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**On Learning, Innovation
and Competence Building in India's SMEs:
Challenges Ahead**

**Keshab Das
K.J. Joseph**



*Gujarat
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Development
Research*

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Abstract

With a vast and diverse SME sector India's industrialization owes much to the technological dynamism of enterprises. Various institutional interventions have been made to promote innovativeness in the sector, albeit, following economic reforms, it appears that the SME sector has not been able to withstand global competition. The sector, in general, has lagged behind in terms of employment generation and also exports. Elaborate institutional arrangements for the financing of SME development at the national, state and regional levels notwithstanding the share of SMEs in the total net bank credit by the public sector banks has been on the decline. Moreover, with a complex maze of institutions for promoting science and technology across space and product spectrum in SMEs in India the R&D intensity in the small-scale sector has been declining over the years. In fact, the R&D activity, in any significant measure, is confined only to a dozen industries and there is absolute lack of coordination between the sectors (small scale, private sector and public sector) in terms of research investment. The study locates, nevertheless, a few sectors that display substantial vibrancy that in turn leave scope for learning from within.

While India is the home for a large number of natural industrial clusters dominated by SMEs, and subcontracting has been systematically promoted through varied policy initiatives, learning, innovation and competence building systems as articulated in the National Innovation System framework is yet to evolve in its real sense. All these indicate the immature nature of India's innovation system as it operates in the SME sector. Hence, there is much need for institutional arrangements that would facilitate interactive learning through clustering, spin-offs, new modes of financing investment and skill upgradation, user-producer interaction and interaction with the universities and public research laboratories across a wider market space. To the extent such interaction with different actors and the learning that is accrued is crucial for competence building the key challenge is to evolve such a vibrant innovation system that would make a mark.

Keywords : SMEs, Innovation system, R&D, Exports, Industrial clusters, India.

JEL Codes : O31, O32, O33, and O38

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On Learning, Innovation and Competence Building in India's SMEs: Challenges Ahead

**Keshab Das
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1. Introduction

The small and medium enterprises¹ (SMEs) are generally considered as capable of generating large number of jobs, reducing desperate rural-urban migration, catalyzing industrial dynamism and above all help achieving a balanced regional development. Hence, in India, a country known to be more diverse than most continents, SMEs have been assigned a key role in its National Innovation System that evolved over the years at the instance of state that focused of planned development. In fact, even before the genesis of India's national innovation system (NIS), the National Planning Committee (1938-41) accorded a status of significance to small-scale industry (SSI) in India's industrial development (Tyabji, 1980). Over the years, various institutional arrangements have been systematically made towards promoting learning innovation and competence building systems in the small scale sector. These included, but not limited to, reserving an increasing number of products for the small scale sector, specific policy measures to promote industrial clusters and ensure concessional finance for investment, exemptions from industrial licensing, provision of specialized infrastructure and incentives for R&D, capital goods import and export promotion along with a range of tax incentives. As a result of the varied institutional interventions, the small scale sector (now called the micro, small and medium enterprise or MSME sector), engaged in the production of over 8000 products with significant contribution to output, employment and export earning, has emerged as a major player in India's national system of innovation and production.

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¹ At the outset it needs to be noted that the category of 'medium' enterprises has been introduced only recently in India, in October 2006, with the promulgation of the Micro, Small and Medium Enterprises Development (MSMED) Act, even as in certain sub-sectors 'small' enterprises had invested in plant and machinery far above the amount stipulated.

With the initiation of market oriented reforms that has had its profound influence on the country's innovation system in general, there have been concomitant changes in the institutional arrangements that governed operations of SMEs as well. The changes, *inter alia*, included de-reservation of products for the small scale sector and de-licensing leading to increased competition with the large scale sector from within the country. Further, dismantling of tariff barriers implied the replacement of the earlier policy of infant industry protection with a regime of open competition with foreign firms. Along with the integration of India's innovation system with the world market, certain sectors within SMEs could manage to get access to the global market *inter alia* on account of their increasing participation in the global production networks (GPNs). But, given the weakness of the innovation system with the absence of institutional arrangements for interactive learning and competence building and the varied constraints that accompanied in the sphere of credit market, factor market (including labour and skill), product market and technology, the large number of units in the SME sector could hardly withstand the heightened competition resulting from liberalization. The outcome has been an unprecedented increase in the number of sick units and decline in the rate of growth in exports by the SME sector. To be more specific, the number of sick units increased from about 0.2 million in 1990 to over 0.3 million in 2000 and the rate of growth in exports declined from 31 per cent during 1986-91 to 18 per cent during 1991-2000.

Being a democracy, the state responded to the new challenges through a series of institutional interventions including policy changes and creation of new organizational structures to help promoting their efficiency and competitiveness through innovation. Thus viewed, the SMEs in India is at the crossroads as India's national system of innovation moved from import substitution and state planning to greater play of market forces with reduced state intervention. Against this background, this chapter has the following two objectives. To analyse the system of innovation and production and to examine the extent to which a "learning, innovation and competence building system" as articulated in the NIS framework has emerged in this sector. Secondly, to highlight the recent institutional interventions in the SME sector and their limits to help evolve an innovation system that, *inter alia*, involves interactive learning through clustering, spin-offs, user-producer interaction and with the academia, participation in global/local production networks, new modes of financing investment and skill upgradation.

2. System of Innovation and Production in SMEs

2.1 On Defining Small Scale Industries

Prior to Independence (1947), SSIs mostly denoted the village and urban based cottage industries and manufacturing handicrafts (Bhatnagar, 1995). The Industrial Policy Resolution of 1948 and the First Five Year Plan (1951-56) document identified the SSIs as those which did not come under the Factories Act, 1948. The SSIs included those industries that used power and employed less than 10 workers or did not use power and employed up to 20 workers. During the First Five Year Plan the distinction between small and village industries was made. SSIs were defined as (i) those units which employed less than 50 workers, if using electricity; or (ii) less than 100 workers if not using electricity; or (iii) having capital assets not exceeding Rs. 0.5 million. In 1960 the employment criterion was dropped and the small-scale industries were defined in terms of investment in plant and machinery alone. As per the 1966 definition, all industrial units with a capital investment of not more than Rs. 0.75 million were categorized as SSIs. In 1982 the service oriented units were included in the small scale sector; provided they are set up in rural areas and towns with population less than 0.5 million and investment limit in plant and machinery below Rs. 0.2 million. In the New Small Enterprise Policy announced in August 1991, the investment limit of SSI was raised to Rs. 6 million. The investment limit was raised to Rs. 30 million during 1997 due to inflation. Later in 1999, the investment limit was reduced to Rs.10 million (Prasad, 2004). In most countries, SMEs units are clubbed together for policy purposes. The recommendation of the Planning Commission Study Group on the Development of Small Enterprises, which submitted its final report in May 2001 constituted to redefine the tiny, small and medium establishments in terms of investment limits of Rs. 2.5 million Rs. 50 million and Rs.100 million, respectively² has been accepted by the government (Bhavani, 2002).

It may be observed that since the mid-1980s, there has been persisting efforts at raising the investment limit for defining the small enterprise. Between 1985 and the most recent (late 2006), the defining ceiling value of investment in plant and machinery has been subject to upward revision

² The investment limit as of now for the enterprises engaged in serviced activities is one million, 20 million and 50 million, respectively, in case of tiny, small and medium enterprises.

as many as six times. Not only a limit of Rs. 3.5 million for small enterprises has been taken to a height of Rs. 50 million (about 1.2 million US dollars at current exchange rate), the inclusion of the 'medium' enterprises with an investment limit of above Rs. 50 million reaffirms a growing bias towards larger enterprises that are likely to have strong export orientation. Even the gradual promotion of business service (distinct from manufacturing) enterprises within the ambit of the small-scale sector is an explicit move towards enhancing competitiveness of the SMEs (Das, 2008a: 123).

2.2 *SMEs in the Indian Economy*³

As per the quick estimates of 4th All-India Census of MSMEs for the year 2006-07, the number of enterprises is estimated to be about 26 million and these provide employment to an estimated 60 million persons. Of the 26 million MSMEs, only 1.5 million (about 6%) are in the registered segment while the remaining 24.5 million (94%) are unregistered units. But it is important to note that 6 per cent of the total number of units in the unregistered sector contributes to as high as 83 per cent of the total employment. The gender distribution of employment indicates dominance of men accounting for nearly 83 per cent of the total employment while only about 7 per cent of the units are owned by women. In terms of their area of operation, while the manufacturing enterprises dominate the registered units (67%) the service sector units dominate the unregistered sector (74%). The MSME sector as a whole contributes 8 per cent of the country's GDP, 45 per cent of the manufactured output and 40 per cent of the exports. In terms of product coverage, some of the major subsectors in terms of manufacturing output are food products (18.97%), textiles and readymade garments (14.05%), basic metal (8.81%), chemicals and chemical products (7.55%), metal products (7.52%), machinery and equipments (6.35%), transport equipments (4.5%), rubber and plastic products (3.9%), furniture (2.62%), paper and paper products (2.03%) and leather and leather products (1.98%).

