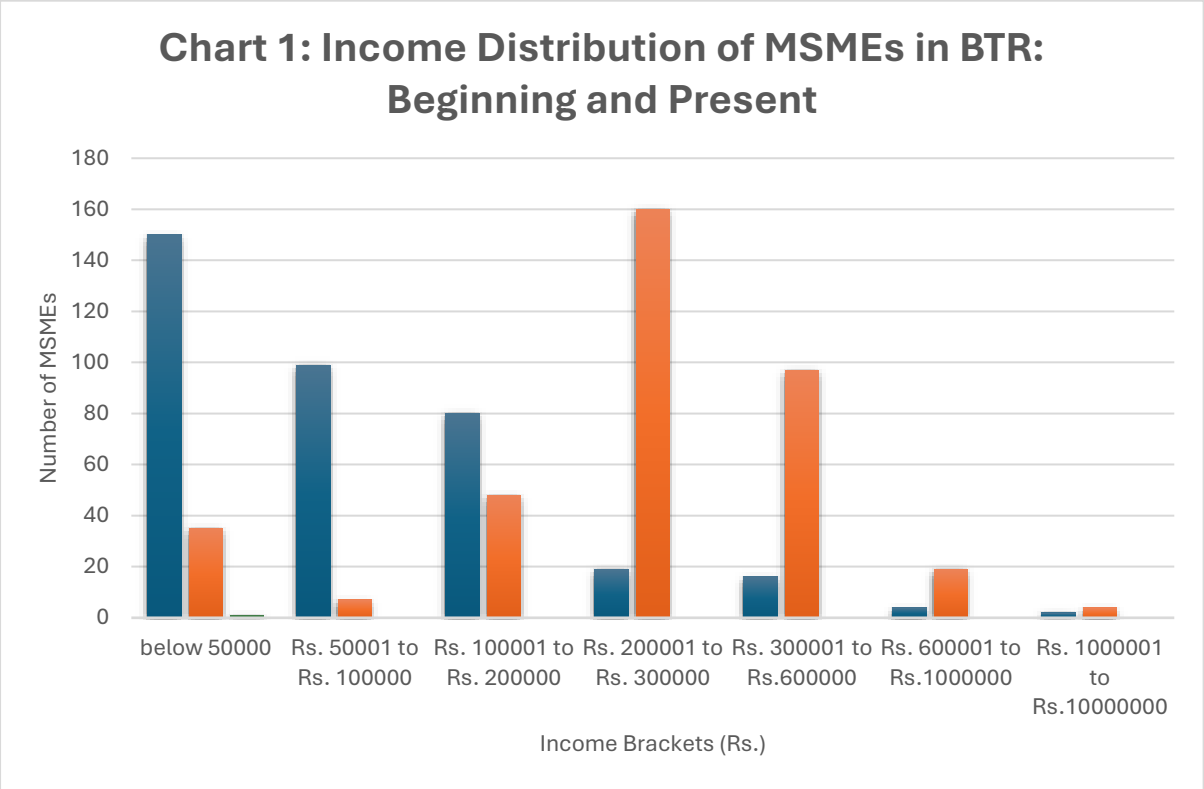
Table: 1

Income Levels	At the Beginning		At Present	
	Number of MSME	Percentage	Number of MSME	Percentage
Below Rs. 50000	150	40.54 %	35	9.45%
Rs. 50001 to Rs. 100000	99	26.75%	7	1.89%
Rs. 100001 to Rs. 200000	80	21.62%	48	12.97%
Rs. 200001 to Rs. 300000	19	5.13%	160	43.24%
Rs. 300001 to Rs.600000	16	4.32%	97	26.21%
Rs. 600001 to Rs.1000000	4	1.08%	19	5.13%
Rs. 1000001 to Rs.10000000	2	0.54%	4	1.08%
Total	370	100	370	100
Chi Square test for Goodness of Fit	Chi-Square = 376.3598782 Degrees of Freedom = 6 P-Value = 0.000		Chi-Square = 369.2442009 Degrees of Freedom = 6 P-Value = 0.000	

