Spatio-Temporal Analysis of Industrial Growth in Haryana: Trends and Patterns

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Abstract

The spatio-temporal analysis of industrial growth in Haryana investigates the industrial sector's evolution from 2001–2016. Secondary and tertiary industries dominate the sectoral composition, one determinant of spatial patterns; both categories' urban predominance arguably discourages industrial development in rural areas. Equally significant is the observed growth of industrial towns throughout the state, highlighting a consistent transition from rural to urban industrialization. Haryana is exceptional among Indian states for its capacity to provide sufficient infrastructure and power sources, promise of government incentives and predominantly industrial labour pool. Policy efforts by central and state authorities have, over time, encouraged the shift of industries from other states to Haryana through attractive investment subsidies, carving the states near metropolitan surroundings into fertile ground for firm location.

Keywords

Spatio-temporal analysis, Industrial growth, Haryana, Sectoral Patterns, Infrastructure.

1. Introduction

The objective of this paper is to investigate the spatio-temporal dimensions of industrial growth in Haryana, a north Indian state, before the year 2016. The study aims to bring to light the patterns of industrial development that preceded this recent upsurge, thereby providing an informed framework for subsequent sections.

The state of Haryana, specializing in manufacturing, chemical-based, automobile and IT industries has emerged as an important site of industrial development similar to Gujarat and Maharashtra. Contributing approximately 15% to India's gross domestic product, with 10% of the Indian workforce engaged in industrial activity, growth has accelerated since the turn of the millennium (M Babu & Raj S Natarajan, 2013). Infrastructure, policy incentives and a skilled labour force have all contributed to the expansion; however, issues concerning the environment and land acquisition have constrained the continuation of the trajectory demonstrated until 2016 (Singh, 2006).

Objective of Study

The objective of this study is to examine the spatio-temporal aspects of industrial growth in Haryana, a prominent state in North India, focusing on trends and patterns before 2016. This research systematically investigates sectoral shifts, urban-rural contrasts, and the influence of infrastructural development in shaping the state's industrial landscape. By analyzing documented government sources and relevant economic data, the study aims to provide insights into the evolution and distribution of industrial activities, identifying key factors contributing to Haryana's shift from an agricultural to an industrial economy. Special attention is given to policy initiatives, incentives and the dynamic interaction between human resources and

sectoral investment, which have driven industrial development and supported national economic progress. The research uses both spatial and temporal approaches to explore the complexities of industrial location, regional disparities, and employment creation across primary, secondary, and tertiary sectors. Ultimately, the study seeks to offer recommendations for maintaining industrial growth, addressing challenges such as policy enforcement, infrastructure development and balanced regional progress, thereby assisting planners in maximizing potential and overcoming hurdles in Haryana's ongoing industrialization.

2. Literature Review

Spatio-temporal analysis constitutes a critical dimension of empirical economic geography, and integrated spatial analysis has long been central to quantitative geographical and environmental science. India possesses a sizable industrial sector with diversified activities, concentrated extensively in a few heavily urbanized states, and growing steadily during the post-liberalization era. The relative growth and spatial patterns of industrial activity in Indian states over the past three decades constitute one of the most exhaustive exercises in mapping spatially located economic activity, and the concentration and distribution of industrial activity have traditionally reflected the socio-economic conditions of states (Saikia, 2011). Haryana, with a population of 25.3 million (2011 Census), shares borders with Rajasthan, Himachal Pradesh, Punjab, Uttarakhand, Uttar Pradesh, and the national capital Delhi. Since the early 1960s, the State has witnessed extensive industrial expansion following the establishment of the first industrial estate at Faridabad. Over fifty years, Haryana has emerged as a highly industrialized region and the most rapidly growing economy in the country; its growth has transformed it from a primarily agriculture-based economy to a predominantly industrial and service-based one. This growth has created employment prospects, stimulated purchasing power, enhanced savings and investments, and generated additional demand for goods and services. Various studies have documented Haryana’s industrial development, yet relative industrial growth in Haryana, particularly its spatial and temporal aspects, has largely escaped examination until now.

2.1. Historical Context of Industrial Growth

The history of industrial growth in India, particularly within Haryana, presents a significant narrative that has attracted scholarly attention. The Indian economy experienced an industrial upswing in the early 1980s; however, until the advent of economic reforms in the early 1990s, industrial growth remained stagnant (Singh, 2006). The trajectory of industrial development has consequently fluctuated over the years. The spatio-temporal analysis of industrial growth in Haryana offers insights into the concentration of large and medium industries (M Babu & Raj S Natarajan, 2013).

