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COMPETITIVENESS OF INDUSTRIAL CLUSTERS: A COMPARATIVE STUDY OF PITHAMPUR AND INDORE CLUSTERS, INDIA

ABSTRACT

Industry clusters have proved critical for a region's economic prosperity and a nation's overall competitiveness. This study aims to evaluate and compare competitiveness performance of two select industry clusters from India viz. Pithampur Auto Cluster and Indore Pharma Cluster. For this purpose, the study has developed a comprehensive framework and a simplified methodology that incorporate both quantitative as well as qualitative data on various aspects of cluster competitiveness. It can be used as a foundation for future works related to assessing competitiveness of the clusters.

Key Words: industry clusters, competitiveness, evaluation, indicators, India

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BACKGROUND AND CONTEXT

These days, industry clusters are gaining impression all over the world because of their significant effect on the regional economy (Shaohong, Jianjun, and Qiulan, 2011). Clusters represent spatial and sectoral concentration of firms (Schmitz and Nadvi, 1999). Besides firms, interlinking of various activities that completes the value chain, along with the cooperation of private, state, Research and Development (R&D) and educational institutions within the vicinity of cluster lays the foundation of regional competitiveness. Clusters give rise to a unique regional identity with the creation of competitive advantage at the local level (Akoorie and Ding, 2009). Thus, clusters have become new paradigm of viewing competitiveness (Choe and Roberts, 2011).

Competitiveness is mainly associated with competition. However, competition alone cannot stimulate competitiveness; cooperation is also required to keep competitive advantages growing. Clusters encapsulate both competition and cooperation, nurtured within the geographic proximity. According to Arthurs, Cassidy, Davis, and Wolfe (2009), at the regional level, competitive advantage is not just a function of firm based resources but also that of local geographic business environment. The root of a cluster's competitive advantage resides at the local level dynamics. Government support extended through various forms of policy, reform or infrastructure development is also an essential component that adds to a cluster's competitiveness.

The evaluation and comparison of competitiveness has been sufficiently addressed at national, industry, and firm level. Cho and Moon (2000) in their book *From Adam Smith to Michael Porter: Evolution of Competitiveness Theory* elaborated the advancements that competiveness theory has made over a period of about two centuries. However, comparisons of competitiveness thin down significantly at the level of clusters. A few significant studies undertaken in the developed nations, notably Britain (Padmore and Gibson, 1998), USA (Colgan and Baker, 2003) and Canada (Arthurs *et al.*, 2009) primarily attempted to identify the strengths and weaknesses of the regional industry clusters in order to nurture them better. But in the context of India, similar studies are hard to find. This paper tries to bridge the gap by evaluating and comparing competitiveness of two regional industry clusters, belonging to automobile and pharma industry sectors, from the Pithampur-Indore region of Central India. These two industry clusters have played a leading role in rejuvenation of the region by transforming it into a dominant centre of industrial activity.

The historic origins of industry clusters may differ, still in the recent times cluster development has become an important policy agenda of the government for fostering regional economic prosperity. Governments from all over the world are looking forward to identify, label, and promote industry clusters. In the context of India, this could be seen from the successive industrial policies framed by the union as well as the state governments promoting regional growth through industrialisation. Accordingly, every state government has identified the areas for potential cluster development. However, cluster development in India is still at a nascent stage and very rarely attempt has been made to evaluate the performance of the clusters, more particularly to ascertain how competitive they are. Thus, the contribution of this study is both conceptual and methodological. The comparison among the select clusters is guided by a generic Cluster Competitiveness Framework developed by the authors based on a review of extant literature on industry clusters and competitiveness. The study employs the mixed methodology that incorporates both qualitative and quantitative data. It can serve as a foundational example to measure competitiveness of industrial clusters. It can be of use to the governments, businesses, administrators and lead industry associations that look forward to gauge and promote economic development of their respective regions.

INDUSTRY CLUSTERS AND COMPETITIVENESS: CONCEPTUALISATION AND THEORETICAL UNDERSTANDING

Porter (2000) defines clusters as the geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries and associated institutions (*e.g.,* universities, standard agencies, trade associations) in a particular field that compete and cooperate. While, Enright (2000) considers cluster's configuration as a group of business enterprises and non business organisations for whom membership with the group is an important element of each member firm's individual competitiveness. The idea of clusters thus inherently carries the notion of competitiveness. As such, there is no theory of clusters per say (Feser, 1998). A broad range of related theories and ideas provide a structured understanding of clusters (Feser 1998; Garden and Martin, 2005) and the determinants of its success. Cluster as a concept had its origin in 1890 as "industrial districts" in Alfred Marshall's book *Principles of Economics*. Marshall wrote that since manufacture of commodity consists of several stages, it is profitable to

have localisation of industry by having small manufacturing units and workshops. What was special about industrial districts in Marshall's model was availability of local labour and internal flexibility, which he called as external economics available to firms because of spatial conjunction. Marshall's model was limited to parallel performance of similar tasks that only captures the horizontal dimension of clusters.

Krugman (1991) stressed that agglomeration happens when economies of scale are greater than transportation costs and mobility. He reiterates that knowledge spill over, labour market pooling and availability of specialized suppliers form the "trinity" of localization. Porter (1998) mentions three reasons, which affect the competition in a cluster are enhanced productivity, stimulus to innovation and entrepreneurship. Business, state, and the institutions are three key stakeholders, which are equally responsible in presenting a cluster as a new model of public private collaboration.

Schmitz (1999) noted that new competitive advantage is the result of collective efficiency, which gets derived from local external economies. Various factors that drive efficiency are division of labour, specialization among small producers, emergence of raw material suppliers, availability of new/second hand machinery and spare parts, availability of agents/sellers, technical service providers and joint action of local producers, etc. According to Maskell (2001), cluster helps in the enhancement of learning process by fostering local level interactions.

LITERATURE REVIEW ON CLUSTER PERFORMANCE EVALUATION

In a study for the evaluation of agricultural and food processing clusters in British Columbia, Padmore and Gibson (1998) have grouped a wide range of indicators under Groundings Enterprises and Markets (GEM) Framework. Infrastructure and resource indicators are clubbed under the head "Groundings," "Enterprises" comprise of indicators related to suppliers, related industries, firm strategy and competition while access to local regional and external markets belongs to the head "Markets." The scores were recorded on a scale of ten and a heuristic competitive scoring technique was developed to reach to the results. Government's policy instruments was also analysed within the purview of GEM framework.

Colgan and Baker (2003) evaluated seven industry clusters hosted by Maine region in USA. A framework comprising of eight heads namely innovation, regional business function, entrepreneurship, financing, relationship, locational advantage, market potential

and lead industry group growth was deployed to accomplish subjective evaluation of the clusters. The limitation of the framework was that it was interpretive in nature.

