CHAPTER - 6

POLICY IMPLICATIONS AND FRAMEWORK FOR CLUSTER DEVELOPMENT

This chapter is devoted to issues pertaining to policy for industrial clusters in India. It is divided broadly in three sections. The first section presents policy related insights emerging from two case studies. It presents a critique of the macro economic policies and the SSI policy adopted by the government, emerging from two case studies, and appraises their impact on the process of technological and functional upgradation of the Indian clusters belonging to traditional sectors. The second section brings out in detail the need for government support in the era of globalization and lists out specific support required for technological and functional upgradation of the Indian clusters belonging to traditional sectors in the era of globalization. On the basis of information collected in two case studies, it spells out some priority areas in which government intervention is crucial. The third section articulates the need for a comprehensive and holistic policy for meeting the objective of sustainable development in Indian clusters belonging to traditional sectors through technological and functional upgradation. This section also calls for an explicit innovation policy for clusters. A framework for a cluster development policy for Indian clusters is provided in this section.

6.1 IMPACT OF POST REFORM POLICY ENVIRONMENT

6.1.1 Impact of New Macro Economic Policy

One point that emerges clearly from both the case studies is that market friendly policies adopted by the government of India since 1991-92 in one form or other have led to growth of exports, but they have not promoted sustainable development based on technological change or functional upgradation in SME clusters. Moradabad case study in a microcosm clearly demonstrates how market friendly macro economic policies of free trade in the face of absence of guaranteed implementation of minimum wage rate coupled with minimum standard of living for workers on a sustained basis, plunges industrial economies of the developing countries in the 'race to the bottom'.422 The Moradabad case study also shows how acute competition from

422 See Blanchflower and Oswald (1994) for a detailed account of the 'race to the bottom'.

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global markets prompts adoption of technologies and organizational practices which can make the problem of unemployment worse and can be instrumental in perpetuating the 'race to the bottom'. (See Wilkinson 1992 and Sengenberger and Campbell 1994)

Though the plethora of blanket incentives for exports, provided under the new macro economic policy regime, have resulted in creation of surplus but this does not automatically lead to significant increase in investment in new machinery and equipment or in the building of technological capabilities. Given the highly hierarchical nature of the production system in cluster like Moradabad, export surplus is concentrated in few hands. A major part of surplus generated in the exports boom is petered away on unproductive activities like building of palatial houses and showrooms. The highly inequitable distribution of gains from export boom may further push the cluster in the vicious cycle of low income, low investment and low technology and block the upgradation possibilities of the entire cluster. Secondly, corruption stemming from attempts at flouting/manipulating the provisions of export friendly policies like duty drawback scheme and DPEP scheme, encourage unfair practices and reduce incentive for enhancing profits through technological upgradation. For example in Moradabad several exporters are manufacturing low value iron items and pass them as brass items in order to get higher duty draw back from the government, instead of moving towards a higher value product.

Greater participation of the two clusters in GVCs, facilitated by the export friendly policies, has not created significant opportunities for their upgradation. As Humphery and Schmitz (1995:158) suggest, ‘whether or not insertion in a commodity chain will create development potential for a cluster will depend both, on its position in the chain, and the capacity of the firms and institutions to make use of, or create sources of competitive advantage and opportunities for up-gradation’. The two case studies show that expected benefits of globalization, in the form of learning by exporting, or through transfer of technology via FDI can not be taken for granted for the SSI sector.

In spite of liberalization of the economy, negative aspects of pre reform policy, like harassment by inspectors, red-tapism, and corrupt bureaucracy continue to be serious bottle necks in the process of upgradation. This is indicated by the fact that harassment by inspectors, red-tapism and corruption resulting from government policies emerge as an important reasons for the lack of technological dynamism, as perceived by entrepreneurs in both the clusters. Continued possibilities of benefiting from manipulation of legal provisions like labour laws

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423 This was revealed in a number of interviews
continue to act as a major disincentive in adoption of cost cutting through productivity gains by undertaking new technologies. According to the owner of one leading unit in Panipat, corruption and black money are the biggest hurdles in the process of technological upgradation. The firms are afraid of being noticed by the tax authorities if they spend large amounts in upgradation. According to him incentives provided for exports have corrupted the system in a big way. Now instead of earning more profits through upgradation, entrepreneurs are busy making fast buck through corrupt means, such as over invoicing of exports. Many entrepreneurs see corrupt bureaucracy, 'whose only job is to create speed breakers' as the biggest problem.

6.1.2 Impact of New SSI Policy

One important policy inference about the post reform changes in the SSI policy that can be drawn from both the case studies is that the removing the growth trap which was inbuilt in the pre-reform SSI policy framework is a step in the right direction. Since both the case studies show that firms have to have a minimum threshold size in order to acquire critical level of intra-firm technological capabilities, the dismantling of protective policies, like reservation, which are mainly responsible for the growth trap of the SSI units, can be expected to promote technological up-gradation of the SSI sector.

Second inference about the SSI policy emerging from two case studies is that in spite of a complex web of a large number of the support programmes to promote technological upgradation in the SSI sector, their reach has been negligible in both the clusters. Three important reasons for the failure of the government support programmes, as they emerge from two case studies are: (i) Much of the support is in the form of fiscal incentives, rather than in the form of real services, (ii) Much of the support is targeted at supporting individual SSI units, rather than clusters and is not geared towards enhancing the technological capabilities of the cluster, it is not effective in promotion of technological upgradation, and (iii) Administration of support is highly centralized. In both the clusters a large number of firms were not even aware of various schemes offered by the central government agencies.

