Cluster-Based Industrialization and Employment Generation in Bawal, Haryana: Closed Economies, Growth Patterns, and Globalization

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ABSTRACT

Cluster-based industrialization has emerged as a significant driver of regional economic development and employment generation in developing economies, particularly in post-liberalization India. This study examines the dynamics of industrial clustering in Bawal, Haryana—an emerging manufacturing hub within the National Capital Region (NCR)—with a focus on employment generation, growth patterns, and the interplay between localized "closed economy" characteristics and global integration. Drawing upon theories of agglomeration economies and industrial clusters, the paper analyzes how spatial concentration of industries enhances productivity, facilitates labor market pooling, and promotes supply chain linkages. The study adopts a qualitative and secondary data-based approach, utilizing government reports, industrial statistics, and existing academic literature. Findings suggest that while cluster-based industrialization in Bawal has significantly contributed to employment creation—particularly in manufacturing and ancillary sectors—the nature of employment remains largely informal and skill-biased.

Furthermore, the region exhibits features of a semi-closed local economy, characterized by strong intra-cluster linkages, alongside increasing integration into global value chains driven by multinational firms and export-oriented production. The paper concludes that although industrial clusters like Bawal foster economic growth and employment, their benefits are unevenly distributed, necessitating policy interventions for inclusive and sustainable development. The study contributes to the growing discourse on regional industrialization by linking local cluster dynamics with globalization processes.

KEY WORDS : Industrial Clusters, Cluster-Based Industrialization, Employment Generation, Agglomeration Economies, New Economic Geography, Globalization, Global Value Chains (GVCs), Regional Development, Bawal Industrial Model Township, Haryana Industrial Growth, Manufacturing Clusters India, Delhi NCR Industrial Region, Informal Employment, Industrial Corridors (DMIC), Local vs Global Economies

INTRODUCTION

Industrial clustering has long been recognized as a central mechanism of economic development, particularly in the context of regional industrialization. Rooted in Alfred Marshall's concept of "industrial districts" and further advanced by Michael Porter's cluster theory, the spatial concentration of firms within a specific geographic area is believed to generate significant economic advantages, including productivity gains, innovation, and employment generation (*Porter, 2000*). In developing economies such

as India, industrial clusters have played a pivotal role in shaping regional growth trajectories, especially following the economic liberalization reforms of 1991.

The state of Haryana, owing to its strategic proximity to the National Capital Territory (NCT) of Delhi, has emerged as a major industrial hub within India. Regions such as Gurugram, Manesar, and Bawal have witnessed rapid industrial expansion, driven by policy initiatives, infrastructure development, and integration into global production networks. Among these, Bawal Industrial Model Township (IMT) represents a significant case of planned industrial clustering, attracting both domestic and multinational enterprises, particularly in the automobile and engineering sectors.

Despite the growing importance of such industrial clusters, there exists limited scholarly attention on micro-level analyses of emerging industrial towns like Bawal. Furthermore, while globalization has facilitated the integration of these clusters into global value chains, it has also raised critical questions regarding the nature and quality of employment generated, as well as the extent to which these clusters function as “closed” local economies with limited external spillovers.

This study seeks to address these gaps by examining the patterns of cluster-based industrialization in Bawal, Haryana, with a specific focus on employment generation, growth dynamics, and the role of globalization. The research is guided by the following questions: (i) How has industrial clustering influenced employment generation in

Bawal? (ii) To what extent does Bawal exhibit characteristics of a closed or self-contained local economy? and (iii) How has globalization shaped its industrial growth trajectory?

2. LITERATURE REVIEW

2.1 Conceptual Foundations of Industrial Clusters

The concept of industrial clusters originates from Alfred Marshall's theory of "industrial districts," which emphasizes the benefits of spatial concentration of firms within a particular locality. Marshall argued that firms located in close proximity benefit from external economies of scale**,** including knowledge spillovers, specialized labor markets, and the development of supplier networks (*McCann & Van Oort, 2019*). These localized advantages reduce transaction costs and enhance productivity, forming the basis of agglomeration economies.

