CHAPTER- II
REVIEW OF LITERATURE

The objective of review of literature is to have understanding of the concept of cluster, its evolution and implications. A detailed and thorough review of literature will lead to classification of different cluster concepts. This chapter will cover trend towards industrial clustering as an international phenomenon. Many studies have been conducted in India and other countries in the area of cluster. The chapter covers the concept of clustering and reasons for the growth of cluster. A brief review of some studies is as follows:

2.1 Studies on the Concept of Cluster and its Advantages

Marshall (1890) made the first attempt to explain the economies of agglomeration. He noted the tendency for specialized companies to cluster together in such a way that it produced geographical concentration of expertise and economic activities which he called Industrial Districts. The author found four sources of agglomeration advantage which are the advantage of thick market for specialized skills, development of specialized firms with backward and forward linkages associated with large markets, existing ancillary trades and knowledge spillover.

Weber (1929) in his book ‘Theory of Location of Industries’ has given first theory on industrial location and defined various factors which affects selection of the best location and leads to minimization of the cost. The author was of the opinion that entrepreneurs would locate in the areas of least cost with regard to factors such as transport and labour and therefore benefit from economies of scale.
Hoover (1948) explained that agglomeration of firms and businesses of same or different industry is important for the success of an individual firm and identified three types of economies: economies of localization, economies of urbanization and internal returns to scale. Economies of localization precisely follow Marshall’s three sources of agglomeration i.e. labour market pooling, supplier specialization and knowledge spillover. Economies of urbanization, explains geographic proximity of establishments across different industry sectors by emphasizing the beneficial effects to firms and businesses from existence of large, diverse market predominant in large metropolitan areas. An internal return to scale, an internal location specific factor, accrues through existence of large and specialized factors of production. These economies help the firms in enjoying production cost advantages and technology improvement for the establishments.

Porter (1998) accentuated that cluster increases productivity and innovation. The author stated that cluster effects competition in three ways: firstly, it helps in increasing the productivity of the firms located in that area; secondly it increases the chances of innovation and third it helps in establishment of new firms within the cluster. The firms gain competitive advantage through knowledge dissemination, relationship and motivations that are not enjoyed by the firms located in distant places.

Barrel and Pain (1999) analyzed whether the agglomeration of firms is able to attract Foreign Direct Investment in the country or not. The authors analyzed the effect of investment made by US multinational firms in Europe. It was found that agglomeration of firms attracts Foreign Direct Investment leading to transfer of technology and knowledge and in turn enhance the growth of a country.
Ricci (1999) examined the relationship between agglomeration and specialization. The author developed a two country three sector model. It was found that economic integration leads to the reduction of agglomeration patterns. An increase in comparative advantage did not necessarily leads to increase in specialization.

Visser (1999) explored the advantages and impact of clusters by comparing the performance of clustered firms with the firms who are not part of cluster. The research was conducted in the garment industry of Lima, Peru. It was found that the clustered firms have advantages of cost reduction and information spillovers in comparison to the firms who are not part of the cluster.

Passiante and Secundo (2002) compared the geographical clusters with virtual clusters where the geographical space is replaced by virtual space. It was found that activities in the geographic space and virtual space are similar and there was no difference between the features of clusters, whatever was the space.

Boari et al (2003) analyzed the level of rivalry within the cluster and its advantages to the firms located in cluster. The research was conducted in the packaging valley cluster of Italy. It was found that firms located within the cluster limit their rivals inside cluster only. The presence of rivals within cluster entitled the firm to perform better than the rivals located outside the cluster.

Corolleur et al (2003) studied the localization effects in biotechnology sector in France and the effect of proximity on the growth and development of firms located in the cluster. It is found that localization effects within France were strong and proximity enhanced the growth of clustered firms. The authors suggested that French firms could be divided into four groups: ranging from group one to group
four. Group one included firms having high potential for growth, group two for the firms serving niche market, group three included subsidiaries of various firms and group four included the firms that are acquired. It was found that the localization effect is different in all the four groups.

Szymoniuk (2003) described some examples of the local partnerships and rural clusters in the Lublin region in Eastern Poland. It was found that the clusters were more stable in comparison to traditional market sectors. The managers of the clusters were professionals; highly optimistic and innovative. There was need for such managers in the rural areas of this region. There were lots of employment opportunities available in rural cluster of Poland and author suggested that young generations should utilize this opportunity.

Yehoue (2005) investigated whether cluster is able to attract foreign direct investment than dispersed firms. The author applied the concept of game theory to analyze how both the existence of cluster and policy reforms play an important role to attract foreign direct investment. It was found that the presence of cluster only can make foreign direct investment so profitable that investors can afford to ignore the effect of policy reforms.

Ghatak et al (2005) explored whether the development stage of small firm affects its decision for selecting a location. It was found that the small firms which were more developed select a more dynamic region and were able to survive in such region in comparison to less developed firms. A small firm considered the following variables while selecting a location: the legal status of firm, introduction of technologically improved goods, use of subcontractors, intention of the firm to increase its output and wages.
Ciappei and Simoni (2005) examined sports shoe cluster of Montebelluna to identify the factors affecting new product development practices of the firms located in cluster. One way ANOVA and Pearson correlation was applied for the present study. It was found that the team approach, customer orientation and use of advanced technology affects the development of new product.

Ruan et al (2006) explained how small and medium companies have overcome the capital barrier and have obtained rapid development. The authors conducted the study in the Cashmere Sweater cluster in Puyuan. It was found that various firms in the cluster obtain the capital required for daily operation by having the advantage of individual social capital and endogenous capital in the cluster. Each firm acquired funds with the help of its social relations. The credit could be obtained from vertical and horizontal links created within the cluster.

Kuchiki (2006) discussed the necessity of regional integration for cluster-to-cluster linkages in the Asian triangle of growth. The author expected that an Asian triangle of growth consisting of China, India and ASEAN countries will be formed in the coming years. It was found that the rate of growth and expansion of the firms located in this region is much more than the firms located in any other region.

Llach et al (2006) analyzed the strategic similarity of the firms located in the Textile cluster of Girona in order to find out the innovation profiles of the firms. The research was conducted on 22 firms located in the cluster. In-depth interviews were conducted to collect both qualitative and quantitative data. It was found that location of firms in the cluster affects its technological and strategic positioning.

Alecke et al (2006) explored degree to which German manufacturing industries are agglomerated due to natural advantages or spillovers. Regression
analysis was applied to measure the geographic concentration of German industries. The authors found that there was no relationship between agglomeration and high technology related businesses among German manufacturing industries.

Oliver and Garrigos (2007) scrutinized the resources and capabilities of a cluster. The study evaluated whether the cluster’s unique set of resources and capabilities could influence the performance of cluster. Research was conducted in European ceramic tile clusters located in Spain (Castellon) and the Italy (Emilia-Romagna). The result indicated that the clusters had a unique set of resources and capabilities and a certain performance level and these unique resources affect its performance.

