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Mapping the Knowledge Landscape of Informal Manufacturing: A Systematic Review and Research Agenda for Assam's Overlooked Sector

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Abstract

The informal manufacturing sector represents a critical yet understudied component of regional economies in developing countries. This systematic literature review examines the global knowledge base on informal manufacturing to identify research gaps specific to Assam, India's northeastern state. Through a PRISMA guided analysis of 46 studies from 2016-2024, we reveal a striking contradiction while informal manufacturing constitutes a significant portion of economic activity in developing regions, Assam-specific research continues to be negligible. This paper contributes to the literature by synthesizing global patterns in informal manufacturing research, developing a theoretical framework for understanding regional variations in informal manufacturing dynamics, and proposing a comprehensive research agenda for Assam's informal manufacturing sector. Our findings reveal that informal manufacturing is driven by complex interactions between institutional factors, socioeconomic conditions, and technological capabilities, yet these dynamics remain unexplored, leading us to outline priority research areas and methodological approaches needed to address this critical knowledge gap.

Keywords: Informal Sector, Regional Development, India's northeastern state, Developing Economies, knowledge gap.

1. Introduction

1.1 Background and Rationale

The informal manufacturing sector represents one of the most significant yet least understood components of developing economies. In India, this sector employs approximately 80% of the manufacturing workforce and contributes 40-70% of total manufacturing output across various scales (Kumar & Sharma, 2020). Despite its substantial economic importance, the informal manufacturing sector remains characterized by significant research disparities, with certain regions receiving extensive scholarly attention while others remain virtually unexplored.

Assam, India's northeastern gateway state, exemplifies this research inequality. Despite its strategic location, rich natural resources, and significant informal manufacturing activities, the state's informal manufacturing sector has received minimal academic attention. This neglect is particularly concerning given Assam's unique characteristics: its position as a border state, diverse ethnic composition, tribal populations, and distinct institutional history that may create informal manufacturing dynamics unlike those observed elsewhere in India.

The absence of region-specific research on Assam's informal manufacturing sector represents more than an academic oversight it constitutes a practical barrier to effective policy formulation, business support, and economic development. Understanding informal manufacturing dynamics is crucial for policymakers seeking to support these enterprises, which provide livelihoods for thousands of families and contribute significantly to the state's economy.

1.2 Research Problem and Significance

This study addresses a fundamental question in regional development research: How can we understand and support informal manufacturing sectors in regions where systematic research is lacking? The specific case of Assam illustrates a broader challenge in development studies the uneven distribution of research attention across regions with potentially different developmental dynamics.

The significance of this research extends beyond academic completeness. Informal manufacturing enterprises in Assam operate within a complex web of local institutions, cultural practices, and economic conditions that may require different support mechanisms than those identified in other regions. Without understanding these context-specific dynamics, well-intentioned policies may prove ineffective or even counterproductive.

1.3 Research Objectives

This systematic literature review aims to:

RO1: Synthesize global knowledge on informal manufacturing to identify universal patterns and context-specific variations.

RO2*:* Develop a theoretical framework for understanding regional variations in informal manufacturing dynamics and identify critical knowledge gaps.

RO3: Propose a comprehensive research agenda for advancing understanding of Assam's informal manufacturing sector.

1.4 Research Questions

RQ1: What are the key themes, patterns, and determinants of informal manufacturing identified in global literature?

RQ2: What specific knowledge gaps exist regarding Assam's informal manufacturing sector?

RQ3: What research priorities and methodological approaches are needed to address these gaps?

1.5 Theoretical Framework for Regional Variations

Building on the research objectives, this study develops a theoretical framework that recognizes informal manufacturing as a complex adaptive system shaped by regional contexts. The framework suggests that informal manufacturing dynamics develop from the interaction of four key dimensions:

1. Institutional Environment: Formal and informal institutions that shape business operations and market access

2. Socioeconomic Context: Local economic conditions, social capital, and demographic characteristics

3. Geographical Factors: Location, infrastructure, and spatial relationships that influence manufacturing activities

4. Cultural and Historical Legacies: Traditional practices, knowledge systems, and historical experiences that shape manufacturing patterns

This framework suggests that understanding informal manufacturing requires moving beyond universal models to recognize how these dimensions interact differently across regions, creating distinct manufacturing ecosystems that require context-specific analysis and support mechanisms.