Lee (2006) has analysed the state of clusters in Southern Taiwan. Case study approach was adopted through the conduct of in-depth interviews with the resource persons from firms, administrators, special institutions like universities and policy makers. The various factors covered for evaluation are infrastructure, education, tax reforms, public facilities, development funds, capital availability, skills, R&D capabilities, innovation and imitation, presence of dominant firms, proximity to suppliers, government policy, and networking over joint projects with public authorities, social capital, and macroeconomic environment.

By means of field survey and structured interviews with select firms and various other cluster actors, Arthurs *et al.* (2009) analysed the performance of eight innovative clusters under National Research Council of Canada. A generic framework for analysing cluster competitiveness was developed. The six constructs in the framework were broadly divided into two categories, three belong to input conditions for forming clusters namely supporting organization, cluster factors, and competitive environment, and the remaining three viz. cluster dynamism, significance, and interaction relate to the current performance of the cluster. The measurement was done with the help of 34 indicators arrayed under weighted sub-constructs.

In order to figure out the potential of an industry cluster in the energy sector of Albany, New York, Frisillo (2007) studied - geography, government's responsibility, entrepreneurship, Small and Medium Enterprises (SMEs), trust, networking, and cooperation. Case study approach was adopted to present the information gathered through primary means like interviews, meetings, and attending trade shows, etc.

Montana and Nenide (2008) conducted case studies on Central San Joaquin Valley and North-Eastern Indiana clusters. For assessment of the clusters, they suggested criteria that included number of employment, wage rates, job quality, and productivity (value added per employee) and growth.

Carpinetti, Galdámez, and Gerolamo (2008) designed a conceptual model for the performance measurement of industrial clusters. The model is based on the concept of balanced score card. The four perspectives of a cluster performance suggested in the model are: economic and social results, firms' performance, collective efficiency, and social value. Local gross product, workforce occupation and any result that brings

economic and social benefits were suggested as indicators under the head of economic and social results. For measurement of firm's performance, a host of financial and non financial indicators were prescribed. Measures related to the cooperative actions and external economic benefits were included under collective efficiency. Indicators related to trust and cooperation were suggested under social value. Two case studies, on the textile cluster and women's footwear cluster in Brazil were also covered in the paper. The model, however, was not validated.

In a case study of packaging clusters of Italy, Boari (2001) has stressed on the role the dominant firms play in a cluster. The lead firms are identified based on its core competencies and network of relationships in clusters. These firms influence SMEs' strength because of the multiple roles they play such as, creation of market by serving as customers, as incubators, and as change agents. Besides focal firms, the paper also highlights the role of government and educational institutions in shaping competitiveness of clusters.

The competitiveness of readymade garment industry clusters in Delhi (India), Dhaka (Bangladesh), and Colombo (Srilanka) has been compared by using modified Porter's diamond model. To perform comparison of the clusters, Choe, Nazeem, Roberts, Samarpalli and Singh (2011) used 39 attributes under 13 primary heads namely- labour, infrastructure, resources, markets, business environment, new products, industry structure, technology orientation, collaborations, value addition, supply chain, social environment and government support. Delphi method was used and scores were recorded on an ordinal ranking scale. The analysis is qualitative in nature.

Wahyuni, Ekaputra, and Tjong (2012) studied electronics industry cluster from Batam, Indonesia. They presented a three layered model consisting of factors that affect a firm's growth. The first layer indicates firm size, effective value chain, R&D efforts, while innovations form a subset of the second layer of strategic cluster initiatives. The third and the supreme layer indicates the macro economic conditions of the region. The framework is put to test using a mixed method approach that first involves qualitative data collection by means of focus group discussion and in-depth interviews with firms, associations, and government representatives. The second stage involves perception survey from 50 firms mostly from the cluster. They conclude that clusters certainly help in unemployment reduction, and find solutions to labour problems, increases transparency in regulatory matters and corporate governance practices, all of which are critical for cluster competitiveness.

Shahzad (2015) has evaluated the performance of Common Facility Centre (CFC) of ceramics cluster in Pakistan. CFC is an initiative by the government and international development agencies to provide infrastructure support for the development of SMEs. Considering the socioeconomic nature of the project and multidimensionality associated with it, the evaluation has been made by means of a mixed methodology approach. However, the model and its factors are specifically relevant to the ceramics sector and hence cannot be generalised.

The studies reviewed above present various dimensions related to the performance evaluation of a cluster. But the dimensions are quite dispersed and the rationale for comparisons differs. Some studies evaluate performance of multiple clusters within a broad geographical region, while others address sector-specific clusters spread across disparate regions. The research methodology applied also varies, though a good majority of the studies base upon either on mixed method or case study approaches. However, most of these studies suffer from lack of generalization, hence limiting their applications beyond the specific contexts in which they were developed. Hence, in this paper an attempt has been made to devise a generic model and methodology for addressing the evaluation of cluster competitiveness.

For the purpose of the present study, cluster competitiveness can be defined as the collective ability of firms and related institutions within a cluster to successfully compete with other clusters. This collective ability is derived from the benefits a cluster can reap by exercising its trading (*e.g.*, buying and selling) and non-trading relationships (*e.g.,* cooperation) with numerous cluster actors under the purview of the policy support (*e.g.*, infrastructure, tax exemptions) received from the government. Cluster competitiveness thus becomes an umbrella concept that encompasses all the causes and effects together to explain a cluster's economic success. Various dimensions that are important for the competitive success of a cluster are explained in the next section. These dimensions are arrayed in the Cluster Competitiveness Framework (see Figure 1) for guiding the evaluation and comparison of clusters. The indicators to measure these dimensions are presented in the table (see Table 1), appending the figure.