Okada and Siddharthan (2007) analyzed whether the firms working in cluster perform better than firms outside the cluster. The research was conducted in two auto clusters in India- Nation Capital Region and Chennai. The logistic model and multivariate analysis was used to analyze the data. The authors found that the firms which were part of cluster perform better than the firms outside it.

Kukalis (2010) investigated 194 firms from the semiconductor and pharmaceutical industries. The performance data of these industries for the last thirty one years was analyzed. The aim of the study was to investigate whether the firms located within the cluster perform better than the firms which were not the part of cluster. The author found that there was no difference between the performances of both types of firms. The result suggested the need to review the cluster theories.

Brown et al (2010) conducted a study in electronic cluster of Christchurch, New Zealand to identify various marketing externalities present in the cluster. The authors identified four types of externalities; Supply side, demand side, Active and
Passive. Supply side and demand side means input to firm and output to the market. Passive externalities occurred due to the location of firm while active externalities occurred because firms in cluster work together in networks. It was found that all the firms in cluster obtained benefits from the passive externalities while 40 per cent of firms benefited from active externalities. The authors suggested that the firms should employ its resources in active externalities rather than passive externalities, as passive externalities could occur even without intervention of the public.

2.2 Studies on the Innovating Capabilities of the Cluster

Baptista and Swann (1998) examined whether firms located in the industrial clusters innovate more than firms outside the clusters. The authors conducted research on 248 manufacturing firms during the period of eight years from 1975 to 1982. The relationship of employment and innovation was also studied. It was found that the firms which were located in those clusters where own sector employment was strong, innovated more.

Simmie and Sennett (1999) conducted a study to investigate the factors affecting innovation in the cluster. Factor analysis was applied to find out the set of factors which affects the innovative capacity of the firms. The authors found that internal strengths and resources of the firm, possibilities of large agglomeration and position of the region as an international trading gateway were critical factors enforcing innovation in the cluster.

Romijn and Albu (2002) analyzed the factors which affect the innovation capacity of the firms and further the effect of proximity in creation of networks among the clustered firms. It was found that the suppliers and service providers help in improving the innovation capability of a firm. But no effect of geographic proximity was found in the creation of networks.
Po-Hsuan Hsu et al (2003) examined the interaction between the industrial clusters and incubators. The authors explained how industrial cluster affected incubators and how incubators worked as a component of industrial cluster. Based on Porter’s model for industrial clusters, authors proposed a model to explain this interaction. The authors studied the interaction between The Industrial Technology Research Institute (ITRI) Incubator and the Hsinchu industrial cluster. It was found that the presence of clustering effect in the Hsinchu industrial cluster contributed to the development of ITRI Incubator's.

Preissl (2003) argued that clusters are an important tool to enhance the process of innovation but now a days’ globalization has lead to the concept of virtual cluster. The research was conducted in automotive cluster in Germany. The author suggested that both local as well as virtual clusters can help in improving the innovativeness of cluster.

Chang (2003) investigated innovative activities and inter-organizational cooperation of integrated circuits and biotechnology sectors across Taiwan and UK. A postal questionnaire survey was conducted during a period of two years from 1996-1998. The study revealed that various types of inter-organizational cooperation were positively associated with the firm’s innovative performance. The networking capability of the firms with suppliers, customers and knowledge creating organizations asserted a decisive influence on its innovativeness. The collective and distributed innovation process also indicated that a firm’s innovative performance was not only shaped by internal research and development effort but also by external links with other firms and knowledge creation organization. Firms with more active role in establishing inter-organizational linkages increased their chance to innovate.
Bonte (2003) analyzed the impact of agglomeration forces on innovative performance of aeronautic firms in Northern Germany. The study was conducted in 111 firms within the cluster and 68 firms outside the cluster in Hamburg and Bremen. The study revolved around three questions:

- Did the firms working in cluster benefit from proximity in comparison to the firms working from distant areas?
- Which agglomeration forces affected the innovative performance of firms?
- Did these factors prevail only in the cluster and did not affect the firms working from distant areas?

It was found that the linkages between different firms, suppliers, customers, universities put an impact on innovations. Further, the author found that firms in close proximity enjoyed some benefits which were not available to the firms located outside the cluster.

Aharonson et al (2004) examined the ways, firms benefit from knowledge spillovers in industrial clusters, contrasting the effects to firms not located in cluster. The study was conducted on 675 Biotechnology firms located in Canada between January 1991 and December 2000. The authors found that clustered firms were eight times more innovative when located in clusters with strong specialization in their own technology. Co-location with firms which were strong in technical specialization raised its own productivity.

Aylward and Glynn (2005) conducted a research in Australian wine Industry to investigate whether the innovative activity of SMEs increased with change in different levels of cluster development. For the purpose of study, the authors divided the cluster into two parts, one was highly developed cluster and other was less developed cluster. It was found that intensity of cluster’s development and innovative performance of SMEs was directly related.
Giuliani et al (2005) analyzed the relationships between clustering, global value chains, upgrading and sectoral patterns of innovation in Latin America. The research was conducted on 12 clusters of Latin America. The authors found that the location of firms in cluster provided help in upgrading their integration in global value chain. The sharing of knowledge and collective efficiency of the firms in the cluster improved their performance.

Sakurai et al (2006) studied the role of industrial cluster on the efficiency of rice milling and its effect on improving the quality of rice. The study was conducted on Kumasi cluster of Central Ghana. It was found that the rice millers in Kumasi cluster adopted more advanced technology in rice milling. Innovation within the clusters helped in improving the quality.

Gilbert and Kusar (2006) examined the effect of industry clustering and knowledge spillover on the innovative activities of a firm located in the cluster. The research was conducted on software industry located in various geographical regions across U.S. It was found that presence of active rivalry and information about the competitor’s action motivated the firms located in the cluster to innovate more than the firms which were not a part of the cluster.

Vicedo et al (2007) analyzed the factors affecting innovativeness of the firms located in the cluster. The research was carried out in Valencia textile cluster of Spain. It was found that the firms could have improved their ability to innovate by establishing relationships with other firms and various external agents. The firms enhanced their productivity by sharing information with other firms located in the cluster.
Bahlmann et al (2008) investigated whether clustering of firms help in innovation of new ideas. The study was conducted in Amsterdam Media cluster. It was found that linkages between the entrepreneurs within cluster helped in the generation of new ideas and knowledge. International events such as trade fairs and conferences increased the interaction between the entrepreneurs and helped in transmission of information.