2. Research Methodology

2.1 Systematic Literature Review Approach

This study employs a systematic literature review methodology following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Sarkis-Onofre et al., 2021). The systematic approach ensures comprehensive coverage of relevant literature while maintaining methodological rigor.

2.2 Search Strategy and Selection Criteria

Database Selection: We used ScienceDirect as the primary database, acknowledging this as a limitation. Future studies should incorporate multiple databases for comprehensive coverage.

Search Terms:

- "Informal Manufacturing" AND "Assam"
- "Informal Manufacturing" AND "India"
- "Informal Manufacturing" AND "Challenges"
- "Informal Economy" AND "Challenges"

Inclusion Criteria:

- Peer-reviewed journal articles published between 2016-2024
- Full-text availability
- Relevance to informal manufacturing or informal economy
- English language publications

Exclusion Criteria:

- Articles published before 2016
- Non-peer-reviewed publications
- Restricted access articles
- Articles without clear relevance to the research objectives

2.3 Study Selection Process

Following PRISMA guidelines, we implemented a four-stage selection process:

Stage 1: Initial search yielded 92,301 references across all search terms

Stage 2: Removal of duplicates reduced the sample to 64,578 unique articles

Stage 3: Application of temporal criteria (2016-2024) resulted in 47,855 articles

Stage 4: Application of access and relevance criteria yielded 46 final articles for analysis

2.4 Data Extraction and Analysis

We developed a standardized data extraction form capturing:

- Study characteristics (author, year, context, methodology)
- Key findings related to informal manufacturing

- Determinants of informal manufacturing growth
- Policy implications and recommendations
- Geographical focus and regional specificities

Analysis involved thematic coding to identify patterns, contradictions, and gaps in the literature.

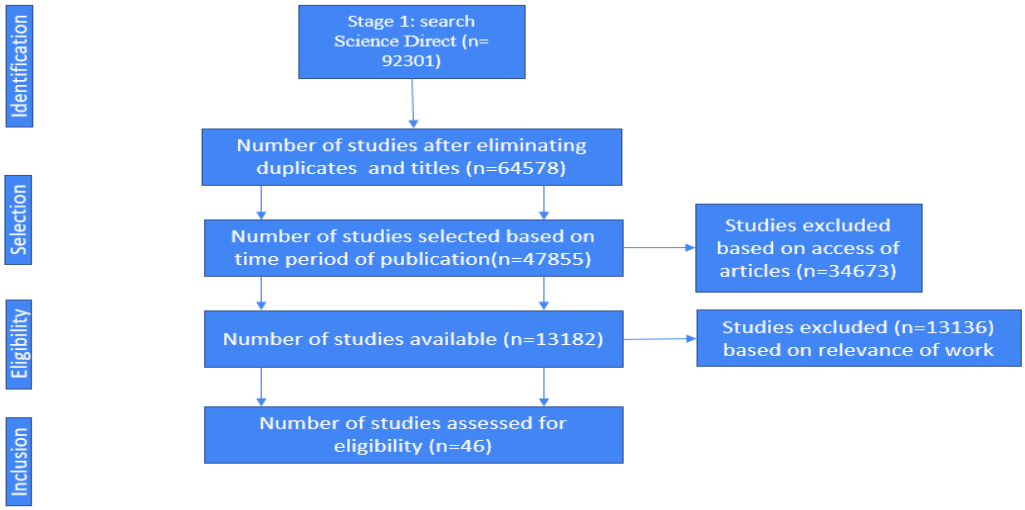

Figure 1: PRISMA Model

3. Results and Discussion

3.1 Conceptual Foundations and Definitional Landscape

The analysis begins with examining how informal manufacturing is conceptualized across different contexts. According to the International Labour Organization, informal manufacturing encompasses "all profitable work, including self-employment and wage labour, that is not acknowledged, controlled or safeguarded by continuing constitutional or regulatory regimes" (Koren, 2022). However, this definition has evolved significantly in recent scholarship.

The ILO defines employment in the informal sector as comprising "all persons who, during a given reference period, were employed in at least one informal sector enterprise, irrespective of their status in employment and whether it was their main or a secondary job" (Bhalla, 2009). The organization uses criteria based on financial and employment limitations, excluding certain enterprises that do not meet these criteria.