Figure 1. Cluster competitiveness framework

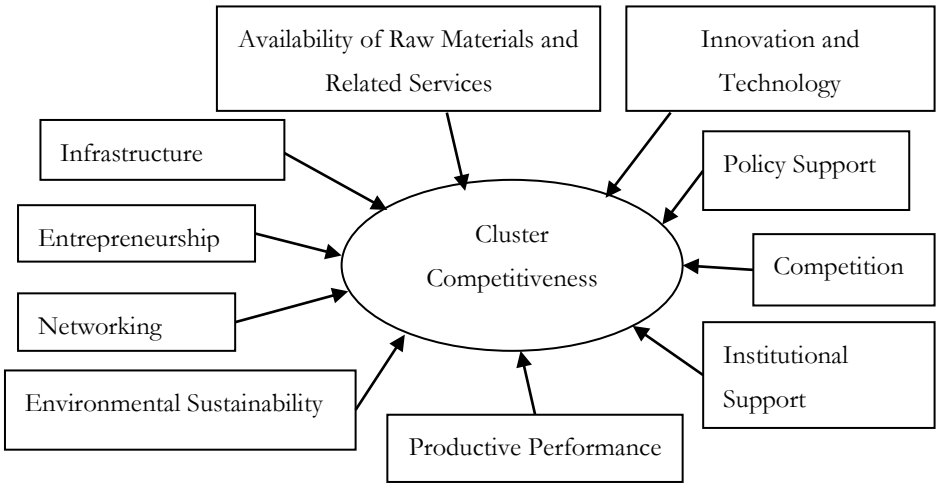

Table 1. Indicators of cluster competitiveness framework

No.	Dimension(s)	Indicators
1	Infrastructure	Quality of paved highways and roads Quality of railway infrastructure Advantage with sea port/dry port Cost and availability of electricity Quality of telecom connectivity Quality of internet availability Quality of local support services
2	Availability of Raw Materials and Related Service Providers	Quality of locally available raw material Proximity to raw material Cost of locally available raw material vs. imports Ease of access to labour Ease of access to skilled professional
3	Institutional Support	Involvement of large firms as buyers/suppliers Role of large firms in quality assessment Support from large firms in providing skills/training Quality of training and educational institutions Quality of support from R&D institutions Quality of support from industry associations
4	Policy Support	Satisfaction with local tax laws Settlement of disputes/wage issues Transparency in the system Export /trade assistance by the government Assistance/funding in R&D projects

No	Dimension(s)	Indicators
5	Competition	From the firms within cluster From firms belonging to other clusters From foreign firms/products
6	Networking	Intensity of interaction among cluster actors Intensity of engagement on joint projects Intensity of engagement in joint marketing efforts Degree of trust on other actors within the cluster
7	Entrepreneurship	Generation leading to start-up No. of spin offs by the firm Affordability of finance for new venture/up gradation Readiness to face business risk
8	Productive Performance	Capacity utilization No. of employees Turnover Profit growth
9	Innovation and Technology	New products developed or ongoing efforts New processes developed or ongoing efforts New marketing efforts No. of patents filed Annual R&D expenditure Source of technology for the unit Availability of latest technology in the cluster
10	Environment Sustainability	Annual environment management expenditure Access to ETP plants No. of ISO or Quality certifications

DIMENSIONS OF CLUSTER COMPETITIVENESS FRAMEWORK

Infrastructure

Porter (1998) in his diamond model on competitive advantage emphasises on factor conditions, which include basic and advanced infrastructure. In preparing country competitiveness reports, both World Economic Forum and International Management Development Institute (IMD) consider infrastructure as an important determinant of national competitiveness. Thus, infrastructure can be considered of equal importance in cluster competitiveness. Some studies (*e.g.*, Garden and Martin, 2005; Lee, 2006; Choe and Roberts, 2011) have considered infrastructure as the basic constituent of a cluster

competitiveness evaluation. The basic infrastructure includes roads, ports, electricity supply, telecom and internet connectivity, etc.

Availability of raw materials and related service providers

A large labour market pooling is one of the reasons and benefits of cluster formation, reiterated by Krugman (1991), after Marshal (1890). Proximity to raw material suppliers is another desired virtue in the cluster that leads to transaction cost benefits. Drawing from Marshall's (1890) trinity of reasons for cluster formation, Porter (1998) has also emphasized on the importance of related and supporting industries in a region. All these ensure availability of raw material suppliers and other related service providers within a cluster.

Institutional support

Besides business firms, institutions also make an important constituent of a cluster. These institutions include educational and training organizations, R&D institutions and industry associations, etc. Educational and training institutions bridge the gap between the demand for and supply of skills with an industry cluster. R&D institutions help firms within a cluster in boosting their innovation efforts. When it becomes difficult for individual firms, specially the smaller ones, to invest in resources, R&D organizations help in providing research support and commercialization of technology (Colgan and Baker, 2003). Industry associations facilitate the platform for raising the needs of the firms in the cluster to higher levels such as local and national government. The role of larger firms is also pivotal as they can be buyers, suppliers, customers, skill providers and to be the source of spin-off companies (Bøllingtoft, 2011).

Policy support

The foundation of competitiveness be at regional, national or industry level, lies at firms, but the onus of providing a conducive environment by means of policy support rests on the state. The government can help firms via export assistance (Wilkinson, 2006), trade assistance (Bhavani, 2006), less rigid tax structures (Lee, 2006), streamlining of administrative procedures (Frisillo, 2007) and by means of funding R&D projects (Guerrero and Sero, 1997).

Competition

Competition lies at the heart of competitiveness irrespective of the level where it is measured. It acts as a stimulus towards better performance. Porter (2000) has considered the role of competition, as one of the conditions in shaping competitiveness. It is when the closely linked competitive firms strive to enhance their efficiencies; the enhancement in the productivity is achieved. The number of players within a cluster affects competition. The role of imported products from foreign firms or from the outside cluster regions can also be considered as an important factor that intensifies competition.

Networking

The degree of social embeddedness has been considered very significant for the health of a cluster. Martin and Sunley (2003) suggest viewing regional competitive advantage beyond productivity. According to studies such as Storper (1992), Porter (1998), and Carpenitti, Galdámez and Gerolama (2008), untraded interdependencies such as degree of trust, network of cooperation are the externalities that play crucial role in the cluster competitiveness. Schmitz (1999) considers joint action by local producers significant for the achievement of collective efficiency within a cluster.

Entrepreneurship

Porter (1998) has mentioned the role of clusters in new business creation. The existence of clusters open up gateway of opportunities for various value chain partnered firms (Colgan and Baker, 2003). Some of the new start-ups come from the ex-employees or others belonging to the cluster because of their knowledge about the gaps. Smooth availability of finance and risk taking attitude make it easier to take new projects in a cluster (Garden and Martin, 2005).

Productivity

Productivity is considered key to competitiveness. It is the central outcome of competitiveness in Porter's (1990) seminal work *The Competitive Advantage of Nations*. In case of a nation, gross domestic product or labour productivity constitutes the measures of productivity. While in case of industrial clusters, the measurements related to regional GDP have been recommended for the purpose (Hill and Brennan, 2000).

Innovation and technology

Innovation makes the highest pillar of competitiveness of a firm, industry, nation and also for clusters. Within cluster, innovation gets affected by means of sophisticated buyers, learning milieu and competitive pressures (Porter, 1998). Garden and Martin (2003) highlight that clusters affect the innovative capabilities of firms by means of regional infrastructure, regulations, non traded interdependencies, public and private regional actors and similar host factors. R&D expenditure, number of patents and commercialisation of any technical or nontechnical business idea are among the indicators, which can capture the status of innovation and technology within a cluster.