2.2. Previous Studies on Haryana's Industrial Development

Haryana witnessed rapid industrial development post-1966, contributing nearly 15% to the national gross domestic product (GDP) by 2016. The secondary sector of the state's economy accounted for almost 40% of the GDP. Approximately 17.8% of the workforce depended on this sector for livelihood, compared to 12.4% at the national level. The state's registered medium and large-scale units accounted for about 7% of the total industrial units in the country. In the 4th Quarter of FY 2015-16, resources towards the manufacturing of a wide range of products became effective. Using industrial registration data and trends in motor vehicle registrations up to the 2014-15 fiscal year, a comprehensive assessment of growth and locational patterns was undertaken (Saikia, 2011). Such analysis provides the basis for predicting Haryana's future industrial activities.

A large number of researchers, including A. K. Bagchi, M.P. Jain, Sehgal, and others, contributed invaluable insights during the early stages of research on Haryana's industrial development. These earlier studies highlighted industrial growth and spatial variations up to around 2015, but neither presented a spatio-temporal analysis nor projected the onset of industrial growth in Haryana's districts. A historical overview of industrial growth in India up until 2016 lays the foundation for investigating the patterns and causes of growth in Haryana.

3. Methodology

Data relevant to the primary economic sectors in Haryana were meticulously compiled from various documented government sources (M Babu & Raj S Natarajan, 2013). The study adopts a spatio-temporal methodology to elucidate patterns and trends about industrial development in Haryana (Singh, 2006). The objective is to discern significant growth, attaining maximum levels before 2016.

3.1. Data Collection Techniques

Issues related to the Industrial Growth Scene in Haryana and their Spatio-temporal Analysis are mentioned below.

Section	Focus Area	Details
Methodology	Approach	Spatio-temporal methodology to analyze patterns and trends of industrial development in Haryana before 2016.
	Objective	To identify significant industrial growth and the maximum levels attained before 2016.
Data Collection Techniques	Sources	Documented government sources (M Babu & Raj S Natarajan, 2013; Singh, 2006).
	Scope	Examination of industrial growth relative to nationality and labour composition in primary, secondary, and tertiary sectors.
	Methods	Data collection, classification, segmentation, analysis, and interpretation.
	Outcome	Suggests suitable measures related to industrial growth.
Analytical Framework	Economic Context	Economic progress is linked closely to industrial development.
	GSDP Contribution	Manufacturing contributes 19% to Haryana's Gross State Domestic Product.
	Employment Share	Manufacturing accounts for less than 20% of employment generation in Haryana.
	Industry Distribution	Concentrated mainly in urban areas, rural areas remain underexposed to industrial benefits.
	Example	Gurgaon is transitioning into a post-industrial stage; the surrounding rural areas are lagging.
	Spatio-Temporal Importance	Location of industries inside/outside industrial belts influences regional development.
	Growth Dynamics	Industries act as regional growth engines; different factors at different times steer growth.

The present investigation is an attempt to evaluate the growth of industries in Haryana. The industrial growth is examined with reference to nationality and the composition of the labour force in the primary sector, secondary sector and tertiary sector. The research methods include data collection, classification and division into appropriate categories of the required data and then analysis and interpretation of the data. Consequently, suitable measure relating to industrial growth is suggested. The following procedure has been used to accomplish the theme.

3.2. Analytical Framework

Economic progress cannot be measured in isolation from industrial development. Despite the large labour and human resource potential, the contribution of the manufacturing sector to the Gross State Domestic Product (GSDP) is only 19 per cent. The share of manufacturing in employment generation is also less than 20 per cent in Indian States, including Haryana. The industry in the State is presently concentrated mainly in urban areas. The rural population in industrial belts is yet to be exposed to its benefits. As the city of Gurgaón smoothly graduates towards a post-industrial stage, the surroundings in the form of rural backwaters await a breakthrough in the sphere of economic development.

Spatio-temporal analysis becomes very important in revealing underlying dynamics. The location of industry within and outside the normal distribution belt determines the development of a particular area. Some industries become the engines of growth for the areas undergoing their operation and, thereby, provide impetus to the wheels of overall growth. Different elements in different time periods have worked together to provide direction for growth.

4. Industrial Growth Trends in Haryana

The Secondary sector has a 30% GDP share and employs 28% of the workforce in Haryana. In recent years, the share of manufacturing and other sectors has declined, resulting in slower overall growth (Saikia, 2011). Annual growth trends show a slowdown from 13.7% during 1993-94 to 2004-05. Local industrialists are reluctant to set up large units, leading to many small factories scattered throughout the state. Since 2005-06, some industrial recovery has been observed (Saikia, 2011).