Building on this foundation, Michael Porter (2000) redefined clusters as geographically proximate groups of interconnected firms and institutions linked through complementarities and competition. Porter emphasized that clusters enhance firm competitiveness, innovation, and productivity, particularly in a globalized economic environment. Unlike Marshall's relatively passive view, Porter's framework integrates competition, innovation, and institutional support as key drivers of cluster success.

Subsequent studies have expanded the theoretical understanding of clusters by incorporating perspectives from new economic geography and regional development

theories, highlighting the role of transportation costs, market access, and increasing returns in shaping industrial location patterns (*Bekele & Jackson, 2006*). These theories collectively suggest that clustering is not accidental but driven by economic rationality and spatial dynamics.

2.2 Agglomeration Economies and Employment Generation

A significant body of literature links industrial clustering with employment generation. Agglomeration economies facilitate the creation of jobs through multiple channels, including firm expansion, entry of new enterprises, and backward-forward linkages within supply chains**.** The concentration of firms reduces hiring costs and creates a pooled labor market, thereby increasing employment opportunities (*McCann, 2008*).

Empirical studies indicate that clusters tend to generate both direct employment (within firms) and indirect employment (through ancillary industries and services). However, the quality of employment remains a subject of debate. While some studies highlight the role of clusters in promoting skilled employment and innovation, others argue that employment in clusters, particularly in developing countries, is often characterized by informality, low wages, and limited job security (*Roy, 2013*).

Furthermore, the employment effects of clustering are not uniformly distributed. Larger firms and multinational enterprises within clusters often capture greater economic benefits, while small and medium enterprises (SMEs) face constraints related to technology, finance, and market

access. This leads to dualistic labor markets within clusters, where high-skilled and low-skilled employment coexist with significant disparities.

2.3 Industrial Clusters in the Indian Context

In India, industrial clusters have played a crucial role in regional economic development, particularly after the economic reforms of 1991. The liberalization policies encouraged private investment, foreign direct investment (FDI), and export-oriented industrialization, leading to the emergence of several industrial clusters across the country (*Das, 2017*). Prominent examples include the automobile cluster in Chennai, the IT cluster in Bengaluru, and the manufacturing clusters in the National Capital Region (NCR).

The NCR region, including parts of Haryana such as Gurugram, Manesar, and Bawal, has experienced rapid industrial growth due to its proximity to Delhi, availability of infrastructure, and policy support. Studies suggest that industrial clustering in these regions has been significantly influenced by Special Economic Zones (SEZs), industrial corridors, and integrated manufacturing townships**,** which promote agglomeration economies and attract both domestic and global firms (*Aggarwal, 2011*).

However, the Indian experience also reveals certain structural challenges. Cluster development has often been uneven and spatially concentrated, leading to regional disparities. Additionally, many clusters function as enclave economies, with limited linkages to the surrounding rural areas, thereby restricting inclusive development.

2.4 Globalization and Cluster Dynamics

Globalization has fundamentally transformed the nature and functioning of industrial clusters. With the integration of national economies into global markets, clusters are increasingly embedded within global value chains (GVCs)**,** where production processes are fragmented across different regions and countries (*Parthasarathy, 2001*). This has enabled clusters to access international markets, advanced technologies, and foreign investment. Porter (2000) argues that clusters enhance competitiveness in a global economy by fostering innovation and specialization. However, other scholars highlight that globalization can also expose clusters to external shocks, competitive pressures, and volatility in global demand**.** The sustainability of clusters, therefore, depends on their ability to adapt to changing global conditions (*Buciuni & Pisano, 2015*).

In the Indian context, globalization has contributed to the growth of export-oriented clusters, particularly in manufacturing sectors. At the same time, it has intensified concerns regarding labor conditions, environmental sustainability, and unequal distribution of benefits. The interaction between local cluster dynamics and global economic forces creates a hybrid system, where clusters are locally embedded yet globally connected.