One of the significant findings in this regard was that mere physical presence of the support institution in the vicinity of the industry is not enough. Though the Metal Handicrafts

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424 Though the export units do have the advantage of being able to continue with tax concessions and other incentives, even as they grow in size, for units catering to the domestic market the inbuilt bias for remaining small still continues. It needs to be addressed.

425 NCAER (1993) study also found that a large number of firms are not even aware of these agencies/programmes of the government.
Services Centre (MHSC), located in Moradabad, comes close to the concept of CFCs (Common Facility Centers) in Italian IDs, the actual role played by the centre in lending technological dynamism to the industry is not significant. Similarly in spite of the seemingly high density of the sector specific facilities in Panipat, technological and the knowledge system of the cluster is not geared towards creation of new technological knowledge. One reason for this is that, like MHSC in Moradabad, most of the government institutions in Panipat are also set up and controlled by agencies of the Ministry of Textile the central government. 426

The important policy insights for SSI policy emerging from the two case studies are:

- Real rather than fiscal support is needed to promote cluster based SSI sector.
- Support should be collective/cluster based instead of being targeted at individual units.
- The support institutions/policies need to have more decentralized structures if they have to be effective.

6.2 NEED FOR GOVERNMENT INTERVENTION

The evidence provided by ID literature shows critical role of (local) government in enhancing the technological capabilities of the cluster particularly in ID Mark II. 427 The role of government and its agencies has also been critical in two of the three most successful Indian clusters Indian clusters, which are often referred to as IDs in the making; Bangalore electrical goods cluster, and the hosiery cluster in Ludhiana. (Holmstrom 1998, Nadvi 1995 Tewari 1998, UNIDO2001a, UNIDO2001b) In Tirupur, though the direct involvement of the government is less visible, the national level sectoral institutions have contributed significantly in the dynamism of the cluster. 428 (Nadvi 1995 and Swaminathan, Jeyaranjan, 1999, UNIDO2001a, UNIDO2001b)

In spite of evidence of limited impact of existing government support programmes, need for government support emerges very clearly in both the clusters. Need for government support was emphasized by several exporters and other actors in Moradabad, in informal interviews. Many exporters made the point that Chinese industry, which is by far their most important competitor, is able to out beat them only due to support provided by the government. According

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426 MHSC is controlled by set up by DC (Handicrafts), which comes under Ministry of Textiles.
427 Julien (1992) draws our attention to the fact that the industrial districts even in the developed countries will not be able to weather the storm brought by the new global context unless they get greater support from the state, and not merely of the short-term nature, but long term economic aid.
428 The proactive industry associations TEA has been able to forge valuable links with a large number of government and semi-government technical/educational institutions like SITRA (South Indian Textile Research Institute), NIFT (National Institute of Fashion Technology), ISI (Indian Statistical Institute) and CEE (Centre for Environment Education) etc. In contrast to this
to them there are several ways in which Chinese government helps the SMEs in managing technological change. The SME units are provided spacious, clean working sheds equipped with modern equipment, technical manuals as well as designs of products developed by the huge design facilities set up by the government. The design centers in China develop their own designs for the coming season on the basis of information about future trends in the global markets, which is collected by joint market intelligence agency. These designs, along with procedural manuals are passed on to the small manufacturing units. Joint marketing allows them to produce impressive catalogues at a reasonable cost.\(^{429}\)

The firm level survey in both the cluster shows that the number of firms who felt that there was no need for direct support from government for technological upgradation was negligible. Table 6.1 gives a summary picture of the type of intervention which the firms perceived to be important for technological upgradation. A majority of the firms felt that cluster level support, such as provision of infrastructure, rather than support to individual firms in the form of fiscal incentives, was crucial for technological upgradation.

Evidence from both the case studies suggests that financial support either in the form of loan/subsidy or in the form of tax concessions on expenditure on R&D is not one of the sought after policy intervention. (Table 6.1) The fact that a negligible number has availed of schemes like TUFS for subsidized loans indicates that fiscal support for technological upgradation to the SSI has little impact.\(^{430}\)

Some of the specific actions needed for the creation of capabilities, which are crucial for the upgradation of clusters belonging to traditional sectors, which emerge from two case studies are given below.

\(^{429}\) These impressions of exporters and others are formed on the basis of their first hand experience of visiting industrial units in china. While some of them visited China as a part of ILO led delegation, others have visited China individually.

\(^{430}\) This does not mean that SSI sector needs no financial support. Rather it means that the way the policy of easy access to institutional credit at reasonable rate of interest, are devised, the section of the SSI sector which needs it has no access to it. Though not urgently needed by the first tier firms, institutional credit is crucial for the HH units as well as the suppliers.
TABLE 6.1 - Facilities Expected from Government for Technological Up-gradation

<table>
<thead>
<tr>
<th>Facilities/Policies</th>
<th>Number of Firms</th>
<th>Moradabad (n=44)</th>
<th>Panipat (n=45)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better Physical Infrastructure</td>
<td></td>
<td>34</td>
<td>12</td>
</tr>
<tr>
<td>Electricity</td>
<td></td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>Roads</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Any Other</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Technological Infrastructure</td>
<td></td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>R&amp;D/ Technological Institution</td>
<td></td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Design Centre</td>
<td></td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Tool room /Testing Facilities</td>
<td></td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Training</td>
<td></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Fiscal Measures for Technological Up-gradation</td>
<td></td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Simplification of Procedures/Policy Reforms</td>
<td></td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Any other</td>
<td></td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