In India, definitional complexity is further compounded by multiple institutional perspectives. The National Sample Survey Office (NSSO) distinguishes between 'informal' and 'unorganized' enterprises, categorizing all private enterprises not registered under the Factories Act, 1948, and Bidi and Cigar Workers Act, 1966, as informal sector enterprises (NSSO, 2008). Meanwhile, the National Commission for Enterprises in the Unorganized Sector (NCEUS) uses 'informal' and 'unorganized' synonymously, including unincorporated private enterprises with less than ten workers (NCEUS, 2007).

The First Indian National Commission on Labour (1966-69) defined the informal sector based on organizational constraints, including employment nature, illiteracy levels, and establishment size (Ministry of Labour and Employment, 2014). This definitional evolution reflects the sector's complexity and the challenges in developing universal frameworks for understanding informal manufacturing across different contexts.

3.2 Global Patterns in Informal Manufacturing Research

3.2.1 Literature Characteristics and Geographical Distribution

The systematic review process yielded 46 relevant studies published between 2016-2024, representing diverse geographical contexts, methodological approaches, and theoretical perspectives. The geographical distribution reveals significant clustering: African contexts (35%), Asian contexts (28%), Latin American contexts (19%), and European contexts (18%). This distribution highlights the global nature of informal manufacturing while revealing research concentration in certain regions.

Methodological diversity characterizes the reviewed literature, with quantitative surveys (43%), qualitative case studies (30%), mixed-methods approaches (19%), and theoretical analyses (8%) represented. This diversity reflects both the complex nature of informal manufacturing phenomena and the challenges associated with studying activities that often operate outside formal statistical systems.

3.2.2 Sectoral Composition and Organizational Diversity

The reviewed studies reveal that informal manufacturing encompasses remarkable organizational diversity, ranging from individual artisans working from home to small-scale enterprises employing multiple workers across various market segments. Rothenberg et al. (2016) provide detailed analysis of Indonesia's informal manufacturing sector, revealing significant variations in organizational structure, technological capabilities, and market orientation within individual countries.

This heterogeneity challenges conventional policy approaches that treat informal manufacturing as a homogeneous sector. The analysis suggests that informal manufacturing includes both necessity-driven survival activities and opportunity-driven entrepreneurial ventures, with different segments requiring distinct support mechanisms and policy interventions.

3.3 Determinants of Informal Manufacturing Growth

The transition from descriptive patterns to analytical understanding requires examining the factors that drive informal manufacturing growth. Our analysis reveals five critical determinant categories that shape informal manufacturing dynamics across different contexts.

3.3.1 Institutional Factors: The Regulatory Paradox

The relationship between formal institutions and informal manufacturing reveals a fundamental paradox that challenges conventional policy assumptions. Fredström et al. (2021) provide compelling evidence that improved governance standards may increase informal sector activity in contexts with large existing informal economies, contradicting mainstream assumptions about institutional quality and formalization.

Etim and Daramola (2020) demonstrate that high taxation and administrative barriers serve as significant drivers of informal manufacturing growth in South Africa and Nigeria. But their analysis finds that various forms of regulatory requirements have differential impacts on informality participation choices, and that the impact of institutions on informality is therefore more subtle than the simple regulatory burden perspective would imply.

3.3.2 Economic Considerations and Market Forces

Financial issues are at the core of informal manufacturing expansion but are not explained by the drivers thereof very well. The literature examined all point to financial constraints being significant deterrents to informal manufacturing expansion but demonstrates very little evidence of other financing options that informal manufacturers are likely to employ.

The study reveals that informal production often serves specific market niches that could be ignored by formal producers, like low-income households, geographically isolated markets, and specialized niche goods. An understanding of these market forces is critical to the development of effective support systems that recognize the distinctive economic functions of informal production.

3.3.3 Social Capital and Network Effects

Social capital comes out as a key informal determinant of manufacturing performance, notwithstanding with significant conceptual and measurement methodological inconsistencies.

Akintimehin et al. (2019) provide detailed analysis of social capital effects in Nigeria's informal manufacturing sector, demonstrating that internal social capital significantly impacts performance when firm age and other factors are controlled.

The study distinguishes between internal social capital (intra-firm relations) and external social capital (relations with suppliers, customers, and stakeholders), with each type having impacts upon different dimensions of business performance. Most studies, however, are based on correlational data and do not adequately control for causal mechanisms.