	Chi-Square = 338.9138 Degrees of Freedom = 5 P-Value = 0.000

Calculation: Authours own calculation

Above table shows Income of the MSMEs at the beginning year. It has been observed that Majority of MSMEs fall under the income bracket below Rs. 50,000, accounting for 40.54% of the total. The second largest group is within the income range of Rs. 50,001 to Rs. 100,000, comprising 26.75% of the total. As the income levels increase, the number of MSMEs decreases gradually. Only a small percentage of MSMEs fall into higher income brackets, such as Rs. 600,001 to Rs. 1,000,000, and Rs. 1,000,001 to Rs. 10,000,000, each constituting less than 1% of the total. Overall, the data indicates that the majority of MSMEs operate within lower income brackets, with fewer MSMEs operating at higher income levels. The current distribution of MSMEs across income levels reveals a notable concentration within the Rs. 200,001 to Rs. 300,000 bracket, comprising 43.24% of the total. Following closely, MSMEs earning between Rs. 300,001 to Rs. 600,000 represent 26.21%. Lower income brackets account for smaller percentages ranging from 1.89% to 9.45%, while higher income brackets, including Rs. 600,001 to Rs. 1,000,000 and above Rs. 1,000,000, collectively make up 6.21%. This distribution suggests a centralization of MSMEs in the mid-income range, potentially reflective of prevailing economic conditions and prevalent business types within this sector. χ^2 test for goodness of fit has been performed between the observed and expected income of both the individual categories of present and beginning income of the sample msme owners of BTR region of Assam and found that there is a significant change in income generation at 1% level of significance as P-value is 0.000 in both the cases. Again, χ^2 test for independence of attributes has been performed between the beginning & present income generation of the msmes and find that the calculated value of χ^2 (i.e., 338.913) is more than the table value and as such we reject the null hypothesis (Ho1) at 5 degrees of freedom (d.f.) and 1 percent level of significance. And thus, conclude that there is a significant change in income generation in the msmes over the period.



Paired Sample Statistics of Annual Income of the Micro Enterprises

Table 2: Paired Samples Statistics

Variables	Mean	N	Std. Deviation	Std. Error Mean

Pair 1	Income at present	3.9459	370	1.27400	.06623
	Income at beginning	2.1135	370	1.23107	.06400

Calculation: Authours own calculation

The table 2 above shows the paired sample statistics of Beginning and Present Annual Income of the sample 370 MSMEs in BTR region of Assam. If we compare the mean value of income of these two periods, we find that it is much better income growth of the MSMEs as mean value of present annual income is Rs. 3.9459, which is much higher than the mean value of beginning annual income of 2.1135 of the MSMEs. The value of standard deviation of Present Annual Income (i.e., 1.27400) is higher than the beginning annual income of 1.23107, it indicates that there is an existence of inequality in income of the MSMEs.

Table 3: Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Income at present - Income at beginning	1.83243	.82247	.04276	1.74835	1.91651	42.856	369	.000

Calculation: Authours own calculation

Table 3 above shows paired t-test of the beginning and present income generation of the MSMEs. The mean difference value of the income generations of these two periods is 1.83243 and standard deviation is Rs. .82247. Out of the 370 observations, the observed value of t is 42.856 at 369 degrees of freedom (d.f.) with relative to the standard error of .04276. It falls in the rejection region and thus we, reject the null hypothesis (H01) and conclude that, there is a significant change in income generation of the MSMEs over the period.

Table 4: Comparative Analysis of Income Generation of MSMEs

Income levels	**Number of MSME at beginning**	**Number of MSME at present**	**Changes**	**Trend**
Below Rs. 50000	150	35	76.66%	Downward
Rs. 50001 to Rs. 100000	99	7	92.92%	Downward
Rs. 100001 to Rs. 200000	80	48	40%	Downward
Rs. 200001 to Rs. 300000	19	160	742.10%	Upward
Rs. 300001 to Rs.600000	16	97	506.25%	Upward
Rs. 600001 to Rs.1000000	4	19	375%	Upward
Rs. 1000001 to Rs.10000000	2	4	100%	Upward
Total	370	370	370	
Correlation (r) between Beginning and Present Income	.785 (Positive Correlation at 1 percent level of significance as p value=0.000)			

Calculation: Authours own calculation

The table 4 illustrates the comparative analysis of the income generation of MSMEs, which also demonstrates. At the beginning, income of the 150 number of MSMEs were "Rs.5,000 or below" which reduced to 35 numbers (i.e., 76.66 percent) at the present; Compared to the beginning, the numbers of MSMEs at the present period reduced to 92.92 percent and 40 percent in the income ranges of "Rs.50001 to Rs. 100000" and "Rs.100001 to Rs.200000" respectively. However, instead of 19 MSMEs at the

beginning it is found that 160 numbers of MSMEs generates more income at the present period which ranges between Rs. 200001 to Rs. 300000, which increased to 742.10 percent. Compared to the beginning income of MSMEs, Present income level of 506.25% percent MSMEs raised in the income group of „Rs. 300001 to Rs.600000" and present income level of 375% percent MSMEs increased in Rs. 600001 to Rs. 1000000 income group. The present income level of 100% MSMEs increased from Rs. 1000001 to Rs. 10000000 income group. Thus, we can conclude that there is a positive impact of development of micro ethe development In the beginning period, more numbers of micro enterprises were generated income in the lowest three categories of income bracket, which shows downward trend of changes in income categories. While at the present period, a greater number of MSMEs generate the highest categories of income which results in an upward trend in the highest three categories of income level.

