



Enhancing the Competitiveness of Smes Through Innovation in Coimbatore District

KEYWORDS

Dr. K. Malar Mathi

Professor, BSMED, Bharathiar University, Coimbatore – 641 046

S. Chidambaranathan

PhD Research Scholar, BSMED, Bharathiar University, Coimbatore – 641046.

INTRODUCTION

The contribution of small firms to innovation-led growth and job creation has been a subject of focus and discussion in recent years. A large volume of data shows that SMEs, especially start-up companies contribute greatly and increasingly to the innovation system by introducing new products and adapting existing products to the new needs of customers. This explains why economists have reopened the debate on whether and why governments have generally increased the priority attached to policies directed towards SMEs while focusing them more on the promotion of innovation. These policies must take into account the challenges and opportunities that new technologies and globalisation raise for small firms. The policies thus formulated must also ensure the right balance between measures addressing generic problems related to size or newness and more targeted and tailored to the varying needs of different types of SMEs.

This study makes an attempt to first identify the challenges and opportunities that globalisation raises for SMEs as they are faced with pressures to reduce production costs, increase productivity, become more knowledge intensive and increase reach in the market. It then discusses what is known about how different types of SMEs innovate, and identify the principle strategies SMEs can pursue to enhance their competitiveness in global markets. Finally the study draws the implications for government policies.

CLASSIFICATION

Micro, Small and Medium Enterprises (MSMEs) have been accepted as the engine of economic growth and for promoting equitable development. The major advantage of the sector is its employment potential at low investment. The labour intensity of the MSME sector is much higher than that of the large enterprises. The MSMEs constitute over 90% of total enterprises in most of the economies and generates the highest rates of employment growth and account for a major share of industrial production and exports. MSMEs play an important role in alleviating poverty and contribute significantly towards the growth of developing economies.

They also lead to an equitable distribution of income due to the nature of business. Moreover, MSMEs helps in efficient allocation of resources in a country by implementing labour intensive production processes, given the abundant supply of labour force in these countries, wherein capital is scarce.

Micro, Small and Medium Enterprises in India

In India, the enterprises have been classified broadly into two categories:

1. Manufacturing
2. Service Sector.

Both categories of enterprises have been further classified into micro, small and medium enterprises based on their investment in plant and machinery (for manufacturing enterprises) or in equipments (for services enterprises). The present ceiling on investment to be classified as micro, small or medium enterprises is as under:

Table 1. Classification of Micro, Small and Medium Enterprises

| Classification | Investment Ceiling for Plant, Machinery or Equipments | |
|----------------|---|---------------------------------|
| | Manufacturing Enterprises | Service Enterprises |
| Micro | Upto Rs.50 lakh | Upto Rs.20 lakh |
| Small | Above Rs.50 lakh & upto Rs.10Cr | Above Rs.20 lakh & upto Rs.5Cr. |
| Medium | Above Rs.10Cr. & upto Rs.30Cr | Above Rs.5 Crs. & upto Rs.15Cr. |

NEED FOR STUDY:

As we all know that research and development has become more important for competitiveness in the global economy. SMEs are not well poised to engage in extensive R&D because of their scale and size. The Small firms cannot earmark much amount of money to involve in enhancing the competitiveness of their methods through time consuming research activity to attain higher levels of technology innovation. This study makes a sincere effort to capture and address most of the challenges that SMEs faced today in the process of technology innovation.

Markets

Perhaps the most radical change in the economic landscape of the end of this Century has been the shift in economic activity away from a local or national sphere towards a much more international or global. The measures of trans-national economic activity which prove there has been a strongly positive

Trend towards greater global activity include: statistics on trade flows (exports and imports), foreign direct investment (FDI), Foreign Institutional Investments (FII), and inter-country labour mobility. But in order to answer how these aggregate trends affect the innovative capacity of SMEs, it is necessary to think about the underlying factors driving globalisation forward. One of the major forces enabling economic globalisation has been technology. In particular, the advent of the microprocessor and the proliferation of inexpensive communications technologies have completely altered the economic meaning of national borders and dis-

tance. Observing the speed and minimal cost with which information can be transmitted across geographic space via the Internet, fax and electronic communication super-highways.

The Emergence of Knowledge as the Source of Comparative Advantage

Confronted with competition to lower costs, producers in the high-cost countries have been confronted with five strategic options in responding to globalisation:

- (1) Change nothing and suffer losses of profitability and market share;
- (2) reduce wages and other production costs sufficiently to compete with the low-cost foreign producers,
- (3) Substitute equipment and technology for labour to increase productivity, and
- (4) Shift production out of high-cost locations to low-cost locations; and
- (5) Shift towards knowledge-based economic activities.