The MSMEs are characterized by higher labour-capital ratio and higher rate of growth as compared to those in the large scale enterprises. However, the heterogeneity within them cannot be ignored. One end of the MSME spectrum contains highly innovative and high growth enterprises. These

³ In the discussion that follows, we use the term SME interchangeably with SSI and MSME.

include MSMEs in sectors like textiles and garments, leather and leather products, auto components, drugs and pharmaceuticals, food processing, IT hardware and electronics, paper, chemicals and petrochemicals, telecom equipment, etc. Such enterprises not only have high potential for growth but could also contribute significantly in enhancing country's exports.

While MSMEs are considered as having the potential to be dispersed regionally and, therefore, could contribute towards achieving national objectives of growth with equity and inclusion, there exists a certain regional concentration in terms of their distribution. In terms of statewise distribution of MSMEs, more than 55 per cent of these enterprises are located in just six states, namely, Uttar Pradesh, Maharashtra, Tamil Nadu, West Bengal, Andhra Pradesh and Karnataka.

2.3 *SMEs in High-tech Industries*

Indian policy encouraged SMEs in a number of high-tech industries. Among the products that were reserved for SMEs included those from high-tech industries like electronic components, test and measuring instruments, consumer electronic equipments and others. In case of the electronics industry, the strategy during 1970s was to develop the industry within the confines of the public sector and the small-scale sector. The "small scale sector led growth" strategy was based on the following economic rationale. First, the manufacture of electronic equipments essentially involved assembly and testing operations. It could be done at widely different levels of automation depending on the scale of operation. While at a larger scale of operation, it is feasible to achieve higher levels of automation involving wave soldering, automated wire insertion and wrapping, etc., at a lower scale of production, the scope of automation is limited. Given the smaller domestic market it was believed that under Indian conditions there was no economic advantage for large-scale production (Joseph, 1997). Secondly, the above strategy appeared to be in tune with the objectives of regional dispersal of economic activities, utilization of local skills, materials and capital, broadening of entrepreneurial base, etc. Thus, in 1976, out of the 81 units licensed for the manufacture of TV receivers, 71 units with a total capacity of 2 million were in the small scale sector. The remaining were organized sector units, which included units under the State Electronics Development Corporations of Kerala, Rajasthan, Haryana, Punjab and Uttar Pradesh (Joseph, 2004).

It has been estimated that at present there are over 3500 firms in India's electronics industry that comprises of 11 central public sector units with 31 manufacturing establishments, 46 units in the state public sector, about 500 units in the organized private sector and more than 2900 units in the small scale sector. Over the years, with policy reforms, the share of organized private sector and the small scale sector increased at the cost of public sector units. Today, the public sector accounts for only about 16 per cent of the total output, which was as high as nearly 35 per cent in 1981. The organized private sector, that also includes foreign firms with considerable share in computers and television, today accounts for about 46 per cent of the total output recording an increase of over 16 per cent since 1981. The increase in their share took place mostly during the last decade. Similarly, the small scale sector also increased its share in the output by about 10 per cent during the last decade to reach a level of 38 per cent in 2002 (Government of India, 2004a).

Similarly, in the IT and software sector of India, the small scale sector plays an important role. India's software industry that comprises of over 1300 firms is characterized by a long-tailed distribution wherein about 20 larger firms account for nearly 50 per cent of the production and export while the rest of the output and export is accounted for by a large number of small firms. Many of the leading software enterprises of today were started as small enterprises. Infosys, Satyam, Mastek, Silverline, Polaris, among numerous others, for instance, were started by software professionals and engineers with small savings and loans at very modest scales to begin with (Kumar, 2001). Thus, the SME, sector acts as a nursery of entrepreneurship, often driven by individual creativity and innovation. In case of the software sector there were a number policy instruments in place that included the Software Technology Park scheme, that apart from providing a single window clearance facilitated access to built-up infrastructure as well as computing and communication infrastructure. In addition, as already noted, there were a number venture funds that paved way for the growth of small enterprises.

3. Policy Framework

Recognizing the importance of SMEs in the development of the economy, various policy initiatives have been put in place over the years. In the Industrial Policy Resolution (IPR) of 1948, the government stressed the role of SSIs for balanced industrial growth, better utilization of local

resources and creation of employment opportunities. The primary responsibility for developing small industries by creating infrastructure has been provided to state governments. The Second IPR of 1956 provided for the support to cottage, village and small industries by differential taxation or direct subsidies and integration of SSIs with that of large-scale industry. In order to improve the competitive strength of SSIs, 128 items were exclusively reserved for production in SSIs, and 166 items were reserved for exclusive purchase by government from this sector. The government, with the IPR of 1977, increased the number of items reserved for the SSIs to 504. The policy laid provision for the establishment of District Industries Centres (DICs) so that in each district a single agency could meet all the requirements of SSIs under one roof. Provision was also made for technological upgradation, special marketing arrangements through offering services, such as, product standardization, quality control and market survey. The Industrial Policy of 1980 underlined the need for an integrated industrial development between large and small sectors. Industrially backward districts were identified for faster growth of existing network of SSIs. “Nucleus plants” in each industrially backward district replaced the DICs. In addition, preferential treatment was offered to agro-based industries recognizing the need for strengthening the agricultural base.

The New Industrial Policy of 1991 that marked the era of liberalization in India underlined the need for simplifying regulations and procedures by delicensing, deregulating and decontrolling. Thus, SMEs were exempted from licensing for all articles of manufacture, equity participation by other industrial undertakings was permitted up to a limit of 24 per cent of shareholding in SMEs and the priority was accorded to small and tiny units in the allocation of indigenous and raw materials. Market promotion of products was emphasized through co-operatives, public institutions and other marketing agencies and corporations. Since the turn of this century, recognizing the need for strengthening SMEs in the context of new challenges, new policy initiatives were made in the years 2001, 2003, 2004 and 2005. While the process of import liberalization along with dereservation and delicensing continued, various provisions were made for the strengthening the SME sector that included setting up of a corpus fund under the Credit Guarantee Scheme, finance at concessional rates, market development assistant scheme and cluster development not only to promote manufacturing but also to renew industrial towns and build new industrial townships⁴.

⁴ For detailed discussions see, among others, Sreepriya (2007) and UNIDO (undated).

In addition, the government set up different committees from time to time in response to specific problems faced by the SME sector⁵. An Expert Committee on Small Enterprises was constituted to address the need for reforms in the existing policies and design new policies for MSME development to facilitate the growth of viable, agile and efficient enterprises responsive to technological change and international competition (Government of India, 1997). In 1999, a 'Study Group on Development of Small Scale Enterprises' was set up to examine the existing policies/ programmes for SSI development, review the definitions and legal framework, examine the necessity of reservation policy, suggest innovative instruments/ institutions to build up the equity base, review the fiscal policy/ tax incentives, examine the impact of various regulatory laws and procedures and review the problems/prospects of marketing concerning the SSI sector. In 1991, a committee was constituted by the Reserve Bank of India (RBI) to examine issues related to the matter of SSI finance followed by the setting up of a working group on flow of credit to MSME sector in 2003. The National Commission for Enterprises in the Unorganized Sector (NCEUS) was established in 2004 to examine the problems confronting enterprises in the unorganized sector and make appropriate recommendations to provide technical, marketing and credit support to the enterprises that submitted 11 reports on varied issues relating to the units in the unorganized sector. Finally, as an offshoot of the meeting of representatives of 19 prominent MSME associations with the Prime Minister, a Task Force was appointed in 2009 to reflect on the issues raised by the associations and formulate agenda for action⁶.

4. Other Institutional Arrangements

Along with the series of policy changes there are various institutions at the national, state and district level for the promotion of SMEs. At the national level the Central Small Industries Organization (CSIO) had been established in the mid-1950s which has been later renamed as the Small Industries Development Organization (SIDO). Over the years this institution has emerged as the core promotional agency at the central level. It consists of 28 Small Industries Service Institutes (SISIs), 30 branch SISIs, 37 extension

⁵ For an overview of all the reports in terms of the major recommendations made and accepted by the government, see, Government of India (2010).