Environmental sustainability

Competitiveness has been traditionally considered linked with measures related to trade, productivity, and income generation. With the increasing awareness about the concept of sustainable development, ecological protection has become an important agenda. It has now taking the central stage in the policy discourse. But sustainable future is the joint responsibility of all the stakeholders. Thus respecting the environmental concerns by means of choice or by external pressures has become the need of the hour. The World Economic Forum has, of late, introduced environmental sustainability as one of the pillars of country competitiveness. Hence, even in case of small regional industrial concentrations the significance of environment cannot be undermined.

METHODOLOGY

Mixed Method that incorporates both qualitative and quantitative research has been used in this study. In assessing competitiveness of clusters, the use of a single approach may not be adequate. Teddlie and Yu (2007) comment on the strengths and weaknesses of each single method, either quantitative or qualitative. For example, quantitative studies are good in capturing the breadth and providing numerical outcomes but at the same time fail to provide the very essence prevailing within the context of the study. Qualitative studies, on the other hand, help in gaining the in-depth understanding. As a cluster consists of several heterogeneous entities like firms of different sizes and special institutions, mixed method makes it the most competent.

Under mixed method, concurrent transformative strategy (Creswell, 2009) has been adopted. This method allows the research to be guided by a conceptual framework, to collect both qualitative and quantitative data concurrently. The weights of the two

methods are considered equal. The analysis followed side by side integration of the qualitative data with the quantitative data. Pansiri (2011) encourages social science researchers to make use of sophisticated research designs, multiple data sources and analysis for making better inferences. The utilimate objective is to allow triangulation (Jack and Raturi, 2006).

Selection of clusters

Two clusters namely Pithampur auto cluster and Indore pharma cluster have been selected from the list of industry clusters provided by The Foundation of MSME Clusters (FMC). FMC is an independent organisation established on the directives of the Ministry of Small Scale Industry, Government of India under United Nations Industrial Development Organisation's (UNIDO) Cluster Development Program. The reasons for the selection of these two clusters are mentioned in the paragraphs that follow.

Both Indore and Pithampur fall in the state of Madhya Pradesh (MP), one among the twenty nine states of India. MP is called as 'the heart of India' because of it being centrally located. The state has remained an agricultural based economy but it is worth mentioning that since 2011, its state domestic product (SDP) has been witnessing double digit growth, surpassing the growth rates of many other states in the country. The SDP growth rate was 11.08 percent for the year 2013-2014.[1] Indore is the largest city and commercial capital of MP. It is also referred as Mini- Mumbai because of its commercial dynamism. Indore has also been the host of MP Government's Global Investor's Summit, thrice.

Pithampur is a major suburb of Indore, located at a distance of about 22 kilometres. India's first green field multi product Special Economic Zone (SEZ) is functional in Pithampur. Pithampur along with Indore is known for its dominance in automobile, textiles and pharmaceuticals industries. During the era of 1980s, it was envisioned to be the "Detroit of India" being centrally located among the upcoming four automotive clusters of India. Five Original Equipment Manufacturers (OEMs), few world renowned component manufacturers and more than hundred fifty automobile component firms are present in Pithampur. It is also one among the four auto clusters in India that has received support under the Industrial Infrastructure Ugradation Scheme (IIUS) of the Government of India. Under the scheme, a Public Private Partnership body named as Pithampur Auto

[1] http://articles.economictimes.indiatimes.com/2014-03-18/news/48331049_1_capita-income-other-states-growth

Cluster Limited was formed in 2004. Unlike other prominent auto clusters in India namely Pune, Chennai, and National Capital Region, the Pithampur auto cluster, however, has not received much attention from the academic world.

The Indore pharma cluster is a decade old cluster that spans around 25 hectares stretching its reach from Indore to Pithampur. It is marked by the presence of five large and a few middle to numerous small scale enterprises leading to a count of 256 in total (Trade and Investment Facilitation Cooperation, 2012). The pharma retail market "Dawa Bazaar" of Indore is one of the Asia's biggest pharmaceutical trade houses. Another notable reason for the selection of these two clusters is that they host industries, which are technology and research intensive. The industrial significance of Indore-Pithampur, can also be ascertained by the fact that it lies on the Delhi Mumbai Industrial Corridor (DMIC), a US$90 billion project dedicated to enhance manufacturing and exports from India.

Sampling frame and data collection

The sampling frame was generated from the two industrial directories, one from the Pithampur Industrial Association and another from the Association of Industries, Indore. In the sample, the smaller and medium firms were randomly selected while the choice of five major OEMs in the auto cluster and five large firms in pharma cluster was purposive. Despite each cluster has a presence of more than 100 firms in it, the reluctance of firms to participate in the survey has been the major hurdle. Finally, the researchers could collect data from a total of 62 firms, 30 from pharma cluster and another 32 from the auto cluster. These data have been gathered by the researchers through personal visits made to the firm's office within the select clusters. The data were collected in two steps, in the first step the respondents were probed about the broad dimensions of the cluster competitiveness. The objective was to gather qualitative information by conducting open ended interviews. In the second step, post interview, the respondents were asked to complete a survey questionnaire, with majority of the questions having a five point Likert scale, ranging from 1 being low to 5 being very high. Besides firms, ten interviews were conducted at the special category institutions such as government offices, training centres and supporting organisations etc. These institutions were asked specifically about those dimension(s) of competitiveness where they play a role in the cluster. The interviews lasted from thirty minutes to about two hours and in all the interviews the respondents were either top/middle level executives, or the owners in case of small firms. The survey

was conducted for over two months during June to July 2014. The respondents were assured of confidentiality of the data. Besides interviews, some information was also gathered from the relevant secondary reports. The mean and standard deviations of the responses given in five point scale were calculated for all the indictors under each dimension and then mean values added together to arrive at the score of a cluster in a particular dimension. The researchers' observations during the field visits have also been utilized to supplement the data in drawing a few inferences.

ANALYSIS OF COMPETITIVENESS OF THE TWO CLUSTERS

Infrastructure

Quality of highways and roads

Both Indore and Pithampur are located on three major national highways along with the DMIC corridor. In 2012, the state government has funded Rs.960 million (US$15.5 million)[2] for improving the infrastructure conditions specially the road conditions in the region. From the personal observation made during the field visits, it has been noticed that the roads in Pithampur are in excellent condition. This indicates the auto cluster is enriched with good road conditions. While in the case of pharma cluster, the roads condition is found to be less than satisfactory. One of the respondents from a pharma manufacturing firm located in Indore responded, "we are here since 1991 and the government took twenty-five years to provide us with the roads." On the contrary, a government official reported that "government spent Rs.12.5 million (US$0.201 million) to build a 7 kilometres length road and the entrepreneurs even do not wish to bear the monthly maintenance cost of Rs.1,000 (US$16.03); they are totally dependent of the government." The quantitative scores means and standard deviations (see Table 2) are in line with the information gathered from the respondents. Lower mean and higher standard deviation of pharma cluster can be attributed to the dispersion of firms in different industrial areas within the same cluster.