2.5 Research Gap

Despite extensive literature on industrial clusters and regional development, there is a noticeable lack of micro-level empirical studies focusing on emerging industrial

townships such as Bawal in Haryana**.** Most existing studies concentrate on larger and more established clusters like Gurugram or Bengaluru, leaving smaller but rapidly growing industrial regions underexplored. Additionally, limited attention has been given to the concept of “closed economies” within clusters**,** where local production networks operate with strong internal linkages but limited external spillovers. The interaction between such localized economic structures and globalization remains insufficiently understood. This study aims to bridge these gaps by providing a focused analysis of cluster-based industrialization in Bawal, examining its employment dynamics, growth patterns, and the balance between local embeddedness and global integration.

3. THEORETICAL FRAMEWORK & CONCEPTUAL MODEL

3.1 Theoretical Framework

This study is grounded in multiple theoretical perspectives that explain the emergence and functioning of industrial clusters in regional economies. The framework integrates Agglomeration Economies Theory, New Economic Geography (NEG), Global Value Chain (GVC) Theory, and the concept of Closed vs Open Local Economies to analyze cluster-based industrialization in Bawal, Haryana.

(A) Agglomeration Economies Theory

Agglomeration economies refer to the benefits firms obtain by locating near each other. These include:

- Labor market pooling
- Specialized suppliers
- Knowledge spillovers
- Reduced transaction costs

In Bawal, industrial concentration within IMT (Industrial Model Township) enhances firm productivity and competitiveness, ultimately contributing to employment generation (*McCann, 2008*).

(B) New Economic Geography (NEG)

Developed by Krugman (1991), NEG explains how:

- Increasing returns to scale
- Transport cost reduction
- Market accessibility

lead to spatial concentration of industries.

 Bawal's advantage:

- Near Delhi NCR
- Connected to DMIC corridor
- Strong logistics network

This attracts both firms and labor → reinforcing cluster growth.

(C) Global Value Chain (GVC) Theory

GVC theory explains how production is globally fragmented across regions.

In Bawal:

- Auto & engineering firms linked to global supply chains
- MNCs bring technology & capital
- Export-oriented production

 Result:
- Growth + employment
- But dependency on global markets

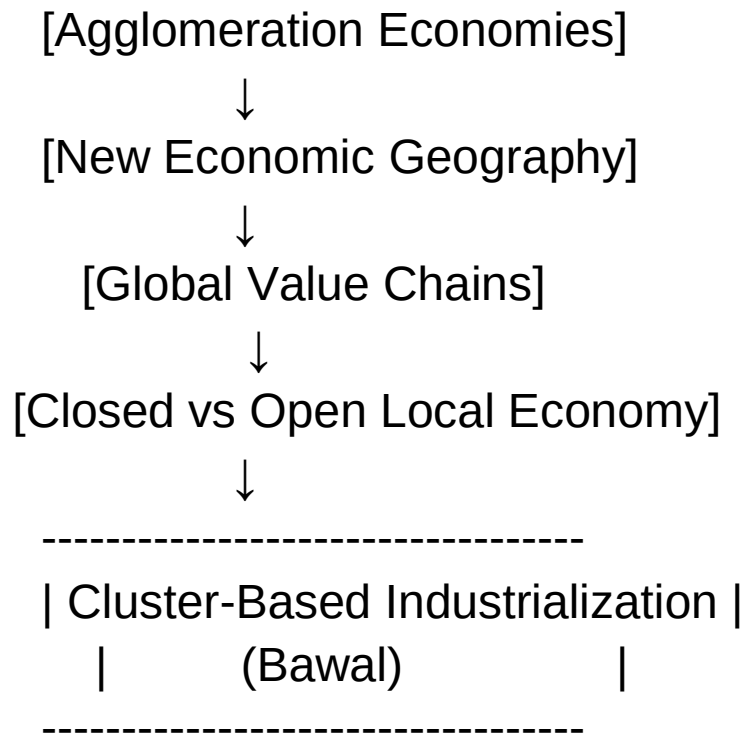
(D) Closed vs Open Local Economies

Clusters often behave as:

- Closed (local) → strong internal linkages
- Open (global) → connected to international markets

 Bawal = Hybrid Model

- Strong internal supplier networks (closed)
- Export + MNC integration (open)



↓

[Employment Generation]

↓

- Direct Jobs
- Indirect Jobs
- Skill Development

3.3 Explanation of the Model

- The model integrates four theoretical pillars:
  - Agglomeration
  - Geography (NEG)
  - Globalization (GVC)
  - Local economic structure
- These factors jointly influence:
  - Industrial concentration
  - Firm competitiveness
  - Infrastructure development
- The final outcome is:
  Employment Generation (Direct + Indirect)
- Feedback loop:
  - More jobs → more migration → more firms → stronger cluster

3.4 Relevance to Your Study

This framework helps:

- Explain why Bawal developed as a cluster
- Analyze how employment is generated
- Understand local vs global dynamics

4. STUDY AREA AND METHODOLOGY

4.1 Study Area: Bawal, Haryana

Bawal, located in the Rewari district of Haryana, has emerged as a significant industrial hub within the National Capital Region (NCR) of India. Strategically positioned along National Highway-48 (Delhi–Jaipur corridor), Bawal benefits from excellent connectivity to major economic centers such as Delhi, Gurugram, and Manesar. Its proximity to the Delhi-Mumbai Industrial Corridor (DMIC) further enhances its importance as a site for industrial development and investment. The establishment of the Industrial Model Township (IMT) Bawal by the Haryana State Industrial and Infrastructure Development Corporation (HSIIDC) has been a key driver of industrialization in the region. IMT Bawal hosts a large number of domestic and multinational firms, particularly in sectors such as:

- Automobile and auto components
- Engineering goods
- Electronics and electrical equipment
- Textiles and light manufacturing

The presence of multinational corporations and export-oriented units has integrated Bawal into global production networks**,** making it an important node in regional and international supply chains.

Despite its rapid industrial growth, Bawal exhibits characteristics typical of emerging industrial clusters, including:

- Concentration of manufacturing units
- Development of ancillary industries
- Influx of migrant labor
- Expansion of urban-industrial infrastructure

However, concerns remain regarding the uneven distribution of economic benefits, limited rural linkages, and the quality of employment generated. These features make Bawal an appropriate case for analyzing cluster-based industrialization and its implications for employment and regional development.

4.2 Research Design

This study adopts a descriptive and analytical research design, focusing on understanding the relationship between industrial clustering and employment generation in Bawal. The research is primarily based on a case study approach, which allows for an in-depth examination of localized industrial dynamics within a broader theoretical framework.

4.3 Data Sources

The study relies on secondary data, collected from multiple credible sources, including:

- Annual Survey of Industries (ASI)
- National Sample Survey Office (NSSO) reports
- Government of Haryana industrial reports
- HSIIDC publications
- Census of India data
- Academic journals and policy papers

These sources provide insights into industrial growth, employment patterns, and regional development indicators.

4.4 Analytical Methods

To analyze the data, the study employs the following methods:

(A) Trend Analysis

Used to examine:

- Growth of industries in Bawal
- Changes in employment over time

(B) Descriptive Analysis

Focuses on:

- Industrial composition
- Sectoral distribution
- Labor characteristics

(C) Cluster Analysis Approach (Conceptual)

Identifies:

- Degree of industrial concentration
- Linkages between firms
- Presence of ancillary industries

(D) Employment Analysis

Examines:

- Direct vs indirect employment
- Skilled vs unskilled labor
- Formal vs informal employment

4.5 Scope and Limitations

Scope

- Focuses specifically on **Bawal industrial cluster**
- Examines **employment generation and growth patterns**
- Integrates **local and global perspectives**