⁶ For details, see, Government of India (2010).

centers in specific products and 74 workshops as in the year 1993. Though some of them have been wound up due to their financial non-sustainability when the policy shifted towards liberalization, as of now, there exists a full-fledged Ministry of MSMEs at the level of the central government. The ministry owes its origin to the establishment of the Office of Development Commissioner (SSI), way back in 1954. “Over the years, it has seen its role evolve into an agency for advocacy, hand holding and facilitation of varied innovations in the small industries sector. It has over 70 offices and 21 autonomous bodies under its management. These autonomous bodies include Tool Rooms, Training Institutions and Project-cum-Process Development Centres. The Office of the Development Commissioner (MSME) provides a wide spectrum of services to the concerned sector. These include facilities for testing, toolmenting, training for entrepreneurship development, preparation of project and product profiles, technical and managerial consultancy, assistance for exports, pollution and energy audits etc... Office of the Development Commissioner (MSME)... is currently focusing on providing support in the fields of credit, marketing, technology and infrastructure to MSMEs.”⁷ For khadi and village industries, a separate high level commission has been set up under the Ministry of Industry. Similarly for handlooms, handicrafts, sericulture and other non-modern small units, separate divisions exist to promote them.

At the state level, Small Industry Development Corporations (SIDCs) have been set up to develop infrastructure in the form of industrial plots and industrial sheds, State Financial Corporations (SFCs) to provide long term credit facilities, State Exports Promotion Corporations to provide marketing assistance for exports, Technical Consultancy Organizations (TCOs) that provide technical, financial and marketing consultancy to the sector. Further, Centres for Entrepreneurship Development (CEDs) and Institutes of Entrepreneurship Development (IEDs) have been set up to promote entrepreneurship through training.

As mentioned earlier, at the district level, in the year 1978, the central government launched a programme of establishing DICs to provide, under a single roof, all the support services, clearances, licenses and certificates required by small entrepreneurs. There are more than 400 such centres, one each in a district.

⁷ For details, visit <http://www.dcmsme.gov.in/sido/sido.htm>

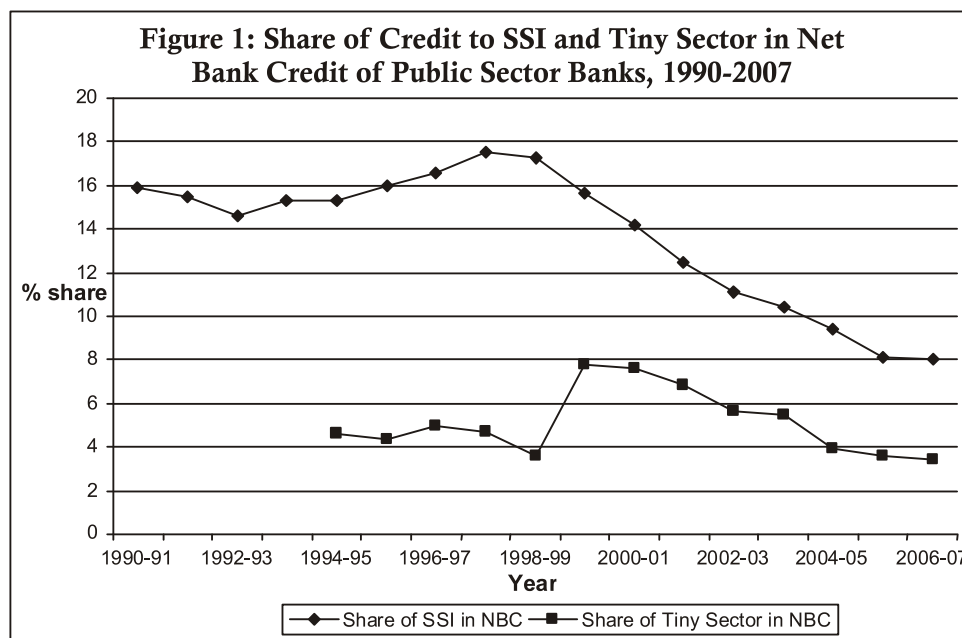
4.1 *Financing SME Development*

Considering the importance of finance for the development of SMEs different agencies have been established at the national, state and district level, as per broad guidelines laid down by the RBI, for financing the SME sector. At the national level, the major institutions include Small Industries Development Bank of India (SIDBI) (mainly through re-finance), National Bank for Agriculture & Rural Development, National Small Industries Corporation, Khadi & Village Industries Commission and the Development Commissioner, MSME. At the state level, SFCs, SIDCs and the State Cooperatives Banks are the major source of finance. In addition, at the district level there are Regional Rural Banks (RRBs), District Cooperative Banks, branches of state level institutions and nationalized banks (about 65,000 in number) and DICs. Here it is to be noted that since liberalization at least three working groups/ expert committees had been set up the look into various finance related issues faced by the SME sector.

Even as the new policy initiatives prepare MSMEs to participate in a globalised market space, the Achilles' heel has been poor or no availability of adequate and timely credit to numerous small and tiny units. The 'priority' sector lending includes small enterprises as a vital recipient, however, the reluctance to serve them is apparent from the data for the period 1990–2007, as represented in Figure 1. The proportion of credit to SSIs (as percentage of net bank credit) has been on the decline since 1997–98 and has touched a low of a mere 8 per cent in 2006–07. Such figures for the huge tiny sector (for the period 1994–95 to 2006–07) have been hovering around a low level of 4 to 5 per cent till 2004–05, with the exception of a jump from 3.6 per cent to 7.8 per cent from 1998–99 to the subsequent year. The fall has continued and touched 3.4 per cent in 2006–07, the lowest so far. It is beyond comprehension as to how with repeated and clear admonitions from the RBI, particularly, not to insist upon the collateral from tiny units, the priority sector lending has failed to cater to the most crucial needs of loan finance to small and tiny enterprises. As observed by a national-level field-based study of small firms, “there are strong structural underpinnings to the inadequate flow: the organizational structure of banks, and processes within them, have taken them far from task orientation, and have created a specific bias against small loan portfolios” (Morris *et al.*,

⁸ For more details refer the UNIDO study available at

2001: 11). The study also points out that the manner of discretion and supervision of commercial banks by the RBI coupled with the fact that there does not exist a performance-based incentive system for proactive bankers assessing loan eligibility, the small firms and, especially, the tiny units find it hard to access the requisite loan finance.



Sources: Upto 2004-05 <http://www.laghu-udyog.com/thrustareas/CREDIT.htm> (accessed June 11, 2008); and for the latest two years, RBI (2007: 73-74).

Notes: Data for 2003-04 and 2004-05 are 'Provisional'. The net bank credit figures for 2005-06 and 2006-07 have been estimated based upon the value and proportion of credit to the SSIs for the respective years. For the tiny sector for the year 2005-06, in the absence of data for the absolute value, average of the corresponding figures for the preceding and succeeding years has been used.

The poor disbursement and management of credit to MSMEs have been linked to the fact that there is no transparency regarding their financial condition. "It could well be that some enterprise owners themselves may not grasp their financial conditions well. Under the condition, it is natural that banks hesitate to give loan to small-scale units. In fact, there is evidence to establish that a fairly significant proportion of loans given to small enterprises in the past have compounded the problem of non-performing assets (NPAs). Unless fairly detailed information on small firms is available,

banks would hesitate to take risk. They might, in fact, prefer relatively larger (including the now medium) enterprises in order to comply with the RBI regulations” (Das, 2008c:75).

Unlike in many developed nations where SMEs have enjoyed a strong credit guarantee support, it is only very recently that in India this issue has received some attention. The newly introduced Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE), being monitored by SIDBI, insures life of the chief promoters of the enterprises. Also there have been efforts by some industry associations who have signed memorandum of understanding with commercial banks and financial institutions to provide collateral security to upcoming entrepreneurs for their credit requirements (Kondaiah, 2007: 7). Nevertheless, the provision of credit guarantee to micro and small enterprises (MSEs) and, particularly micro units, whether for starting or expanding business is still in a nascent state and its broad-basing poses a major challenge to the existing financial system.

Private equity and venture capital funds cannot be expected to flow adequately and regularly to the SME sector given their singular focus on maximising returns over fixed periods of time. They, hence, are bound to flock to sectors that demonstrate the ability to reap profits for fairly longer periods of time. In India, after the initial excitement about IT, real estate and infrastructure, most of the funds have come to concentrate in sectors like education, healthcare and microfinance. As for formal institutional arrangements, the major initiative was taken by SIDBI when it set up a wholly owned subsidiary, SIDBI Venture Capital Limited (SVCL) in 1999 with a stated mission of catalyzing ‘entrepreneurship by providing capital and other strategic inputs for building businesses around growth opportunities and maximize returns on investment’. It manages two funds – the National Venture Fund for Software and Information Technology (NFSIT) in collaboration with the Ministry of Information Technology and the SME Growth Fund (SGF) in association with the leading commercial banks. The NFSIT was set up as a close-ended 10 year fund with a corpus of Rs. 1 billion and the SGF as a close-ended eight year fund with a corpus of Rs. 5 billion. The SGF launched in 2004-05 focuses on a range of growth sectors including life sciences, retailing, light engineering, food processing,

information technology, infrastructure related services, healthcare and logistics and distribution. The fund has provisions of early investment and subsequent financing, provided the investees promise of growth and dynamism. It also envisions to develop international networking and explore possibilities of co-investment from international venture capitalists in subsequent rounds of financing. The NFSIT has 11 ongoing investments and under SGF 17 investments are ongoing. The fund has disinvested from two ventures. The lack of institutional innovation for SMEs runs contrary to the initiatives towards building a globally competitive enterprise sector.