Quality of railway infrastructure

Indore is well connected to all the metro cities of the country. However, Pithampur does not have a direct railway line. The nearby railway stations from Pithampur are Mhow and Indore, which are located at a distance of about 11km and 22km, respectively. One of the

[2] 1 US $ = Rs 62 approximately for the year 2014.

respondents informed that a new proposed railway line between Indore and Dahod (Gujarat) will pass through Pithampur, which will enhance the connectivity of the region. This is reflecting in the lower mean score of the auto cluster as compared to that of pharma (see Table 2).

Proximity to dry/sea port

Pithampur has the dry port facility from the Container Corporation of India Limited. This has made availability of containers at Pithampur thus providing boost to the export-import from the region. The presence of a SEZ along with this dry port has fastened the export/import operations in the area. One of the respondents from an OEM firm from Pithampur reports that "55 percent of our raw materials and parts come from international supply but weight wise it is only 10 percent, the rest 90 percent by weight comes from domestic sources. It is because countries like China supply extremely light weight and cheaper components and with the port facility here the imports have become an easy and cost effective affair for us." A senior administrative official from MP Government informed that pharma followed by engineering goods tops the list of exports from the region. The quantitative scores reveal that pharma cluster is more benefited by the presence of dry port (see Table 2).

Table 2. Comparison on infrastructure

	Auto Cluster Mean (Std. Dev.)	Pharma Cluster Mean (Std. Dev.)
Quality of paved highways and roads	4.52(0.65)	3.60(1.45)
Quality of railway infrastructure	2.60(0.63)	4.52(0.51)
Advantage with seaport/dry port	4.17(0.88)	4.80(0.41)
Cost and availability of electricity	4.52(0.62)	4.20(1.14)
Quality of telecom infrastructure	4.52(0.62)	4.45(0.74)
Quality of internet availability	4.47(0.62)	4.46(0.74)
Quality of local support service	4.52(0.62)	4.33(0.72)
Total Score	29.32	30.36

Availability, quality, and cost of electricity

Uninterrupted supply of electricity is essential for industrial operations. However, power should be made available at affordable prices also. In response to a question on electricity availability, one of the respondents from a small scale pharma firm laments about the supply of power when he says "power cuts are very common here; it hampers our operations besides the electricity tariff is high in the region, the government should do

something to provide electricity to small scale units at cheaper rates like the Uttrakhand[3] Government does." To verify the validity of the respondent's opinion, the electricity tariff rates in the two Indian states have been cross checked, and it was found that average tariff rate in Madhya Pradesh for the year 2014 was Rs.5.30/Unit (US$0.08/unit) as compared to Rs. 4.30/unit (US$0.07/unit) of Uttrakhand. A government official claimed that separate lines for power transmission have been installed for uninterrupted power supply to industrial units.

Quality of telecom, internet, and local support services

On the quality of telecom connectivity, internet and local support services like logistic providers etc. no specific concern was raised by the cluster firms. On the availability of water, one of the respondents from Pithampur revealed that though pharma manufacturing requires a lot of water, adequate supply of water is not there. He says "there exists only one water reservoir 'Sanjay Jalashay' that bears the load of meeting the entire industrial requirement, water supply is an area of concern for industries in this region."

Availability of raw materials and related service providers

Labour and skilled professionals

Automotive manufacturing is a labour intensive activity and therefore automobile industry requires a good quantity of labour force along with skilled professionals. The stakeholders revealed during discussions that there is more demand for skilled labourers than engineers. As the demand and supply ratio of the region is 15:10, the two skill imparting institutions in the cluster are not able to cater to the industry's labour demand despite 100 percent placement of their trainees in local companies. While in case of pharma industry the need of labourers is not as high as in the automotive industry, it requires a significant proportion of skilled professionals, for which the respondents have shown satisfactory disposition (see Table 3).

Raw material supply

Steel, plastics, aluminium, glass, cast iron, rubber, etc. are the major raw materials used in the automobile manufacturing. Most of the respondents from the auto cluster reported

[3] Uttrakhand is one among the 29 states of India.

that not more than 10 to 15 percent of their raw materials are locally sourced. Majority of the materials come from outside clusters like Chennai, Bangalore, and Delhi or from international sources. The main reason being lack of quality adherence by local suppliers, cost is a secondary issue here. For the firms having head offices outside the cluster or for those having foreign parent or partners, it becomes compulsory to get the raw materials sourced from their nominated vendors, leaving the scope for local suppliers to minimal. Only one major OEM reported that they are in the process of developing a composite local vendor system in order to save their cost and time.

In case of pharma cluster, Active Pharmaceutical Ingredients (APIs) constitute the main raw material. As pharma companies are extremely quality conscious, the firms engaged in formulations were found not very keen in buying APIs from within the cluster. The reason is the absence of required quality from the local suppliers. During interviews, they revealed their clear preferences for buying from the outside locations such as Maharashtra, Gujarat, etc. The poor ratings on the three indicators of this parameter reveal the weak preferences for buying raw materials from within the cluster (see Table 3).

Table 3. Comparison on availability of raw materials and related service providers

	Auto Cluster Mean(Std. Dev.)	Pharma Cluster Mean (Std. Dev.)
Ease of access to labour	4.52(0.62)	4.86(0.35)
Ease of access to skilled professionals	4.52(0.62)	4.93(0.25)
Proximity to raw material	2.50(1.09)	2.21(1.05)
Cost of local raw material vs. imported	2.73(1.09)	2.92(0.73)
Quality of locally available raw material	2.80(0.67)	2.33(1.11)
Total Score	17.08	17.25

Institutional support

Role of large firms as buyers and suppliers

The auto cluster has presence of five major OEMs and two large component manufacturers, which are part of the global network and markets. The firms were asked about the role of large firms as buyers and suppliers within the cluster. The large firms specially the OEMs are found acting as the major customers of the ancillary units. These firms buy components related to braking and suspension, engine parts and drive parts. In pharma cluster, there exist five dominant firms of Indian origin but these firms have not shown any favourable attitude to buy APIs from the firms within the cluster. For firms

engaged in manufacturing of formulations, the role of large firms as buyers and suppliers was found irrelevant. These firms are selling their own registered products in the market and they do not have any association with other firms of the region. The wider difference in the mean scores confirms the trend prevalent in the two clusters (see Table 4).

Support from large firms in quality assessment

In auto cluster, the supplier firms confirmed that they get regular assistance from the OEMs in quality guidelines, inspection, in the resolution of issues relating to operations. In case of pharma cluster a lower mean can be interpreted as an outcome of low involvement of the large firms with the suppliers from the cluster (see Table 4).