Limitations

- Based primarily on secondary data
- Limited availability of micro-level firm data
- Does not include primary field surveys (if you want, we can add it later)

4.6 Significance of the Methodology

The chosen methodology enables:

- A structured analysis of cluster-based industrialization
- Linking theory with real-world regional dynamics
- Understanding both quantitative trends and qualitative patterns

5: ANALYSIS & DISCUSSION

5.1 Growth Patterns of Industrialization in Bawal

Bawal has witnessed rapid industrial growth, particularly after the early 2000s, driven by policy initiatives, infrastructure development, and its strategic location within the National Capital Region (NCR). The establishment of

the Industrial Model Township (IMT) played a crucial role in attracting both domestic and foreign investment. The region's integration into the Delhi-Mumbai Industrial Corridor (DMIC) has further accelerated industrial expansion by improving connectivity, logistics, and access to markets. As a result, Bawal has transformed from a relatively underdeveloped area into a significant manufacturing hub. This growth pattern reflects the principles of New Economic Geography, where industries concentrate in regions with better market access and infrastructure. The clustering of industries in Bawal has created a cumulative growth process, where initial investments attract further firms, reinforcing the cluster (*Krugman-type cumulative causation*).

5.2 Nature and Characteristics of the Industrial Cluster

The industrial cluster in Bawal is characterized by:

- **Sectoral specialization**: Dominance of automobile and engineering industries
- **Presence of MNCs**: Integration with global production networks
- **Strong supplier linkages**: Development of ancillary units
- **Industrial concentration**: High density of manufacturing firms

These features align with Porter's cluster model, where firms benefit from proximity to competitors, suppliers, and institutions. The existence of backward and forward linkages strengthens the cluster by creating interdependencies among firms. However, the cluster is not

entirely diversified. The dominance of specific sectors (e.g., auto components) makes it vulnerable to sector-specific shocks, particularly those arising from global demand fluctuations.

5.3 Employment Generation and Labor Dynamics

One of the most significant outcomes of cluster-based industrialization in Bawal is employment generation. The cluster has created:

(A) Direct Employment

- Jobs within manufacturing units
- Skilled and semi-skilled labor demand
- Employment in MNCs and large firms

(B) Indirect Employment

- Ancillary industries
- Transport and logistics
- Service sector (shops, housing, food services)

The presence of a large number of firms has led to labor market pooling, reducing hiring costs and increasing employment opportunities. Migrant labor plays a significant role, indicating the cluster's ability to attract workforce from other regions.

However, the nature of employment raises concerns:

- High proportion of contractual and informal jobs
- Limited job security
- Wage disparities between skilled and unskilled workers

This reflects findings from broader literature that clusters in developing economies often generate quantity over quality employment**.**

5.4 Closed Economy Dynamics within the Cluster

An important aspect of Bawal's industrial structure is the presence of semi-closed local economic characteristics**.** This includes:

- Strong intra-cluster supplier networks
- Dependence on local subcontracting
- Internal circulation of goods and services

Such characteristics create a localized economic system, where firms rely heavily on each other rather than external regions. This enhances efficiency and reduces costs.

However, this "closed" nature also has limitations:

- Weak linkages with surrounding rural areas
- Limited spillover effects
- Concentration of benefits within the industrial enclave

Thus, while the cluster is economically vibrant internally, its contribution to broader regional development may be restricted.

5.5 Impact of Globalization

Globalization has significantly influenced the development of Bawal's industrial cluster. The presence of multinational corporations and export-oriented industries indicates strong integration into global value chains (GVCs).

Positive Impacts:

- Technology transfer
- Increased productivity
- Access to international markets
- Higher investment inflows

Negative/Challenging Aspects:

- Dependence on global demand cycles
- Vulnerability to external shocks
- Pressure on local firms to remain competitive

This duality highlights that Bawal functions as a “glocal” system—simultaneously local (cluster-based) and global (GVC-linked).

