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Patterns and Predictors of Women's Micro-Enterprise Development: Evidence from Karimganj District, Assam

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***Abstract*—** *Women's entrepreneurship has emerged as a vital force in promoting grassroots economic development, especially in rural and semi-urban regions of India. In Assam, micro-enterprises owned and managed by women play a significant role in generating livelihoods, supplementing household income, and strengthening local markets. This study investigates the socio-economic factors influencing women's micro-enterprise performance in Karimganj District, Assam, using comprehensive statistical tools. Primary data were collected from 150 women entrepreneurs across diverse sectors such as textiles, food processing, livestock, tailoring, retail, and household-based production units. The study explores the relationship between enterprise performance and variables such as education, training exposure, access to credit, Self-Help Group (SHG) membership, family support, and entrepreneurial experience. The findings underscore the importance of targeted interventions such as skill training, simplified credit access, and stronger SHG networks to facilitate women's entrepreneurial growth. The study concludes with actionable recommendations for policymakers, banks, NGOs, and development agencies to enhance micro-enterprise sustainability among women in rural Assam.*

Keywords*— *Chi-Square, Credit Access, Micro-Enterprise, SHG, Training Programs, Women Entrepreneurship

I. INTRODUCTION

Entrepreneurship is widely recognized as a catalyst for economic development, innovation, and employment generation. In developing countries like India, women entrepreneurs have emerged as significant contributors to household income, community development, and local economic resilience. Micro-enterprises, in particular, serve as entry points for women who possess limited financial capital, family responsibilities, and restricted mobility [1] [2]. In Assam, women have historically participated in weaving, food processing, livestock management, traditional crafts, and retail activities. Despite structural barriers, women in rural and peri-urban regions have increasingly taken up entrepreneurial ventures to support their families and assert economic independence [5]. However, their success is influenced by several socio-economic factors including education, financial access, training, family support, and institutional assistance through Self-Help Groups (SHGs) [6] [7].

The Karimganj District of Assam represents a unique socio-economic setting where women-led micro-enterprises have flourished over the past decade. Yet, systematic research on determinants of enterprise performance remains limited. This study attempts to fill this gap by identifying patterns, relationships, and predictors of micro-enterprise performance among women in Karimganj District using statistical techniques.

II. REVIEW Of LITERATURE

Past studies consistently highlight that women entrepreneurs face a complex mix of enabling and constraining factors. Education is often identified as a strong predictor of business performance, enhancing managerial ability, decision-making, and financial literacy [9]. Training exposure has also been shown to strengthen entrepreneurial competencies, diversify production, and improve profitability [11]. Access to credit is another central element, especially in regions where informal finance mechanisms dominate. Micro-credit and loans offered through SHGs, banks, and NGOs significantly impact enterprise scale and sustainability [3] [4]. Family support, particularly in patriarchal societies, significantly influences women's autonomy and ability to manage businesses [8] [10]. Although research in India is abundant, studies specifically focusing on northeastern states like Assam remain comparatively fewer. Existing work emphasizes the role of women weavers, food processors, and livestock managers, but rarely integrates rigorous statistical assessment using chi-square analysis. This study contributes to the literature by offering an empirical, statistically grounded exploration of women's micro-enterprise development in a rural context.

III. OBJECTIVES OF THE STUDY

1. To assess the socio-economic characteristics of women entrepreneurs in Karimganj District.
2. To examine the relationship between education, training, credit access, family support, and enterprise performance.
3. To analyze the strength of association between socio-economic variables and enterprise outcomes.
4. To identify the strongest predictors of high-performing women-led micro-enterprises.