Role of large firms in skill development

Large firms have been found serious about the significance of skill development among the employees. This is not only for meeting their own requirements, but also for adding to the skilled workforces of the cluster as a whole. One of the Human Resource Heads at a large firm in automotive cluster says that "we take imparting training to our employees as our utmost priority. Our employees are not only trained in one role infact we train them on rotational basis so that they can understand the skills at all the levels." The large firms in the pharma cluster also confirmed their seriousness towards training of employees (see Table 4).

Quality of training and educational institutions

In the auto cluster, inspite of presence of many engineering colleges even in the vicinity of the cluster, firms are found looking more towards specialized training institutes. The two training institutes in the cluster are the Indo German Tool Room that is governed by the Ministry of Micro, Small and Medium Enterprises, Government of India and the Advance Technical & Industrial Training Center that is governed by PACL since 2007. The respondents were found reporting that the engineering graduates from the local engineering colleges don't have the same level of skills as possessed by the students of these two institutions because of the presence of practical content in their curriculum. The trainers at the Indo German Tool Room informed that they are proactive in gathering industry requirements by means of periodic surveys to industries. For the pharma cluster, four pharmacy colleges in the state are satisfactorily meeting the industry needs. The MP

Pharmaceutical Council ensures to maintain uniformity and quality among the degree/diploma courses offered by the institutions across the state.

Quality of support from R&D institutions

The presence of R&D institutions is pivotal for any regional concentration of industries to emerge as a innovative cluster. Unfortunately, there is no unique and dedicated R&D institution within the select clusters, despite both the clusters being listed as innovative clusters, under government schemes.

Quality of support from industry associations

The Pithampur auto cluster has a well established industry association named Pithampur Auto Cluster Association that has been led by eminent industrialists. The auto cluster firms seem contented with the role of the association in raising their issues to the higher authorities in the government. Also the Public Private Partnership model under PACL has been considered effective in the cluster development program. The present infrastructure of the cluster is the outcome of the positive role played by the associations on a continual basis. In pharma cluster, the information obtained during the interviews reveals that there exists no common platform in the name of an association. The local pharma manufacturers are passive in having an active collaboration with any of the national level associations too. This could be one of the reasons for local firms not being able to garner sufficient resources and support from the government. The quantitative scores are listed in the table below (see Table 4).

Table 4. Comparison on institutional support

	Auto Cluster Mean (Std. Dev.)	PharmaCluster Mean (Std.Dev.)
Involvement of large firms as buyers/suppliers	4.47(1.32)	2.35(1.69)
Support from large firms over quality assessment	4.52(1.32)	2.93(1.75)
Support from large firms in skill generation	4.76(0.56)	2.93(1.75)
Quality of training and educational institutions	4.11(1.05)	4.53(0.63)
Quality of support from R&D institutions	1.00(0)	1.07(0.26)
Quality of support from industry associations	3.06(1.24)	2.70(0.88)
Total Score	17.45	14.06

Policy support

Local taxes and incentives

Generally, the local governments support the cluster development activities through an array of tax and non-tax benefits. However, most of the respondents from both the clusters except some small scale pharma firms do not hold any strong opinion in this matter,. A senior administrative official from the MP Government informed that the MP Government is following investment and development friendly policy for the manufacturing units at Pithampur. He also mentioned that the local government provides incentives like subsidised land and tax benefits to the firms in Pithampur. Some of the incentives of the MP Government are listed below:

- During 1990 to 2004, the government offered land at 50 paisa per square feet, between 2004 to 2009 the land prices were raised to Rs.7.50 (US$0.12) per square feet, from 2009 onwards the land was offered at Rs.75 (US$1.2) per square feet and the prevailing rate(in year 2014) is Rs.150 (US$2.4) per square feet
- The investors in the region were given capital subsidy of 25 percent
- Tax holiday of 150 percent is given for 9 years
- Interest subsidy of 5 to 7 percent
- Reimbursement of the amount spent on ISO certifications and
- 50 percent exception on sales tax

Wage issues/disputes

In response to the issue of wages, the auto cluster firms confirmed that on an average Rs. 8,000 (US$128) per month is paid to an operator level permanent labourer at the start of job career. Some firms also employ contractual labourers but they are not sure about the wages such labourers get because they pay lump sum amount to the contractors who supply labourers. The labour management relationship has been stable within the cluster. Unlike the other three Indian auto clusters (Pune, Chennai, and NCR), no incidence of strike has been reported so far in Pithampur over wage issues. For the pharma cluster this question was found not of that significance as in the case of auto cluster because of low labour intake in pharma production.

Transparency in the administrative system

The auto cluster firms did not report any problem related to transparency and governance issues. This issue was found critical in the pharma cluster. The respondents bemoan about the delay in the procedures. One of the respondents states, "Obtaining a license here is a

difficult task, we look at Ahmedabad Pharma Cluster where one can get a license approved in a day's time via online process, but here the situation is different."

Export/Trade assistance

To promote exports from Pithampur, a SEZ has been established. The SEZ spans over 1,113 hectares of land. The container depot managed by Container Corporation of India (CONCORE) is spread over 6.57 hectares of land within the SEZ for smooth export/import related operations along with the dry port facility. The auto cluster firms and the pharma firms located in the SEZ premises are getting benefited. Pharma cluster respondents informed that only in case of small firms the government sponsers the group(of five manufacturers or more) visits made for export/trade purpose.

Assistance/Funding in R&D projects

In both the clusters, SMEs form a larger proportion of all the firms. The SMEs particularly the smaller units are less inclined to their own R&Ds because of the various limitations including lack of funds. Whereas the notable lead firms in the clusters are large enough in terms of capital availability and their global reach, to seek any special cooperation from the government. Despite this fact, it is sad to discover that in both the clusters there exist no single dedicated R&D Centre, neither have they got any funds from the state to pursue R&D. Although in case of Indore pharma cluster, the State Government in collaboration with industries has been trying to bring out a common R&D centre and testing facilities since 2009, but it has not been materialized till the time we made our last visit to the cluster. The means and standard deviations (see Table 5) indicate the variation is scores on the variables under governance and policies in the clusters.