*Cluster Development: Some Important Function*

i. *Good Infrastructure*

Since lack of adequate physical, infrastructure emerges as one of the most serious impediments in the process of change in both the clusters, provision of good infrastructure has to be an integral part of a cluster development policy. One of the biggest reasons for technological backwardness in Moradabad, as perceived by the exporters as well as suppliers and artisans is government's failure to provide regular power supply at a reasonable rate. 431

75% of sample firms in Moradabad thought that provision of uninterrupted electrical supply by government was the most significant steps that the government could take for technological upgradation of the cluster. (Table 6.1) As many as 34 sample firms in Moradabad and 12 in Panipat regarded provision of better physical infrastructure as the most desired policy intervention for technological upgradation. Of them 30 firms wanted better power supply. Almost every exporter pointed out that one of the main reason for China to out-compete Moradabad was availability of cheap electricity. The problem faced by the suppliers and small units is far more acute than those faced by big exporters since they can’t work in two or three shifts as the big exporters, unit cost of generating power works out to be very high. 432

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431 The supply of power in Moradabad is precarious in spite of the fact that 1998 Industrial policy of the UP government promises subsidized, twenty four hour uninterrupted power supply to industry through dedicated feeders, (page 13-14, Uttar Pradesh Sarkar Udyog Niti 1998).

432 Some of them have installed generators costing as much as Rs. 50,000. But due to small orders and seasonal nature of their work, per unit cost of electricity works out to be very high. Moreover, since most of the suppliers work in small units in very congested areas, noise pollution created by the generators is highly hazardous.
Cheap and uninterrupted supply of electricity, excellent network of roadways and waterways is seen by cluster actors as the main reason for Chinese industry's competitiveness. Cheap and regular source of electrical supply may seem only a part of the cluster's production capabilities but the Moradabad case study shows that it may indeed also be crucial to adoption and viability of many technologies. Therefore provision of regular supply of electricity at an affordable price is the most critical aspect of policy for the upgradation of any cluster.

Apart from general infrastructural needs such as electricity and roads and water, clusters can have industry specific requirements with respect to physical infrastructure, such as gas pipeline in Moradabad. In the export oriented clusters facilities like container depots and good IT infrastructure are critical. For clusters with industries creating high levels of water pollution provision of CETP is a high priority area. Given the different priority list of different clusters it is necessary that upgradation of infrastructural should be undertaken with in the frame work of the comprehensive cluster development policy, so that general as well as specific needs of the cluster are met effectively and expeditiously.

ii. Appropriate Institutions

As Porter (1998) observes, the new technological paradigm has obliterated distinction between high tech and low tech sectors. Due to the possibilities of application of new technologies like IT, Bio-technology, nano technology and new materials, has presented infinite possibilities of technological innovations even in traditional sectors like textiles. A corollary of this is that if Indian clusters, including those operating in the traditional sectors, have to retain their long term competitiveness, strengthening of the local knowledge system; strengthening of the knowledge creating and knowledge using elements has to be an important aspect of the policy.

Though both the cluster in the case studies do have some presence of technological services provided by the central government, their role is marginalized because of their inability to keep pace with the requirements of the fast growing challenges of globalization, which requires them to be more flexible than ever before, even as they remained bogged down by several archaic laws. More over, they have to cope up with drying up of funds and mandate to be self sufficient in financial terms. By and large, they have failed to evolve in synchronization with the changing requirements of the clusters. The in-built rigidity in their structures on the one hand, and receding financial support from the government due to the new policy paradigm, has
meant that their relevance is decreasing at a time when the need for specialized institutions is increasing. The networking links between these institutions and the cluster firms are low and seem to be on the decline.433

The two case studies suggest that the existing knowledge institutions in the regions, such as degree colleges and ITIs, are not involved with the task of creation/diffusion of technological knowledge in the industry. Role of other institutions is also peripheral. Creation of appropriate institutions is essential for creation/diffusion of new technological knowledge and training workers in new skills. Equally important is the task of upgrading the existing institutions, removing ex-inefficiency prevailing in them and making them relevant for the industry. For example the existing network of more than 5000 ITIs can be used effectively by imparting appropriate industry specific knowledge and training.

iii. Plugging Value Chain Gaps

Panipat case study clearly demonstrates that presence of activity in the backward and forward links in value chain helps the cluster firms in a big way in the innovative activity. Moradabad case study reveals that break in the value chain in the cluster (like absence of a state of art die making unit) can seriously constraints the process of technological upgradation in the cluster.434 Rabbelotti (1995) cites lack of machine good sector as the main reason for the lack of technological dynamism in, Guadlajara, the Mexican shoe cluster. This suggests that one of the functions of the cluster development agencies should be to facilitate the creation of integrated and synergetic value chain, covering maximum number of activities in the value chain. Among other things, such an effort can facilitate knowledge spillovers through learning by interacting.435

iv. Special Focus on Workers

The evidence from two case studies supports the generally held view that virtual unlimited supply of labour is forcing clusters to remain on low road of flexible specialization, and is perpetrating the vicious cycle of low wages, low productivity, poor quality, low price. Breaking of the cycle in a labour surplus region requires specially designed initiatives to help the artisans and the workers.