IV. RESEARCH METHODOLOGY

A descriptive and analytical research design was employed to study women entrepreneurship and micro-enterprise development in Karimganj district. The study aimed to combine socio-economic profiling with statistical examination to understand the factors influencing enterprise performance. A total sample of 150 women entrepreneurs was selected using purposive sampling, ensuring adequate representation across key sectors such as tailoring, grocery, livestock, beauty services, and home-based food processing. Primary data were collected through a structured questionnaire, supplemented by field interviews and observational notes to ensure data reliability and contextual understanding. For the analysis, several variables were considered, including enterprise performance (categorized as high or low) as the dependent variable, and education level, training received, access to credit, SHG membership, family support, and years of experience as independent variables [6]. To extract meaningful relationships and test the research hypotheses statistical tools such as Chi-Square test was applied to the dataset.

V. DATA ANALYSIS AND INTERPRETATION

The socio-economic profile highlights the demographic diversity of the respondents engaged in various entrepreneurial and livelihood activities. The majority of the respondents belong to the 30–50 years age group (48%), indicating that most entrepreneurs are in their economically productive and mature phase of life. About 35% are below 30 years, showing a considerable presence of young participants entering entrepreneurship as a livelihood option. Only 17% are above 50 years, suggesting limited participation of older individuals, possibly due to physical constraints or risk-averse tendencies. A significant proportion, 70%, of the respondents are married, which indicates that entrepreneurship is taken up mainly by individuals with family responsibilities who seek to augment household income. 23% are unmarried, representing young individuals pursuing self-employment paths. People from various caste groups are involved in entrepreneurial activities, showing a mix of social backgrounds among the respondents. The highest share comes from the General category (58%), followed by OBC (21%), SC (19%), while only 2% belong to the ST community. This suggests that small business activities are spreading across different caste groups, with noticeable involvement from SC and OBC individuals as well. The very low participation from the ST group may indicate limited access to resources, support, or information.

5.1 Education and Enterprise Performance

Table 1.1: Cross-Tabulation of Education and Performance

Education Level	Low Perf.	High Perf.	Total
Illiterate	11	4	15
Primary	16	10	26
Secondary	22	19	41
Higher Secondary	18	23	41
Graduate+	7	20	27
Total	**74**	**76**	**150**

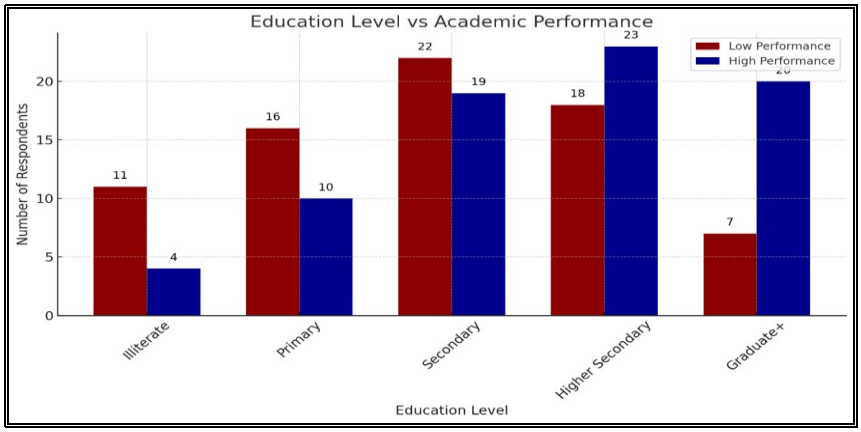

Fig 1.1: Education level with respect to enterprise performance

The statistical result, χ^2 (df = 4) = 11.72, p = 0.0196, indicates that the association is statistically significant at the 0.05 level. Since p = 0.0196 < 0.05, the null hypothesis, which states that education level and enterprise performance are independent is rejected. This means that education level has a significant influence on the performance of women-owned enterprises in the study area.