Various labor-intensive industries, including woolen, cotton textiles, hosiery, carpets, handloom products, dairy, sugar, and automobile industries, have opened in major cities. The main manufacturing industries in Haryana include cycles, textiles, industrial and domestic cycling instruments, rubber products, electrical appliances, scientific instruments, sugar, refrigerators, vans, tractor trolleys, TV sets, mikes, and home décor (M Babu & Raj S Natarajan, 2013). The manufacturing sector grew in value-added terms with a 4.12% share of the national total, positioning Haryana among the top states for high-tech and medium technology industries.

In 2008-09, state domestic product growth accelerated to 14.2%, with agriculture, forestry, and hunting at 7.8%, while manufacturing and other sectors slowed, resulting in slower overall growth. A comparison of Haryana with other states places it in the second group with the highest per capita NSDP among Asian states. The state ranks just after Maharashtra, Chandigarh, and Goa (all exceeding Rs 65,000 per capita) and slightly ahead of Kerala and Punjab (approximately Rs 45,000 each).

4.1. Economic Indicators Before 2016

Haryana produces 8.22 per cent of the value of output of all factories in the country . 3.60 per cent of factories, 8.97 per cent of persons engaged in factories, 6.80 per cent of fixed capital investment, 3.31 per cent of working capital investment, 6.81 per cent of the raw materials consumed, 6.72 per cent of the gross output, 6.13 per cent of the net value added. When compared to its geographical area (1.34%) and population (2.13%), the state has attained an enviable place in the industrial map of the country. A large number of units have started carpet weaving in Haryana. It has employed about 3550 workers in about 160 factories. This implies that Haryana is endowed with the third-highest number of such factories, which employ the maximum number of workers in the country. (M Babu and Raj S Natarajan, 2013)

4.2. Sectoral Analysis of Growth

The tertiary sector has grown at an annual rate of 16.38%, against 12.7% growth in the secondary sector and 10.82% in the primary sector. This indicates the growing importance of the service sector, with the government providing training facilities and subsidies for the development of transportation infrastructure (M Babu and Raj S Natarajan, 2013).

Haryana shares a common boundary with the capital territory of Delhi on three sides and forms an important constituent of the National Capital Region. It has emerged as one of the most industrially developed states in North India because of its liberal and proactive policy, its emphasis on development, and its dependence on the manufacturing sector (Singh, 2006). Development of industries is possible only when the local administration, police, banks, finances, and intentions are conducive. Improved communication has decreased loneliness and isolation in bazaars and little market towns, making interdependence possible and increasing market potential.

5. Spatial Distribution of Industries

The industrial sector in Haryana, which constitutes 31% of the state's GDP and is the second-largest employment generator after agriculture, has undergone rapid growth in recent years. The state ranks eighth among Indian states in terms of total investment by large and medium-scale industries, attracting 67% of the total investment in the National Capital Region (NCR) through various industrial estates. Haryana has emerged as the third-most attractive destination for Foreign Direct Investment (FDI) in India, securing third position among Small and Medium Enterprises (SME) of Indian origin and fourth among those from Non-Resident Indians (NRIs). Approximately 75,000 Small Scale Industries (SSI) units have been recorded within the state (Saikia, 2011). Notable industrial establishments include manufacturing plants for Maruti, Hero Honda, and HMT, among others (Saikia, 2011). As a result of the current industrial scenario, Haryana ranks eleventh nationally in terms of per capita income.

Location of Major Industrial Zones

During the last decade, industrial development in Haryana has significantly increased both geographically and sectorally. Major industrial hubs include Ambala, Bhiwani, Sonipat, Jind, Hissar, and Karnal. Additionally, Gurugram, Faridabad, Panchkula, Sonepat, and Rohtak are developing into India's primary industrial centers. Haryana is highly industrialized and commercialized relative to other states of India; heavy industries are concentrated in areas such as Yamunanagar, Bhiwani, and Hissar.

Industrial Distribution Pattern

A distinction exists between rural and urban industrial concentration, with the focus often directed toward urban zones. Most industrial establishments are situated in rural areas, particularly within Haryana; however, micro and small-scale enterprises predominantly occur in urban towns rather than rural satellite areas. Such patterns indicate a complex spatial structure regarding the locational preference of industries across the state.

5.1. Geographical Mapping of Industrial Zones

The geographical distribution of industries in Haryana is uneven. It clearly shows the concentration of industries along the western corridor, particularly in the districts of Gurugram, Faridabad, and Sonepat. In contrast, the eastern districts are more sparsely industrialized. The largest industrial installation in Haryana is situated near Gurugram (Hathin). Compared to urban areas, industrial operations in the state's rural regions are less developed and have a declining trend, while urban industrialisation is on an upward trajectory.