5.6 Key Challenges in Cluster Development

Despite its success, the Bawal cluster faces several challenges:

- Environmental stress due to industrial pollution
- Infrastructure pressure (housing, transport)
- Skill gaps in the labor force
- Inequality in income distribution
- Limited inclusive development

These challenges indicate that cluster-based industrialization alone is insufficient without supportive social and policy frameworks.

5.7 Synthesis of Findings (Linking Theory to Reality)

The analysis confirms that:

- **Agglomeration economies** → Driving industrial concentration
- **NEG factors** → Explaining location advantage
- **GVC integration** → Driving growth and competitiveness
- **Closed economy features** → Explaining internal dynamics

 Final Insight:
Bawal represents a hybrid industrial cluster model**:**

- Locally embedded (closed networks)
- Globally connected (exports, MNCs)

This hybrid nature explains both its success and limitations**.**

6: FINDINGS AND CONCLUSION

6.1 Major Findings of the Study

The analysis of cluster-based industrialization in Bawal, Haryana reveals several important insights regarding growth patterns, employment generation, and the role of globalization. First, the study finds that industrial clustering has significantly contributed to regional economic growth. The development of IMT Bawal and its integration with the Delhi-Mumbai Industrial Corridor (DMIC) has accelerated industrial expansion, confirming the relevance of New Economic Geography theory, where location and connectivity play a decisive role in industrial concentration.Second, the cluster has generated substantial employment opportunities. Both direct

employment (within industries) and indirect employment (ancillary and service sectors) have increased. However, the nature of employment is largely informal, contractual, and low-skilled, indicating that while job quantity has improved**,** job quality remains a concern**.** Third, the study highlights that Bawal exhibits characteristics of a semi-closed local economy. Strong intra-cluster linkages, supplier networks, and localized labor markets create a self-sustaining economic system. However, the benefits of industrialization are not evenly distributed, with limited spillovers to surrounding rural areas. Fourth, globalization has played a dual role. On one hand, integration into global value chains (GVCs) has enhanced productivity, technology adoption, and export potential. On the other hand, it has increased dependency on global markets, exposing the cluster to external economic fluctuations. Finally, the study finds that Bawal represents a hybrid industrial model, combining local embeddedness with global integration. This dual structure explains both its rapid growth and its structural limitations.

6.2 Conclusion

This study examined the dynamics of cluster-based industrialization in Bawal, Haryana, with a focus on employment generation, growth patterns, and globalization. The findings confirm that industrial clusters serve as powerful engines of economic development by leveraging agglomeration economies, improving productivity, and creating employment opportunities. However, the benefits of such development are not uniformly distributed. While Bawal has emerged as a successful industrial cluster, it also

reflects key challenges such as informal employment, regional inequality, and limited inclusivity. The coexistence of “closed” local networks and “open” global linkages highlights the complexity of modern industrial clusters in developing economies. The study contributes to the existing literature by providing a micro-level perspective on an emerging industrial cluster and by linking theoretical frameworks with real-world regional dynamics. It underscores the need for a more balanced approach to industrial development that not only promotes growth but also ensures sustainability and inclusiveness**.**

7: POLICY RECOMMENDATIONS

7.1 Skill Development and Employment Quality

- Establish vocational training centers in and around Bawal
- Promote industry-academia collaboration
- Improve working conditions and job security

7.2 Strengthening MSMEs

- Provide financial and technological support
- Encourage innovation and diversification
- Integrate MSMEs into global value chains

7.3 Enhancing Regional Linkages

- Improve rural-urban connectivity
- Promote local entrepreneurship
- Ensure spillover benefits to nearby villages

7.4 Sustainable Industrial Development

- Implement environmental regulations

- Promote green technologies
- Monitor industrial pollution

7.5 Infrastructure Development

- Improve housing, transport, and public services
- Develop smart industrial townships
- Strengthen logistics and supply chain systems

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