5. FINDINGS AND ANALYSIS

Shift in Income Distribution

- Initially, a majority of MSMEs (67.29%) operated within lower income brackets (below Rs. 200,000).
- At present, a substantial shift has occurred, with 69.45% of MSMEs now falling within the mid-income range (Rs. 200,001 to Rs. 600,000).
- The proportion of MSMEs in higher income categories (above Rs. 600,000) has also increased significantly—from 1.62% at the beginning to 6.21% currently.

Chi-Square Test Results

- The **Chi-square test for goodness of fit** indicates a significant change in income distribution between the beginning and current periods ($\chi^2 = 376.36$, $p = 0.000$).
- The **Chi-square test for independence** between beginning and present income confirms a strong association ($\chi^2 = 338.91$, $df = 5$, $p = 0.000$).
- Both tests confirm a statistically significant transformation in income patterns at the 1% significance level.

Paired Sample T-Test Results

- The **paired t-test** reveals a significant increase in income levels over time.
- The null hypothesis is rejected at the 1% significance level, confirming substantial income growth among MSMEs.

Correlation Analysis

- The **correlation coefficient (r)** between beginning and present income is **0.785**, with a **p-value of 0.000**, indicating a strong positive relationship.
- This suggests that MSMEs with better starting incomes have continued to grow, while others have also shown upward movement.

Key Findings

- MSMEs in the BTR region have witnessed considerable income growth during the study period.
- Income distribution has shifted from lower to mid and upper income brackets, reflecting economic progress and enhanced business sustainability.
- Statistical evidence strongly supports the significance of this upward trajectory.
- These trends imply growing economic resilience, improved management practices, increased market access, and the possible impact of supportive mechanisms.

6. DISCUSSION

The study highlights a significant transformation in the income distribution of MSMEs in the Bodoland Territorial Region. A noticeable decline in enterprises within the lower-income brackets, coupled with a substantial rise in mid-to-high-income segments, reflects the transition of many MSMEs from marginal, survival-based operations to viable and sustainable business entities.

The strong positive correlation between initial and current income levels suggests that early financial stability can be a predictor of long-term growth. However, the overall upward mobility across income

brackets implies that even initially low-performing MSMEs have benefitted from structural improvements in the business environment.

Despite these positive trends, persistent barriers remain. Limited access to affordable finance, complex regulatory processes, and inadequate digital infrastructure continue to restrict the full potential of many enterprises. These challenges underscore the need for targeted interventions to sustain the momentum and ensure inclusive growth.

7. CONCLUSION AND POLICY RECOMMENDATIONS

Conclusion

This empirical study concludes that MSMEs in the BTR have made significant strides in income generation over time. Their growing contribution to local economic development underscores their potential as engines of employment, entrepreneurship, and regional transformation. The transition from low-income to mid- and high-income categories highlights both the resilience and growth capacity of the MSME sector in this region.

Policy Recommendations

To further strengthen the MSME ecosystem in the BTR, the following policy measures are recommended:

1. **Enhanced Financial Support**
   - Introduce and expand low-interest credit schemes and microfinance initiatives tailored for small enterprises, particularly first-generation entrepreneurs.
   - Facilitate easier access to venture capital, government-backed loan guarantees, and credit insurance schemes to mitigate financial risks.
2. **Regulatory Simplification**
   - Streamline registration, licensing, and tax filing procedures through single-window clearance systems to reduce time and administrative burden.
   - Simplify compliance norms and reduce red tape, especially for first-time and rural entrepreneurs.
3. **Digital Adoption and Capacity Building**
   - Provide digital literacy and skill development programs targeting MSME owners, women entrepreneurs, and workers.
   - Invest in digital infrastructure, including broadband internet connectivity, cloud services, and affordable access to digital tools.
4. **Improved Market Access**
   - Facilitate MSME participation in domestic and international e-commerce platforms through marketing assistance and digital onboarding.
   - Promote cluster-based industrial development and connect local MSMEs with national supply chains, export networks, and public procurement systems.
5. **Infrastructure Development and Public Services**
   - **Electricity**: Ensure uninterrupted power supply by upgrading rural power infrastructure, particularly in industrial and business zones.
   - **Transportation**: Improve road connectivity, logistics hubs, and transport services to reduce cost and time in the movement of goods and services.
   - **Security**: Enhance the overall security environment in rural and semi-urban areas to build investor confidence and support safe operation of MSMEs, especially in sensitive zones.

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