5.1.2 Training Participation and Performance

Table 1.2: Training and Performance

Training	Low Perf.	High Perf.	Total
Yes	25	45	70
No	48	32	80
Total	73	77	150

Here, it examined the association between training participation and performance level among the women in the sample. The results show a statistically significant relationship between the two variables, χ^2 (1) = 7.87, p = 0.0050. Since the p-value is far below the 0.05 threshold, the null hypothesis of no association is rejected. This means that women who received training are significantly more likely to exhibit high performance compared to those who did not receive training. Among those who received training (70 individuals), 64.3% (45 out of 70) are high performers, while 35.7% (25 out of 70) show low performance. In contrast, among the untrained group (80 individuals), only 40% (32 out of 80) achieve high performance, whereas a much higher 60% (48 out of 80) fall into the low-performance category. This difference is both statistically significant and practically meaningful. The findings strongly indicate that training plays an important role in enhancing women's performance in their entrepreneurial or work-related activities.

5.1.3 Analysis of Factors Encouraging Women's Entry into Micro-Business Activities

Table 1.3: Respondents' Opinions on Motivational Factors with Weighted Scores [12]

Sl. No	Factors	SA	A	PA	DA	SDA	Wt. Sum	Wt. Avg	Rank
1	Unemployment	51	43	38	8	10	567	3.78	1
2	To be self-reliant	50	39	29	23	9	548	3.65	3
3	As hobby	20	26	25	33	46	391	2.61	5
4	Additional income	55	35	31	19	10	556	3.71	2
5	Livelihood	39	48	26	18	19	520	3.47	4
6	Avoid monotonous job	16	24	30	31	49	377	2.51	6

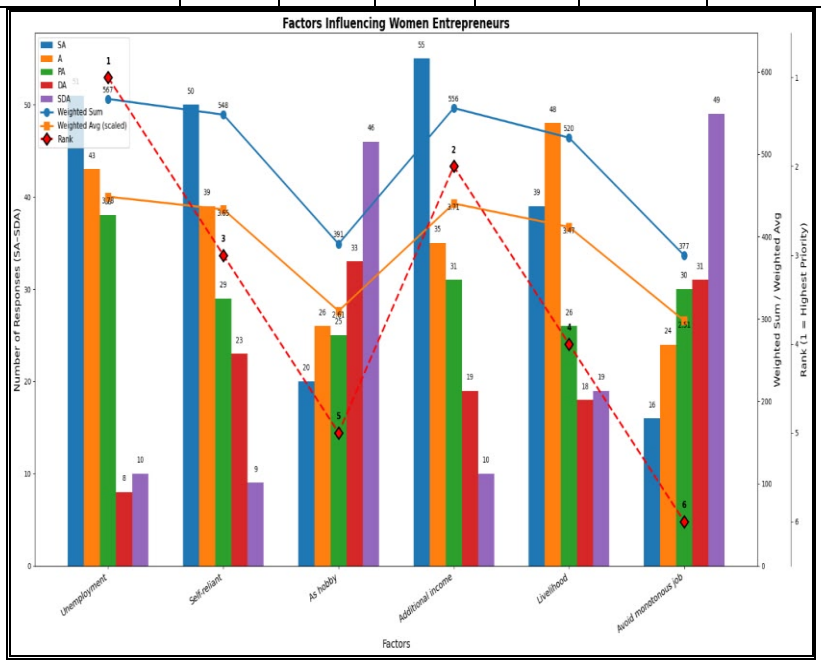

Fig 1.2 Comprehensive Visualization of Respondents' Ratings (SA–SDA), Weighted Sums, and Weighted Averages for Factors Influencing Entrepreneurial Choice

The fig.1.2 shows that unemployment is the most important factor influencing women entrepreneurship with the highest weighted score of 567 and Rank 1, where 51 respondents strongly agreed. Additional income is the second major factor with a weighted score of 556 and Rank 2, supported by 55 strongly agree responses. The desire to become self-reliant ranks 3rd with a weighted score of 548 and 50 strongly agree responses. Livelihood also plays an important role with a weighted score of 520 and Rank 4. In contrast, entrepreneurship pursued as a hobby received a lower weighted score of 391 and Rank 5, while avoiding monotonous jobs obtained the lowest weighted score of 377 and Rank 6. Thus, the figure indicates that economic necessity and financial independence are the primary motivations for women entrepreneurship.

