



ISSN: 2617-6548

URL: [www.ijirss.com](http://www.ijirss.com)

## Evidence of Input Sharing and Labour Pooling in an Automobile Cluster of Central India

 Pratyoosh Madhavi<sup>1\*</sup>, Binayak Choudhury<sup>2</sup>,  Amit Chatterjee<sup>3</sup>

<sup>1,2</sup>*School of Planning and Architecture, Bhopal, India.*

<sup>3</sup>*Sidho-Kanho-Birsa-University, Purulia, India.*

\*Corresponding author: Pratyoosh Madhavi (Email: [pratyoosh.madhavi@gmail.com](mailto:pratyoosh.madhavi@gmail.com))

### Abstract

Literature on agglomeration economies firmly establishes the trinity of Input sharing, Labour pooling, and Knowledge spillover, originally conceived by Alfred Marshall, as the foundation of any industrial agglomeration or cluster. Acknowledging the rationale of the trinity, this paper documents the pieces of evidence of Input sharing and Labour pooling in a planned automobile cluster of Pithampur, a backward region of the state of Madhya Pradesh in India. The development of the automobile cluster has transformed Pithampur from a bunch of villages to an automobile hub of central India. Knowledge spillover has been kept out of this study due to the paucity of data. These pieces of evidence are collected through primary and secondary data. It is found from the pieces of evidence of input sharing that both union and state government have played a significant role in developing industry-related infrastructures in Pithampur. The availability of supporting infrastructure, services and various fiscal incentives has helped the firms enjoy economies of scale and attracts potential investors to establish their firms in Pithampur. The evidences of labour pooling capture the dramatic changes in the demography of Pithampur in terms of population growth, sex ratio, occupational shift, migration, etc.

**Keywords:** Agglomeration economies, Automobile cluster, Demographic change, Infrastructure development, Input share, Labour pool.

**DOI:** 10.53894/ijirss.v5i4.958

**Funding:** This study received no specific financial support.

**History: Received:** 10 August 2022/**Revised:** 14 October 2022/**Accepted:** 27 October 2022/**Published:** 14 November 2022

**Copyright:** © 2022 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

**Authors' Contributions:** All authors contributed equally to the conception and design of the study.

**Competing Interests:** The authors declare that they have no competing interests.

**Transparency:** The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained.

**Ethical:** This study followed all ethical practices during writing.

**Publisher:** Innovative Research Publishing

### 1. Economics of Agglomeration

An industrial cluster is the spatial concentration of manufacturing and ancillary activities in an area. Industrial clusters and employment centers within cities are one of the forms of Urban agglomeration [1]. Most often, two distinct types of agglomeration economies are usually observed: (i) general economies of regional and urban concentration applicable to all firms and industries in a single location, and (ii) economies that relate to similar or interconnected industries leading to the formation of clusters [2]. Most literature reviews on agglomeration begin with Marshall [3] trinity – labour market pooling, input sharing, and knowledge spillovers [4]. He argues that firms experience external economies and increasing returns when they agglomerate together in close geographical proximity. Although the theory continues to be the foundation of agglomeration economics, Marshall's theorization is only restricted to industry-specific localization economies and not to

the exploration of the role of technological relatedness on the evolution of firms, agglomerations, networks, industries, and regions [5, 6]. Sometimes, the skills developed in one industry can be used by other related industries when the application of such skills benefits each industry [7, 8]. Weber [9] in the early 20<sup>th</sup> century underscores the combined effects of labour and transport costs on industries' tendency to agglomerate. Later, in the mid-20<sup>th</sup> century, Hoover [10] developed his ideas based on Marshallian principles. He explains that the agglomeration of businesses and firms favours the individual firm's success and identifies three types of economic agglomeration based on economies of localization, urbanization, and internal returns to scale in production. Isard [11] who coined the expression 'Industrial Complex' expounded upon Hoover's notion of localization economies and said that these economies are obtained when plants of parallel or related characters (by and large inside a given industry) meet up on a specific location exploiting shared resource pool. Similarly, for urbanization economies, he said that these are "spatially juxtaposed rather than geographically separated," as urbanization economies combine with localization economies. Krugman [12] argument on the localization of industries and agglomeration at a relatively small scale is based on Marshall [3] three sources of agglomeration economies. However, he emphasizes labour market pooling and the availability of specialist suppliers and deals only briefly with technological knowledge spillovers Markusen [13]. Krugman [12] through his New Economic Geography argues that there are two divergent forces that determine the spatial structure of the urban economy, - forces of agglomeration (determining geographical concentration) and forces of dispersion (determining dispersal of economic activities).

Firms located in a region where they may exploit a natural advantage, as well as agglomeration economies form co-locating firms. Ellison and Edward [14] investigated the relative contributions of each of these elements in the mid-1990s. Perroux [15] idea of propulsive industries acting as poles of growth and creating an economic space with dominant and dependent industries is akin to an industrial cluster based on a Hub and Spoke structure as described by Markusen [13]. According to Perroux [15] however, the economic space created around these growth poles is rather abstract and homogeneous, with firms and businesses (or industries) buying from and selling to one another based on centrifugal and centripetal forces. Perroux later added the notion of time to his theory, in which growth poles form a cluster and expand further, involving outside enterprises via various other linkages.