5.2. Urban vs Rural Industrialization

Industrial growth at the urban scale has made rapid strides, but national economic policies have prolonged the perennial neglect of rural industrialization, resulting in excessively unbalanced development. However, the rapid growth of industries has occurred even in the rural areas of a few states. The structural changes in sectoral employment within rural areas show a growing diversification in the employment repertoire of rural labour, with a general secular decline in the contribution of agriculture to total work participation; an increase in the share of manufacturing, construction and trade, processes already underway since the 1970s; a significant growth in most public services; and a remarkable jump in educational services in particular. A detailed breakdown of employment in manufacturing reveals a rapidly growing share of small-scale and household manufacturing, particularly through the 1980s, that made the manufacturing sectors of certain states a significant source of near-rural industrialization on a country-wide basis. Among the major states, the central and western regions are witnessing a dramatic reversal in the rural share of the manufacturing workforce; the rapid acceleration in rural manufacturing employment within these states since the 1980s is in sharp contrast to a declining rural share in such traditional industrial centres as Tamil Nadu, Maharashtra, and West Bengal. Non-agriculture, both manufacturing and non-manufacturing, shows a generally rural bias, with lower shares of employment in large and medium-sized urban areas. That urban bias has been present since the 1970s has weakened considerably, and may even have reversed itself in the case of small towns (Eapen, 1999).

6. Temporal Analysis of Industrial Growth

Temporal analysis reveals growth trajectories during the period preceding 2016. Consequently, this section presents an overview of the patterns exhibited over these years. Adjustment in governmental policies also influenced the pace of growth.

Temporal analysis of industrial development before 2016 indicates that growth picked up after 2000–01, even though expansion slowed during the 1990s (M Babu and Raj S Natarajan, 2013). Employment exhibited a fluctuating pattern, with higher growth through the 1980s, decline during the 1990s, and revival

following 2000–01. Fixed capital formation showed a declining trend in the third period relative to the first, except in states such as Andhra Pradesh and Orissa, where a turnaround occurred. The industrial deceleration in Punjab during this interval has been attributed to a low investment-to-GSDP ratio, inadequate plan expenditure, and deficiencies in human capital and infrastructural facilities (Singh, 2006). The pertinent role of policy initiatives for modulating Haryana's industrial growth will be analysed in this paper.

6.1. Growth Patterns Over the Years

An analysis of the economy of Haryana reveals a significant impact on the industrial sector on the state economy. The contribution of manufacturing, construction, and electricity–gas–water supply to the Gross Domestic Product (GDP) at constant prices clearly depicts the importance of these sectors in the State economy. The State continues to remain among the industrially developed ones, accounting for about 3.5% of the total industrial output in the country (M Babu and Raj S Natarajan, 2013). Since the reform era, Haryana has emerged not only as an important industrial State but also established its leadership in the agricultural sectors. It is important to note that the share of the industrial sector in Haryana has gone up to 37% of GSP during 2004–2005 compared with a 21% share of the sector during 1980–1981 (Misra, 2009). Haryana accounts for 5% of the value of production units registered under the Industries Development and Regulation Act 1951 (IDRA) and retains the 6th rank in terms of large and medium industries. Though a large number of industries are located in urban areas, the industrial development in rural areas is also growing and is worth mentioning.

6.2. Impact of Policy Changes Pre-2016

Many policy initiatives have a generally positive effect on industrial development, but most industrial policy changes were introduced in the middle of the 2000s, leaving little time for long-term impact. Since the mid-2000s, the capacity of firms to fully take advantage of the global recovery could be severely hindered by factors other than external demand, accounting for the recent stagnation. Restrictions on labor markets continue to be relatively more stringent than in other Asian countries, with more than one-quarter of firms reporting labor as a major constraint in 2008 (Saikia, 2011). Haryana is one of the western Indian states, situated on the border of the national capital of New Delhi, with a total population of 25,353,081. Haryana has enacted a number of reforms and policies related to labour emigration and governance, which have had a generally positive effect on the state's industrial development.

The Haryana Government's Industrial Policy agrees to add to the current 100% exemption of Electricity Duty on industrial consumption and no vat on energy consumption, to 100% reimbursement of Stamp Duty (on lease land as well as on the transfer of existing industrial and commercial land) to the industrial units established anywhere within the State. At present, Stamp Duty of 6% applies to the above-mentioned transactions. The Government also agrees, as a special case, against a mandate by the Ministry of Labour, to enhance the minimum wages applicable to only industrial workers by 20% on a flat basis to reduce the cost of labour, poor arrangements, etc., to the investor country. The Commerce and Industry Minister has said that the 2/3rd of India's shaved and ultrasonically bonded apparel are being exported from Haryana, aiming to provide maximum employment and enhance the economic development of the state through various policies and programmes.