433 This is particularly evident in the case of MHSC in Moradabad, and to a lesser extent, in the case of NITRA centre and WSC in Panipat.
434 For example, closure of UPBWC which used to provide brass at a confessional rate to the artisans, has not only adversely affected the interest of the artisans and small units, but has also resulted in dilution of quality of products.
435 For example a state of art die making facility will not only increase the efficiency of the Moradabad cluster by plugging an important gap in the production chain, but can also boost design based innovation, due to closer interaction between traditional designers and the modern die making unit.
Two important components of a long-term policy are; creation of *Education and training facilities for workers* for helping workers in acquiring new skills and *Facilitating Trade Union Movement*. Not only are these policies necessary for improving the condition of the working classes, but are crucial for significant technological upgradation of the clusters.

*Creation of Education and Training Facilities*

In the traditional clusters which have high dependence on tacit knowledge of workers, one important aspect of public policy is to create appropriate dynamics of continuous synergy between traditional skills and modern scientific knowledge. Formal education of the artisans is a necessary condition for creating such a dynamics. Lack of education among workers limits their capacity to combine traditional skills with science-based technological knowledge, even as it saddles the cluster with path dependency in terms of human capital or/and may create huge army of technological refugees. Since, unlike machines, human mind can be retrained for new technologies, the problem of path dependency in terms of human capital is less imposing than the one caused by the stock of physical capital, and can be addressed by evolving a mechanism to upgrade human skills in accordance with new requirements. Therefore these clusters need facilities for formal training to upgrade/modify the skill base in accordance with the demands of changing times. They need an institution which has a specific mandate of creating synergy between traditional skills/knowledge and fast-changing modern technological knowledge. Not only should such an institution have capacity to forge close links with the artisans, it should be able to develop appropriate skill upgradation programmes either independently or with the help of other institutions.

Several entrepreneurs as well as artisans in Moradabad held lack of education among workers as the main reason for the cluster's lack of technological dynamism. Lack of modern

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436 Moradabad case study shows that lack of capacity of artisans to learn through codified knowledge means that though there is high level of skill flexibility within a narrow spectrum; say for moving from brass to iron items, there is zero flexibility outside it. The brass artist with their highly developed intuitive knowledge, have been able to switch over to other metals without any formal training or outside help but due to their illiteracy and lack of capacity of scientific learning, they are not able to switch over to radically different materials like glass and wood. There are a large number of technological refugees created as a result of inability of the highly skilled but illiterate members of the working class to modify their skills or to acquire new skills which are in demand.

437 Though DC (Handicrafts) has entrusted MHSC with the task of having programmes for training the artisans, they are utterly inadequate.

438 Several exporters as well as the secretary and the president of the Dastkar Association held lack of education among artisans/workers responsible for technological backwardness of the cluster. According to Mushtaq Ahmad, one of the suppliers belonging to artisan family, who has done his graduation, the technology in Moradabad is 200 years old, and the reason for this is illiteracy of the artisans. According to Akbar Qayuum, owner of Akbar Brass, one of the biggest export units located in the heart of the city, it is the lack of knowledge.
scientific knowledge among workers sets a ceiling on the process of learning by doing and makes the process of continuous up-gradation of workers' skills, which is a necessary condition for remaining competitive in face of fast changing technologies, near impossible.

Good educational infrastructure, along with adequate training facilities, is crucial not only for undertaking significant technological change; it can be a strong antidote to the process of deterioration in the condition of the weakest sections of the society, which is often accompanied by the unbridled globalization process.

Facilitating Trade Union Movement

It is now recognized that absence of workers' collective bargaining power can be instrumental in making the system dependent on low labour cost and numerical flexibility for its competitiveness, which in turn reduces incentive for attaining competitiveness through technological upgradation. Evidence from the clusters in the Emilia Romagana region in Italy and in Belgium has effectively demonstrated that a strong trade union movement induces the system to introduce continuous innovation and technological change, which in turn requires more permanent employment, multi-skilled labour and continuous skill upgradation of workers. (Schmitz and Musyck 1994). Nearer home, Tirupur, one of the most successful Indian clusters, has had a fairly long history of presence of trade unions. (Swaminathan and Jeyaranjan 1999, Vijayabaskar 2005) Not only has the presence of strong trade union movement helped in arresting the trend of falling real wages and other forms of exploitation of labour, it is accompanied by considerable technological change in the cluster.

The evidence from both the case studies in this project shows that there is negligible and declining presence of trade unions in both the clusters, and the trade union movement is on the decline. The percentage of units with trade union affiliation in these clusters is much lower than the national average. A strategy for encouraging trade union movement in the region, will not only be helpful in protecting the rights of the workers, but it may create disincentive for a growth pattern which thrives on acute exploitation of labour, rather than productivity gains through technology upgradation.

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440 Though the Tirupur industry continues to have expendable and low paid labour force consisting mainly of women and children, the involvement of the trade unions has helped in getting the core of the labour force reasonable wages and decent terms. More significantly, this has happened without undermining the economic dynamism of the cluster. (See Swaminathan and Jeyaranjan 1999)
441 A survey of 1300 manufacturing units by Deshpande et al. (2004) shows that employees of 30% of all firms and 10% of small firms (employing 10-19) are unionized. Two case studies on the other hand suggest near zero participation of workers in trade union activities. According to Mr. Naqvi, labour lawyer in Moradabad, total number of workers with trade union affiliations in Moradabad does not exceed 500.
v. Special Focus on Smaller Firms