4.2 *Innovation and R&D*

Indian policymakers, particularly in the early years of Independence, highlighted the crucial role of technology and innovation in addressing the development problems in the country and underscored the role of domestic generation of technology. Accordingly, almost all the policies formulated over the first 40 years – including the policy statements exclusively for science and technology and others relating to industry, trade, investment and fiscal measures – were intended to influence innovation in general and domestic generation or imports of technology in particular (Joseph and Abrol, 2009). Apart from establishing various agencies by the state to promote innovation in almost all sectors of the economy including the SMEs, the government encouraged the private sector, with the aid of various policy measures, to engage in innovation and in-house R&D activities.

Public research institutions (PRIs) laboratories established across the country are a major source of technology for the SMEs. The Government also encouraged setting up of Cooperative Associations with active involvement of industry such as textiles. In addition, there are product-specific arrangements like the Indian Diamond Institute in Surat for technology upgradation and for imparting training to labour in skill development. The National Institutes of Fashion Technology (NIFTs) have been established in New Delhi and Gandhinagar for providing information and forecast on latest fashions and for developing the industry technologically. Footwear Design and Development Centres have been established at NOIDA, Agra, Chennai and Kanpur where the footwear clusters exist. The Central Glass and Ceramics Research Institute (CGCRI) has centres in Kolkata, Khurja and Naroda. The institute provides services to entrepreneurs on technology upgradation and training of skilled manpower. The Central Leather Research

Institute (CLRI) at Chennai performs the function of designing and development, information dissemination, technology upgradation and training of skilled manpower (UNIDO, undated).

Within the general policy framework, a major initiative has been the establishment of the Technology Development Board (TDB) to provide financial assistance in the form of equity, soft loans or grants. This was followed by the setting-up of technology business incubators (TBIs) in 2001 where grants-in-aid are provided by the government department, both on capital and recurring for a set period. Another notable initiative has been the setting up of National Innovation Foundation (NIF) to harness traditional knowledge. The NIF has scouted over 50,000 grassroots innovations and traditional knowledge from over 350 districts with the help of HoneyBee Network and others. Many of these technologies have high potential for commercialization by small and medium scale entrepreneurs through exclusive or non-exclusive licenses.

The SIDBI that came into being as a subsidiary of IDBI in the year 1991 took up the initiative of cluster development during the first year of its operations under the area of Promotion and Development. The stated objectives of the programme are creation of awareness on new products, processes and technologies, skill upgradation, development of technology related common facilities for the cluster, provision of unit specific modernization packages and promotion of energy conservation and introduction of environment friendly technologies. SIDBI has so far selected 20 small industry clusters for technology upgradation. The product groups covered include locks, textile processing, bicycle & parts, scientific instruments, salt and salt based chemicals, powerloom, machine tools, rubber products, seafood products, glassware, gems & jewelry, brass & bell metal, blacksmithy, leather & leather products, foundries and hand tools. Other national level institutions that are supporting the small scale sector are National Research Development Corporation (NRDC), Bureau of Indian Standards (BIS), National Productivity Council (NPC), Consultancy Development Centre (CDC) and Electronics Test and Design Centres (ETDCs). The central financial institutions have also set up the Entrepreneurship Development Institute of India (EDII) at the national level to promote entrepreneurship.

While institutional arrangements for promoting innovation and R&D is fairly elaborate, it is rather difficult to assess the innovation performance. Though R&D expenditure could hardly represent important innovations in the sphere of organization, markets and others, it is often considered as a major indicator of innovations in terms of new products and processes⁸. The distribution of industrial R&D across public sector, private sector (large-scale) and small-scale sector is presented in Table 1. It is evident that in terms of total industrial R&D, though the share of small-scale sector almost doubled during the period under consideration, their share comes to only 4 per cent. This compares very poorly when considered in terms of their contribution to output, employment or export earnings.

⁸ In India, R&D data across different industries have been compiled and published by the Department of Science and Technology (DST) from 1976-77 onwards. These data relate to units registered with the DST initially (1973-84) and, subsequently, with the Department of Scientific and Industrial Research (DSIR). Notwithstanding the comprehensive nature of the database in terms of the large number of variables included, the coverage of units is quite problematic. Though data are collected for public, private and small scale sectors, data pertaining to R&D investment in the small sector are poorly represented, as the registration of R&D units by the industry is voluntary and may not capture the R&D expenditure of those units, which do not find the necessity of registering with the government. It has also been argued that a sizeable number of firms utilize the R&D units' registration scheme as a means of importing restricted machines and very little R&D work happens in these units (Desai, 1984) Moreover, the classification of data as public, private and small scale is odd since the first two is based on ownership and the last one is based on size, hence comparisons are bound to be biased and skewed.

Table 1: Distribution of R&D Investment by Broad Sector

(Percentages)

Year	Public sector	Private sector	Small-scale sector	Total
1980-81	41	57	2	100
1981-82	41	57	2	100
1982-83	41	56	3	100
1983-84	47	51	2	100
1984-85	44	54	2	100
1985-86	45	52	3	100
1986-87	45	52	3	100
1987-88	49	48	3	100
1988-89	44	53	3	100
1989-90	45	52	3	100
1990-91	46	50	4	100
1991-92	46	50	4	100
1992-93	42	54	4	100
1993-94	39	57	4	100
1994-95	28	67	5	100
1995-96	24	71	5	100
1996-97	27	69	4	100

Source: Department of Science and Technology, R&D Statistics, Different years

With a view to get a more disaggregated picture we have estimated the R&D intensity of small-scale firms across different industries during 1980-81 to 2005-06. It is evident that the R&D intensity (R&D expenditure as a proportion of sales) of the small-scale sector has been declining over the years. Nevertheless, their R&D intensity is much higher than that for the economy as a whole and also for the organized private sector. It is also to be noted that R&D activity is not prevalent in all the industries but confined to about a dozen and others are yet to get involved in R&D in any significant manner. Also, R&D expenditure in most industries is rather erratic. This may partly be attributed to the fact that it includes both current and capital expenses, especially the imported equipment that do not take place in all the years.

Sarma (2002) explored the extent of integration of small-scale sector with the public sector and private sector, within an innovation system framework. The study, by using a methodology in tune with revealed comparative advantage and location quotient, estimated the revealed R&D Advantage (RRA) as well as the R&D base of these sectors. In all the three sectors, the study found substantial internal consistency in terms of industries, which have higher RRAs. In other words, within the sector, there is a high degree of focus on investment in R&D over the years, especially with respect to

public sector. This has resulted in the build-up of appreciable technological capability as shown by other more in-depth studies. With respect to other two sectors though there is sectoral consistency, the technological competence of firms in these sectors is circumspect due to sectoral system of innovation that prevailed as manifest in the nature of actors, networks, institutions and the demand. But the most alarming finding of the research has been the absolute lack of co-ordination between the sectors in terms of research investment. The fact that there is not even a single sector throughout the period of research (1980-97), where in the public, private and small sector $RRA > 1$ is a matter of concern (Sarma, 2002). On the whole, the study found very poor level of integration between different agents engaged in innovation pointing towards the immature nature of India's innovation system.

4.3 Clustering, Networking, and Interaction with Universities and Public Research Laboratories

For long, sub-contracting as a means of promoting interactive learning has been systematically promoted in the SME sector. Several measures like ancillarisation, vendor development programmes, buyer-seller meets, and the provision for shareholding by large enterprises, among others, have been initiated. This helped a large number of MSEs to develop marketing linkages and get access to technological inputs that are strategic to competence building through interactive learning. However, in view of the dependent relationship of such enterprises with large enterprises, they also face different set of problems. New empirical evidence in the last two decades, therefore, challenged this passive view towards the development of small scale sector and portrayed small firms as integral to a country's long-term competitiveness, and as important institutions that help build locally rooted, and diversified industrial capabilities in an era of intensified competition, uncertain markets and footloose capital (Tewari and Goebel, 2002).

India is home to large number of clusters and most of them have naturally evolved over the years without any external inducement. The size in terms of the number of units and the quantum of output of these clusters vary significantly. Some of them are so big that they produce upto 70 to 80 per cent of the total volume of that particular product produced in India. For example, the township of Panipat produces 75 per cent of the total blankets produced in the country. Similarly Tirupur, a small township in the

Coimbatore district of Tamil Nadu contributes 80 per cent of the country's cotton hosiery exports. Yet another example would be of the city of Agra, virtually a Footwear City with 800 registered and 6,000 unregistered small and cottage footwear production units, making 1.5 lakh pairs of shoes per day with a production value of US \$ 1.3 million per day and exporting shoes worth US \$ 57.14 million per year. Similarly, Ludhiana in Punjab produces 95 per cent of the country's woolen knitwear, 85 per cent of the country's sewing machines and 60 per cent of the nation's bicycle and bicycle parts (UNIDO, undated).