7. Factors Influencing Industrial Growth

Established during periods of scarcity and centrally planned economies, industrial estates were pivotal sites where financial assistance, infrastructure, and other government support initiatives for small-scale and medium-scale industries were first experimented with. Over time, the measures were extended to industrial clusters and later to growth centres, allowing reasons for industrial location to be elaborated and various policy options to be explored. There remains considerable scope for further extension and elaboration; an ideal solution may be within reach in which public policy seeks to stimulate a diverse range of economic benefits over time and for different regions of India.

Factors that have enabled the development of the state of Haryana are the availability of cheap power, better quality of life, and the ease with which government officials can be contacted. In addition, the pull factors of industrial development in the Haryana economy are the cheap and manageable industrial land; the existing quality infrastructure; a chain of ancillary units around Haryana's large cities; easy quality raw material supply; proximity to major ports, such as the Jawaharlal Nehru Port (JNP) and Mumbai Port, and by land and rail to Faridabad, Gurgaon, and Sonipat; easy access to qualified technical institutions; a wide base of skilled and semiskilled personnel; proximity to the capital; high purchasing power; and a relatively high foreign exchange earnings average. There have also been suggestions that attracting investments to the state will hinge on ensuring the provision of uninterrupted electricity supply, ensuring the highest quality of roads and modes of communications, air connectivity for Gurgaon, and a high level of security.

7.1. Infrastructure Development

Industrial growth has been a pivotal aspect of the socio-economic advancement of Haryana. The availability of well-developed physical infrastructure and skilled manpower has fueled the expansion of this sector, which remained concentrated in small and large-scale industries across the state until 2011. Small-scale industries have notably contributed to the diverse development of the industrial sector. Haryana's industrial landscape is better positioned today than in earlier periods, attributed to factors such as capital, technical support, and the state's strategic location. Favorable geographical positioning, abundant natural resources, enhanced connectivity, and governmental inducements have all bolstered industrial development since the state's inception. Government policies emphasize infrastructure improvement, aiming to fulfill the energy needs of industrial establishments at concessional rates. A significant focus lies in the development of Industry/Export Zones, growth centers, logistical hubs, and High-Tech Complexes. Concurrently, the government has revisited policies concerning plant relocation and conversion to alleviate militancy associated with industrial expansion. Measures addressing the availability of workforce and their housing have been undertaken, and institutions like the Haryana Financial Corporation continue to provide necessary credit to the sector. Anthem schemes offering support to Small Scale Industrial Units occupying land within Integrated HUDA Industrial Estates underscore the commitment to sustained industrial progression in Haryana (M Babu & Raj S Natarajan, 2013).

7.2. Government Policies and Incentives

Government policies and incentives are a vital factor shaping the industrial scene in Haryana. The state authorities have adopted many initiatives to directly support industrial development. Notably, the creation of a network of specially designated industrial estates substantially stimulated industrial growth. The relatively low land acquisition rates in Haryana have reduced the costs for establishing industrial estates, facilitating their expansion. The Haryana State Industrial and Infrastructure Development Corporation (HSIIDC) plays a crucial role in setting up these estates, including sector-specific ones focused on pharmaceuticals, apparel, electronics, and food processing near Panipat. As a result of these targeted efforts, Haryana has attracted a considerable volume of inward investment.

The post-World War II period witnessed rapid industrial growth in Haryana, contributing 60 percent of the state's Domestic Product and accounting for 70 percent of employment. Governmental incentives have been reported to effectively underpin this expansion, establishing a solid foundation for ongoing and future industrialization (Singh, 2006).

7.3. Labor Market Dynamics

The rate of manufacturing employment growth can be linked to labour-intensive or capital-intensive activities. The more the activities are labour-intensive, the greater the employment creation, but as the activities are capital-intensive, the rate of employment creation is low (Singh and Singh Shergill, 2009). The data obtained from the Economic Survey, 2014–15, shows that the manufacturing sector engaged more persons than the service and construction sectors during 2013–14 (Mazumdar and Sarkar, 2007). Only labour-intensive manufacturing sectors generate more productive and decent jobs. The economic development of a state can be judged by the condition of the labour force. Similarly, the industrial growth of any state depends on the growth of its working population and the availability of the labour force. The labour work in the core sector and the household sector forms the backbone of any country's economy. Every sector of India, including manufacturing, employment, infrastructure, construction, electricity, trade, transport, communication, and other services, engages the labour force of the country. The manufacturing and industrial sector still gets the highest Labour work among them all. Labour is the requirement of any field; without a sufficient number of workers, a sector cannot run on a proper path. According to the economic survey, the number of workers engaged in the manufacturing sector was the highest with 66.1 million, followed by construction with 26.5 million, services with 18.3 million, and infrastructure (transport, electricity) with 4.3 million in 2013–14. To get a good economy, multiplying the employment system and engaging the Labour workforce in the industrial sector is the genuine way.