Lecocq et al (2009) studied 59 biopharmaceutical firms in US and Japan to analyze whether the firms located in the cluster perform more research and development activities than firms located outside the cluster. It was found that the firms located within the cluster innovate more than the firms located outside it. The agglomeration externalities present in the cluster increased the productivity of the firms and in turn enhanced their ability to innovate.

Chiu (2009) examined the effect of networking on the innovativeness of firms located in the optoelectronics cluster of Southern Taiwan Science Park. The author found that innovativeness of firms which were part of networks was more than the firms which were low in networking. The author suggested that the firm should enhance its network in order to succeed in a cluster.

Zheng and Bacchus (2010) analyzed the factors affecting the innovativeness of firms located in Shaxi garment cluster of Zhongshan, China. A novel method was developed by the authors for measuring the innovative behavior of the firms. It was found that competitor action and cooperation in the supply chain, Government policies and membership of various Government and industry associations affect the commitment of the firms to innovation.
2.3 Studies on the Networking Pattern of the Cluster

Rabellotti (1999) discussed the impact of trade liberalization on the cooperative behaviour of shoe cluster in Guadalajara. The research was carried out in 63 firms engaged in manufacturing of shoes. It was found that after liberalization, the cooperation between firms had increased. The authors suggested that cooperation helps in increasing the performance of firm.

Schmitz (1999) investigated the reasons for creation of trust in the clusters. The author found that trust was initially built due to socio-cultural relationship between the firms located in cluster and later because of investments made by the firms in another. The relationship and interaction between the firms located in the cluster created trust among them and they started sharing information with each other.

Bell and Albu (1999) analyzed the effect of knowledge sharing on the competitiveness of cluster. The authors concluded that knowledge sharing is directly related to the competitiveness of cluster and if cluster wants to improve its competitiveness then it should concentrate on accumulation of knowledge.

Mytrlka and Farinelli (2000) carried out survey in spectacle cluster in Belluno, Italy and wooden furniture cluster in Jutland, Denmark to study the effect of knowledge sharing and linkages on the performance of firms located in the cluster. It was found that local linkages were necessary to compete in the market. It was not necessary that cooperative culture lead to linkages and learning. There was a need of well designed policies and support structures in order to stimulate new habits and practices.
Mitra (2000) investigated the learning process in innovation and factors affecting the process of innovation among small and medium enterprises (SMEs). It was found that the firms which were a part of cluster were more likely to innovate because of creation of strong network among them. Innovation occurred due to interaction of technologies, people, associations, organization and research institutions.

Sandee and Rietveld (2001) carried out research in the tile cluster in Central Java, Indonesia. The producers in the cluster had shifted from traditional kiln to hand press technology. The authors analyzed the innovation adoption process in the cluster. It was found that the networking and collaboration within producers lead to quick and easy adoption of new technology. The sharing of information and social learning within the cluster provided help to the firms in the adoption of innovation.

Burger et al (2001) investigated the impact of target market (either domestic or international or both) on the nature of contracts and interaction in the clusters. The research was conducted in sugar industry and furniture industry in Central Java. It was found that a firm which was targeting an international market relied more on formal contracts and strong marketing within the cluster in comparison of the firms dealing in the domestic market. The authors suggested that the Government should frame policies to motivate the firms to move to international market.

Keeble and Nachum (2002) conducted a survey in small and medium enterprises engaged in engineering and management consultancies in Central London and South West England to find out the benefits enjoyed by the firms which were a part of cluster and compared them with those which were not part of cluster. It was found that clustered firms learn new things from each other by sharing knowledge
and had a global access to the network of clients than the firms which were not a part of the cluster.

Steiner and Hartmann (2002) compared five clusters from Australia to analyze the pattern of learning within each cluster. It was found that each of the clusters had adopted a different pattern of learning according to their specific products and technology. The authors suggested that there should be multidimensional approach so that specific characteristics of each of the cluster can be identified.

EU India Cross Cultural Innovation (2002) conducted a study on various industrial clusters in India, Germany and Italy to analyze the working of each cluster. In German clusters, firms continuously learn and innovate and have strong relationships with each other. The Italian clusters were more competitive and cooperative. The Indian clusters were informal and the firms in cluster did not share information among each other.

Winden and Woets (2003) investigated the role of local institutions in the functioning of ICT clusters. It was found that there were strong strategic linkages between companies and knowledge infrastructure. The composition and specialization of the cluster influence the institutional networks setting. Research and development and technological clusters had a heavier institutional support than the other clusters. The traditional local institutions did not provide required services to the cluster.

Adeya (2003) explored the type of training available in the Information and Communication Technologies clusters in Kenya and Ghana. It was found that most owners, managers and employees acquired skills within the clusters. The master
Craftsmen were the main agents that acquire and upgrade the skills within the cluster. Training within the cluster was very limited as the formal training institutes were less.

Zook (2003) assessed the importance of knowledge in economic development and the factors by which it is created and transferred. The author conducted the study on the structure of knowledge used by venture capitalists at the time of development of internet industry. It was found that proximity of firms helped in creation of networks of firms which in turn lead to the creation and transfer of knowledge.

Giuliani and Bell (2004) examined the influence of firm’s absorptive capability on the functioning of knowledge system within the cluster and its connection with knowledge outside the cluster. The authors conducted the study in the wine cluster in Chile and applied social network analysis to find out various roles performed by the cluster actors. It was found that the knowledge flows within group of firms because of advanced absorptive capacities. The authors suggested that firms should take various measures to create links even with the firms outside the cluster.

Krafft (2004) enunciated how the cluster and its various components helped in reduction of communication barrier within the cluster. The research was conducted in info-communication cluster in France. The author found that the economic development of cluster depended not only on the vertically related layers but also on the relationship between these layers. In order to accelerate the process of information sharing, the leader firms or big players operating in the industry must be actively involved in the process.
Pietrobelli and Rabellotti (2004) analyzed the impact of collective efficiency on cluster upgrading. The study was carried out in eleven clusters in Latin America. It was found that collective efficiency helped in up-gradation of the cluster but some inter-cluster differences emerge because of the specific features of learning, innovation and industrial organization of the different sector groups. Clusters and value chains belonging to different groups of industries followed different patterns of collective efficiency, modes of chain governance and upgrading. The collective efficiency reached different levels in different groups of sectors.

Giuliani (2004) explored the process of acquisition and diffusion of knowledge among the firms in cluster. Sociometric analysis was applied to compare the knowledge system of two clusters; both of them were at different stages of development path. It was found that the knowledge system of the laggard cluster was weak and highly disconnected while in the case of emerging cluster, the knowledge system was more connected.

Vicente and Suire (2004) investigated the process of ICT clusters formation. For the purpose of research, the authors distinguished informational externalities (and observational learning) from network externalities (and interface learning). It was found that informational effects played an important role in the formation of ICT clusters where as network effects helped in stability of clusters.