3.3.4 Technological Factors and Digital Transformation

The contribution of technology to informal manufacturing development is both promising and daunting. Erumban (2024) presents an optimistic perspective of the promise of digital transformation in reversing the detrimental effects of informality, arguing that technology utilization can reduce transaction costs and facilitate formal sector linkages.

But this perspective is perhaps overlooking significant structural barriers to technology adoption, including a lack of financial resources, poor digital infrastructure, and skill shortages that hinder the effective use of technology. The review suggests that technology research could be aided by more realistic diagnoses of adoption issues rather than focusing primarily on possible future benefits.

3.3.5 Geographic Determinants and Spatial Dynamics

Geographical determinants are especially important in informal manufacturing development, although systematic bias towards formal sector studies is implied in studies. Chakraborty (2024) and Driver (2024) are important sources of data regarding manufacturing investment trends and performance but concentrate largely on formal manufacturing operations.

The analysis suggests that informal manufacturing may follow different spatial logics than formal manufacturing, prioritizing factors such as proximity to informal markets, access to flexible labour, and low-cost operating locations over traditional infrastructure requirements. This insight has important implications for understanding regional variations in informal manufacturing development.

3.4 Growth Trajectories and Development Pathways

Understanding how informal manufacturing evolves over time requires examining growth trajectories and development pathways. This analysis reveals sophisticated mechanisms that operate differently from formal manufacturing development models.

3.4.1 Learning and Innovation Mechanisms

The literature reveals sophisticated learning and innovation mechanisms within informal manufacturing, though these remain understudied. Avenyo (2023) provides valuable insights into learning pathways in Ghana's informal

manufacturing sector, demonstrating that apprenticeship systems improve technological capabilities while formal interactions provide market intelligence and business development support.

Innovation capabilities in informal manufacturing contexts remain particularly understudied, with limited analysis of how informal manufacturers develop and implement innovations in resource-constrained environments where formal research and development activities may be limited.

3.4.2 Structural Transformation and Productivity Dynamics

The relationship between informal manufacturing and broader structural transformation processes presents complex dynamics. Djidonou and Foster-McGregor (2022) examine the informal sector's contribution to India's manufacturing growth, finding that informal economy expansion has contributed to sluggish productivity improvement in the manufacturing sector overall.

However, this aggregate analysis may overlook important firm-level variations in productivity and growth performance within the informal manufacturing sector, potentially missing high-performing informal manufacturers and the conditions that enable their success.

3.4.3 Entrepreneurship and Digital Innovation

Entrepreneurship literature reveals important insights into informal manufacturing entry dynamics. Estrin et al. (2024) provide nuanced analysis of entrepreneurship entry decisions, examining the intersection of necessity-opportunity and informal-formal dimensions, suggesting that informal entry often serves as experimentation for business opportunities.

Digital innovation presents significant opportunities for informal manufacturing development. Gaglio et al. (2022) examine digital technology adoption in African micro and small enterprises, finding that social media and internet usage positively impact innovation and productivity outcomes, though studies often focus on communication technologies without addressing the full range of digital opportunities.

3.5 Regional Variations and Context Specificity

The reviewed literature demonstrates significant regional variations in informal manufacturing patterns, supporting the theoretical framework's emphasis on context specificity. These variations manifest across several dimensions:

African Contexts emphasize the importance of social networks, apprenticeship systems, and resource constraints in shaping informal manufacturing development. Studies from Ghana, Nigeria, and South Africa reveal common patterns including reliance on traditional learning mechanisms, importance of social capital, and challenges related to technology access and market development.

Asian Contexts, represented by studies from India, Indonesia, and Bangladesh, highlight different dynamics including institutional factors, digitalization opportunities, and gender-specific challenges. These studies reveal how different regulatory environments, cultural contexts, and economic structures create distinct informal manufacturing characteristics.

Latin American Contexts focus on policy interventions, social protection mechanisms, and macroeconomic factors, providing insights into how different policy approaches affect informal manufacturing development and worker welfare.

Gender Dynamics reveal complex patterns of participation, constraint, and opportunity that vary significantly across circumstances. Sifullah et al. (2023) provide detailed analysis of vulnerabilities faced by female migrants in Dhaka's informal economy, identifying harassment, financial difficulties, social stigma, and safety concerns as major challenges affecting women's informal manufacturing participation.