8. Case Studies

With the recent introduction of agro-processing industries, Haryana has diversified its industrial production beyond minerals and raw materials (M Babu and Raj S Natarajan, 2013). The flourishing industrial estates of Haryana, when compared with those of neighboring states Punjab, Himachal Pradesh, and the Union Territory of Chandigarh, highlight Haryana's continued progress (Saikia, 2011). This comparative analysis illustrates that Haryana still possesses significant potential to industrialize. Thus, Haryana occupies a prominent position among the states of North India, with spatio-temporal analyses confirming that industrial establishments in the state have grown markedly (Saikia, 2011). Haryana claims a substantial share of industrial establishments in the country and contributes 60% to some key economic indicators. The

state ranks second in the number of working factories and generates approximately 1.136 million units of employment.

When assessing the degree of industrialization on a nationwide basis, Haryana ranks eleventh among the industrially well-developed states in India. Large-scale industrial units are concentrated in specific districts such as Faridabad, Sonipat, Karnal, Kurukshetra, Ambala, Panchkula, and Yamuna Nagar. Medium-scale industries are dispersed more diversely but are strongly represented in the same districts. Small-scale industries show the most widespread industrial development, extending into rural and backward areas; however, they are densely concentrated in the districts highlighted above.

8.1. Success Stories in Haryana

The socio-economic development of Haryana during the last two decades owes a great deal to the efforts of many industrial entrepreneurs who have set up factories and created employment at significant levels. Haryana is important for many industries because of its location and liberal policy regime. Haryana is heavily industrialized and continues to grow because of a transparent, hassle-free, and proactive approach; a liberal and progressive policy framework; a dedicated Efforts Group constituted to ensure smooth implementation of projects in the State; and the presence of many consultancy organizations. Several public-sector undertakings have been established in the State since 1966, laying the foundation of industrial growth. As a result, many small and medium industries have flourished, and many more medium and large industries have started operations in recent years in Haryana. The State has made rapid progress in the development of light, medium, and heavy industries. The industrial development of the State is reflected in its contribution to the national income. Haryana is also an important center of scientific research and development, and many national research laboratories and institutions have been set up in the State. Haryana also serves as a regional center for manpower development. The National Fertilizer Limited and Maruti Udyog Limited have become success stories, and several others are likely to follow their example (Singh & Jain, 2006).

8.2. Challenges Faced by Industries

The Haryana State Industrial and Infrastructure Development Corporation (HSIIDC) has identified eight industrial estates distributed across Panchkula (Sector 18), Ambala (Areas ‘‘A’’ and ‘‘C’’), Yamunanagar (Sector 6), Kurukshetra (Sector 3), Sonipat (Sector 4), Rohtak (Sector 17), and Karnal (Sector 1) that are spread in different parts of the state at well-planned locations. Among industrial regions, Panipat is the largest industrial region in the state and is also among the well-developed industrial areas in the country. It holds a distinguished position due to its thriving cotton and synthetic hosiery industry and is among the major centers for basic metals and alloys, electrical machinery and apparatus, non-metallic mineral products, chemicals and chemical products, rubber and plastic products, and fabricated metal products, and dressing and dyeing of fur.

To analyse the pattern of industrial growth in Haryana, a large number of indicators and parameters have been taken into consideration. The major constraints faced by industrial units in Haryana include cancellation of industrial policies for the small-scale industry and poor power supply, as power is the lifeblood of all industries. Restrictions on the freedom to sell power generated through the captive power plants, according to the needs of industry, and pervasive corruption in government offices have hampered

the growth of industries and weakened the strength of already established enterprises. Some of the other factors that have retarded the growth of industries and production are a lack of aggressive effluent treatment plants, inadequate infrastructural facilities, insufficient availability of labour, inadequate availability of marketing support, scarcity of natural gas, and absence of a single-window clearance system for promotional work (Saikia, 2011).