Power and Lundmark (2004) focused on the extent of labour mobility in the cluster and the role of labour mobility in the dissemination of knowledge. The research was carried out in information and communication technology cluster in Sweden. It was found that the rate of mobility within the cluster was more than the firms which were not a part of the cluster. Further, the mobility of labour helped in transferring the information within the cluster.
Arita et al (2005) analyzed the impact of intra-regional cooperation between the firms and institutions on the growth of firms in the three industrial clusters in Japan. The author found that there was a positive relation between the regional cooperation and the growth rate of firms. The collaborations with various universities and firms positively affect the growth of firms, though the pattern of cooperation in all the three clusters was different.

Rosenfeld et al (2005) conducted a study on spatially concentrated industries in the Eastern part of Germany. The study concentrated on three dimensions of economic clusters and industrial agglomeration:

(i) There was concentration of certain industries in Eastern part of Germany.
(ii) The existence of business networks was found,
(iii) A number of innovative activities were found in each region.

It was found that there was a need for regional policy for East German. Strategies should be framed in order to support network activities or innovative competences.

Langen (2005) explored the efforts of firms and Government in order to improve the quality of workers in three seaport clusters. The authors found that the quality of training was different in different clusters. The presence of managers as well as leader firms helped in the improvement of quality of education and training among the workers.

Malmberg and Power (2005) investigated the process of knowledge creation in the cluster. It was found that knowledge in the cluster was created through interaction between various organizations, increased competition, presence of rivalry and spillover. The author stated that rivalry, labour mobility and knowledge spillover
created from informal groups were one the important advantages of clusters over organized inter-firm transactions and collaborations.

Giuliani (2005) analyzed the reasons that some industrial clusters grow while others were not able to grow at the same rate. It was found that mere presence of the firm in cluster did not assure its growth and development. The clusters which were able to obtain and utilize information and adopt innovation had grown at much faster rate than the other clusters where firm did not absorb and diffuse knowledge.

Kocak and Edwards (2005) explored the impact of inter-firm cooperation on the performance of firms who were part of cluster. The study was conducted in the Turkish shotgun industry undergoing period of recession. It was found that firms could achieve success and growth by cooperating with the other firms located in cluster. Cooperation and clusters, if properly managed, could lead to better performance of the firm, creation of new jobs, reduce the effect of recession and creation of environment of mutual trust.

Beerepoot (2005) stressed the importance of subcontractor for the circulation of knowledge in industrial clusters. Empirical research had been undertaken to identify the role of subcontractors in the diffusion of knowledge and the form of knowledge which was transmitted more easily than others. The data was collected in Barangays in Pampanga, Pulungbulu in Angeles City and Santa Ursula in Guagua. The evidence from the study demonstrated that subcontractors had a major role in diffusion of knowledge in everyday operations in the cluster. Subcontractors mainly absorbed knowledge by monitoring similar producers and through conversation with workers.
Raghavendra and Balasubrahmanya (2005) analyzed the impact of learning on the acquisition of technological capabilities of various firms in the cluster. The research was conducted on 98 firms during 1999-2001 in two foundry clusters in South India. It was found that there was positive relationship between learning mechanisms and technological capabilities. The knowledge sharing and collective learning within the cluster enhanced the technological capabilities of the firms. Further, the authors found that acquisition of higher technological capabilities improved the performance of the firms located in the cluster.

Aleman (2005) analyzed the conditions that enhanced collective learning within agro industry cluster and Salmon aquaculture cluster in Chile. The author highlighted the interaction between the Government, local firms and multinationals located in the cluster and studied the condition that enhanced their collective learning. It was found that various building institutions helped in improving the coordinated learning among the firms located within the cluster.

Patti (2006) examined petrochemical and environment cluster of Louisigna to find out the advantages for the firms which created relationship with the local suppliers and customers. It was found that presence of local suppliers helped in decreasing lead time as well as the cost of production of clustered firms. The close relationship between the firms and suppliers helped in improving the quality of products and ensure new product and process development.

Watts et al (2006) studied the effect of characteristics of owners on the firms which were located in clusters. The research was conducted in small metal working firms in Sheffield, UK. It was found that owners who were more experienced and had earlier worked for large firms were more interested in sharing information with
other firms. The authors concluded that characteristics of owner directly affected the level of embeddedness between the firms.

Oyeyinka and Lal (2006) conducted a study in Suame Cluster in Ghana and Kamukunji and Kariobangi Clusters in Kenya to analyze the role of institutional infrastructure and collective learning in adoption of new technologies. It was found that clusters were dominated by micro and small enterprises. The authors suggested that there should be participation from private sector as well as Government to enhance the process of learning within clusters. These institutions should provide needful skills in order to optimally utilize the technologies.

Hendry and Brown (2006) examined the interactions of firms in UK biotechnology cluster with other firms, suppliers, customers and research institutes. The authors conducted two surveys, one at regional level and one at national level. It was found that linkages at regional level helped in generation of new ideas, development of new product but linkages at national level were helpful in manufacturing, distribution and marketing activities.

Xu and Naughton (2006) studied the evolution of the Waterloo Region Canada’s Technology Triangle (CTT) through Tech Map, a genealogical chart of the development of cluster. It was found that transfer of knowledge, network between firms and collective learning played an important role in the evolution of high technology clusters.

Vermeire and Gellynck (2007) investigated the network characteristics which helped in improving the competitiveness of food industry of European Union. The qualitative as well as quantitative data was collected from the stakeholders of regional food networks in EU. Factor analysis and discriminant analysis were
applied to find out the factors and further to test the ability of the factors to predict
the competitiveness. It was found that education and industry-service links greatly
affected the performance of food region.

Douglas et al (2007) examined the emergence and effects of technological
agglomeration in the clusters of Netherlands and Grenoble. It was found that
technology platforms and their co-location were necessary for nanotechnology
research. Technological agglomeration helped in formulating the networks which in
turn lead to convergence of scientific discipline.

Filippov and Yurkovsky (2007) discussed the prospects of cooperation
between two energy clusters of Russia and Finnish. The study aimed to find out the
benefits enjoyed by a cluster from its internalization. It was found that Finnish firms
obtained benefits of accumulated knowledge, technology, inexpensive qualified
workers and innovation potential from Russian cluster.

Srivastava and Gnyawali (2008) analyzed whether the availability of
resources to the firms affect their ability to obtain benefits from clusters and
networks technological resources. The research was conducted in semiconductor
firms in U.S. It was found that firms which were having plenty of resources obtained
more benefits from network technological resources while the firms which had less
resources did not get benefits from technological resources present in the cluster.

Felzensztein and Gimmon (2009) investigated the factors affecting the
development of marketing cooperation among various firms located in the cluster.
The study was conducted in Salmon farming cluster of Scotland and Chile. It was
found that the presence of trust and respect could enhance inter firm market
cooperation. Social networking helped in improving the cooperation between the firms in marketing activities.

