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Technology Interventions in MSME Clusters to Improve Productivity and Role of Technology Business Incubators

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Abstract

Productivity growth is the basis of efficient economic growth. Economic growth has been defined as the process of a sustained increase in the production of goods and services in making available a progressively diversified consumption goods to the population and is traditionally been associated with industrialization. Regions have focused on new technologies as the away to provide higher levels of wealth and higher paying jobs for their citizens. This has increased the focus on technology based productivity improvement.

Technology Interventions are the organized efforts to increase growth and competitiveness of firms involving government and research community. Clusters have become a central feature in improving the growth and competitiveness of firms within the regions. These innovative technology-based firms have a capacity to transform and revitalize local economies providing economic competitiveness, wealth creation, and jobs. Micro, Small and Medium Enterprises (MSMEs) are identified as the growth engines of the Indian economy by virtue of their ability to create jobs, foster entrepreneurship, and providing depth to the industrial base of the economy by undergoing substantial changes on the technological front. The major challenges are the need to develop micro, small and medium enterprises (MSMEs), as wider process of social and economic restructuring.

The author has tried to link up the interventions through Cluster Initiatives to improve the productivity of MSME clusters by the examples from EDI Cluster Development Programme. The findings of Cluster Initiatives show remarkable improvements in over all development in the selected cluster regions.

Keywords: *Clusters, Economic development, industrialization, MSME, productivity, technology business incubator, technology intervention.*

1. Introduction

Economists have tried extensively to understand the conditions that allow countries to reach a critical minimum mass of capabilities and embark on a long, sustained journey to economic growth and development [1]. If a country's economic growth is driven largely by massive investment in fixed capital and accompanied by negligible improvement in the way of its utilization, then the growth would not be sustainable and eventually wind down. The reason is that investing in more machinery and infrastructure inevitably faces diminishing returns unless additional machinery and infrastructure are of increasingly better quality, or used with increasing efficiency.

Academic and practitioner communities have shown substantial interest in what is often referred to as 'high-tech economic development' or 'job and wealth creation'. Many governmental and non-governmental organizations have undertaken efforts to better understand economic development in order to identify the factors that lead to a healthy job and wealth creation climate. Drawing from prior academic and practitioner-oriented research [9], following are the broad categories of factors that are believed to drive technology-based economic development: capital availability, education, support systems, information infrastructure, entrepreneurial activity, R&D, clusters, and creativity. These factors have significant effect on the technology and productivity improvement of the MSME clusters.

The concept of clusters has emerged as a central idea in competitiveness and economic development in the recent past. The reasons for cluster formation and the benefits of cluster formation for productivity and innovation are becoming better known. Micro, Small and Medium Enterprises (MSMEs) are identified as the growth engines of the Indian economy by virtue of their ability to create jobs, foster entrepreneurship, and to provide depth to the industrial base of economy. Cluster Initiatives in different forms are launched in all regions of the world as a part of economic development. The main focus of this programme is to foster cluster development and the need to understand best practices.

2. Need for Productivity Improvement in Economic Development

The need for studying productivity growth arises due to the intimate link between productivity and economic growth. Economic growth has implications for resource use in general and for use of technology in particular. Technology use in turn has implications for industrial growth, which countries will not be able to ignore for long. Therefore productivity growth is critical for ensuring sustained increase in the production of goods and services.

Small enterprises in India, with their dynamism, flexibility and innovative drive are increasingly focusing on improved production methods, penetrative marketing strategies and modern scientific management capabilities to sustain and strengthen their operations. They are poised for global partnership and have the potential to absorb latest technologies in diverse industrial fields. As the country integrates into the global village, the small and medium sectors will have to respond accordingly. They deserve special attention as they play a pivotal role in a country's socio-economic development [8]. To enable MSMEs to mitigate the sickness problems and enhance their access to new technologies for increasing their

competitiveness in the international market, it is imperative to give them a conducive environment through joint efforts like,

- Setting up Industrial Districts/Technology Parks/Clusters Initiatives to promote sourcing of new technology, innovation and effective transfer;
- Organizing local level information services, data banks, and seminars in collaboration with professional bodies;
- Promoting strategic alliances with R&D institutions, universities and other enterprises at national, regional and international levels.