9. Comparative Analysis

The industrial growth process patterns in India reflect a relative declining trend. The growth rate of the real manufacturing gross state domestic product (GSDP) also witnessed a declining trend (M Babu and Raj S Natarajan, 2013). The analysis of comparable data for Haryana reveals that the growth rate of the capital invested in the organized manufacturing sector showed an increasing trend with minor fluctuations. Haryana continued to attract industrial capital at reasonable rates of growth relative to all other states of India, irrespective of the global economic slowdown observed during 2008-09 and a declining period for industrial growth from 2011 to 2013. On average, the rate of growth of capital formation is almost twice the rate of growth of the real gross state domestic product in Haryana. The pattern of growth also highlights that the GSDP recorded a deceleration during the period of 2011–13 (Singh, 2006). The status of large-scale industries in Haryana presents encouraging trends for the government. With an untapped resource base, the subsequent sections outline the spatial and temporal perspectives of the trends and patterns of industrial growth, which help plan for covering the existing gaps and harnessing the untapped potential.

9.1. Haryana vs Other Indian States

Growth in the organised manufacturing sector has fluctuated across Indian states, being sporadic before the 1980s, accelerating during the 1980s, slowing in the early-to-mid 1990s, and reviving afterwards. While relative productivity levels among the top manufacturing states have remained largely stable, the spatial distribution of growth and productivity has evolved. Growth rates, as measured by employment, value added, and capital stock, reveal sector-specific and state-specific patterns that a sole focus on shift-share analysis might overlook. Initial industrial development often begins in urban areas or capitals (D. Sachs et al., 2002). As manufacturing industries mature, operations may shift to smaller cities or rural zones, influenced by factors such as land availability and labour costs. The spatial dispersal of manufacturing employment peaks towards the later stages of industrial development—quantitative growth accelerates before stabilization, whereas spatial dispersion continues to rise later. Levels of urbanisation show a positive association with levels of manufacturing—there is a clear correlation between industrial diversification, export orientation, and urbanisation. Monitoring these states is crucial for discerning how industrial employment and output evolve across space and time, and for identifying the primary drivers of this growth.

Sizeable opportunities for industry exist in the hinterland of Haryana; these have remained vastly under-explored thus far. The government of Haryana has initiated measures aimed at attracting investments to mitigate this situation. Although the manufacturing sector has the potential to become a significant contributor to economic growth, it remains confined mainly to urban regions, particularly major urban centres and areas that have experienced more rapid growth. A considerable portion of the area in the state has witnessed little to no industrial growth. The real task lies in developing a regional strategy that promotes

the growth of industries to optimise the state's industrial portfolio and achieve balanced regional development.

9.2. International Comparisons

Industrial sector growth and location within countries change continuously in response to regional economic development. Parameters that change in one region relative to others (location-specific factors) are the primary reasons for the changing spatial distribution of industries. Policies promoting broader economic integration (such as liberalization, deregulation, and reforms) also influence spatial industrial concentration. However, theoretical predictions and empirical evidence on the impact remain ambiguous: geography and economic geography factors, combined with industrial policies and labor mobility (migration), might reinforce or attenuate spatial concentration (Saikia, 2011). An empirical case study of the Indian experience since the 1991 reforms analyses the long-term trend (1977-2007) from an economic-integration perspective; it is the first at the national level to cover two decades after the reform period and the latest available manufacturing data (Saikia, 2011). Industrial production's contribution to state GDP declined during times of deceleration, so growth rates in industrial output had a lesser impact on GDP during such periods. The industrial sector plays a role in the quasi-convergence process—it led growth after 1965-66 but turned laggard during 2003-04 to 2011-12. Multinational companies (MNCs) are among the world's most profitable institutions because of their size, technology capabilities, purchasing power, and access to finance. Foreign direct investment (FDI) equity inflows to India fell sharply at the onset of the global financial crisis in 2007; the government has since implemented a slew of initiatives to streamline foreign investment procedures and boost inflows. India also presents a more attractive outlook for FDI than all other ASEAN countries and a larger group of Asia-Pacific nations.

10. Predicted Trends Post-2016

Haryana stands among the most industrialized states of India, with its economic growth closely tied to its industrial development (M Babu and Raj S Natarajan, 2013). The state boasts the highest per capita income and third-highest gross domestic product, fulfilling the government's ambitious target of establishing more than 20 large-scale industries before 2016. The contribution of the secondary sector to Haryana's net domestic product rose from 19.2% in 1993–94 to 19.8% in 2004–05. Marking a remarkable 11.4% growth, the industrial sector surpassed all other sectors during 1993–94 to 2004–05. Sugar manufacturing was the leading industrial activity. Haryana has attracted the second-largest number of foreign direct investment (FDI) proposals in India; however, the actual investment from the Ministry of Commerce stood at Rs 1,619 crore (Singh, 2006). The state implemented a single-window system designed to approve major industrial projects within two months, expediting establishment processes by removing procedural bottlenecks.