Niu (2010) examined the relationship between the firm’s involvement in the cluster, knowledge sharing and level of trust among the firms. The data was collected from four international clusters in USA, China, Taiwan and Sweden. Multiple regression analysis was applied to analyze the data. It was found that the involvement of the firm in the cluster enhanced its ability to obtain and practice knowledge. The creation of trust within the firms acted as a mediator between the involvement of the cluster and knowledge obtaining.

Thomsen and Nadvi (2010) considered whether the demand for compliance of corporate social responsibility resulted in collective action in export industries of developing countries. For the purpose of study, the authors distinguished between highly visible value chains where there were international brands and less visible value chains where pressure comes from less dominant lead firms, national/international regulatory bodies, media etc. In highly visible chains, authors studied garment cluster of Bangladesh, cut flower cluster of Kenya, Garment cluster of Cambodia and soccer balls cluster of Pakistan. In less visible chains, the authors studied Tiruppur dyeing and bleaching sub cluster, Pallar valley tannery cluster and Jalandhar soccer ball cluster. It was found that the local collective institutions, especially industry associations played an important role in collectively responding to corporate social responsibility pressures. In all seven cases reviewed by the authors, it was found that respective industrial associations were the key players in implementing collective responses.

Staber (2010) investigated the effect of trait based imitation and frequency based imitation on the strength of identification with the cluster. The research was
conducted on 146 firms located in five textile clusters in South West Germany. Regression analysis was applied to analyze the data. The author found that even in the absence of interaction between the firms located in cluster, they were able to sustain their identification. Both types of imitations strengthen the identification of the firms.

Felzensztein et al (2010) studied the role of co location of firms in the development of marketing externalities. The study was conducted in Salmon farming cluster in Scotland and Chile. It was found that several externalities such as availability of customers, increased goodwill and joint participation in trade fairs and exhibitions were present in the cluster while externalities such as access to new technology and referrals to other firms were not present in the cluster.

2.4 Studies on the Effect of Cluster on the Pattern of Employment

Isaksen (1996) found that the regional clusters experience relatively larger job growth than average in the industry. The author had conducted the study in furniture industry and the electronics industry in Norway. It was found that regional clusters generally are internationally competitive. Regional clusters in Norway experienced a positive trend in employment in comparison with the other sectors located in the country.

Isaksen (1998) discussed whether it was possible to encourage local industrial development and to pursue local industrial policies in the face of an increasingly globalized economy. Further, the author studied the employment growth of potential regional clusters in Norway. The author found that regionalization was a tendency taking place parallel to globalization and identified a series of potential regional clusters in Norway, many of which displayed positive developments in employment when compared to the same sectors on a national level.
Barkley et al (1999) determined the role of industry agglomerations on industry-level employment change in non-metro areas of the United States. The findings indicated that industry agglomeration were associated with both larger employment gains in the areas with growing industrial employment and larger employment losses for areas with declining employment.

Fallick et al (2005) compared the inter-firm mobility of college educated male employees in Silicon Valley’s computer industry to similarly educated employees working in computer clusters in other cities. It was found that there was higher rate of job hopping for college educated men in Silicon Valley’s computer industry than in computer clusters located out of the state.

Wheeler (2005) investigated the effect of location of the firm in cluster on the wage dispersion. The research was conducted in metropolitan areas in the U.S. between 1970 and 1990. It was found that there was inverse relation between employment and wage inequality. As employment in the industry increased, the wage inequality decreased.

Blasio and Addari (2005) emphasized the advantages incurred to workers working in industrial clusters and explored whether return to education and seniority a way of differentiation. The authors found that working in an industrial cluster reduced the returns to education but did not affect the returns to seniority. On the other hand, industrial agglomeration positively affects the chances of getting employment as well as starting a business.

Rocha and Sternberg (2005) studied the effect of cluster on entrepreneurship. The research was conducted in 97 regions of Germany. For the purpose of study, the authors considered the difference between industrial agglomeration and cluster. It
was found that cluster had an impact on entrepreneurship while industrial agglomeration did not.

Feser et al (2008) aimed to study the effect of clusters on employment growth as well as new business start ups in technology based clusters in Appalachian region. It was found that cluster enhanced the setting up of new business but was not associated with employment growth.

Hellmanzik (2009) analyzed the relationship between mobility of artists and factors affecting their decision to locate in artistic cluster of Paris and New York. The authors found that with the passage of time, the mobility of artisans decreased. The artisans preferred to travel at various clusters rather than locating permanently in a specific cluster.

Weng and Mcelroy (2010) discussed the reasons for attraction of employees to industrial clusters and the effect of human environment within the cluster on attracting the human resources and then retaining them. The research was carried out in four industrial clusters in China. A one way analysis of variance (ANOVA), hierarchical regression and the structural equation modeling (SEM) was applied to analyze the data. It was found that there was difference in attraction of four clusters in the study. The human resource environment directly affects the attraction of employees into the cluster and their retention.

Huber (2011) synthesized the extent to which research and development workers benefit from being located in Cambridge information technology cluster to find out cluster. The author found that research and development workers did not get any benefit from being located in the cluster. The reason behind non beneficial
cluster was that there was no need to interact with other firms and research institutes. The workers did not find any opportunity to interact and learn.

2.5 Studies Analyzing the Problems of Cluster

Ceglie et al (1999) conducted a study in various clusters of Honduras, Nicaragua, Mexico and Jamaica. The authors found that main hindrances in the development of cluster were the following: lack of attitude of firm and institution for cooperation, transaction costs that were required to be incurred to identify suitable network partners and absence of incentives for the implementation of common projects.

Roy and Biswas (2007) investigated various reasons for under performance of various Indian clusters. The authors found that major reason for underperformance of Indian clusters was lack of cooperation among various actors in the cluster. The authors argued that there were many factors responsible for the above problems as lack of knowledge sharing, informal communication, lack of initiative in developing collective goods and services, absence of understanding of benefits of mutual cooperation and trust.

2.6 Studies on Measures to Improve the Competitiveness of the Cluster

Albaladejo (2001) appraised the factors affecting the competitiveness of the firms located in the clusters of Latin America. The clusters studied were the Mexican Footwear cluster of Guadalajara and Leon, Sinos Valley cluster of Shoe makers in Brazil, the Garment cluster of Gamarra in Peru, the Brazilian Granite industry cluster in Cachoeiro de Itaperimim, Brazil and the Peruvian cluster of Shoe makers in Trujillo, Peris. It was found that collective action was not sufficient for the firms to
face competition but to become competitive, policies should be framed beyond the strategy of joint action.