Table 5. Comparison on policy support

	AutoCluster Mean (Std.Dev.)	PharmaCluster Mean(Std. Dev.)
Satisfaction with local tax laws	3.30(0.77)	2.67(1.23)
Settlement of dispute/wages	3.82(0.80)	3.93(0.70)
Transparency in the administrative system	3.76(0.75)	3.33(1.04)
Enforcement of Labour Regulations	4.11(0.92)	3.86(0.74)
Trade/Export assistance by the government	2.69(0.62)	3.67(0.59)
Assistance/funding in R&D projects	1.18(0.72)	2.53(0.74)
Total Score	18.86	19.99

Competition

In the auto cluster, the interviews reveal existence of competitive spirit among commercial vehicle manufacturers as well as the ancillary units. As most of smaller firms of the cluster operate on a thin profit margin, the competition prevails in containing the production costs. Besides this, delivering customised products by meeting quality standards and time schedule also unleashes competition among the cluster firms. External factors like rising cost of raw materials, lower quotes (price) by competitors can intensify the competition from within the cluster or outside. But competition in a cluster does not remain confined to price, cost or quality alone and it spans over other aspects, such as winning trust for repeat purchases and establishing long term buy and sell relationships. For larger firms, though the main rivalry is in the finished goods segment (*i.e.*, product market), the inside cluster competition can be witnessed in the input market. In the case of pharma cluster, the competition seems to be higher and it emanates from all the three sources viz. within cluster, outside cluster and foreign/imported products. The reason being most of the firms whom we contacted during the survey are engaged in the production of generic drugs, the most competitive segment of pharma industry. The quantitative scores indicate (see Table 6) the degree of competition prevailing in the select clusters.

Table 6. Comparison on competition

	Auto Cluster Mean (Std. Dev.)	Pharma Cluster Mean (Std. Dev.)
Competition from firms within cluster	3.88(1.65)	3.27(1.53)
Competition from firms belonging to other clusters	3.23(1.43)	3.40(0.91)
Competition from foreign firms/products	2.41(1.06)	3.33(1.34)
Total Score	9.25	10.0

Networking

Networking among the cluster actors is a critical success factor for competitiveness. Accordingly, this aspect was probed during the survey and interviews. While the respondents from both the clusters admitted about frequent interactions among themselves but these interactions were mostly informal in nature. The discussions with the respondents revealed that the formal interactions take place only for the exchange of organisational policies, matching of employee salary structures, and gaining knowledge about the credibility of vendors, etc. It rarely takes place for business purposes of higher order such as sharing any joint project on production or R&D or efforts in

marketing/purchase. The degree of trusts on each other seems to be low and it is varying widely among the cluster actors (see Table 7). The networking is less effective in both the clusters and comparatively it is low in the pharma cluster. One of the respondents from the pharma cluster told "in our field nobody can be trusted."

Table 7. Comparison on networking

	Auto Cluster Mean (Std. Dev.)	Pharma Cluster Mean (Std. Dev.)
Intensity of interaction among cluster actors	3.94(1.33)	2.93(1.34)
Intensity of engagement on joint projects	1.70(0.56)	1.20(1.04)
Intensity of engagement in joint marketing efforts	1.00(0.56)	1.20(0)
Degree of trust on other cluster actors	2.70(0.74)	1.53(1.40)
Total Score	9.34	6.86

Entrepreneurship

During the interviews with the auto cluster firms, the stories of spin off from the large firms were heard several times. The spin offs were generally in the related business areas. In many cases, the spin-offs are from the ex-employees who started their new business ventures with support from the firms they once worked with. While most of the firms in the pharma cluster, started in the decade of 1990s, are by the first generation entrepreneurs, those in the Pithampur region came up because of the SEZ initiative by the government. A government official informed about a special provision of the Reserve Bank of India (RBI) that lends at base rates to MSMEs belonging to industrial clusters. This indicates the influence of cluster milieu in encouraging new business creation. The firms from the clusters also conveyed the determinations in facing business related risks (see Table 8).

Table 8. Comparison on entrepreneurship

	Auto Cluster Mean (Std.Dev.)	Pharma Cluster Mean (Std.Dev.)
Affordability of finance for new venture/up gradation	4.00(0.89)	4.53(0.51)
Readiness to face business related risk	3.76(1.03)	4.26(0.70)
Spin off from firm	3.00(0.25)	1.00(0.26)
Total Score	7.76	9.79

Productivity and financial performance

In order to gaze the level of productivity, firms have been asked about their capacity utilization, number of employees, turnover and profit growth, but limitations lie in

quoting such data as they cannot be verified from any source. Finally, by referring the data available from the secondary sources, the productivity of the clusters have been calculated (see Table 9).

Table 9. Comparison on productivity

Cluster	Employment	Annual Sales (Rs million)	Productivity (Sales in Million Rs/employee)
Auto*	25000	20000	0.8
Pharma**	20000	32000	16

*Bhaskaran (2012), ** MSME Development Institute (2012)

Innovation and technology

The respondents were tight lipped on the issues of the R&D expenditure, patents and innovations in general. The reason disclosed is that the head office(s) of these firms are located at bigger cities like Mumbai, Gurgoan, Pune, etc. The R&D activities are controlled by the head offices. The plants located at the clusters (*i.e.*, Pithampur/Indore) are primarily meant for manufacturing only. One public listed large pharma firm was found to be an exception in this matter as it maintains its own R&D centre at Indore. This firm has three more centres at different locations. In an answer to the questions related to the sourcing of technology, acquisition by means of licensing, alliances or joint ventures were mentioned by the respondents, but none of the firms confirmed to incubate R&D within the cluster.

Environment sustainability

The waste water from pharma and auto industries contains harmful chemicals. Thus, installation of Effluent Treatment Plants (ETP) is mandatory in such cases. The firms in both the clusters were asked about the expenditure on ETP plants and environmental audits. The firms are generally found conscious about safety, health and environmental (SHE) issues. These firms also admitted incurring some expenditure for this. The discussions revealed that the for firm's own ETP plants, the cost of installation ranges from Rs.0.5 million to Rs.1.5 million in case of small/medium firms. The large firm respondents were not sure about the exact amount of expenditure but from most the discussions, it is revealed that in general these firms spend about 1-2 percent of their total cost on the environmental protection that also includes health issues of the employees.

There exists a dedicated hazardous chemical waste disposal facility at Pithampur, hosted by PACL for its members. This facility in the auto cluster has relieved the pain of the firms for moving and disposing hazardous waste to other states like Gujarat. The pharma cluster does not have any common CETP, as there is no industry association to raise such a demand. The cluster firms confirmed about obtaining the ISO certifications, some of them also possess WHO-GMP certifications.

SUMMARY OF FINDINGS AND IMPLICATIONS

Reflecting on the qualitative information gathered via interviews, observations, and opinion survey coupled with limited secondary information, the following inferences can be drawn about the comparative assessment of competitiveness of the select clusters.