4. The Assam Knowledge Gap: Critical Assessment and Implications

4.1 Systematic Absence of Regional Research

The systematic review reveals a striking absence of research specifically focused on Assam's informal manufacturing sector. Despite extensive searching using multiple search strategies, only one study (Das & Guha, 2022) acknowledges the northeastern Indian context, focusing on trade relationships rather than manufacturing dynamics.

This research absence is particularly concerning given Assam's significant population, economic importance in northeastern India, and unique geographical, cultural, and institutional characteristics that likely create distinct informal manufacturing dynamics. The state's strategic border location, ethnic diversity, resource endowments, and institutional complexity suggest that informal manufacturing patterns may differ significantly from those observed in other Indian states.

4.2 Theoretical Implications of the Knowledge Gap

The absence of Assam-specific research has important theoretical implications for understanding regional variations in informal manufacturing. The theoretical framework developed in this study suggests that informal manufacturing dynamics should vary significantly across regions due to differences in institutional structures, cultural practices, resource endowments, and historical legacies.

Assam's unique characteristics including its position as a border state, ethnic diversity, resource abundance, infrastructure challenges, and institutional complexity suggest that the state's informal manufacturing sector may exhibit patterns not captured in existing research from other regions. Understanding these patterns is crucial for developing comprehensive theories of informal manufacturing development.

4.3 Policy and Practical Implications

The absence of Assam-specific research creates significant challenges for policy development and practical support for informal manufacturing. Policymakers must rely on findings from other regions that may not apply to Assam's unique context, potentially leading to ineffective or inappropriate interventions.

The knowledge gap also affects other stakeholders including entrepreneurs, support organizations, and financial institutions that lack context-specific information for decision-making. This information deficit may limit the development of appropriate business models, support services, and financing mechanisms for informal manufacturing enterprises.

5. Synthesis: Critical Gaps and Future Directions

5.1 Methodological Limitations and Theoretical Development Needs

The systematic review reveals five critical methodological limitations that constrain current understanding of informal manufacturing dynamics:

Definitional Inconsistencies: Studies employ varying definitions of informal manufacturing, making comparative analysis difficult and limiting theory development. Later research would then concentrate on creating standardized definitions that capture the essence of informal manufacturing, thus making comparative studies possible.

Bias in the Formal Sector: Most studies employ formal manufacturing analytical models without properly considering the unique characteristics of informal manufacturing. This bias can lead to informal manufacturing process misinterpretation and policy misdirection.

Limitations of Static Analysis: Current studies mainly rely on cross-sectional analysis, ignoring longitudinal studies that may shed light on the history of informal manufacturing over time. The understanding of dynamic processes is needed for the development of effective support measures.

Context Specificity Gaps: Inadequate consideration of the way various contexts influences informal manufacturing dynamics limits the formulation of context-specific policies and support measures.

Shortfalls in Causal Mechanisms: Failure to give priority to understanding the different factors influencing informal manufacturing slows the development of effective interventions.

5.2 Policy Research Priorities

The systematic review identifies important policy research priorities for supporting informal manufacturing development:

Context-Specific Policy Design: Research examining how different policy approaches affect informal manufacturing in various regional contexts.

Support Mechanism Evaluation: Systematic assessment of various support methods, including financial services, technology support, and skill development programs.

Institutional Design Research: Examination of how formal institutions can be structured to better support informal manufacturing development without harming the sector's advantages.

Integration Strategy Analysis: Research on how informal manufacturing can be more effectively connected to formal economic systems while preserving sector strengths.

6.Proposed Research Agenda for Assam's Informal Manufacturing Sector

Based on our analysis, we suggest the following key research areas organized around our theoretical framework:

6.1 Foundational Mapping Studies

Sectoral Mapping: Surveys to identify the size, scope, and characteristics of Assam's informal manufacturing sector.

Regional Variations: Studies that look at how informal manufacturing differs across various districts and regions within Assam.

Value Chain Analysis**:** Examination of informal manufacturing value chains and their connection to formal sectors.

6.2 Institutional Analysis

Regulatory Environment: Analysis of how formal and informal institutions shape informal manufacturing in Assam.

Policy Impact Assessment: Evaluation of how various government policies affect informal manufacturers.

Governance Structures: Investigation of how traditional and modern governance systems interact to influence manufacturing activities.