Presently, the term 'Industrial cluster' is widely associated with the theory and model brought forth by Porter [16] in his book "The competitive advantage of nations" published in 1990. Porter [16] through his Diamond Model, describes "sources of locational competitive advantages" for an industrial cluster. He believes clusters to be typical and not unique. However, he finds it perplexing because this scenario argues that the durable competitive advantage comes through local factors such as expertise, relationships, and motivation in a global market, which remote competitors cannot match. Acknowledging the sources of agglomeration, this paper tries to offer a heuristic explanation of labour market pooling and input sharing with the help of datasets drawn from secondary sources and primary surveys.

## 2. Methodology

Based on the theoretical framework (as has been explained in the literature) initially conceived by Marshall [3] and later on by Krugman [12] and Porter [16], this paper attempts to offer an exploratory explanation of labour market pooling and input sharing in Pithampur Automobile Cluster (PAC) in the Indian province of Madhya Pradesh (MP). Knowledge spillover, the third determinant of agglomeration, has been excluded from the scope of this paper due to the paucity of data.

Input Sharing in PAC is explained in terms of sharing the benefits of various infrastructures and services which facilitate the development of industries within Pithampur. The inputs provided by the State government and the Central government have explicitly been considered for the study. These details have been extracted from archival records of both State and Central government like Land Bank Reports, Detailed Project Reports of Infrastructure projects, Census data about infrastructure availability in towns. The study also relied on a survey through an open-ended questionnaire across various heads of industries from mother units (6 Nos.), ancillary units (14 Nos.), and heads of Industry associations (3 Nos.) to gather opinions and experiences that enabled much deeper and more extensive information about PAC.

For the development of the Hub and Spoke model of PAC, data from the Annual Survey of Industries (ASI) have been used. Since the ASI unit-level data do not reveal the district code, district-level analysis becomes complex. For this study, ASI Frame has been used because it gives industrial information through Industrial code {4-digit National Industrial Code (NIC) based on NIC-2008 Classification along with State Code, District Code, Number of Employees, Location of Industry etc. [17]. ASI Frame serves as a universe for the ASI sampling. The Frame is revised and updated each year by the National Statistical Office (NSO). Field Operations Division (FOD) selects the units to be used for the survey. At the time of the revision, ASI frames are updated to remove the names of factories that are no longer registered and to add new names. Factories Act Section 2m(ii) states that only those firms that employ ten or more workers with power or 20 or more workers without power are included in a Frame according to Section 2m(i). Presently an updated ASI Frame 2018-19 based on the information collected during its last survey year is available [18]. After the Hub and Spoke (Figure 2) model was developed for the PAC, selected heads of industries were asked to validate the codes used. The NIC codes considered for the same are as follows.

- 1) Mother Units: 2910,2920,3091,3020,2824
- 2) Ancillaries:2930,2829,2823,2822,2814,2710,2720,2732,2740,2790,2511,2512,2591,2592,2599,2410,2420,2431,2432, 2399,2310,2211,2219

For the pieces of evidence collected for the Labour Pool, this study majorly depends on Census data of 1991,2001 and 2011. Labour contractors (10 Nos.) were surveyed through an open-ended questionnaire. Moreover, 265 PAC workers residing in Pithampur were also surveyed. The workers were selected through random sampling during the entry hours in

the industries that take place in two shifts, morning and evening. These primary survey findings are presented in the form of a percentage. The survey was conducted from May 2019 to November 2021.

### **3. Pithampur Automobile Cluster (PAC)**

This paper focuses on PAC. Historically, the economy of MP has never been an industry-led one. It still relies on agriculture more than its industries. To promote industrial growth, the Government of M.P. adopted a growth center approach in the early '80s. PAC is an interesting case of an industrial cluster that came into being to develop a backward area through industrial development. PAC unfolds a fascinating history as it emerged to be one of the prominent automobile hubs of India, although the location was not industry-friendly. Other than having the license to set up their units, the concerned firms did not have access to good infrastructure, skilled labour, supporting ancillary industries, good transport linkages, etc. Despite all odds, PAC has thrived through three and a half decades with the support of the Central Government, Government of Madhya Pradesh (GoMP) and local municipality. Although there are many other industries in Pithampur, the presence of the automobile cluster is dominant in terms of investment, the number of units, employment and area. Presently there are 15 large-scale, 22 medium-scale, and 360 small-scale industries in PAC [19].

### **4. Input Sharing in Pithampur Automobile Cluster**

It is observed that input sharing is one of the crucial factors for agglomeration economies [20]. The density of activity results in an increased specialisation and production of a wider variety of intermediate inputs, infrastructures, and services. Sharing of intermediate inputs, infrastructures, and services by different industries presupposes the existence of scale economies. In cases where input suppliers meet the collective or multiple demands for inputs, they gain the cost advantages from an efficient scale of production and pass on some of this advantage to their customers [3]. Once a sizeable fixed cost associated with a shared facility has been incurred, the larger the population shares the facility, the lower the cost per user [21].