Table 1.4: Significance of Response Variation Across Entrepreneurial Motivation Factors

Factor	Chi-Square (χ^2)	df.	p-value
Unemployment	24.67	4	0.00006
Self-reliant	13.02	4	0.011
As hobby	38.5	4	0.0001
Additional income	15.58	4	0.0036
Livelihood	6.34	4	0.17
Avoid monotony	47.33	4	0.00001

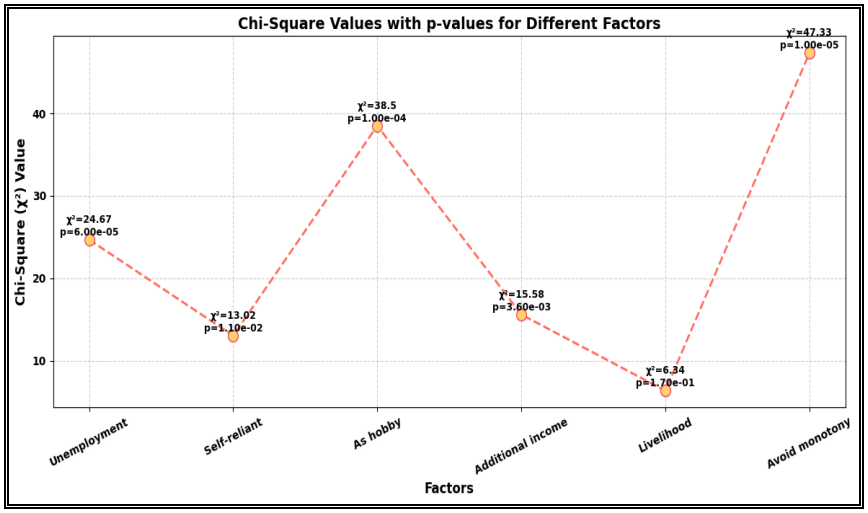

Fig 1.3: Comparative Chi-Square Values (χ^2) for Motivational Factors Related to Entrepreneurship

The Chi-square analysis in fig 1.3 reveals significant differences in response patterns for all six motivational factors. Here it examined the association between factors and response categories (SA, A, PA, DA, SDA) among the women in the sample. The χ^2 test of independence shows a statistically highly significant association between factors and response categories, $\chi^2(20) = 145.44$, p-value < 0.001. Since $p < 0.01$, so we reject the null hypothesis of no association between factors and response categories. Further examination of the row-wise χ^2 test of independence reveals that most factors show a statistically significant association with response categories. Factors such as unemployment, as hobby, sources of additional income and keeping away from monotonous job are highly significant. Whereas livelihood does not show a significant association, suggesting that respondents' opinions are evenly distributed across response categories and do not show a strong departure from independence. Livelihood ranked high (based on weighted average) but χ^2 is not significant. It means respondents generally agree it is important, but with mixed intensity leading to an even distribution.

Table 1.5 Challenges Faced by Women Entrepreneurs (Weighted Ranking Method)

Sl. No	Factors	A	N	NA	Wt. Sum	Wt. Avg	Rank
1	Inadequate Finance	96	31	23	373	2.49	1
2	Inadequate Infrastructure Facility	90	38	22	368	2.45	2
3	Competition	53	78	19	334	2.22	4
4	Lack of Market Linkages	62	38	50	312	2.08	6
5	Training and Management Skills	43	30	77	266	1.77	9
6	Discrimination from Society	67	22	61	306	2.04	7
7	Limited Access to Technology	87	35	28	359	2.39	3
8	Lack of Family Support	47	33	70	277	1.84	8
9	Work–Life Balance & Time Management	68	42	40	328	2.19	5