One important policy inference emerging from Moradabad case study is that bottoms up strategy, with special focus on small firms is necessary not only for balanced and equitable development, but it is essential for the ability of the cluster in managing significant technological upgradation. The organizational set up of these clusters, in which most of manufacturing activity in the cluster is carried out by small artisanal units, while the control of the value chain lies with merchant entrepreneurs; puts sever limits on the ability of small firms to undertake technological upgradation. The exporters, who realize a very disproportionate part of the export surplus, are not inclined to bear the risk associated with introducing technological changes. On the other hand, small units lack financial resources and autonomy to take decisions as well as technological capabilities to bring about technological upgradation. As a result, the growth process leaves the technologies used by the HH units unchanged, while it makes technological change in upstream activities less rewarding. Therefore upgradation policy for these clusters has to focus sharply on the ways of improving the condition of the small artisanal units. Unlike the incentives for exporters, public expenditure on technological support targeted at the lower end of the value chain can have the effect of upgrading the entire value chain by increasing productivity of labour as well as quality of life in the entire cluster. Not only would such an initiative be equitable but is also likely to fuel growth by arresting the process of diversion of surplus in activities like building of palatial offices and houses by the exporters as is the case at present.

That it is possible to evolve an artisan/worker centric cluster development strategy which may increase the global competitiveness of the industry through value addition is demonstrated by RUDA (Rural Non Farm Development Agency) initiative in the Kotjewar Blue Pottery cluster located in Jaipur. (See Anon. 2001)

6.3 FRAMEWORK FOR CLUSTER DEVELOPMENT

6.3.1 Need for a Comprehensive Cluster Development Policy

Two case studies explored call for a comprehensive and holistic cluster development policy aimed at meeting the explicitly stated objective of attaining equitable and sustainable development through technological and functional upgradation. This is in line with the recommendations of the Abid Hussian Committee report which observes, “The fundamental flaw in the policy of small industry development in India has been that it has ignored the
clusters that have taken root as a result of entrepreneurial effort. World-wide experience suggests that these clusters can stagnate in their later stages unless they are supported by institutions’ (Abid Hussian, 1997). Therefore it recommends that ‘the future policy for SEs should be to bolster growth in the existing clusters by redirecting current investment in regional development to such centres of growth’. (Ibid). As discussed in Ch 1, there have been several cluster development initiatives started by the SSI ministry as well as some other ministries since 1997, but there has been no systematic attempt to develop a holistic perspective for a cluster development policy at the national level.

Need for holistic policy perspective emerges clearly from the case study of Moradabad metal Art-ware cluster in which creation of high value items by combining traditional artistic skills with modern technology and finding appropriate market niche for them seems to be the only upgradation route, which will ensure equitable and sustainable development in the region. This can be achieved only through a coordinated effort in several directions, such as creation of appropriate infrastructure, development of appropriate technologies, creation of technological capabilities, and arranging finances for small units and at the same time, developing a high value niche market for these items. Unless all this is undertaken within the framework of a comprehensive development strategy, the efforts for development through technological upgradation are not likely to succeed.

Glimpse of such a comprehensive strategy can be seen in RUDA (Rural Non Farm Development Agency) initiative in the Kotjewar Blue Pottery cluster located in Jaipur. (See Anon. 2001). RUDA has helped the upgradation of the cluster by building strategic networking capabilities, and in developing strategic market capabilities. Links with national R&D institutions like CCGRI has helped the cluster very significantly in the process of technological upgradation. Collectively marketing strategy adopted by the artisans, both in the domestic as well as international market has helped the artisans in having direct access to market as well as market information.

The two case studies in this project also show that the main thrust of the government policies should be to upgrade the technological capabilities of the clusters in synergy with the strategic marketing capabilities. Mere presence of good technological infrastructure, without

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42 CCGRI has designed a suitable furnace for blue pottery, and helped the artisans in solving technology related problems. Creation of electrical furnace as a joint facility has helped in tackling the problem of lumpiness of investment, and has made diffusion of new technology faster and at low cost.
access to appropriate market may not only fail to bring the required dynamism in the industry, but may also lead to atrophic degeneration of the existing institution.

6.3.2 Policy Framework for Cluster Development in India: Some Suggestions

Two Layer Structure

One significant insight emerging from the comparative view of two clusters is that in spite of several similarities like having high degree of export potential, being located in non-metro cities and being big clusters, both in terms of turn over and employment, and having a very high location quotients, the two clusters show considerable divergence in the extent and nature of innovation and technological change taking place in them as well as their functional dynamism. To some extent these differences can be attributed to differences in regional aspects such as differences in culture, in infrastructure and knowledge systems. But, as the two case studies suggest, a large part of differences are due to their sectoral affiliation. Literature on technological change points out that the clusters belonging to different industrial sectors/sub-sectors have different sources and patterns of technological dynamism, (Pavitt 1984, Dosi 1988). Recent research shows considerable inter-sectoral variations in the way collective efficiency contributes in the up-gradation of clusters belonging to different industrial sectors; this means that the dynamics of (public) joint action is likely to be different in clusters belonging to different sectors. Policy implication from these insights from literature, which are re-iterated in this study, is that from a policy perspective all the clusters in India cannot be treated as a monolith and the policy for development of clusters in India should have a two layer structure: National Cluster Development Policy providing broad outline of the development goals to be perused by all the clusters and broad guidelines for allocation of government funds to different clusters, and a Local Cluster Development Policy to promote development of individual clusters. It is suggested that an apex body namely National Cluster Development Agency (NCDA) be created to monitor and co-ordinate the functioning of local cluster development agencies, to create appropriate networks of clusters and coordinate them. A two layer policy, with an interface between the national and local agencies, can maintain symmetry in terms of broad development goals of all the clusters, even as it makes it possible

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443 Pietrobelli and Rabellotti (2004) divide industrial sectors in four main categories. They finds that while collective efficiency is positively associated with upgrading in Traditional Manufacturing, Natural Resource-Based, and Software clusters, the relationship is not significant in complex products.
for each of them to reap the benefits of presence of a very large number of same sector clusters in the country.