The Eleventh Five Year Plan (2007-2012) is aimed at the creation of employment opportunities as an integral part of the process of economic growth, and includes accordingly strategies to this end.

3. Contribution and Growth of MSMEs

As per UNIDO-2008 Report [2], the small scale industries sector encompassing micro and small enterprises (MSEs) produced 39 percent of the total industrial output and 34 percent of the country's total exports. It currently contributes 7 percent of GDP and is growing at the rate higher than that of the industrial sector. The growth rate of output and exports by MSEs has been in the double digits from 2002-03 to 2005-06.

Growth rates of production: Table 1.1

Year	Growth Rate of SSI Sector (%)	Overall Industrial Growth Rate (%)
2002-03	8.68	5.70
2003-04	9.64	6.90
2004-05	10.88	8.40
2005-06	12.32	8.10

Source: MSME Report 2006-07

A. Present Status: Today, the MSMEs account for more than 90 per cent of all the enterprises both in developing and developed countries [3] [4]. It occupies a position of strategic importance in the Indian economic structure due to its significant contribution in terms of output, exports and employment. It accounts for 40% of gross industrial value addition and 50% of total manufacturing exports. More than 3.2 million units are spread all over the country producing about 8000 items, from very basic to highly sophisticated products. The MSMEs are the biggest employment-providing sectors after agriculture, providing employment to 29.4 million people. However MSMEs are now facing a tough competition from their global counterparts due to liberalization, change in manufacturing strategies, technological changes, and turbulent and uncertain market scenario [5].

B. Technology oriented problems of MSMEs: The problems faced by the MSMEs, particularly in accessing technology and maintaining competitiveness have been formidable. The reasons for the inability of MSMEs to identify their technology needs are:

- Poor financial situations and low levels of R&D;
- Poor adaptability to changing trade trends;
- Non-availability of technically trained human resources;
- Emphasis on production and not on production costs;
- Technical Incompetence;
- Lack of access to technological information and consultancy
- Isolation from technology hubs.

C. Technology Challenges before MSMEs:

- **Research and Development:** MSMEs face the constraint of putting up desired research and development facilities due to their resource and talent constraints.
- **Training and Development of Personnel:** Non competent workforce in handling the specific MSME proposals and schemes.
- **Technology Up gradation:** New ideas, constant up-gradation of the product and processes as per global standards and specifications.
- **Intellectual Property:** MSMEs are the driving force behind new products, brands and creative designs, but unable to leverage their breakthrough as they are not aware of IP system and its protection to provide their inventions, brands and designs.
- **Global competition:** The challenges are in the form of increased competition, shorter life cycle of products as well as technology, reduced protection due to lower tariffs, and market determined rate of interest.

D. MSMEs as Industrial Clusters: Industrial clusters have become an area of interest to policy makers concerned with identifying, maintaining and increasing regional competitive advantage. Investigations and policies centering on industrial clusters as an important contributing factor to regional economic growth and development have proliferated throughout the developed and developing nations [6]. Third All India census of small scale industries (2001-02) shows 1223 clusters in the registered sector covering 321 products and 819 in the unregistered sector covering 250 products, the total number of items produced over 8000 [7]. It is estimated that there are about 400 MSME clusters in the country.

The ability to innovate under globalization is the key to the economic competitiveness. Industrial clusters are favorable for the establishment of such ability and enable MSMEs to sustain both their development and innovation capabilities.

4. Cluster Initiatives and Technology Interventions

As described by Michel Porter [10] in his 'The Cluster Initiative Greenbook', that the Cluster Initiatives (CI) is an organized efforts to increase the growth and competitiveness of clusters within a region involving cluster firms and/or the research community. CIs have become a central feature of microeconomic policy in the last decade linking to industrial policies, regional policies, SME policies, FDI attraction, and research and innovation policies. CIs are initiated from industry leaders, government and academia. International organizations such as UNIDO, OECD, USAID, World Bank are becoming more involved in cluster work in transition and developing economies for less developed regions within the nations. Cluster Initiatives have come to play an important role in rejuvenating ailing clusters and regions and in promoting the emergence of technological firms.