Though it has been argued that clusters are major sources of technology spillovers and increasing returns (Roemer, 1986; Krugman, 1991; and Grossman and Helpman, 1991) studies in the innovation system would argue that the existence of clusters *per se*, however, is only a necessary condition for facilitating innovation. While some of these studies highlighted the role of universities and educational institutions and public laboratories in encouraging cluster formation (Zucker *et al.*, 1998; Cooke, 2001; Breschi and Malerba, 2001; and Audretsch and Lehmann, 2005) others have emphasized the role of region specific characteristics in particular the role of networking within the region (Ronde and Hussler, 2005). Yet another set of studies suggest that a high level of qualified and skilled labour force and the presence of good universities (Asheim and Coenen, 2005).

While the available evidence, mostly from the developed world, indicates that interaction with universities and public research institutions (PRIs) is an important source of means of innovation in the manufacturing enterprises, in India, however, industry-university interaction is still in its infancy. A survey of 462 large industrial units spread across different industries indicated that even the large Indian firms are largely inward looking and depended mainly on their own manufacturing process, and customers as the major sources of knowledge for innovation. Neither universities nor PRIs have any important role as sources of information either in terms of suggesting new projects or help completing the existing ones. Only 11.3 per cent of the firms claimed that they had any form of collaboration with a university or a PRI. While the overall level of interaction is found low, for those who have interacted, the collaboration has been a success in terms of achieving the objective (Joseph and Abraham, 2010). However, the firms in the SME sector are increasingly making use of the testing tool room and other facilities in the PRIs and universities. Though the relevance of interactive learning

as articulated in the systems of innovation framework is yet to be adequately appreciated explicitly in the policy circles, some of the recent committees (for instance, the NCEUS) appointed by the government have underlined the need for greater interaction with the PRIs and universities.

5. SME Participation in Global Production Networks

With the formal opening up of the economy in 1991, the small enterprise sector, 'protected' as it was from external competition for over four decades since the First Plan at least, had to gear up to the impetus of globalization. This implied that the SMEs needed to develop their capability to engage in external orientation by focusing upon competitiveness, innovative activities and networking with multiple 'stakeholders' both within and beyond the domestic sphere. In 1991, the introduction of the new category of Export Oriented Units (EOUs) within the SSI sector and the recognition of the Small Scale Service and Business Enterprises (SSSBEs) were early indicators of motivating the small enterprises to the global business arena. This definite proclivity towards outward orientation has, in fact, favoured those few units in a certain subsectors, which have a global market presence and, hence, has left out massive number of smaller units where the average capital investment has been far low and the global market has no demand for their type of products.

Moreover, the hype regarding participation in the global value chains (GVCs) or GPNs as the key to success of small firms in developing nations has acted almost as a bait to getting entrapped in a production arrangement where the anchor or leading firm engages in what has been termed as 'rent-poor' activities, whereby, typically, labour-intensive and low value-adding tasks are subcontracted to SMEs in poorer countries, mainly to benefit from cheap labour. Clear incidences of decline of barriers to trade and foreign direct investment (FDI) have resulted in the relocation and reconfiguration of processes of production, beyond national boundaries, especially by the large multinational enterprises (MNEs). Encouraged further by the rapid progress in the information and communication technologies (ICTs) and reduction in transport costs, the global production systems have emerged in a number of modern and often labour-intensive subsectors, for instance, cosmetics, garments, furniture, furnishing textiles, leather goods, pharmaceuticals, computer/electronic goods, automobile parts, agro processing, scientific equipments and so on.

Being integrated into these “quasi-hierarchical” value chains, where buyers (MNEs, typically) from industrialized countries not only determine the specific manner in which processes to be undertaken, but also practise exclusion by which the local producers/assembly units hardly have any access to facilities to upgrade, diversify or even to know the full details of the final output and its market. This could be attributed at least partly to the nature of innovation system in which the domestic firms operate wherein they are not able to provide the complementary capability set required by the MNEs and that in turn leads to an unequal participation in the GPNs. In a discussion on the “downside” of the GVC promotion, a recent study notes that, “the controversial issue is whether firms are also able to achieve functional upgrading, and to determine the role buyers play in furthering, neglecting or obstructing functional upgrading by their suppliers” (Knorringa and Meyer-Stamer, 2008). In fact, in addition to the well-known aspect of such global production systems taking undue advantage of local cheap labour in developing nations, there are serious issues in the process of participation *per se*. The stringent criteria adopted in selecting a particular sub-contractor and also disallowing opportunity to participate in non-labour or high-tech stages of a given process are instances of highhandedness in an obviously asymmetrical business ‘partnership’. In the Indian context, the software as well as garment sectors, the two most typical examples of SMEs, have been feeling the heat of such blatantly translucent and essentially exploitative business relationship, where mostly the participating enterprises do not have complete information regarding the entire processes involved. In a study of Bangalore’s famed IT sector boom, attributed to the growing preference by MNEs for this cluster, it has been argued that in terms of knowledge spillover, technological capacity building and moving up in the value chains the SMEs have gained precious little (Vijayabaskar and Krishnaswamy, 2004).

In the case of garments (that tops the list of export goods from the SME sector in India), with a vast number of smaller units operating under immature innovation systems with outdated machines and without reference to legal provisions of production and industrial safety, exploitative labour market, they have not found favour to be chosen as sub-contractors with global garment giants. Nevertheless, there have been relatively larger local units which have been producing for MNEs and/or exporting themselves. However, this sub-sector that employs a staggering 3.5 million workers has been widely criticized for poor working conditions (including payment of

less than minimum wages) and serious compromise of formal status of workers. The growing incidence of contractualization, informalization and casualization of the workers, mostly women, have prompted various labour and social organizations to voice concern over the systematic subversion of workers' legitimate rights and social security (Das, 2008a: 123-125). The so-called 'networking' efforts, under the governance of GVCs, have carefully kept off the labour question. Excepting that there has been a nagging insistence to free labour regulations.

While globalization has favoured only a small privileged section of the enterprises from a few subsectors (typically, garments, pharmaceuticals, electronics and machine tools), one has to be cautious in being euphoric about participating in GPNs as the *sine qua non* for the progress of the SMEs. Such practices have been encouraging a dependence syndrome in small enterprises and, essentially, been acting against generating an innovative ethos in the domestic arena. In fact, an overemphasis upon external orientation can potentially result in the neglect of the domestic market, which needs various supportive measures, including improving the distribution channels so as to connect remote SMEs to larger markets within the country and also outside.

6. Growth Performance

Small firms, being highly heterogeneous, vary widely according to the sector they are in, the market they serve, the technology they use, the organization of work within the firm, the nature of the workforce, and, most importantly, according to the nature of the productive and institutional relationships they are embedded in (Tewari and Goebel, 2002). Going by the data obtained from the All India Census of Small Scale Industries, the small scale sector during the pre-reform period (prior to 1991) recorded a relatively high growth in terms of number of units, investment, output, employment and also exports. This tends to indicate that during this period this sector has been fairly successful in terms of achieving the declared policy objectives. As part of enhancing the competitiveness of Indian small firms, the strategy has essentially been to raise the capital intensity of production. However, given the preponderance of smaller or tiny units in this sector, it is likely that a few relatively larger units have emerged competitive by being able to invest in expensive plant and machinery.

Unlike the conventional emphasis on supporting the small-scale sector with a clear purpose of promoting participation of labour, the policy mechanism has been driven by the interests of a small set of enterprises who would be keen on augmenting the machining capability of their units so as to be able to join the wider global market. Thus, as is evident from Table 2, while the output capital ratio recorded a compound annual growth rate of 4.3 per cent during the pre-reform period, the corresponding growth during the post-reform period was negative. The labour intensity declined from about 156 persons per million investment in 1972-73 to seven persons in 2001-02. While such an aggressive reorientation has hardly helped accelerating output growth (which has declined after 1992-93 and moved in a cyclical manner) of the small firm sector during the last decade or so, it has led to an undesirable situation whereby the pace of rise in capital productivity (as expressed through the capital-output ratio) has far out-stripped that of the labour productivity since the 1990s (Figure 2).