6.3 Socioeconomic Studies

Livelihood Analysis: Studies examining how informal manufacturing contributes to household livelihoods and poverty reduction.

Gender Dynamics: Investigation of women's participation in informal manufacturing and associated challenges and opportunities.

Social Capital: Analysis of how social networks and trust mechanisms support informal manufacturing activities.

6.4 Innovation and Technology Studies

Innovation Capabilities: Research on innovation practices and capabilities within Assam's informal manufacturing sector.

Technology Adoption: Studies examining barriers and opportunities for technology adoption in informal manufacturing.

Digital Transformation: Investigation of how digitalization affects informal manufacturing in Assam.

6.5 Comparative Studies

Cross-Regional Comparisons: Comparative studies with other northeastern states and regions with similar characteristics.

Cross-Border Analysis: Investigation of how proximity to international borders affects informal manufacturing.

Historical Analysis: Longitudinal studies examining the evolution of informal manufacturing in Assam.

6.6 Methodological Recommendations

Given the complexity of informal manufacturing, we recommend mixed-methods approaches combining:

Quantitative Surveys: Large-scale surveys to establish baseline data on sector size, characteristics, and performance.

Qualitative Studies: In-depth interviews, focus groups, and ethnographic studies to understand contextual factors and processes.

Participatory Methods: Community-based participatory research approaches to ensure local knowledge and perspectives are incorporated.

Longitudinal Studies: Long-term studies to understand how informal manufacturing evolves over time, the impact of policy interventions, and responses to economic shocks and opportunities.

Network Analysis: Social network analysis to understand how informal manufacturers connect with suppliers and customers, the role of social capital in business success, and information and knowledge transfer mechanisms.

7. Limitations and Future Directions

7.1 Study Limitations

The study's reliance on a single database (ScienceDirect) may have limited comprehensive coverage of relevant literature. The focus on English-language publications may have excluded relevant research in other languages. The 2016-2024 timeframe may have excluded important historical perspectives on informal manufacturing. The literature reviewed primarily focuses on certain regions, potentially limiting the generalizability of findings.

7.2 Future Research Directions

Beyond the specific agenda for Assam, this study suggests several broader research directions:

Comparative Regional Studies: Systematic comparisons of informal manufacturing across different regional contexts.

Theoretical Development: Further development of theoretical frameworks for understanding regional variations in informal manufacturing.

Methodological Innovation: Development of new research methods appropriate for studying informal manufacturing in diverse contexts.

Policy Research: Investigation of how different policy approaches affect informal manufacturing in various regional contexts.

8. Conclusion

This systematic literature review has revealed a significant contradiction in informal manufacturing research. While the sector is recognized as globally important and locally significant, critical regional variations remain unexplored. The case of Assam illustrates how research inequality can perpetuate knowledge gaps that hinder effective policy development and support for economically vital sectors.

Our analysis contributes to the literature by synthesizing global patterns in informal manufacturing research, developing a theoretical framework for understanding regional variations, and proposing a comprehensive research agenda for addressing critical knowledge gaps. The findings demonstrate that informal manufacturing is a complex phenomenon shaped by multiple interacting factors, with significant regional variations that require context-specific investigation.

The absence of research on Assam's informal manufacturing sector represents more than an academic oversight it constitutes a practical barrier to supporting enterprises that provide livelihoods for thousands of families and contribute significantly to the state's economy. The proposed research agenda offers a roadmap for addressing this gap through systematic investigation of foundational questions, institutional dynamics, socioeconomic impacts, and innovation capabilities.

This study's implications extend beyond Assam to other understudied regions where informal manufacturing plays important economic roles. The methodological approach and theoretical framework developed here can be adapted to investigate informal manufacturing in other contexts, contributing to a more comprehensive understanding of this vital economic sector.

The path forward requires coordinated efforts from researchers, policymakers, and support organizations to prioritize understudied regions and develop context-specific knowledge. Only through such efforts can we hope to develop effective policies and support mechanisms that harness the potential of informal manufacturing for sustainable and inclusive development.

Future research should build on this foundation by conducting the empirical studies outlined in our research agenda, testing and refining the theoretical framework, and developing policy recommendations based on solid evidence. The goal is not merely to understand Assam's informal manufacturing sector but to support its development in ways that enhance livelihoods, promote innovation, and contribute to the state's broader economic development.

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coverage in future studies.

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