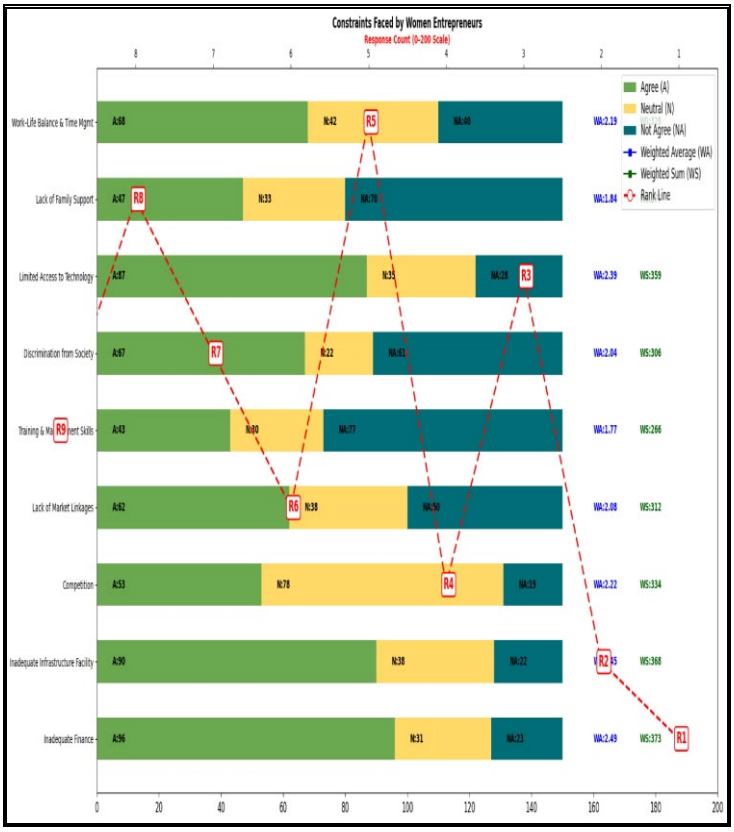

Fig 1.4: Perceived Constraints Among Women Entrepreneurs

The stacked bar chart presents a detailed picture of the major constraints faced by women entrepreneurs, based on responses categorized as Agree (A), Neutral (N), and Not Agree (NA), along with weighted averages, weighted sums, and rank order. The findings indicate that financial and infrastructural barriers emerge as the most severe constraints, while issues like training and management skills, though important, are perceived as relatively less critical in comparison. Inadequate Finance ranks first (R1) with the highest weighted average (WA = 2.49) and weighted sum (WS = 373). A large majority of respondents agreed (A = 96) that lack of finance is a major obstacle, highlighting difficulties in accessing credit, loans, and financial support systems. This underscores that financial constraints remain the most pressing challenge limiting the initiation, sustainability, and expansion of women-led enterprises. Inadequate Infrastructure Facility stands at second rank (R2) with a WA of 2.45 and WS of 368. A substantial proportion of women entrepreneurs agreed (A=90) that poor infrastructure such as inadequate workspace, electricity, transportation, and basic facilities significantly hampers their business operations. This reflects structural deficiencies that disproportionately affect women entrepreneurs, especially in semi-urban and rural areas. Limited Access to Technology is ranked third (R3) with a WA of 2.39 and WS of 359. A high number of respondents agreed (A = 87) that restricted access to modern technology, digital tools, and technical know-how acts as a serious constraint. This indicates a digital and technological gap that limits productivity, innovation, and market competitiveness among women entrepreneurs. Competition occupies the fourth rank (R4) with a WA of 2.22 and WS of 334. While more than half of the respondents agreed (A = 53), a notable proportion remained neutral (N = 78), suggesting that competition is perceived differently depending on the nature and scale of enterprises. Nevertheless, market competition from established firms and male-dominated businesses remains a significant challenge. Work–Life Balance and Time Management is placed at fifth rank (R5) with a WA of 2.19 and WS of 328. The responses reveal a fairly even distribution among Agree (A = 68), Neutral (N = 42), and Not Agree (NA = 40). This indicates that balancing domestic responsibilities with entrepreneurial activities continues to be a considerable issue for many women, though its intensity varies based on personal and family