#### *4.1. Sharing of Inputs Provided by the Government of MP (Provincial Government)*

##### *4.1.1. Management of Land*

Availability of land is the primary requisite for industrial development. Madhya Pradesh Industrial Development Corporation (MPIDC) manages land acquisition and land development for the industries at PAC. Acquiring land from landowners and developing the site thereafter for the industries by putting up different infrastructures and services is the sole responsibility of MPIDC. This service provided to different firms under the automobile industries acts as significant input sharing for the industrial units because the cost of acquisition to development of land is shared by all the automobile industrial units of PAC, making it economical for them. Although most of the land acquired by MPIDC in Pithampur till 2013 followed the provisions under the Land Acquisition Act 1894, MPIDC switched over to land pooling since the new legislation titled 'The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013' mandates heavy compensation to the landowners for parting with their land. GoMP also gives land concessions to the firms if they wish to establish undeveloped government-owned land. Concession is also provided to medium, large and mega-scale industrial units to develop power, water, and road infrastructures if the investor acquires private land or gets undeveloped government land for setting up such projects [22]. In the early years of development, land on lease was given to industries for 90 years, which has now been reduced to 30 years.

##### *4.1.2. Incentives and Subsidies*

In the initial years of development, the major factors behind the firms' locating their plants at Pithampur have been the fiscal and monetary incentives in the form of tax holidays for nine years, capital subsidy, interest subsidy, entry tax exemption, Value added tax (VAT) and Central Sales Tax (CST) assistance, electricity subsidy besides the Government of India's investment subsidy of 25 per cent up to 25 lakhs (Indian Rupees) to the smaller units. Such government assistance has been made to ancillary industry firms, which led to a significant investment by many ancillaries. These slews of incentives enabled many big companies to locate their plants at Pithampur in the initial years of development. Although the above-mentioned incentives and subsidies have been given to individual firms, these have mutually benefitted all the firms since the benefit accrued to one indirectly benefitted the other which can be regarded as one form of input sharing, at least implicitly.

##### *4.1.3. Infrastructure Development*

Infrastructures play a crucial role in the development of industries. Good connectivity and quality living through roads, electricity, water, gas, waste disposal facility, warehouses, port, or dry ports are some of the fundamental requirements of an industry. The availability of such facilities together at a location makes it an attractive destination for industrial development.

###### *a) Road and Other Connectivity*

Pithampur enjoys the distinction of being located in the Central India region and falls under the Dedicated Freight Corridor, which comes under the influence zone of Delhi Mumbai Industrial Corridor (DMIC). Pithampur is well served by National Highway (NH) 57, NH 42, other State highways, rail linkages (under the Western Zone of Indian Railways), and a domestic airport at Indore at a distance of 25 km. It is only obvious that different modes of connectivity available in Pithampur are only shared by the firms of the automobile cluster in Pithampur.

#### b) Electricity

In order to ensure an uninterrupted power supply to the industrial units, the GoMP gave free land to Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company (erstwhile MP State Electricity Board) for establishing its grid. At present, the automobile cluster shares the electricity supplied through various substations situated at various locations in Pithampur. The details are as follows:

- 1 Nos. 400 kV substation.
- 2 Nos. 220/132/33KV sub-station (1 in sector I & 1 in sector III).
- 6 Nos. 33/11KV sub-station [23].

Considering the growing power requirement, a 315 megavolt-amperes substation was approved by Madhya Pradesh Electricity Regulatory Commission in the year 2020 and is expected to be commissioned in 2022 benefitting the cluster significantly.

#### c) Water

Water supply has been a major challenge in Pithampur Industrial Area. With the increase in the number of industries, water demand has also increased substantially. Presently, the water demand for the Industrial area is 18-20 million liters per day. Industries in Pithampur get water from two reservoirs, Sajayjalashay and Karam dam, each with a capacity of 2 million gallons per Day (M.G.D.) developed by GoMP [24]. Anticipating the future demand owing to the development of Pithampur-Dhar-Mhow Investment Region, a Special Purpose Vehicle (SPV) named 'Pithampur Jal Prabandhan Company Ltd.' (i.e., Pithampur Water Supply Company Limited) under the joint venture of Madhya Pradesh Adhyogik Kendra Vikas Ngam and Delhi Mumbai Industrial Corridor Development Corporation has been formed to augment the existing capacity to 90 M.L.D. from Narmada Kshipra Link Project of Narmada Valley Development Authority. It will also work on the refurbishment of the existing system [24]. Thus, it is seen that the industrial units of PAC share the water that is served by the concerned authorities.

#### d) Dry Port

MP is landlocked; hence, to improve the export potential for the industries in the state, GoMP established an 'Inland Container Depot' (ICD) in 1994 at Dhannad near Sector 1 of Pithampur, to provide logistics solutions to various industrial locations across MP. The ICD is spread over an area of 6.9 hectares and provides all the facilities provided by gateway ports for containerised cargo. As shown in Table 1, the terminal is linked to railways and major Indian ports [25]. It is thus seen that the automobile industries of Pithampur share the ICD facility as and when they need it.