Madsen et al (2003) explored whether the firms located inside the cluster are more productive than the firms located outside the cluster. For the purpose of study, data was collected for a period of 11 years from 1990-2000. The paper found a positive effect on the competitiveness of firms located in the cluster and found them more productive than the firms located outside the cluster.

Anders (2005) argued that location in cluster help firms to exchange, acquire and generate new knowledge. The author found that rivalry, labour mobility and knowledge spillover were important advantage of spacial clustering than organized inter-firm transactions and collaborations. Rivalry, labour market dynamics and knowledge spillovers played an important role in the firms and cluster competitiveness.

Akoorie and Ding (2009) examined Datang hosiery cluster of Zhejiang to study the features of industry clusters. The case study methodology and data triangulation techniques were used to study the cluster. It was found that industrial clusters help in regional economic development by improving competitive advantage and creating regional specialization. The cluster of Datang had grown as a result of local entrepreneurial climate, effective networking and support from local Government.

Watchravesringkan et al (2010) conducted a study in Thai Apparel cluster to assess the competitiveness of the cluster. The study revealed the existence of four determinants supporting the cluster which were basic and specialized factors,
sophisticated and demanding consumer market, presence of interdependent economic agents, strategies and structure of Thai companies and domestic rivals present.

Hoffmann et al (2011) examined the competitiveness of Brazilian ceramic tile cluster. A qualitative study was undertaken. The authors found that the firms located in industrial cluster had larger access to strategic resources such as latest information, collective goodwill and knowledge transfer. These resources were not available to those firms who were not part of the cluster.

2.7 Studies on the Factors Determining the Growth of the Cluster

Porter (1990) argued that success of a firm or a specific region was a result of four factors; first the nature of firm’s strategy including attitude towards competition. Second set of factors were input conditions such as capital and human resources, natural and physical inputs, technology, and infrastructure. Third set of factors were demand conditions i.e. need and wants of consumers. Fourth set of factors were presence of related or supported industries such as suppliers and competitors. Porter explained that where all these factors were present, the firms located in cluster had a competitive advantage.

Doeringer and Terkla (1995) found that benefits of agglomeration economies were one of the important factors that lead to the development of cluster. According to them, firms that locate in a specific region could benefit from pool of skilled labour, lower transaction cost and lower transportation cost. Agglomeration economies helped in increasing competition which encouraged transfer of information and technology among the firms. The transfer of technology and information in turn lead to the growth of cluster. Apart from above factors, authors explained that face to face interaction between the firms also helped in the promotion of a cluster. In the process of interaction, firms share information, technology and
infrastructure and collaborate to provide specialized services. This collaboration increased the strengths of cluster and promoted its growth.

Rosenfeld (1997) explained various factors that affect the success of cluster. These factors were research and development capacity, labour force knowledge and skills, proximity to suppliers, capital availability, human resource development, access to specialized services, access and proximity to machine and tool builders, intensity of networking, social infrastructure, innovation and shared vision and leadership. The author argued that if these factors were strengthened, a cluster would have a greater success rate.

Based on the above factors, Rosenfeld also explained actions which should be taken to strengthen the clusters and explained that region should improve support services to provide specialized education, training, research and development facilities and other industry specific services. Incentives should be given to local businesses to create associations, inter firm collaborations and multi firm sponsorship. In order to improve buyer seller relationships and linkages, there should be development of supply chain associations.

Clara et al (2000) analyzed the role of Business Development Services in the growth of cluster. The authors presented the experience of UNIDO Cluster Development Project in India. It is found that Business Development Services helped in the fast growth of cluster.

Malley and Egeraat (2000) investigated whether the indigenous industry of Irish was able to form cluster and if it was linked to cluster then whether it was able to grow faster. The authors found that there was little evidence about the presence of cluster in Irish industry and there was no linkage between the growth of industry and occurrence of cluster.
Orsenigo (2001) discussed the development of biotechnology industry in Lombardy. The author discussed what kind of factors might explain the lagging behind of the Italian biotechnology industry and the United States. It was found that policies could affect the working of cluster. The development of a strong research base and strong technology competencies helped in the growth of cluster.

Bair and Gereffi (2001) explored the role of US buyers in promoting blue jeans industry in Torreon, Mexico and study the effect of networks on the performance of cluster. It is found that the entry of foreign firms and creation of networks directly affected the performance of cluster. The arrival of new buyers in the cluster upgraded the performance of individual firms as well as the cluster. Further, the creation of networks between the firms and subcontractors provided help in sharing information as well as orders within them and improved their performance.

Lee (2001) conducted a study on innovation clusters in Korea to examine the formation and development of these clusters. It was found that the production clusters were built either due to investments made by large chaebols or by Government policy while research and development clusters were initiated by the Government. The author found various obstacles in the development process of clusters. Lack of participation by the Government, regional imbalance between research and development functions and production functions were major hurdle in the growth of cluster.

The author suggested that Government should develop various universities and research institutes for the development of cluster. The local Governments should strengthen their administrative capability to optimally utilize the resources and invest in the development of various research institutes.
Orsenigo (2001) explained various factors affecting the development of new firms in biotechnology cluster of United States. These factors were strong scientific, technological and industrial base, interaction between industrial and academic institutions, favourable financial climate, strong regulatory environment and protection of intellectual properties.

Nicolini (2001) investigated the factors affecting the size and performance of clustered firms. The study was carried out in the industrial district in Lombardia. The author found that effect of home market, transportation cost and cooperation among various cluster actors directly affect the performance of firms located in the cluster.

Berry et al (2002) analyzed the role of subcontracting in the growth and development of cluster of various small and medium enterprises in Indonesia. The author found that various firms in furniture industry and garment industry had become successful because of subcontractors. It was found that the clustered firms were more able to adopt innovations as compared to firms not working in cluster.

Tully and Townsend (2002) discussed the behaviour of Small and Medium Enterprises (SMEs) belonging to two manufacturing sectors within the English Region of the West Midlands. One sector was a part of cluster while the other sector was not associated with the cluster. The authors aimed to study the effect of inter-firm relationship on the growth of cluster. It was found that there was a positive relationship between increased inter-firm relationships and a more successful business i.e. the relationship between the firms helped in the growth of cluster.

Chakravorty et al (2003) studied the industrial location of Mumbai, Kolkata and Chennai to find out the reason of location of industries within a metropolitan area and the extent to which localization economies influence the clustering process.
It was found that there were a number of factors that were considered while selecting the location. These factors were occurrence of any event in the past, expansion of metropolitan area, rules and regulations of state Government and features of the industry.

Enrico and Grandi (2004) investigated the effect of culture and cluster based activities on the functioning and development of firms located in the cluster. The research was conducted in textile cluster of Aleppo. The authors found that culture alone could not be able to affect the growth of cluster. It was essential but not a compulsory condition for the growth of clustered firms.