Local Cluster Development Agencies

There is need for a Local Cluster Development Agency (LCDA), for every (big) cluster, which can formulate local cluster development policy keeping in mind the customized needs of the individual clusters and implement it with the help of decentralized action.

The task of the LCDA would be to promote technological and functional upgradation by creating the right mix of technological, strategic marketing and network capabilities required by each cluster. The responsibilities of LCDA would include all the functions discussed in section 6.3.2, creation of adequate physical and educational infrastructure which meets the specific needs of the cluster; creation of technological infrastructure to promote diffusion of generic and sector specific technological knowledge; networking with regional/national institutions, training, plug value chain gaps, and to take special steps for facilitating upgradation of smaller units in the cluster and for improving the condition of workers.

Technology Intermediation Agency

Creation of a technology intermediary agency with in the framework of a local cluster development policy can be an effective way of promoting innovation and technological change in the clusters.

Success of several well known clusters in the developed world is often associates with presence of an apex agency in the region, which is engaged in the task of creating and coordinating various technology related organizational networks and acts as umbrella organizations for technology intermediation in the regions. Some of the well documented examples are; ERVET, the Regional Authority for Economic Development, in the Emilia-Romagna region of Italy, IMPIVA; Institute for the Promotion of Small and Medium Size Firms, in the Valencia region of Spain and the Steinbeis Foundation for promotion of SMEs in the B-W region of Germany. (See Pyke 19)

Now the need for a technology intermediation in the context of SMEs in the developing countries is being increasingly appreciated. AS Sidharthan and Rajan (2002:162) stress, “The

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444 For this the LCDA will have to network with other government agencies responsible for provision of these facilities, and lobby for specific needs like gas pipeline in Moradabad.
success of the SMEs in the changed global environment will, to a large extent, depend on the emergence of technology intermediaries. This is more so in the case of Less Developed Countries (LDCs), where technology intensities of the SMEs have been low.” “Demands of economic efficiency coupled with fast changing product cycles and consumers’ preferences require a number of proactive steps for speedy conversion of knowledge and technological competence into products and profits. The ensemble of these pro active steps is called technology intermediation.” (Ibid: 162).

Can a real service centre devised on the lines of Italian IDs, serve as an effective technology intermediation agency (TIA)? 445 The Moradabad case study suggests that though there is much to be learnt from the example of Italian IDs, there is need for going beyond RSC and CFCs and creating an agency which can plan and take action simultaneously on technology front as well as on marketing front. As Sidharthan and Rajan (Ibid) suggest, technology intermediation in the case of SMEs should go beyond technology action and technology funding, and should help creating new markets. The failure of MHSC, which comes quite close to the concept of a RSC in terms of its functions and facilities, can be appreciated in the light of this observation. 446

Obviously the functions of technology intermediation must be given to a local body. However, as the experience of Moradabad shows, physical proximity of a technological institution with local industry is not enough. It is equally important for the TIAs to be free from remote control. 447 Remote control of MHSC by central government has neutralized the advantage of its physical proximity to the local industry. Due to lack of autonomy the centre can’t optimize the advantage in terms of knowledge of local culture and local conditions.

445 Experience of the developed world shows that the diverse technological needs of the SME clusters, such as training, testing, specialized equipment, market information etc. are best met with the help of local agencies like RSCs or CFCs.

446 The mandate of the centre was to rendering professional and technical advice to manufacturers, to offer training facilities for up-gradation of skills of the crafts persons and the technicians, and to set up common facilities with modern plant and machinery, combined with sophisticated research and development programmes.

447 MHSC is an institution belonging to a central government agency; DC (H), with some stake of the UP government in it and is acting as a service centre for an industrial cluster, whose administration lies with the local government. Representatives of all the governments; central, regional and local are involved at various levels of hierarchy of controls. The physical distance of MD MHSC, who is housed in the office of DC(H), New Delhi, predictably makes his knowledge of the real issues if the cluster as well as his direct contact with the various actors in the cluster is far from adequate.* This came across clearly in the interview with him, which was held in New Delhi in The day to day control lies with the executive committee, headed by the Collector and the District magistrate of MB, who as the restructuring committee points out, probably has no time or inclination to lead and control the affairs of MHSC. As observed by Johri, the then GM of MHSC, the proposals and recommendations for improvement are prepared by the MB based executive committee, where as decisions on them are taken either in Luck now or Delhi. The control of DC (H) over the finances makes things worse.
Another lesson from MHSC is that multiplicity of government agencies involved in the management, and lack of co-ordination between them can be detrimental for the effective functioning of such an agency and should be avoided. Therefore, unlike agencies like MHSC, Technology Intermediation Agency (TIA) should be an autonomous body funded by the LCDA. It should be free from the control and interference of central/state governments.