**Table 1.**  
Distance of major Indian ports from inland container depot, Indore.

Indian Ports	Distance (Km): Road+Rail
Jawaharlal Nehru Port Trust /Nhava Sheva International Container Terminal /Gateway Terminals India	874
Mundra/Pipavao	950/977

Source: EXIM - India [25].

#### e) Other Logistic Facilities

Warehouse management is a crucial part of the automobile industry. In 1986, Central Warehousing Corporation developed a warehouse of 5000 metric tons capacity in Sector 1 of Pithampur. In addition, many private companies rent out warehouses to the industrial units of PAC. There are also many cargo operators in Pithampur. Thus, the automobile industries in Pithampur are able to share the warehouses and cargo service facilities developed in Pithampur.

#### 4.2. Sharing of Inputs Provided by the Government of India (Central Government)

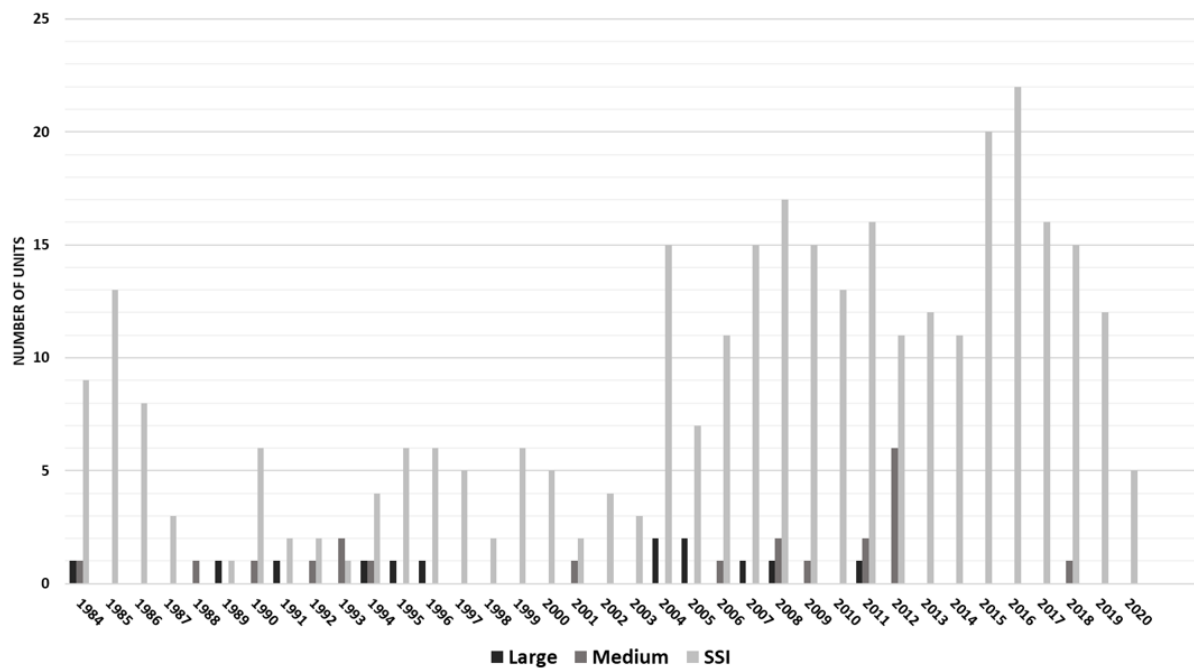
PAC has also been given special support by the Central government through Industrial Infrastructure Upgradation Scheme (IIUS) in 2003 to enhance industrial competitiveness by providing grant- funding for quality infrastructure through a public-private partnership. Under this scheme, an SPV was formed to develop an Advanced Technical and Industrial Training Centre to conduct specially programmed courses for the skill set required in PAC and recognised by the National Council of Vocational Training since 2007. The other development under IIUS was the Hazardous Waste Disposal Facility for collecting and disposing of hazardous industrial wastes of PAC through landfill, stabilisation, and incineration. The SPV has also developed a Tool Room & Technical Services Centre to meet the normal tooling requirements of PAC besides reducing the outsourcing to external firms. A wide range of technical services, such as design and development, materials testing, calibration, and technical and quality advice required by PAC, were earlier to be procured from service providers from New Delhi, Pune and Kolkata, and since technical consultancy for quality up-gradation was often found inaccessible to the PAC units, the abovementioned SPV has also established a Technical Service Centre at Pithampur [26] whose benefits are now being shared by the units of PAC.