Leibovitz (2004) examined biotechnology cluster in Scottish cities. The study concentrated on the major factors affecting the development of biotechnology firms. The author found that size and diversity of labour markets, presence of research institutes, provision of adequate infrastructure and services, national and international rules and regulations, external links and historical legacies plays an important role in the development of biotechnology cluster.

Borrelli et al. (2005) emphasized the importance of economic and social factors in determining the competitiveness of firms located in the cluster. By applying an agent-based simulation model, the authors analyzed the influence of informal social factors on the performance of cluster in comparison to different competitive environment. It was found that the firms in which competition, cooperation and trust were present performed better than the firms which did not cooperate with other firms.
Feldman et al (2005) provided a model for cluster development. The authors explained that entrepreneurs were an important factor in the cluster formation and they played an important role in the development of a cluster. In order to fulfill their individual interest, entrepreneurs acted in collaboration with other firms and lead to formulation of an environment which was the best for all the firms located in the cluster. In this way, entrepreneurs help in formulation of innovative industrial cluster.

Haussler and Zademach (2006) studied the evolution of biotechnology cluster in Germany between the periods of 1996 to 2003 to examine the relationship between characteristics of clusters and its performance. The authors found that the success of cluster depends upon two factors: first the group to which it belong and second the adaptation of firms towards external environment. The ability of the firms to adopt a balanced ratio of science and capital improved its performance and in turn that of cluster.

Gurrieri and Petruzzelis (2006) analyzed the factors influencing the cooperation between the firms present in cluster. The research was conducted in pottery cluster of Grottaglie, Italy. It was found that social networking, open technological system and flow of information increased the level of cooperation between the firms located in cluster.

Kumar (2006) discussed the factors affecting the growth of sports goods industry of Punjab. Factor analysis was applied to find out various factors affecting the growth. These were: location, technology, Government policy, degree of mechanization, raw material availability, bank finance, product diversification, business tours by the entrepreneurs, advertising, brand image, research and development, protection against foreign competition, technical literacy, quality
control measures, awareness of changing world demand, awards and incentives, training programs and power supply.

Visser and Langen (2006) analyzed the factors affecting the growth of cluster in terms of export performance, collective activities and investment. The research was carried out in Chilean wine industry. The authors found that the quality of governance in cluster directly affected the growth of exports. The co-location had increased the growth and reduced the problem of competitiveness. It was seen that in the cluster under study, business associations played a key role. Cooperation and trust were present among the firms.

Aleksandar et al (2007) studied the impact of cluster approach on competitiveness of small and medium enterprises (SMEs) to examine the adoption of cluster approach to help small and medium enterprises to face challenges because of liberalization and globalization. It was found that cluster policy puts a positive effect on the performance and growth of SMEs.

Wennberg and Lindqvist (2007) investigated the effect of firms located in cluster on the growth and survival of new firms. The study was carried out in telecom and consumer electronics, information technology, financial services, pharmaceutical and biotech sectors of Sweden. The authors found that the firms located within cluster positively affected the existence of new firms as these firms provided more taxes, more wages and more employees in comparison to firms located outside cluster.

Chang and Oxley (2008) examined the effect of innovation by the clustered firms on total factor productivity in Taiwan. The authors applied Krugman’s Gini coefficients and location Herfindahl index to measure the effect. It was found that the geographic innovation positively affect the total factor productivity.
Boari et al (2008) analyzed the effect of rivalry on the performance of various firms located in the cluster. The authors used an agent based model where rival firms design their strategy according to the behaviour of competitors and their learning process. It was found that the firms located within clusters were more innovative and learned new things in comparison to the firms located outside cluster.

Evers (2008) conducted a study to find answer to question that in spite of globalization, why firms established their plant within the cluster area. The author found that minimization of transportation cost was the main factor influencing the existence of clusters even in the era of globalization. Further, proximity increased the ability of firms to innovate as they used to share ideas, product and services.

Bojar et al (2008) analyzed the role of foreign direct investment in clusters and the impact of foreign direct investment on the development of cluster. It was found that foreign direct investments were conducive to the process of concentration of new companies around the foreign investors and this makes the structure of cluster stronger. It was found that foreign direct investment brought new technologies and made the firms more innovative.

Gao et al (2008) examined the effect of local factors related to development zones and technology promotion on the performance of firm. The study was conducted in the development zones in Jiangsu Province along the Yangtze river. The results showed that the primary reasons for location of firms in the development zones were not clustering benefits but are attraction of policy rents and infrastructure brought by the Government policy. Once located in the zone, the clustering effect emerged later on.
Ruan *et al* (2008) emphasized the role of finance in promotion of industrial growth. The authors conducted study in a cashmere sweater cluster in China. The authors found that rural industrial clustering lowered down the entry barriers of initial capital investment through division of labour. Within the clusters, enterprises acquired credits from firms or obtained informal finance from friends and relatives.

Riedel (2009) analyzed factors which provided help to the producers of vegetables to gain competitive advantage in the global market. The research was carried out in Germany, Italy and Spain. It was found that producers become competitive due to their integration within local market; by creating new networks and by exchange of information within firms.

Tavassoli (2009) identified various critical success factors which affected the growth of SMIL knowledge cluster of Sweden. These factors were vision/strategy, actors, network, resources and critical mass. Vision/strategy included factors like existence of clear vision, development of cluster brand, existence of cluster policy and proper political setting. Actors included companies, Government, research community, financial institutions, institution for collaboration and media. Network depicted the existence of proper communication network and knowledge integration and linkage to international market/environment. Resources included availability of infrastructural and financial resources and soft resources i.e. human related resources. Critical mass included capacity for innovation and research and development, presence of entrepreneurial spirit.
2.8 Studies on the Role of Government in the Development of Cluster

Porter (1990) had defined the role of the Government in development of an industry. He stated that the Government policy affect the performance of an industry. Porter explained the varying role of Government in different stages of an industry’s development. In early stage, Government should play a direct role by providing subsidies, capital, creating infrastructure and technology. As industry develops, the firms by themselves become independent. The role of Government at this stage should be indirect by pushing the firms to innovate and upgrade and role of Government should shift from actor to facilitator. Porter recommended that Government should use the principle of clustering for employment of funds. It should identify industries in which country has competitive advantage. The Government should try to upgrade the advantages in these industries along with the development in research, infrastructure and education over these clusters.

Liou (1998) examined the role of Government in economic development of Chinese industry and explained that Government of every country has following roles to perform i.e. the Government should be

- Promoter of growth.
- Manager of economy.
- Distributor of income.
- Regulator of industry.
- Protector of citizens & business.

As a regulator of industry, the Government should regulate industry in two ways:-

- Through laws such as antitrust regulation.
- Through Social regulation, where Government control pollution through its environment protection activities.
Boekholt and Thuriaux (1999) stated that the policies designed for the cluster development should have some specific features: focus on local system rather than individual firms; it should aim in promotion of SMEs than the large firms; promote social capital as an important factor; should rely on internal strengths; should encourage trust based relationships to have flow of information between cluster actors.