- In terms of infrastructure and availability of raw materials and related service providers, the two clusters can be considered equally competitive. The scores are at par on almost all the sub dimensions. However, some discrepancies still could be observed with respect to the condition of roads and electricity availability. The reason being unequal focus by the government across the industrial areas of the state. There is a need for proper communication and bounded vision between business enterprises and the government.
- On the issue of institutional support, Pithampur auto cluster appears to be more competitive. However, the support on R&D emerges as a major predicament in both the clusters. The scores of the pharma cluster are relatively low on most of the sub dimensions. Formation of an active industry association at local level may provide a relief in figuring out the issues of the firms in the cluster.
- In terms of policy support, the clusters are equally competitive. Despite being under the same State Government, the Indore pharma cluster faces more problems on issues such as transparency and bureaucratic hurdles as compared to the auto cluster. The government is also not giving adequate thrust on promoting R&D efforts within the clusters.
- Competition is affecting both the clusters almost in equal terms.
- Networking is a self driven activity for firms in any cluster. Unlike the auto cluster, where dialogues happen between OEMs and ancillary units over commerce as well as for exchange of information on other issues, the pharma firms in the Indore cluster are not communicating much with each other. The joint efforts on

various activities which can add a ripple of benefits to the cluster as whole are more or less missing.

- Both the clusters are fostering new business creation, though the pharma cluster scores relatively high on entrepreneurship development.
- Based on the secondary data, the pharma cluster is found more productive in comparison to auto cluster.
- Innovation and technological up gradation efforts are disappointing in both the clusters.
- The firms in both the clusters are seen to have concerns for environmental issues.

The benchmarks on cluster competitiveness are not easily available in case of emerging countries like India. The concept of competitiveness is relative in nature. One can at best make comparisons across clusters based on a set of select parameters. We have attempted the same in this paper through development of a cluster competitiveness framework with various dimensions and several parameters (*i.e.*, indicators) in each dimension. From the results of the quantitative evaluation undertaken here, the aggregate mean scores of all the parameters (excluding productivity) for Pithampur auto cluster stands at 109.06, which is marginally higher than the total score (99.31) of the Indore pharma cluster. This means, overall, the Pithampur Auto Cluster is more competitive as compared to the Pharma Cluster at Indore. The qualitative information brings up to surface some of the insights latent under the brand "cluster." The idea of cluster promotion has been adopted from the success of the developed nations, with the underlying objective of ushering regional economic prosperity. However, not all "agglomerations" make a "cluster," because cluster is a collective concept wherein "harmony" among the individual entities is more critical than mere "proximity" of a geography. This harmony can bring in positive results for the individual units in the cluster and at the same time for the cluster as a whole. Thus, the policy makers should take a great deal of care before labelling an agglomeration as an industrial cluster.

An important understanding that emerges from this study is that the very nature of the industry to which a cluster belongs plays a critical role in shaping competitiveness by way of fostering the trade and non-trade ties among the cluster actors. The theory on clusters says that competitiveness is a socio economic phenomenon that is nurtured through numerous economic and social interactions within the cluster. However, in

practice, the trade linkages prove to be the first step in bringing the cluster actors together. Following the continued interactions, mutual trust can be developed which leads to unpriced benefits like knowledge spill over, learning etc. Besides trust building, it encourages different forms of partnerships for a common goal like forming an association, joint negotiations for resource acquisition, sharing of common facilities etc. Because of this cycle, the cluster competitiveness can be called as "economic- socioeconomic" phenomenon. Thus, the industry that has wider value chain can accommodate more trade partners in its geographic vicinity. This leaves for higher scope of generating trade and non-trade ties that, in turn, enhances competitiveness in a cluster. This could be one reason why, in the present case, the auto cluster which is functioning in a more synchronised manner is found to be in a higher competitiveness plateau as compared to the pharma cluster. The auto industry at Pithampur was seen more engaged in "buy and sell" relationships by outsourcing various manufacturing activities with multiple partners within the cluster. In contrast, presence of value chain partners was very much limited in the case of Indore pharma cluster. Here, the dependency of pharma (manufacturing) firms on their trade partners was more or less confined to buying of raw materials, mainly the APIs.

The policy makers should undertake regular performance evaluation of the clusters in order to take corrective actions in time. Sometimes, variations in cluster performance might occur even when the clusters are promoted by the same agency (*e.g.*, state government) and they are located in the same region. This was very much apparent in the present case. Therefore, while extending the policy and other supports, the cluster promoting agencies must keep in consideration the specific needs of a cluster. For example, if there is a large number of export oriented firms in a cluster, establishment of a dry port may be a good idea, whereas if the cluster has a mass of SMEs, subsidies and tax relief could be a wise strategy. Spreading awareness on the cluster benefits can help initiate voluntary actions and linkages to grow in the cluster. The government's vision on clusters should be aligned with those of the stake holders, primarily the firms, for harnessing competitive advantages within a cluster.

CONCLUSION

The pursuit of economic prosperity of the regions has provided "clusters" a front seat in the regional as well as national economic policies. India has adopted this contemporary trend of success from the developed nations. Thus, development of clusters is placed high

in the economic agenda of the country. As clusters are receiving higher attention, evaluation of their economic competitiveness becomes paramount. In this direction, the contribution of the present paper is both conceptual and methodological. A generic framework with conceptually grounded indicators and a simplified methodology, within the data limitations has been presented. The study accomplished the evaluation and comparison of two select industrial clusters viz. Indore pharma cluster and Pithampur auto cluster, both are from the state of Madhya Pradesh in India.

It is found that even though the clusters are in contiguity, there exist variations in their competitiveness performance. The results of our quantitative assessment shows that the auto cluster is more competitive than the pharma cluster, though in terms of aggregate scores the difference between the two is not very high. The qualitative data, however, reveal a lot of interesting information that explain what can influence competitiveness in a cluster. One such factor is the nature of the industry, which can play a significant role in stimulating various dimensions of competitiveness, such as leadership, networking, competition, and entrepreneurship within the cluster. The wider the value chain of an industry, more is the scope for trade and non-trade benefits to flow in making a cluster competitive. The second important factor is the government's role in perceiving and executing supports to the clusters. It can be inferred that building a competitive cluster is a "push-pull" attempt. The "push" factor works through the state's intervention by means of envisioning a cluster, infrastructure development, arranging skill trainings for the workforce, promoting exports, etc. While "pull" requires the voluntary participation by the various cluster actors, notably the firms of the cluster. In the context of developing nations, the responsibility of augmenting cluster competitiveness also lies on the larger firms that can act as guide to the smaller firms in the matters of technology adoption, skill enhancement, quality adherence, generation of spin offs, etc. As Cooke and Morgan (1998) rightly mentions, "clusters cannot be created by political injunctions or through mere physical proximity. Clusters form as a result of a self selection process on the part of firm which sees advantages in exploiting their interdepencies for mutual benefit, a process which can be encouraged but not ordained by public agencies." This study involving two industrial clusters from India is a humble beginning in the direction of analysing cluster competiveness, yet it unravels many interesting facets on competitiveness that might be helpful in the future development of clusters, especially in the emerging nations.

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