#### 4.3. Vendors or Component Suppliers

Each firm experiences economies of scale only when the forces of supply and demand operate efficiently within a given geography. Proximity to component suppliers allows for a lower cost of production to the mother units because of the lower transportation cost in procuring materials. An automobile cluster runs in collaboration between the mother industry

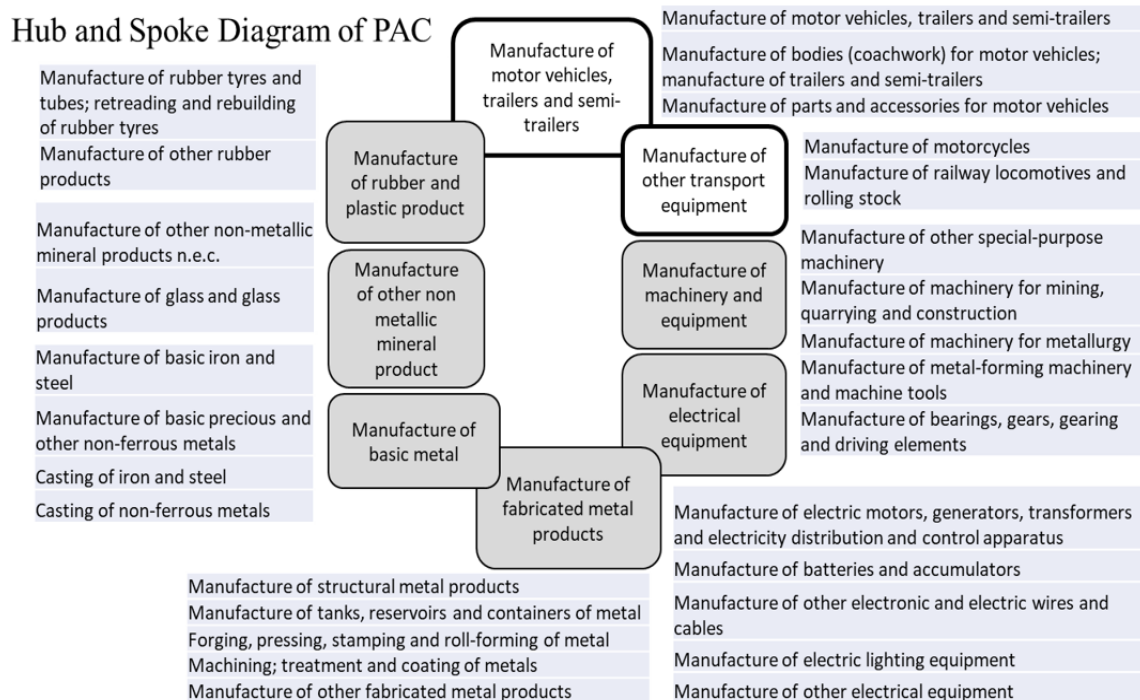


and component suppliers. Since 2000, there has been a substantial surge in the growth of small and medium-scale component suppliers (Original Equipment Manufacturers) in PAC Figure 1.



**Figure 1.**  
Chronological growth of industries within the Pithampur automobile cluster.  
**Source:** Estimated by the authors based on MPIDC, Indore Unit List Data [19].

PAC demonstrates a “Hub-and-Spoke district” model as defined by Markusen [13]. In this model, a few dominating enterprises form the cluster’s core and these dominating enterprises are surrounded by several tiny firms directly linked to them [13]. The complex network of the automobile cluster within the boundaries of PAC has been captured under the hub and spoke model Figure 2. Due to the lack of open access data, it is difficult to assess the dependence of mother units on component suppliers within and outside the cluster. However, interviews with the heads of mother units endorse the significant development of component suppliers within the cluster and sharing of the components by the mother units. To incentivise component suppliers to establish their units near mother units, GoMP gives incentives to component suppliers provided 75% of their products are sold to mother units [22].



**Figure 2.**  
Hub and spoke diagram of PAC.  
**Source:** Estimated by the authors based on ASI Frame 2018-19 [18].

#### **4.4. Proposed Multi-Model Logistic Park**

There are two proposed railway lines which would benefit PAC. The first one links Indore to Dahod (204 km), and the other one connects Indore to Manmad (362 km). This development has also spurred the establishment of a Rail Linked Multi-modal logistics park at Tihi village near Pithampur developed by the Container Corporation of India (CONCOR). This is expected to provide a cost-effective and efficient logistics solution to the international and domestic cargo movement to and from PAC. Presently, any cargo containment has to travel 847 km to reach Jawaharlal Nehru Port Trust, Navi Mumbai (J.N.P.T.) from Pithampur (Pithampur to Ratlam - 110 km and Ratlam to JNPT -737 Kms). Upon completion of the two aforesaid railway links, railway distance would come down by 50% offering a considerable saving in transport costs to the firms in PAC [25].

#### **4.5. Proposed Test Tracks**

The National Automotive Test Tracks (NATRAX), a world-class automotive test track is being set up on 4,140 acres of land for comprehensive testing and evaluation of all types of vehicles. Since the site is near Indore between NH-3 and N-59, PAC shall stand to gain profusely from this facility. This facility shall evaluate different aspects of automobile performance, which inter alia include maximum speed, acceleration, braking, efficiency, noise, vibration, handling, and stability. Given the diverse portfolio of the firms in PAC, it is only obvious that NATRAX shall benefit all of them by way of input sharing [27]. Although the services of insurance companies, banks, accountancy firms, and law counselling firms located in Pithampur town are expected to be shared by the firms in PAC, no concrete evidence could be established due to the inaccessibility of the data on these services.