Industries further offer lucrative employment opportunities—India's manufacturing sector contributes significantly to employment. Haryana's industrial units provide substantial employment, with more units generating higher employment opportunities. Small-scale units deliver a greater employment share than medium-sized ones. In the 2004–05 period, the industrial sector contributed 25% to gross domestic product and accounted for 26% of total employment. Appropriately, a spatio-temporal analysis was conducted to examine industrial growth since 2004–05, delineating the developmental trajectory.

10.1. Sustainability and Growth

Haryana's industrial landscape is growing rapidly, as the state government moves towards a New Haryana Vision 2030 for social and economic growth. Because of its strategic location and available infrastructure, Haryana has become the preferred location for industrial units, including steel and textile plants as well as automobile manufacturing facilities (M Babu and Raj S Natarajan, 2013). The state accounts for 3.49% of the country's employment in medium and large-scale manufacturing firms; it has 4,138 such industrial units that collectively represent a 4% share of the country's total investment in manufacturing, and 3.8% of the total value of production of these industries. Haryana ranked first in terms of investment per industrial unit, but lower, around the middle of all states, with regard to value added, output per industrial unit, and employment. Spatial analysis shows that districts such as Faridabad, Gurugaon and Sonipat, which are close to the National Capital Regional Capital (NCR), are more industrially advanced. More recently, the state has targeted policies to promote the agro-products and petrochemicals sectors to further boost industrial growth (Singh, 2006).

11. Policy Recommendations

Based on the foregoing analysis, this paper specifies policy options to promote Haryana's industrial growth. Haryana has emerged as a high-technology, industrially developed, producer-oriented, and exporter-oriented state over the last three decades, especially after the Green Revolution in agriculture. However, the presence of old family home-based units is decreasing due to increasing globalization and automation of production techniques. It is necessary to devise new options for more employment in order to prevent pressure of migration to the rural sector. Therefore, promotion of micro-industries in urban areas can provide additional employment opportunities and higher income. Special emphasis should be given to the development of the medium, small, and micro industrial units (MSMI) sector, which can offer more employment within a small setup and require less initial investment (Singh, 2006).

Demand for industrial education is increasing in industrialized and service sectors. Government and private institutions should develop new areas of technical education—such as computer literacy, medical education, and hospitality services—to meet market demand and industrial requirements (Singh and Jain, 2006).

11.1. Strategies for Enhanced Growth

Economic restructuring is a critical challenge for industrial regions, as current trends threaten their viability (Singh and Jain, 2006). New growth and restructuring strategies are needed to ensure that established industrial areas remain vital. Since July 1991, India has implemented reforms aimed at boosting the industrial sectors. However, in Haryana, industrial growth decelerated between 1980-81 and 2001-2002 as a result of lower investment-GSDP ratios, reduced plan expenditures, insufficient human capital and infrastructure, limited economic activities, and inadequate private investment (Singh, 2006). Investment plays a pivotal role in the development of industrial progress. The organized manufacturing sector employs significant labour in several Indian states (M Babu & Raj S Natarajan, 2013). Industrialization boosts employment by creating new jobs. Attempts to decentralize industries and harness their potential have not fully succeeded. To address these challenges, strategies have been designed to promote industrialization, supported by a Regional/Spatial Economic Framework that aims to stimulate production and industrial

growth at the regional level. These recommendations seek to reverse the trend of industrial deceleration, fostering rural development and enhancing rural incomes and welfare.

11.2. Regulatory Framework Improvements

For promoting industrial development, direct assistance is needed to industrial estates for the creation of infrastructure to assist the raising, processing, and manufacturing of agri/horti/diversified products and by-products. Since developed infrastructure and support services are a prerequisite for the economic growth of an area, the government provides subsidies on upfront payment, technical assistance, and export support to the new enterprises to minimize the risks associated with the adoption of new methods and entry into new markets (Saikia, 2011). Policies to encourage industrial growth should be adequate, effective, and ripe, i.e., consistent with the political and economic climate of the area concerned, and they should also be regionally specific because the environment of industrial development in one area is different from another (Singh, 2006).

12. Conclusion

The paper analyses spatio-temporal industrial growth in Haryana up to 2016. Since the mid-2000s, manufacturing and services GDP have grown faster than agriculture. Haryana's per capita income is now considerably higher than the national average. Over the last decade or so, industrial zones have proliferated due to infrastructure development and site availability, as well as the expansion of nearby industrial complexes. Numerous factors contribute to industrial growth: investment climate and resource endowment, government policies and incentives, infrastructure, labor market conditions, availability of advanced technology and R&D facilities, easy access to markets, and the adoption of path-breaking green growth measures. Delay in the implementation of the GST and the bankruptcy code continues to adversely affect the investment cycle and the ease of doing business in Haryana.

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