Table 2: Selected Indicators of Performance of Small Scale Sector

Item	1972-73	1987-88	2001-02	Growth Period 1	Growth period 2
Production/ Investment in Fixed Assets	24.7	46.2	22.1	4.26	-5.13
Production/ Employment	1.57	11.72	32.98	14.34	7.67
Employment/ per unkt of Investment in Fixed Assets	156.7	39.4	6.7	-8.79	-11.89
Investment in Fixed Assets/ Employment	63.80	253.59	1489.29	9.64	13.48

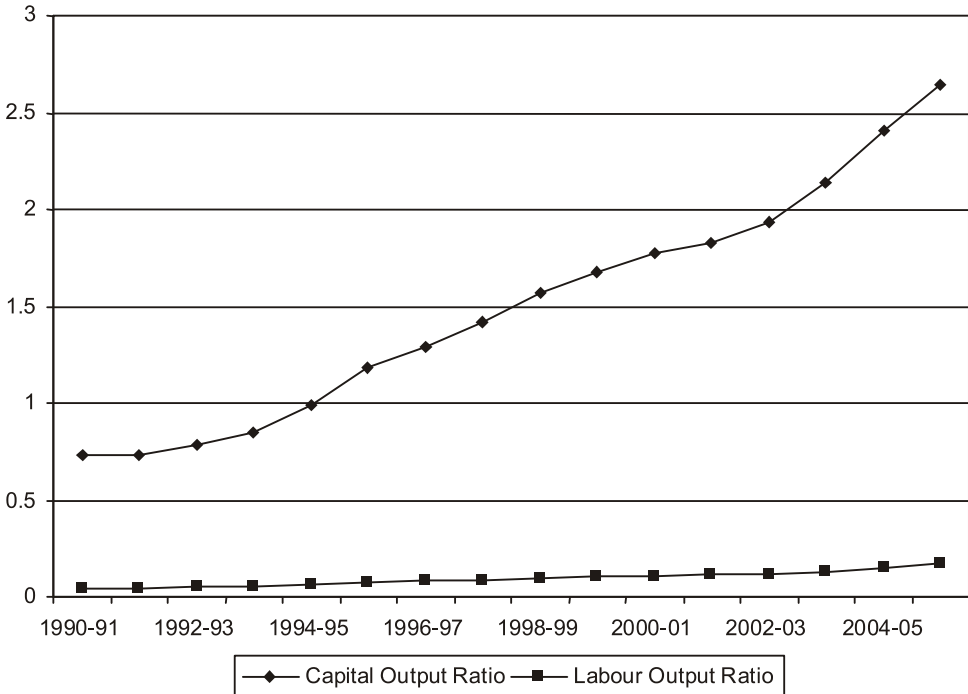
Source: Estimates based on Reports on All India Census of Small Scale Industries, 1972-73, 1987-88 and 2001-02.

The above analysis at the aggregate level has been further reinforced by our analysis at the industry level. Estimates based on Reports on All India Census of Small Scale Industries, 1987-88 and 2001-02 indicated that labour productivity growth declined in almost all the industries with the possible exception of food products. When it comes to capital productivity, the reduction in growth rate was much drastic in almost all industries.

7. A Regional Perspective

In a country that is more diverse than most continents and balanced regional development has been upheld as a key policy objective, the role of the small-scale sector could not be over emphasized. While there have been varied policy initiatives to facilitate regional spread of industries, even today, the distribution of industries is characterized by high regional concentration. The imbalance in the regional distribution appears to have got accentuated with globalization (Subrahmanian, 2003). The point has been reinforced by the positive and highly significant value of the estimated rank correlation coefficients over the years. Thus, as investment decisions got governed by the market test of profitability rather than social objectives even in the small scale sector, their operations got confined to the developed regions. Here it appears that while the policy instruments and institutional arrangements have been in place, the small industries are not acting as catalysts of balanced regional development perhaps on account of the fact that regional innovation system does not exist or the interaction between different agents is weak to facilitate the growth of industries. While growth

Figure 2: Factor Productivity in SSIs, 1990 to 2006

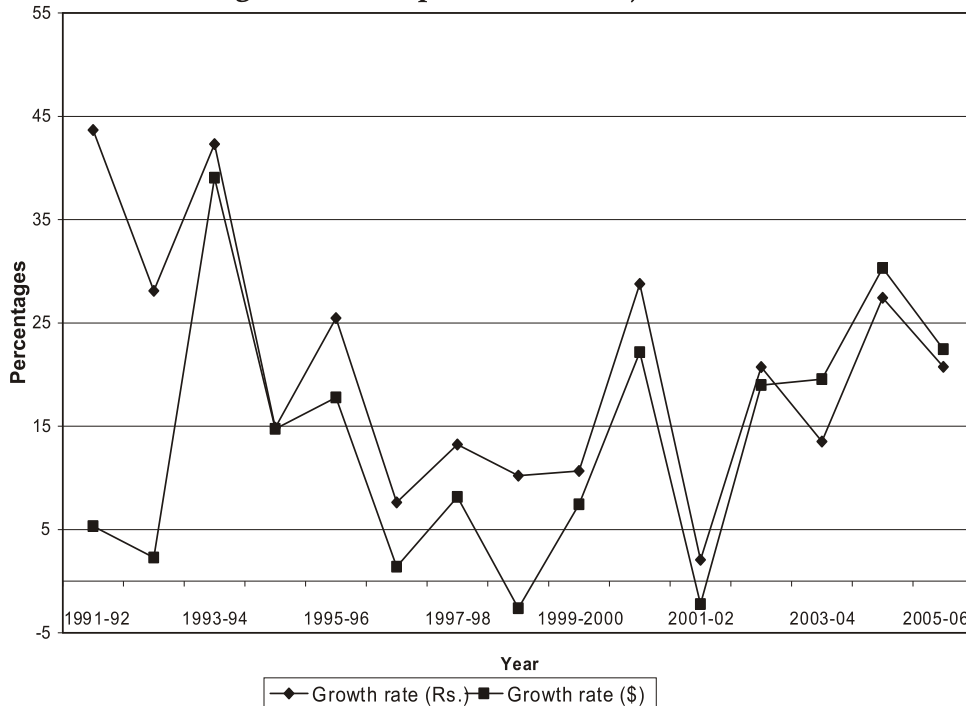


rates in one or more of the three key variables, namely, number of units, employment and production have often been negative even in industrially advanced states like Gujarat, Punjab and Tamil Nadu, most of the poorer states have fared badly during the period (Sreepriya, 2007). More striking, perhaps, is the negative growth in West Bengal for all the three variables. The poor showing of the manufacturing sector in the state has been part of an overall decline of competitiveness of an erstwhile vibrant industrial sector and cannot be de-linked from the nature of innovation system at the regional level and calls for detailed investigation.

8. Exports: A Mixed Picture

The performance of exports from the small firms in India presents a mixed picture. Whereas the Ministry data suggest a steady rise in the value of exports, as between 1990 and 2007, the growth rates have fluctuated heavily over the period. In fact, the growth rates based on dollar values have not only varied massively but have been negative for two years (Figure 3). The export performance in rupee terms hides more than it reveals.

Figure 3: SSI Exports from India, 1991-2006



If the available data is any indication, though the share of SSI exports in total exports has gone up steadily over the years, their performance in relative terms lagged behind the economy as a whole during globalization. To illustrate, the share of SSI exports in total exports almost doubled from about 16 per cent in 1973-74 to about 30 per cent in 1990-91. The increase thereafter has been at best modest. After reaching a level of 36 per cent in 1993-94 it declined to 33 per cent in 1996-97 and hovered around that level to remain at 34 per cent in 2003-04. However, the 2008-09 data indicate that exports from the small scale sector accounted for 40 per cent of total exports. This indicates that the innovation system governing the small firm sector has been beset with factors hindering the learning innovation and competence building process. Ensuring high standards of product quality across (and even within) most sub-sectors has remained a challenge. This could be due to the operation of informal practices (often influenced by price competition in the vast domestic market) and/or poor or no linkages with formal sources of R&D.

A consistent rise in the ratio of exports to production since early 1990s has not encouraged diversification in export composition. Considering values of major commodities exported since 1988, excepting for 'Electronic and computer software' those for all other product groups have remained the same. Further, seven product groups (namely, garments, engineering goods, electronic and computer software, chemicals, pharmaceuticals, processed food and leather goods) have accounted for close to 90 per cent of exports from this sector. Thus viewed, it appears that while the innovation system in the SMEs as a whole is yet to be vibrant, there are certain sectors within the SMEs that appeared to have displayed vibrancy. Therefore, there is scope for more detailed analysis using sectoral systems perspective such that lessons could be learned for emulation by lagging sectors.

9. Towards Evolving a Vibrant Innovation System: Recent Initiatives

Recognizing the importance of SMEs from varied angles various institutional interventions have been undertaken by the state with their implicit or explicit effect on innovation system in the SME sector. Despite these initiatives, if the discussion we had in the previous section is any indication, a vibrant innovation system in the SMEs is yet to emerge and this has been undermining their ability to be internationally competitive under globalization

and contribute towards the overall economic development. In this context drawing from the reports submitted by different high-level committees, a number of new initiatives that are being undertaken require mention.