Thus, the above evidence of input sharing in PAC shows that both the central and State government have played a significant role in developing industry-related infrastructures in Pithampur. In general, the government of any nation adopts various approaches to the economic development of a region [28]. These are: 'Open for business' (improve the general business environment); 'Big game hunting' (compete aggressively for plant and new investment); 'The next big thing' (enter new high-tech high growth industries); 'Build it and they will come' (invest in large infrastructure/industrial zone project). Pithampur's case has been the case of 'Big Game Hunting'. The State government of MP has offered more attractive incentives and tax reliefs than other State governments to invite industries to MP. This is a situation where one wins in calling industries to its land at the cost of heavy investment. This has been the case with Pithampur. Being an incentive-driven cluster planned in a remote location, PAC had to rely on the government for every infrastructure. This study documents the slew of infrastructure and services created by GoMP as well as the Central Government tailored for backward areas development leading to massive investment from the end of the government.

### **5. Labour Pooling in Pithampur**

Existing literature points to labour market pooling as a key driver of economic agglomeration and urbanisation. A wider pool of workers in a given area makes it easier for businesses to find employees with the necessary skills. Likewise, workers are more likely to find a job that matches their qualifications in a wider labour market. In a nutshell, labour pooling mutually benefits both employers and employees. The diseconomies of scale associated with increased city size (greater commute costs, congestion, and higher land rent) limit urban growth and labour assemblage [29]. The workers' skillset in large cities or industrial concentrations is better matched to the job profiles of the industries as evidenced by high termination rates. On the other hand, employers in smaller cities have fewer options to terminate an employee; thus, the actual termination rates might not indicate the full extent of matching unsuitability. The high rates of employee turnover indicate that workers can change their jobs and firms can hire new employees. The workers' skill sets and the firms' requirements can be better handled in a cluster that offers alternatives to both the employers and the employees. In the case of PAC, labour pooling is explained through population growth rate, changes in occupational structure, increase in rented dwellings, sex ratio and net in-migration.

#### **5.1. Evidence of Labour Pooling**

Since 1991, Pithampur had experienced a dramatic demographic change Table 2. Fourteen villages of 1981 which got merged to present Pithampur town saw an astounding growth in population from 9,818 (in 1981) to 1,26,200 (in 2011) as per the Census of India. Such a stupendous annual growth rate of population has been way higher than the state (Madhya Pradesh) and the district (Dhar). The latest population estimate (in 2018) by Pithampur Municipality shows a population of 2,25,000. This exponential increase in population can be attributed to the net in-migration to PAC. The steep fall in the sex ratio from 850 in 1981 to 796 in 2011 can also be attributed to the male workers migrating to Pithampur for work. The slums of Pithampur town accommodate around 23,000 labourers (34% of the 2011 total population) engaged across the firms in PAC. There has also been an occupational shift from agriculture to the service sector in Pithampur as the percentage of 'other workers' (mainly comprising of workers engaged in industries and the service sector) rose from 39% percent in 1991 to 84% by 2011. Pithampur also records a high worker participation rate (WPR) due to employment generated by industries.

**Table 2.**

Demographic change in the last two decades.

Location	Year	1991	2001	2011
MP	Population	48,566,242	60,348,023	72626809
	Annual growth rate	2.72	2.43	2.0
	Sex ratio	912	919	931
	Workforce participation ratio	42.8	42.7	46.6
	% other workers	22.5	24.5	27.17%
Dhar District	Population	1,367,412	1,740,577	2185793
	Annual growth rate	2.93	2.73	2.56
	Sex ratio	951	955	964
	Workforce participation ratio	46.7	36.2	47%
	% other workers	15.9	17.0	18.40%
Pithampur	Population	11980	68080	126200
	Annual growth rate	2.2	46.8	8.5
	Sex ratio	789	714	796
	Workforce participation ratio	43	41	39.4
	% other workers	42.5%	87%	84%

Source: Census of India.

Migration data Table 3 of Dhar district shows that the percentage of migrants in Dhar has been high since the initiation of industrial development in Pithampur.

**Table 3.**

In-migration to Dhar district.

Year	Total Population	Total Migrants (%)	Born elsewhere in the district of enumeration (%)	Born in other districts of MP (%)	States in India beyond MP (%)	Born outside India (%)
1991	1367412	31	66	29	4	0.07
2001	1740329	31	66	28	5	0.03
2011	2185793	36	64	31	5	0.03

Source: Census of India.

The primary survey of PAC workers who live in Pithampur revealed some interesting facts about the character of the Labour pool created in Pithampur. The results demonstrate that industries engage migrant workers over the native population. The survey revealed that only 15% of workers are originally from Pithampur and only 11% from the district Dhar. 58% of workers were found to have migrated from other districts of MP and 16% belonged to other states of India (namely, Uttar Pradesh, Bihar and Maharashtra). However, in the early years of development, companies like Eicher Motors (presently known as V. E. Commercial Vehicles Pvt. Ltd) procured skilled and unskilled labours from its own factories located in the States of Haryana, Rajasthan and Himachal Pradesh. The industries in Pithampur are also dependent on premier institutes situated in Indore, Bhopal, and Gwalior to provide skilled workers. Some of these institutes include the Indian Institute of Management, Indore; Maulana Azad National Institute of Technology; Bhopal, Indian Institute of Information Technology, Design and Manufacturing, Jabalpur; Indian Institute of Technology, Indore; Central Institute of Plastics Engineering and Technology, Bhopal; Institute of Information Technology and Management, Gwalior; and National Institute of Design, Bhopal, among others.