The slowdown of clusters in India can in no way be termed as mild. In the recent past amidst the economic dynamism of the world, they have seen some eventful times and unfortunate downfall. So the result oriented interventions to infuse competitiveness became necessary to address them with its contemporary, dynamic and market friendly methodologies and approaches. In India, one of the Cluster Initiatives was started by the efforts of UNIDO through Entrepreneurship Development Institute of India. EDI has started working for the improvement of some selected clusters in the country. Following section deals with the examples of Cluster Initiatives and interventions with the involvement of EDI through its Cluster Development Programme.

5. Examples of successful interventions in Industry Clusters by EDI

The establishment of International Centre for Cluster Competitiveness and Growth (IC³G) with the support of UNIDO and the Office of the Development Commissioner (SSI), Government of India, set up at EDI started its interventions in 2000 to ensure the required upsurge in clusters. Working towards the sustainable benefits of clusters, the cell played an important role in infusing competitiveness in micro, small and medium enterprises. The success of interventions is discussed through following cluster examples.

A) Jamnagar Brass Parts Cluster: Jamnagar is known for manufacturing brass parts worldwide. There are 4000 enterprises involved in manufacturing brass parts in this cluster and the cluster provides employment to 50000 people. However, after liberalization of the economy, the enterprises started facing increasing competition in the market. There were problems of quality and productivity. The export market was also gradually depleting because of increased competition from China, Taiwan, Germany, and Italy. As a result about 1000 entrepreneurs had to close down their factory by the turn of 2001.

B) Rajkot Diesel Engine Cluster: The industrial city of Rajkot is known for manufacturing diesel engine, machine tools, bearings, agricultural implements, kitchenware, pumps etc. There are 6000 enterprises in this cluster and it provides employment to 70000 people. A cluster development programme during October 2003 was initiated to ensure holistic development of the cluster through intervention in various strategic areas.

C) Moradabad Metal Handicrafts Cluster: Moradabad is known since Mogul period for designing and manufacturing brass metal handicrafts. 15000 enterprises are engaged in this business and there are 250 enterprises exclusively concentrating on overseas market. However, in the regime of globalization and WTO, the metal handicraft manufacturers were facing severe competition from countries like China, Taiwan, Thailand, Indonesia, etc. Total export of the cluster declined from 1800 crore in the year 1997 to Rs.1200 crore in the year 2000. But there was hardly any technology up gradation took place in the cluster and efforts like joint marketing, brand building, participating in international exhibition were non-existent. EDI took up this project for intervention in the year 2001.

D) Ambala Scientific and Medical Instrument Cluster: Ambala is synonymous with the production of scientific and medical instruments. Small and Medium Enterprises (SME), managed largely by qualified technocrats, are the basic constituents of this cluster. This 100 year old cluster has about 1000 SMEs, employing, directly or indirectly, about 30000 persons. Export from the Ambala cluster is estimated at US\$ 20 million and major export destinations are E.U., USA, Middle East, Africa and Latin America. As part of economic liberalization, import restriction was completely abolished in this sector leading to fierce competition from large multinationals. The sub-contracting relationship was not optimally exploited and there was hardly any inter-firm linkages and network with support institutions and Business Development Service.

E) Machine Tool Cluster, Bangalore to Promote Exports: The Bangalore machine tool cluster was in bad shape. India started importing machine tools and entrepreneurs engaged in manufacturing (machine tools) business found it difficult to sell their products. The problem became more severe because of the fact that there was hardly any technology up gradation took place in the sector and efforts like joint marketing, brand building, networking were also limited. To overcome these problems and help the entrepreneurs exploit their growth potential EDI took up this project in the year 2000.