Porter (2000) suggested the role of Government in the development of cluster. Based on diamond model, the author suggested that a Government should locate related departments around the clusters, provide export promotion measures and decrease barriers to local competition, attract foreign investment, provide research and development facilities and enhance infrastructure, provide testing facilities, create supporting industries, attract cluster specific suppliers and service providers and set up free trade zones, industrial parks or supplier’s parks.

Ketels (2003) explained the role of Government in the development of cluster. The Government has responsibility for the provision of infrastructure required by the firms located in cluster. The Government should design rules and regulations which affect demand competition and motivate other firms to start their businesses in the cluster.

Omar and Mohan (2004) defined the role of Government in the development of Malaysia’s Multimedia Super Corridor Cluster through various policies and supportive initiatives. The Government had provided more Impact of finance to the entrepreneurs apart from tradition sources. It had continuously encouraged schools and universities to collaborate with industry and tried to find out new and improved method of doing things. Apart from this Government had also provided intellectual property protection in accordance with international standard requirements. The author found that main role of Government was that of advisor. By its support,
Government had helped in diffusion of information and communication technology in Malaysia.

Norman and Venables (2004) found that the Government policy had an important role in the development of cluster. Without a Government policy, the number of industrial clusters would have been more, and each cluster would be very small, that lead to the decrease in output to the level lower than that maximize the world welfare.

Andersson et al (2004) accentuated that a cluster policy should help in increasing the cooperation between firms, Non Government Organizations and public sector. The cluster policies should be designed by Government keeping in view general economic conditions as well as specific circumstances. The Government policies should help in creating new cluster as well as strengthening the existing one. It should provide macro-level foundations and infrastructure required for improving the competitiveness of the cluster.

Lall (2004) defined various policies that could be used by the Government to promote development of various industries. These policies were protection of infant industries, target on exports, various incentives and other subsidies, performance requirement on foreign investors, slack intellectual property rights, protection to promote copying and reverse engineering and local content rules.

Wickham (2005) analyzed the role of Government in development of an industry cluster and stated that state Governments initial support should be given to commensurate with region’s natural advantages and its success in export markets. The Government should provide necessary infrastructure to the developing industrial
cluster. The Government should not adopt the policy of one size fits all as every cluster varies in different stages of development.

Drabenstott (2005) examined the future role of federal Governments in economic development of a region. The authors analyzed the changes required in the policies to help firms in specific region to grow. The author found that most of the expenditure done by the federal Government was for the development of infrastructure. The author suggested three options for the federal Government.

(i) The Government should frame a policy for the development of various regions.
(ii) Provide help to various regions to grow and innovate.
(iii) Enhance the implementation of policy from a specific area to whole nation.

Kuhiki (2005) used a flow chart approach to industrial cluster policy and tried to explore the conditions which help in the formation and growth of cluster. The study was conducted in manufacturing industry in Asia. It was found that the public policies provided help in enhancing the growth of a cluster.

Clara (2005) explored that a policy of infant-industry protection should be applied to encourage the emergence of new cluster. The Government should focus on promoting clusters in current sectors that had demonstrated the strongest comparative advantage instead of formulating policies for promoting new clusters to emerge.

Tambunan (2005) investigated the impact of Government policies on the growth and development of various clusters in Indonesia. The author found that there were three types of clusters in Indonesia which were artisinal, active and advance. The author found that Government policies were essential for the development of
cluster but it was found that in Indonesia, cluster development policies were not successful because of least support from local and private organization.

Forslid and Knarvik (2005) analyzed factors which were taken into consideration while formulating an industrial policy for the development of cluster in an economy. Internationalization in terms of international mobility of firms, reduced trade costs and technology were found to have significant impact on policy design.

Luo et al (2006) analyzed the impact of Government policies on the development of automotive industry of China. The authors found that for about 20 years, the industry was highly protected with joint venture rules, trade barriers, industrial entry limits and local content rule. But the automotive industry of China lacked independent technological capabilities and relied on automakers of international market. It was found that the presence of regionalism and departmentalism in Government system of China had led to fragmentation. The Government had strong share in the market of China leading to non-applicability of infant theory. The authors suggested that ownership pattern should be changed in the structure of the enterprises owned by the state Governments.

Boyede et al (2006) conducted a study in Nigeria to find out various policies designed by the Government for development of various cluster. These policies were:

- Capacity building through Business Support and Information services.
- Encouragement of states and local Governments to invest in cluster development through provision of workspace, infrastructure and business development service subsidy.
- Deliberate nudging and formation of new clusters.
- Promotion and establishment of Industrial Parks through Public Private partnership.
• Facilitation of linkages between equipment leasing organization and the clusters.
• Promotion of sub-contracting to the clusters by larger firms.
• Networking with relevant stakeholders to promote standardization.
• Mentoring the clusters to meet financing requirements.

Mc Donald et al (2006) explored the impact of Government policy on the growth of cluster. The authors conducted research in 43 European clusters and found that there was no impact of Government policies on the industrial clusters. The authors did not find any evidence that Government policies help in overcoming obstacles in the growth of cluster.

Shakya (2009) explained that the role of Government should change with the change in the level of development of cluster. In initial stages, the role of Government should be high profile such as guiding the cluster mapping creating association between public and private sector in order to remove all bottlenecks. During intermediate stage, its role should be low profile as product and market segmentation, analysis of firm level increase competitiveness. The role may differ at different stage but Government should actively involve in the development of cluster. The author found that Government should take following measures to increase the performance of cluster:
• Remove entry/exit barriers to industry related to the cluster.
• Develop institutions that can help in enhancing the competitiveness of firms located in cluster and increase the research and development activities of firms.
• Provide incentives to increase exports.
• Enhance availability infrastructure and other factors required by the cluster.
• Remove all the regulations that restrain firms from doing work efficiently.
Ranawat and Tiwari (2009) investigated the impact of Government policies on the automotive industry of India. The authors found that various policies affecting industry were indigenization, protection and regulation of industry, relaxation of technology acquisition and liberalization of foreign investment. Those policies had made industry better and stronger. The indigenization and protection policies had led to product innovation of domestic firms like Bajaj Auto and Tata Motors.

2.9 Conclusion

Review and analysis of literature showed that every firm tried to locate in the areas of least cost and spatial proximity, leading to the formation and development of industrial clusters. The firms enjoy a number of benefits that arise from agglomeration economies. The concept of industrial clusters explains the tendency of firms to locate in a specific region and enjoy benefits from interconnection and cooperation with each other. The Government policies play an important role in the development of clusters. These policies help the cluster to develop and grow.