Workers staying in Pithampur town are mostly those who have been employed through labour contractors. The increasing number of labour contractors thus validates labour pooling in Pithampur. As most of the workers are engaged on a contractual basis for a period not exceeding 11 months, these labour contractors keep moving these labourers from one industry to another. 69% of workers were found to be either on a contract or a temporary basis. *This shows that the termination rate is high in PAC since a significant labour pool offers options for industries to choose from the existing labour pool.*

### 5.2. Labour Pooling through Labour Contractors

Labour Contractors have a strong presence in Pithampur. Both registered and unregistered contractors supply labourers. Such labour - outsource service has emerged out of need and is a big help to the industries in PAC. It has made procurement of labourers easy for industries. These contractors respond to the demand for labourers from various industrial units of PAC and provide the desired number of workers on agreed terms and conditions. They take a commission for every labour they provide. Labourers desirous to work for the industrial units in PAC directly contact these contractors and get engaged as and when required by respective units in PAC. Majorly, the labour contractors supply housekeepers, gardeners, loading/unloading experts, drivers, assistant machine operators, technicians etc. All these outsourced workers are contract

labourers who are engaged in a company for eleven months. As was found through the primary survey, the percentage of contract workers increases with time compared to those on muster rolls. Such outsourcing is a cost-cutting strategy of the companies as permanent workers are eligible for many wage and terminal benefits to be borne by the companies leading to an overall increase in the cost of production. The units in PAC share the services of these labour contractors at PAC. Such in-migration has also got reflected in the adverse sex ratio (from 850 in 1981 to 796 in 2011 as per Census of India) and the rise in rented dwellings (from 7.8 in 1981 to 43.2 in 2011 as per Census of India) over the years. Although the current sex ratio could not have been calculated from the primary survey, it could have been ascertained that a majority of workers engaged in PAC are tenants (61%).

## 6. Conclusion

Input sharing brings a cost advantage to the industries in a cluster as it lowers the overall cost of production of a particular product. In the case of an automobile cluster that operates on a hub and spoke structure, this cost advantage increases when the input-sharing components like component suppliers locate their units in close geographic proximity. Usually, a natural inclination of industries towards a particular location is seen towards those areas endowed with competitive advantages in terms of economies of scale due to the sharing of different input components like infrastructure, logistic services, and availability of raw material, human resources etc. In the case of Pithampur, the past three and a half decades of industrial development have been a challenge for the state and the central government. Development of an automobile cluster in a backward area like Pithampur with no competitive advantage except that of being centrally located in the country and being close to the city of Indore (the biggest city of Central India), came into being exclusively due to heavy investment by both central and state government. The government's efforts in the formative years of PAC have been more towards creating the minimum infrastructures and offering promotional incentives, which created the right kind of environment for the industries to flock to Pithampur in order to take advantage of the external economies generated through the sharing of different types of inputs discussed in previous sections. Development of Inland Container Depot, Government Warehouse, expansion of water service, augmentation of power supply and different types of development under the Central government scheme i.e. *Industrial Infrastructure Upgradation Scheme* back the above claim. The surge in the number of small-scale industries (majorly component suppliers) since 2000 proves that the growth of PAC has since been organic where the new units are pouring in realizing the prospective benefits offered by the place. From the first industrial policy launched in 1972 to the new Industrial policy of 2021, the main thrusts have been backward area development and growth centre promotion, balanced regional development, holistic growth of MSMEs (Micro Small and Medium Enterprises) and Cluster-based approach, land concession, different types fiscal relief and green industrialization (2021). This paper however restricted its scope only to document the sharing of inputs (infrastructure and services) created under the policies from 1972 to 2021. It does not examine the different types of fiscal reliefs and green industrialization promoted through the 2014 and 2021 Industrial Policy respectively. This study unfolds how GoMP facilitated industrial development in its backward areas through huge investments in infrastructure and services in the initial stage as proposed in its first Industrial Policy of 1972 and underscored in the subsequent industrial policies thereafter. This paper also proves that PAC has successfully created a labour pool in the region. It has been narrated in the previous sections through (i) the exponential increase in the population of Pithampur, (ii) significant in-migration to the district of Dhar (which PAC falls under), (iii) change in occupation from agriculture to other workers and (iv) lowering of sex ratio. The high termination rate (contractual engagement of workers for a period of 11 months) of workers also signifies the labour pool, as it is possible only at locations which give an opportunity to industries to choose from the pool of workers around seeking employment.