F) Enterprise Modernization and Growth Counselling Programme for Leather Industry Cluster at Chennai: The leather cluster in Chennai was facing competition because of low level of technology up gradation, inability to achieve economies of scale, limited linkage among cluster actors and no joint effort for marketing and export. In the era of liberalization imports became cheaper and entrepreneurs were not able to compete with large multinationals. As a result, some of the entrepreneurs started looking for alternative business opportunities. To help the entrepreneurs in overcoming their problems, EDI intervened in the Chennai leather cluster mainly focused on training entrepreneurs, capacity building of the cluster actors and establishing enterprise-BDS/ Counsellor network.

6. Findings of the Interventions

In order to address the cluster issues, EDI took up a project and carried out interventions as part of cluster development project in different cluster regions.

A) The interventions at the clustering firms in Jamnagar brass-parts cluster during April -2002, had shown improvements in quality and productivity, reduce rejection rate, increase in sales and exports, strengthening forward and backward linkages. The interventions has also developed the process of capacity building of the cluster actors

and strengthening local industry association in order to ensure long-term sustainability of the cluster, and developing the cluster vision.

B) Some of the major findings of Rajkot diesel cluster intervention includes: developing the quality consciousness in entrepreneurs and their employees catering to the requirements of high-end customers, about 67 technological implementations led to improvement in quality and productivity, and establishing networking among enterprises in the cluster.

C) Cluster Intervention at Moradabad Metal Handicrafts Cluster helped in overcoming the competition through creating awareness among entrepreneurs about the importance of technology up gradation, training of entrepreneurs in various facets of technology and marketing, adopting health and safety measures for pollution free working environment and reduce health hazards, reduce fatigue of the workers, training on how to do direct export.

D) To overcome this problem, EDI initiated the interventions in Ambala Scientific and Medical Instrument Cluster and Business Development Services were roped in for the cluster. This resulted in Capacity building of the association, developed shared vision and network among cluster actors, Joint procurement of raw materials and inputs was explored,

E) The Bangalore machine tool cluster development project has helped the participants to take an objective look into their enterprise and understand as to how their business is not performing well. It has also helped the participants understand their growth potential and exploit the possibilities of overseas marketing to the maximum possible extent. Facilitated in chalking out enterprise growth plan and striving towards the achievement. Brought about changes in the management practices of the enterprises.

F) Enterprise Modernization and Growth Counselling Programme for Leather Industry Cluster at Chennai intervened to help the entrepreneurs in overcoming competition and taking their business to new heights in a planned and purposeful manner. It also enabled the entrepreneurs in understanding the problem areas and helped them in chalking out growth plans and work out strategies for achieving the same. Provided training in various facets of technology, marketing, diversification, etc.

7. Technology Business Incubation and Technology Interventions

Rustum Lalkaka [11] argues that technology-based start-ups represent a cornerstone of the knowledge economy that dominates the attention of policy makers, regional economic development officials, and average citizens as a result of the jobs and wealth it creates. The technology business incubator nurtures the development of technology based and knowledge driven companies helping them to survive and grow during the start up period. They provide an integrated package of work space, shared office services, access to specialized equipment and value added services like management assistance, business planning, and access to finance, technical assistance and networking support.

The National Science & Technology Entrepreneurship Development Board (NSTEDB), established in 1982 by the Government of India under the aegis of Department of Science & Technology, is an institutional mechanism to help promote

knowledge driven and technology intensive enterprises. The Board has created the Science and Technology Entrepreneurs' Park & Technology Business Incubator programme as a mechanism for promoting technological development in India. The programme creates an appropriate climate for innovation, the sharing of ideas and encourages entrepreneurs and researchers to complement each other's work. Its mission is to create a technocratic industrial society through human resources development and by providing, through incubators, managerial and expert assistance for enhancing the productivity, quality, finance, R and D and management capabilities of enterprises, especially MSMEs, during their establishment and growth through Science & Technology (S&T) interventions.

8. Conclusion

Technology Interventions plays a pivotal role in the clusters to interlink the factors of improvement in productivity of MSME sector. For the design of a model that would integrate the requirements of MSME entrepreneurs to synchronize with the TBI services, the academic institutions can perform an intermediate role to assist the cluster development programme. In India, TBIs can provide an alternative for technology interventions in the development of MSME sectors if implemented with the right way. It can be an effective mechanism to support technology based MSMEs for the productivity improvement and economic development.

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