The central task of a technology intermediation agency should be act as a technological leader of the cluster and to facilitate all the steps in an innovation cycle, starting from the identification of technologies best suited for the industry in the cluster, and their best sources for acquiring them. The task of modification and adaptation of technologies accessed from outside sources to make them suitable for local conditions, and the task of facilitating diffusion of new technologies should also be performed by TIA. The task of technology diffusion would require provision of real services like training in new technologies, provision of specialized equipment in the form of common facility and adequate testing facilities.448

The two case studies show that many of the technological changes require new equipment which is not readily affordable for all the firms. This means that the diffusion cycle of even minor changes like introducing a new finish is around three years. As a result, by the time the late adopters, (mostly small firms), purchase the equipment the demand for new finish is over. This leaves behind a considerable amount of sunk in cost and obsolete machinery. The dynamic inefficiency created at the firm level could be avoided by speedy availability of the equipment/ specialized services. Speedy provision of specialized services at a competitive price to all the firms449 simultaneously can help the cluster in coping with the problems created by shortening product life cycles of the products, and will allow the cluster to reap full advantage of product innovation at the peek of the product lifecycle. The experience in Moradabad suggests that delay in coming up of market based services and the poor quality of the services provided by the market are two important reasons why some of the specialized services may have to be provided by a government agency.

The evidence from two case studies, and particularly from Moradabad, suggests that there is negligible use of IT in manufacturing activities Facilitating use of IT tools by providing

448 In some sectors/sub-sectors creation of new technological knowledge indigenously may be as important in order to maintain long run competitiveness.
449 The findings of our survey in Moradabad show that the price of specialized services provided by MHSC is often higher than the price charged by the private service providers. A large number of firms, particularly the smaller ones, can not avail of MHSC services for various reasons.
training access to IT tools/software in the form of common facilities by TIA or any such bridging institution may go a long way in diffusion of IT in the cluster operating in the traditional, low tech sectors. Big clusters should have a tool room, which are equipped with equipments like CAD/CAM and various CNC machines, and which are expected to design and develop precision tools, jigs and fixtures needed by the SSI in the cluster. Secondly TIA can help in leveraging the advantage of the existing networks like DISNIC (District Information System of the National Informatics Centre) and NISNET and put them to effective use for the development of the local industry. TAI can also undertake the task of searching/developing software for meeting the specific need of the industry, and make it available to cluster firms at an affordable price.

Provision of adequate testing facilities, with international accreditation is a task which TIA must undertake seriously, if the cluster has to realize value addition by catering to the upper end of the global market have to depend on outside agencies for testing.

Secondly, TIA should help the cluster move on to non manufacturing stages of value chain through functional upgradation. For this it will have to have multi-pronged action; which includes development of appropriate design facilities for promoting design autonomy, and promote appropriate market innovation. Cyprus Textile and Clothing cluster and Cantilone ceramics cluster in Spain, are good example of upgradation of a cluster through design autonomy. On the other hand, Moradabad experience shows that the attempt of central agencies like DC (H) in creation of design capabilities, in the form of creation of NDPDCs can fall flat. The collective design facility has to be created and controlled by a local TIA which can facilitate creation of designs as per changing requirements of the markets.

Development of markets is an important, for the effort on technological front to succeed. Collection of market intelligence, creation of high value niche market, development of market consortiums, developing and promoting a brand name for the cluster, and setting up of retailing chain are some of the tasks that TIA has to perform in order to promote upgradation of the cluster. Creation of high value market niche, focusing on the core specialty of the local industry, is particularly important for handicrafts clusters, where artistic knowledge of local artisans

450 DISNIC is set up to computerize functions of government and its agencies at the district level and NISNET was set up for connecting all the district with the national network this has helped in reducing information asymmetry between the different parts of the country, with regard to diffusion of market knowledge and knowledge about new methods of production, tools and systems.

should be treated as the key resource for development. Creation of local facilities like an art centre or a museum\textsuperscript{452} and organizing exhibitions which focus on of the artistic skills of the cluster should be the responsibility of TIA of the cluster, rather than that of a central/state agency.

Given the paramount importance of networking in the innovation process, \textit{creation and promotion of innovative networks} with in the cluster and interacting with innovative networks outside the cluster, on behalf of the cluster agents would be an important function of a cluster based technological intermediation agency. TIA should network with all the actors with in the cluster like cluster firms, non firm institutions, artisans/workers, and the local administration. At the same time it should be able create linkage facilities which will allow the cluster to network with the relevant actors outside the cluster, such as sectoral R&D/Educational institutions, both in the public and private sector. Identifying appropriate institution outside the cluster is one of the tasks for which the agency should be well equipped.

\textit{Innovation Policy}

Though at present there is no explicit innovation policy in India, either at the national or regional level, a strong need for developing an appropriate innovation policy directed at industrial clusters is clearly reflected from the two case studies. The ID literature greatly emphasizes the role an active innovation policy with in the framework of regional innovation system (RIS) in the promotion of industrial clusters.\textsuperscript{453} But given the size of the country and the balance of power between the central and the state governments, it is not easy to replicate the RIS model in India. Nor is it necessary to do so. There are lessons to be learnt from diverse sources. While in countries like Cyprus and Denmark, technological dynamism of SME clusters can be attributed to strong national innovation system (NSI); Japanese network of Kohsetsushi