With the recent pronouncement of the 'landmark' MSMED Act, 2006, the Indian government has explicitly recognized the dynamic role to be played by the MSMEs in an increasingly globalised world. The clear thrust of the recent policy initiatives has been three-fold: i) enhance competitiveness through encouraging an innovative ethos amongst firms and being quality conscious; ii) increase links with multiple stakeholders with a view to benefit from networks both nationally and globally; and iii) strive for a larger market presence beyond the domestic. The policy attaches importance to networking with stakeholders both upstream and downstream in the entire GVC, from raw material procurement to processing/manufacturing to marketing to customer services. For one thing, the Act has identified the category of 'medium' enterprises as a vital section in the manufacturing stream and, for the other, it has taken special note of distinct roles to be played by what are termed business service enterprises.

In addition to the MSMED Act, a plethora of contemporary policy initiatives in various spheres, particularly concerning SMEs, can be identified. It is important to state that these policy measures are fairly nascent in origin and there hardly exists any basis to be euphoric about their effectiveness. Rather one needs to be extremely cautious in extrapolating their impact, given that in the past many such policy measures with ample potential hardly have been translated into enhanced performance of the MSMEs. Poor monitoring of implementation and effect of various small firm policies has been an issue of concern.

For the present purpose, it may be useful to discuss, briefly, the major policy initiatives in recent times that could have their effect on the innovation system as it operates in the SME sector (Das, 2008c: 80-84).

9.1 *Building Competitiveness*

In the policy circles there has been a growing recognition of both the criticality and possibility of enhancing SME competitiveness through reducing cost of production, improving product/service quality and targeting niche markets. The most explicit such initiative has been the creation of the National Manufacturing Competitiveness Council (NMCC), which

would, basically, identify and focus on certain clusters and firms in certain promising sub-sectors. The following four major areas have been proposed to be covered for appropriate intervention, based on the diagnostic studies and discrete requirements of the enterprises or cluster or industry: i. Manufacturing and engineering; ii. Marketing; iii. Financial and general management; and iv. Information technology. The interventions would include technology upgradation, design and intellectual property rights protection, marketing and sales promotion strategy and skill upgradation etc. Table 3 provides a list of the sub-schemes under the National Manufacturing Competitiveness Programme (NMCP).

Table 3: Sub-schemes under NMCP

#	Sub-Schemes under NMCP
1	National Programme on Application of Lean Manufacturing
2	Promotion of ICT in Indian manufacturing sector
3	Mini-Tool Rooms to be set up (by the Ministry of MSME)
4	Technology and Quality Upgradation Support for SMEs
5	Support for Entrepreneurial and Managerial Development of SMEs
6	Design Clinic scheme to bring design expertise to the manufacturing sector
7	Enabling manufacturing sector to be competitive through quality management standards and quality technology tools
8	National campaign for investment in Intellectual Property
9	Market assistance and technology upgradation activities to SMEs (the Ministry of MSME in co-operation with TIFAC/CSIR)
10	Marketing support/assistance to SMEs

Source: <http://www.nmcc.nic.in/NMCP.aspx>

The action plans would be implemented on a public private partnership (PPP) basis with provision for fund sharing by the firms and the government. As has been clarified in the official website, “the government assistance would not be in the nature of subsidy but for implementing the concrete interventions identified to improve competitiveness.” It also intends to link these initiatives with the existing schemes which promote competitiveness.

Another effort to encourage competitiveness in the SMEs has been the Visionary Leaders for Manufacturing Programme (VLMP), under the Indo-Japan Cooperation Agreement signed in December 2006. The target group of the VLMP has been to create a critical mass of 300 'visionary' managers, executives, CEOs and entrepreneurs through imparting advanced training and exposure of 'best practices' from Japanese experience. These trained business leaders would help transform Indian manufacturing by underscoring industry-academia linkages and other business practices that increase competitiveness.

Promotion of products from rural areas and provision of marketing support to these and numerous other products in the sector have somehow missed the attention of the concerned state agencies in the globalization drive; the situation, incidentally, had never been better even during the earlier decades. As one looks into the various 'new' initiatives of the government, especially the various sub-schemes under the NMCC, concerning building competitiveness, an explicit emphasis upon focusing on *selected* product groups which have potential for global competitiveness resonates partially favouring the well-off subsectors and within those the bigger alert ones. The industries chosen to be promoted are food processing, garments, engineering, consumer goods, pharmaceuticals, capital goods, leather and IT hardware. The question of providing basic business infrastructure to the huge number of enterprises in non-metro regions and connecting them to the mainstream marketplace has not been an issue of concern. There remains a major lesson to learn from the Chinese strategy of the state playing a vital role in creating a dynamic business environment (including building physical and economic infrastructure) for networking between manufacturers and traders who are otherwise disadvantaged by distance and limited local market.

9.2 Promoting Innovativeness and Awareness about Quality

A key area of worry for SME development has been ensuring a business environment that generates an innovative ethos and a serious concern for product/service quality. While it is well recognized that product/service quality determines marketability, especially, in the global arena, Indian SMEs, with exceptions, are yet to gear up to face the challenge. While in certain sectors FDI in technology and services has been on the rise and are welcome as well, its broad-basing has remained a major issue; sub-contracting relations with MNEs have not been an automatic and unconditional mechanism to

enhance innovativeness in domestic firms. Recent policy measures have attempted to address this issue of facilitating greater number of SMEs to improvise the level of technology through accessing support from the recently created Technology Bureau for Small Enterprises (TBSE). This SIDBI arm has collaborative arrangement with the Asian and Pacific Centre for Transfer of Technology (of the UNESCAP) that would help enterprises to strengthen their capabilities to “develop, transfer, adapt and apply technology; improve the terms of transfer of technology; and identify and promote the development and transfer of technologies relevant to the region” (<http://www.apctt.org/>). This would provide a good opportunity for SMEs to establish business collaboration with foreign firms as also to access professionally-managed acquisition of foreign technology.

Amongst various measures initiated to upgrade quality, an insistence upon obtaining ISO certification has been somewhat well responded to; with the provision of reimbursement of 75 per cent of costs in acquiring the certification, on an average, annually over 3000 enterprises have been availing this service close to 15 years now. Further, for aspiring MSEs, schemes to reimburse part of the expenses to units opting for bar coding and credit-linked capital subsidy for technology upgradation have been launched. A provision has been made to provide financial assistance by state governments (upto 50 per cent of total costs) to IEDs those creating training infrastructure. Similarly, government would partly contribute towards setting up of mini tool rooms and testing centres by industry associations. The emerging mechanism of providing microfinance for microenterprises is also visualized as a preliminary step in ‘preparing’ them to grow up with stronger technological abilities.

9.3 Enabling SMEs to Participate in Global Value Chains and Markets

For Indian SMEs, participating in the GVCs to upgrade the technological capability and, quintessentially, expanding global market access have not been easy as constraints exist in terms these firms being WTO-TRIPS regulations compliant, awareness regarding appropriate steps involved in international sub-contracting, familiarity with complex bureaucratic procedures in external trade and, not less importantly, conducting business through e-commerce. Contrary to the previous ‘protective’ regime, there has been substantial relaxing of FDI norms that has, in fact, resulted in increasing interest of MNEs to invest in India, particularly, in the sphere of garments,

automobiles, electronics, chemicals, etc. Although in its formative stages, government efforts are on to facilitate networking between SMEs and foreign firms. Advisory and other services are being made available to SMEs to link with GPNs towards activities such as joint procuring of inputs, joint selling and undertaking and benefiting from joint market research. Some of the steps in this direction include starting of a number of business support services as awareness and training programmes for familiarizing firms with systems of patenting, norms under the intellectual property rights regime; establishment of the National Intellectual Property Organisation (NIPO) has been an effort in that direction.

So far as participating in external markets are concerned, there have been the Market Development Assistance (MDA) schemes of both the Ministry of Commerce and Ministry of MSME which offer funding support for participation in international fairs, study tours abroad, trade delegations, publicity, etc. Further, in its recently (April 2006) revised MDA scheme, the Ministry of Commerce has underscored the following aspects of business promotion by Indian SMEs abroad⁹:

- Assist exporters for export promotion activities abroad.
- Assist Export Promotion Councils (EPCs) to undertake export promotion activities for their product.
- Assist approved organizations/trade bodies in undertaking exclusive nonrecurring innovative activities connected with export promotion efforts for their members.
- Assist, Focus, export promotion programmes in specific regions abroad like Focus (Latin American Countries), Focus (Africa), Focus (Commonwealth of Independent States) and Focus (ASEAN + 2) programmes.
- Assist residual essential activities connected with marketing promotion efforts abroad.