circumstances. Lack of Market Linkages ranks sixth (R6) with a WA of 2.08 and WS of 312. A significant number of respondents agreed (A = 62) that inadequate access to markets, poor networking, and limited exposure to wider customer bases restrict business growth. This suggests the need for stronger institutional and market support mechanisms. Discrimination from Society is placed at seventh rank (R7) with a WA of 2.04 and WS of 306. Although a majority agreed (A = 67) that societal discrimination affects women entrepreneurs, the relatively lower rank indicates that, while social bias remains relevant, economic and structural constraints are perceived as more immediate challenges. Finally, Lack of Family Support ranks eighth (R8) with a WA of 1.84 and WS of 276. Despite a notable number of women agreeing (A = 47), a large proportion of neutral responses (N = 33) and not agree responses (NA = 70) suggest mixed experiences. This indicates that family support varies widely and, for many respondents, is not as severe a constraint as financial or infrastructural issues. In total, the analysis clearly demonstrates that economic and structural barriers particularly finance, infrastructure, and technology are the most critical constraints faced by women entrepreneurs. Social and personal factors, though important, are perceived as secondary. These findings highlight the urgent need for targeted financial assistance, improved infrastructure, digital inclusion, and supportive policy interventions to promote women entrepreneurship effectively.

VI. DISCUSSION

The findings of the study clearly indicate that women's micro-enterprise performance in Karimganj District is shaped by a combination of socio-economic attributes and structural constraints. Education emerged as a significant determinant of enterprise success, with higher educational attainment positively associated with high performance. The chi-square test confirmed this relationship, highlighting the role of literacy and schooling in enhancing managerial capability, financial decision-making, and adaptability to market demands. Training participation was found to be another strong predictor of enterprise performance. Women who underwent entrepreneurial or skill-based training demonstrated substantially higher performance levels compared to those without training. This supports existing literature that emphasizes the value of capacity-building programs in upgrading technical skills, improving product quality, and strengthening business management abilities. Motivational analysis shows that economic factors—particularly the need for additional income, self-reliance, and livelihood security—are the primary drivers encouraging women to enter micro-business activities. The highest weighted scores and chi-square values for "Additional Income" underline the centrality of financial necessity in rural women's entrepreneurial choices. Personal-interest factors such as hobby or avoidance of monotony, though statistically significant, were less influential. The ranking of constraints further illustrates that financial limitations are the most severe challenges faced by women entrepreneurs. Lack of access to adequate capital, insufficient infrastructure, competition, and technological gaps emerged as top barriers affecting enterprise growth and sustainability. Social and cultural challenges—such as discrimination and limited family support—also play a role but rank lower compared to financial and infrastructural issues. The comparatively lower rank of market linkage problems suggests that while market access is a concern, it is not perceived as critical as other structural bottlenecks.

Thus, the results suggest that improving women's entrepreneurial outcomes requires targeted interventions in financial inclusion, infrastructure development, digital access, and continuous training. Strengthening SHGs, promoting accessible credit mechanisms, and enhancing entrepreneurial skill-building programs can significantly improve enterprise performance. The discussion reinforces that empowering women entrepreneur in rural Assam is not only a matter of economic support but also a holistic strategy involving education, training, social recognition, and family encouragement.

VII. CONCLUSION

This study highlights that the success of women-led micro-enterprises in Karimganj District is shaped by a blend of personal capabilities and external support systems. Education and training clearly emerge as key drivers of high enterprise performance, underscoring the importance of skill development and knowledge enhancement. Women primarily engage in entrepreneurship to secure additional income and achieve self-reliance, indicating that economic necessity is a dominant motivator. At the same time, financial limitations, inadequate infrastructure, competitive pressures, and technological barriers continue to

restrict their entrepreneurial progress. Addressing these constraints through improved financial access, better infrastructural support, and sustained training initiatives will be crucial. In total, fostering women's entrepreneurship requires coordinated efforts that strengthen both individual competencies and the broader enabling environment.

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