\textsuperscript{452} For example the arts and crafts museum in Chandigarh is dedicated to showcasing art of Phulkari.
\textsuperscript{453} Some of the well documented examples of successful networks, with strong moorings in the RSI model are; ERVET, the Regional Authority for Economic Development, in the Emilia-Romagana region of Italy, IMPIVA; Institute for the Promotion of Small and Medium Size Firms, in the Valencia region of Spain and the Steinbeis Foundation for promotion of SMEs in the B-W region of Germany. ERVET coordinates a network of generic and sector specific centers in the region. A sector specific centre is typically located close to the industry it serves. In addition every cluster in the region has access to services of four transversally operated centers providing generic services. IMPIVA coordinates a network consisting of several Science and Technology Parks, several business Innovation Centres (BICs), assisting the artisan establish new enterprises, and four horizontally oriented institutions providing generic services across sectors and eleven sector specific technology centers which are the key institutions for providing technical services to the SEs. Steinbe is Foundation is a network of 129 sectoral technology transfer centers For detail about institutional network for SMEs in Emilia-Romagana, Italy, Valencia region of Spain, B-W region of Germany, Denmark and Japan see Pyke (1994).
has strong sheds of NSI, RIS and sectoral system of innovation. Some examples of successful clusters like Sinon Valley Footwear cluster and Ceramics cluster of Santa Catarina in Brazil and Electronic Goods cluster in Bangalore suggest complementary role of national and local/regional systems of innovation in promoting technological dynamism. Technological dynamism of the SME clusters belonging to steel based industry in the Bihar-Jharkhand region, in spite of a weak regional system of innovation as well as absence of national level technological and R&D institutions, can best be explained with the concept of Sectoral System of Innovation. Tirupur knitwear cluster points out towards strong complementarily between local and sectoral actors/institution.

All this suggests that while India can borrow selectively from the models of other countries when the same when transposed should reflect Indian ground realities. The two case studies indicate that each cluster has its own functional dynamism, dictate the optimal mix of dependence on national, regional and sectoral resources. Panipat experience, in particular, highlights the need for a policy framework which brings out the optimal complimentarity between the national, sectoral and the regional dimensions of technological dynamics. While bringing home the importance of the sector specific institutions, the case study also suggests that helpful as it be mere presence of a web of sector specific resources in the country is not adequate in creating adequate technological capabilities in the dispersed centers. There has to be presence of a strong RSI, and strong cluster level networking facilities, if the cluster is to benefit significantly from the sector specific institutions which exist at the national level. For example, though Panipat is linked with the national level R&D institution, NITRA, the link is not efficient. In contrast Tirupur knitwear cluster a strong trade association (TEA) has effectively networked with sectoral institutions, like SITRA and NIFT to create very significant

454 The network which is coordinated by MITI comprises of decentralized service centers providing sector specific help to SEs at the local level. This network makes it possible for SEs to have access to the services and specialized technical inputs of all the institutions under MITI, through their local centre.

455 The Brazilian Ceramic Centre, located in Santa Catarina, which is active in doing R&D, providing training, and in collecting consumer information was started by the central government, but is maintained by Anfacer, the national level trade association. (See Meyer-Stamer 1998). For detail about the technological infrastructure of Bangalore (See Holmstrom, 1998, Bowander 2001)

456 High technical dynamism of the region's Engineering/ Auto- parts cluster is confirmed by the study by Ray Chaudhury (1999). The region is dominated by the presence of two TATA giants, TELCO and TISCO. Most of the SSI units in the region are vendors of these two private sector firms. These SSI units go far beyond simple fabrication work and have diversified into auto-components and machinery parts. TELCO, which has more than 260 vendors in the region, has played a significant role in technological up gradation of the SSI units. It has a special division for rendering technical services to the vendors. This division provides technical assistance and technical training. It also issues them certificates. Insistence of TELCO on high quality and its help in adopting TQM and other good practices has led to high quality standards of these vendors. In fact some of the units have acquired ISO 9000/9002 certification.
technological dynamism. This suggests how a strong local agent is necessary to leverage the advantage of a good sectoral system of innovation. A strong RIS is critical for developing linkage capabilities which will allow the cluster to effectively benefit from strategic capabilities, such as marketing capabilities, which are equally important for the promotion of innovation based development of clusters.

‘Groups of Clusters’ Approach

India, being a vast country, has several same sectors/sub sectors clusters in many industrial sectors. There is need for networking and co-operation between same sector clusters in order to optimize the use of sector specific technological resources available all over the country. The NCDA can group clusters on the basis of their sectoral/ sub-sectoral affiliations for the purpose of optimizing the use of sector specific technological resources available all over the country, and for proper co-ordination between the sector specific institutions at the national level and the local institutions. In cases where the sector is dispersed over several centers, there has to be proper co-ordination between the national level sectoral institutions and the local institutions, in order to leverage the benefits of the existing institutions. Establishment of proper links between the R&D institutes, located mostly in the metropolitan cities, and the decentralized production centers, spread all over the country, may be of vital importance. In the case of textiles for example, links between the four major research institutions; ATIRA, BTRA, SITRA and NITRA and the sixty odd textile clusters may not only be helpful for these clusters, but may prove to be equally important for the survival and growth of these institutions.

It is suggested that the clusters such as ones located in Moradabad, Firozabad and Aligarh which have a very significant part of the entire industry located in one region, should be designated as the lead clusters of the group of clusters to which they belong. The lead cluster should have an important sector specific institution, which should act in the dual capacity; as the TIA for the lead cluster, and as the pivotal sectoral institution. For example, MHSC in Moradabad and CRTI (Carpet Research and Training Institute) in Bhadohi can be developed as a pivot institution, responsible for developing/assimilating relevant technological knowledge, and its diffusion in other clusters in the group through appropriate networks.

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457 TEA, the association of exporters has forged excellent links with sectoral institutions, like SITRA, NIFT etc. located outside the cluster.

458 Appendix - Ila provides detail on number of clusters in different sectors.

459 Some of the research institutions like ATIRA are facing resource crunch due to closure of large industry, which used to be the major source of funding for the institute. Forging of links with the clusters of SMEs can not only help in enhancing the technological capabilities of these clusters but may help in augmentation, consolidation and better utilization of the resources of these institutions.