## References

- [1] L. E. Blume and S. N. Durlauf, *The new palgrave dictionary of economics*. London: Palgrave Macmillan, 2016.
- [2] A. Malmberg, Ö. Sölvell, and I. Zander, "Spatial clustering, local accumulation of knowledge and firm competitiveness," *Geografiska Annaler: Series B, Human Geography*, vol. 78, pp. 85-97, 1996. Available at: <https://doi.org/10.1080/04353684.1996.11879699>.
- [3] A. Marshall, *Principles of economics*. London: Mac-Milan, 1890.
- [4] W. C. Strange, "Agglomeration research in the age of disaggregation," *Canadian Journal of Economics*, vol. 42, pp. 1-27, 2009. Available at: <https://doi.org/10.1111/j.1540-5982.2008.01497.x>.
- [5] K. Frenken and R. A. Boschma, "A theoretical framework for evolutionary economic geography: Industrial dynamics and urban growth as a branching process," *Journal of Economic Geography*, vol. 7, pp. 635-649, 2007. Available at: <https://doi.org/10.1093/jeg/lbm018>.
- [6] R. Boschma and K. Frenken, *Technological relatedness and regional branching*, in *Beyond territory: Dynamic geographies of knowledge creation, diffusion and innovation*. New York and London: Routledge Taylor & Francis Group, 2011.
- [7] F. M. Neffke, M. Henning, and R. Boschma, "The impact of aging and technological relatedness on agglomeration externalities: A survival analysis," *Journal of Economic Geography*, vol. 12, pp. 485-517, 2012. Available at: <https://doi.org/10.1093/jeg/lbr001>.
- [8] R. Boschma, R. Eriksson, and U. Lindgren, "How does labour mobility affect the performance of plants? The importance of relatedness and geographical proximity," *Journal of Economic Geography*, vol. 9, pp. 169-190, 2009. Available at: <https://doi.org/10.1093/jeg/lbn041>.
- [9] A. Weber, *Theory of the location of industries*. Trans. Friedrich, C. J. Chicago: University of Chicago Press, 1929.
- [10] E. M. Hoover, *Location of economic activity*. New York: McGraw-Hill Book Company, 1948.
- [11] W. Isard, *Methods of regional analysis*. Cambridge: MIT Press, 1960.
- [12] P. Krugman, "What's new about the new economic geography?," *Oxford Review of Economic Policy*, vol. 14, pp. 7-17, 1998. Available at: <https://doi.org/10.1093/oxrep/14.2.7>.



- [13] A. Markusen, "Sticky places in slippery space: A typology of industrial districts," *Economic Geography*, vol. 72, pp. 293–313, 1996. Available at: <https://doi.org/10.2307/144402>.
- [14] G. Ellison and L. G. Edward, "The geographic concentration of industry: Does natural advantage explain agglomeration?," *The American Economic Review*, vol. 89, pp. 311–316, 1999. Available at: <https://doi.org/10.1257/aer.89.2.311>.
- [15] F. Perroux, "Note on the concept of a growth pool," *Economic Applied*, vol. 8, pp. 307-320, 1955.
- [16] M. E. Porter, *Clusters and the new economics of competition* vol. 76. Boston: Harvard Business Review, 1998.
- [17] MOSPI, "Central Statistics Office (Industrial Statistics Wing) - Ministry of Statistics & P.I, Govt. of India, 2017-18," 2017-18.
- [18] National Statistical Office, "National statistical office: Industrial statistics Wing, ASI schedule and instruction manual. Retrieved from: <http://www.csoisw.gov.in/cms/En/1024-asi-manual.aspx>. [Accessed Tuesday May 2021]," 2021.
- [19] MPAKVN, "List of units, 11 September. Retrieved from: <http://www.mpakvnindore.com/index.php?page=viewlist-unit>," 2020.
- [20] World Bank, *World development report 2009: Reshaping economic geography*. Washington DC: Wiley, 2009.
- [21] D. Puga, "The magnitude and causes of agglomeration economies," *Journal of Regional Science*, vol. 50, pp. 203-219, 2010. Available at: <https://doi.org/10.1111/j.1467-9787.2009.00657.x>.
- [22] Government of Madhya Pradesh, *Industrial promotion policy 2014*. Bhopal: Department of Industrial Policy & Investment Promotion, 2018.
- [23] MPIDC, *MP Industrial Land Bank 2019*. Bhopal, 2019.
- [24] L. STUP Consultant Pvt, "Improvement of water supply system for Pithampur Industrial area and Phase-1 of Pithampur-Dhar-Mhow Investment region. Delhi Mumbai Industrial Corridor Development Corporation, India," 2016.
- [25] EXIM - India, "EXIM- India Year Book 2017-18," Team EXIM-India," 2018.
- [26] P. A. Cluster, "Auto Cluster project-at a glance," Retrieved from: <https://www.pithampurautocluster.com/auto-cluster-project-at-a-glance/>. [Accessed 14 February 2020]," 2020.
- [27] NATRiP, "National automotive testing and R&D infrastructure project (NATRiP)," 15 September . Retrieved from: <https://www.natrip.in>," 2020.
- [28] M. E. Porter, *Reshaping regional economic development: Clusters and regional strategy*. Minneapolis: University of Minnesota, 2014.
- [29] P.-P. Combes and G. Duranton, "Labour pooling, labour poaching, and spatial clustering," *Regional Science and Urban Economics*, vol. 36, pp. 1-28, 2006. Available at: <https://doi.org/10.1016/j.regsciurbeco.2005.06.003>.