As is well recognized, greater use of the information and communication technology (ICT) has emerged as the *sine qua non* of business networking and growth, both at home and abroad. Given that India has an added advantage in this aspect, policy efforts are being directed towards making

⁹ See for details, <http://commerce.nic.in/mda-guidelines.pdf>

the best use of this technology. However, as indicated earlier, caution needs to be exercised in linking local business with GPNs.

10. Fostering Industrial Clusters: Strategic Limitations

With the launching of the cluster development programme in India by the UNIDO in 1997, promoting clusters as a strategy to enhance the competitiveness and to participate in the GVC has been almost a celebrated strategy countrywide. The surge of various cluster schemes can be observed since 2000 onwards. Numerous government and quasi-government documents have acknowledged cluster development as the most important initiative to improve the performance of the MSMEs in the country. For instance, the Draft 11th Five Year Plan document states that “A cluster approach can help increase viability by providing these units with infrastructure, information, credit and support services of better quality at lower costs, while also promoting their capacity for *effective management of their own collectives*” (Planning Commission, 2006: 35. Emphasis ours).

The acknowledged traditional benefits of clustering, identified in the literature on agglomeration economies, include i. information/knowledge spillover at the enterprise level; ii. sharing of inputs, services and technology; and iii. multi-skilling of labour improves job opportunities. Moreover, the advent of globalization has opened up newer spheres of networking and business spread.

Cluster development has attracted much attention in the policy circles as it has the potential for broad-based networking amongst the government, private sector, academia and various support/service agencies, both within and outside the country. Some dynamic and modern sectors as garments, pharmaceuticals, IT based industries, leather goods and machine tools seem to have benefited extensively through following the cluster approach and there is redoubled enthusiasm to extend these advantages to the traditional and artisanal clusters spread across the country.

Given the vast range of goods produced in clusters, levels of technology and markets accessed, a recent policy-oriented study (Das *et al.*, 2007) has classified the clusters into: i) high-tech clusters (mostly knowledge-based and IT-linked); ii) traditional manufacturing clusters (non-high-tech and non-micro sectors like leather goods, ceramics, garments, etc.); and iii) low-tech, poverty-intensive micro enterprise clusters (including handicrafts, handlooms

and other labour intensive micro enterprises). Despite major limitations of obtaining cluster-specific data, information on some key variables has been compiled in Table 4; no useful database concerning the so-called service clusters are available.

Table 4: Typology of Industrial Clusters in India

Parameters	Micro enterprise Clusters	Traditional Manufacturing Clusters	High-tech Clusters
Number of Clusters	6000 (93.6%)	388 (6.1%)	20 approx. (0.3%)
Estimated Share of Employment (by Cluster typology)	80%	14%	6%
Average Wage levels	Low	Medium	High

Source: Das *et al.* (2007:12).

It is important to note here that there exist a number of government schemes/ programmes to support various requirements of MSMEs, including provision of industrial estates, marketing support and concessional credit. Nevertheless, these schemes, typically, address the need at the enterprise level. The cluster approach, contrarily focus on a range of activities that concern collective issues, whether provision of common facility centres, cluster specific transport infrastructure, linking to the external markets, or encouraging participation in trade fairs. The most important advantage, however, is the potential of networking with an array of stakeholders in the business that widens scope for both enhancing product/process quality and operating gainfully in a larger market space. The synergy of collective action improves manifold as enterprises in the similar product line pursue certain common business goals.

A close look at most schemes/programmes focusing on cluster development in India reveals that these discrete initiatives have often defined clusters differently and are being implemented by a diverse set of agencies, including central government ministries, state governments, international agencies and other specialised (e.g., financial) institutions. These schemes have diverse agenda and support instruments and focus upon a specific group of products/ clusters in different parts of or entire country. With diverse set of actors and limited interaction and coordination between them on account of the

limited understanding of the need for evolving an innovation and production system for the SMEs appears to be an issue that requires immediate attention.

In order to distinguish cluster policy from policies for MSMEs, it is important to recognize that the quintessential cluster concept is multi-dimensional and encompasses aspects such as the sub-sector, space and its various linkages with agencies / institutions both internal and external to the site of production that in turn help the emergence of a vibrant system of innovation and production. Whereas the sub-sector represents the activity/services *per se*, space relates to the regional dynamics within which it works on location; the spatiality of clustering is not merely a reference to the *place*, that is, say, rural or urban, but indicates the level of local development that determines the cluster's access to both social and economic infrastructure and institutions. The variety of internal and external linkages (whether in terms of intra-community ties, business associations, technology sharing, support from specialized institutions, trust, networking, cooperation, etc.) suggests the extent to which the sub-sectoral/regional policy and institutions are able to articulate the demand for developmental intervention or determine the path of progress of the cluster.

The performance of a cluster, including its potential to move up in the value chain and be innovative, depends crucially upon these factors. These amply indicate the nature of policy intervention cluster promotion shall entail. Although a cluster is a meso-level entity, it is obvious that a combination of macroeconomic, sectoral and regional/ local policy instruments would effectively address complex and multiple issues facing its growth and competitiveness. In order to appreciate the need for a multi-pronged approach to promote clusters, it is essential to recognize the following key dimensions of clustering in India, first, market access and, second, the nature of technical processes (concerning product quality, technology, adherence to legal norms, labour use, etc.) that characterise the cluster dynamics.

Clusters in India cater to varied and substantial markets at local, regional, national and international levels; the sheer vast size of the domestic market necessitates distinct strategies to network among different actors to promote them. It is natural that the market for certain products could be limited by the locality or culture-specific need or absence of cost-competitiveness due

to high material or transport cost; in such cases supportive interventions need to be made towards product diversification and upgrading local technological capabilities of these clusters. Exploring ways of rendering the products geared towards a high value adding export market through linking with the GVCs, thus, becomes an important policy focus. This is especially challenging as one deals with the specific cases of what may be classified as poverty clusters.

It needs to be acknowledged that a large number of industrial clusters in India often derive advantages through functioning in an informal/illegal manner as exemplified through poor labour standards, inferior input use, copying trademarks/designs, flouting of fiscal/environmental regulations, etc. These are indicative of either the absence of or at best the presence of an innovation system that is immature or in its infancy.

11. Concluding Observations

India is one among the developing countries that has undertaken a series of institutional interventions to develop an innovative and vibrant SME sector on account of their role in generating employment, facilitating balanced regional development and other social objectives in the country's national system of innovation and production. As a result, with the proliferation of large number of SMEs, the sector has emerged as a major source of industrial output, employment and export earnings. With the initiation of market oriented reforms there have been changes in the institutional arrangements that governed the innovation system in the SME sector as well. Going by the available indicators, the SME sector has not been able to withstand competition from the world market as the earlier regime of protection and regulation gave way to competition under globalization. The sector in general has lagged behind in terms of employment generation and also exports. Moreover, it appears that as investment decisions got increasingly governed by the dictates of the market, even the SMEs began to get regionally concentrated into more advanced regions and, thus, aggravating rather than mitigating regional inequities.

Elaborate institutional arrangements for the financing of SME development at the national, state and regional levels notwithstanding the share of SMEs in the total net bank credit by the public sector banks has been on the decline since 1997-98 and has touched a low of a mere 8 per cent in 2006-

07. It may not be an exaggeration to state that the maze of institutions for promoting science and technology across space and product spectrum in SMEs in India has no parallel in the developing world. Yet the R&D intensity in the small-scale sector has been declining over the years. Moreover, R&D activity is not prevalent in all the industries but confined only to a dozen and others are yet to get involved in R&D in any significant manner. Interestingly, there is absolute lack of co-ordination between the sectors (small scale, private sector and public sector) in terms of research investment. Yet the study locates a few sectors that display substantial vibrancy that in turn leave scope for learning from within. The SME sector has been taking a backseat with respect to credit allocation calling for a proper system of financing SME development.

While India is the home for a large number of natural industrial clusters dominated by SMEs, and subcontracting has been systematically promoted through varied policy initiatives, learning, innovation and competence building systems as articulated in the NIS framework is yet to evolve in its real sense. All these indicate the immature nature of India's innovation system as it operates in the MSME sector. Hence, there is much need for institutional arrangements that go beyond clustering and subcontracting to facilitate interactive learning through clustering, spin-offs, new modes of financing investment and skill upgradation, user-producer interaction and interaction with universities and PRIs and increased participation in global/local production networks.

While a plethora of new measures being initiated in the recent MSMED Act toward strengthening the innovation system, much would again depend upon how these function on ground. External orientation and a global outlook for the SME sector must first address persisting basic constraints facing the sector in terms of evolving a vibrant system of innovation and production. As the Indian SMEs are looking forward to a newer and larger market space, with its numerous advantages of skills, raw materials and large domestic market as well, networking with various stakeholders both within and outside the country is a worthwhile attempt. To the extent such interaction with different actors and the learning that is accrued is crucial for competence building, the key challenge is to evolve such a vibrant innovation system which apparently is at its infancy at present.

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