While some firms opted for the first strategy and suffered, many of the firms that have successfully restructured resorted to alternatives 2, 3, 4 and 5. Reducing wages has helped to maintain or at least minimise job losses in some industries. Substituting capital and technology for labour, along with shifting production to lower-cost locations has shown good results.

The demand for innovative products in knowledge-based industries is high and growing rapidly; yet the number of workers who can contribute to producing and commercialising new knowledge is limited to a few areas. Many indicators in fact show the shift in the comparative advantage of the high-wage situations towards an increased importance of innovative activities.

Given the shift in comparative advantage towards more knowledge based economic activity, many have predicted the demise of SMEs. But in fact, the shares of economic activity accounted for by SMEs have risen. While some SMEs have fallen victim to globalisation, still others have deployed strategies to maintain or even enhance their competitiveness in a changing economy.

The Role of Small Firms in Innovation Systems

Table: 2 Different Forms of Innovation

We list here below the different innovations that small firms can carry out in their effort to adapt improved technologies that can contribute to enhance their competitiveness.

| | |
|--|---|
| Technology | Technology |
| Computer Aided Design(CAD)/ Computer Aided Engineering (CAE) | Computer Integrated Manufacturing (CIM) |
| Computer Aided Manufacturing | Accounts payable/receivable |
| Local Area Network (LAN) | Sales Analysis Software |
| TQM | Payroll |
| JIT | Billing |
| MRP | Cost accounting |
| MRP II | Word processing/presentation |
| ERP | Video Conferencing |
| Flexible Manufacturing System | Statistical Software |
| Numerical Control Machines | Decision Support System |

| | |
|-----------------------------------|----------------------------------|
| Automated production line | Management Information System |
| Automated SMT machines | Inventory system |
| Automated Loading and Unloading | Job costing system |
| Pick & Place Robots | Manufacturing Information System |
| Other robots | Product Data Management |
| Automated material handling | Computers |
| Automated storage/retrieval | Forecasting software |
| Automated sensor-based inspection | Fax Machine |
| Electronic Data Interchange | QFD |
| ISO | CRMs |
| SPC | |

Computer Aided Design (CAD)/ Computer Aided Engineering (CAE):

Computer-aided drafting (CAD) is the use of computer systems to aid in the creation, modification, analysis, or optimization of a design. CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing. CAD output is often in the form of electronic files for print, machining, or other manufacturing operations.

Computer Aided Manufacturing:

Computer-aided manufacturing (CAM) is the use of software to control machine tools and related ones in the manufacturing of workpieces. CAM may also refer to the use of a computer to assist in all operations of a manufacturing plant, including planning, management, transportation and storage. Its primary purpose is to create a faster production process and components and tooling with more precise dimensions and material consistency, which in some cases, uses only the required amount of raw material (thus minimizing waste), while simultaneously reducing energy consumption.

Local Area Network (LAN):

A local area network (LAN) is a computer network that interconnects computers within a limited area such as a residence, school, laboratory, university campus or office building and has its network equipment and interconnects locally managed.

TQM:

Total quality management (TQM) consists of organization-wide efforts to install and make permanent a climate in which an organization continuously improves its ability to deliver high-quality products and services to customers. While there is no widely agreed-upon approach, TQM efforts typically draw heavily on the previously developed tools and techniques of quality control. TQM enjoyed widespread attention during the late 1980s and early 1990s before being overshadowed by ISO 9000, Lean manufacturing, and Six Sigma.

JIT:

Just-in-time (JIT) manufacturing, also known as just-in-time production or the Toyota production system (TPS) is a methodology aimed primarily at reducing flow times within production as well as response times from suppliers and to customers. Following its origin and development in Japan, largely in the 1960s and 1970s and particularly at Toyota

MRP:

Material requirements planning (MRP) is a production

planning, scheduling, and inventory control system used to manage manufacturing processes. Most MRP systems are software-based, while it is possible to conduct MRP by hand as well.

An MRP system is intended to simultaneously meet three objectives:

1. Ensure materials are available for production and products are available for delivery to customers.
2. Maintain the lowest possible material and product levels in store
3. Plan manufacturing activities, delivery schedules and purchasing activities.

MRP II:

Manufacturing resource planning (MRP II) is defined as a method for the effective planning of all resources of a manufacturing company. Ideally, it addresses operational planning in units, financial planning, and has a simulation capability. It is a total company management concept for using human and company resources more productively.

ERP:

Enterprise resource planning (ERP) is a category of business-managementsoftware—typically a package of integrated applications—that an organization can use to collect, store, manage and interpret data from many business activities, including:

- product planning, purchase
- manufacturing or service delivery
- marketing and sales
- inventory management
- shipping and payment
- Sales, Accounting and Payroll

Flexible Manufacturing System:

A flexible manufacturing system (FMS) is a manufacturing system in which there is some amount of flexibility that allows the system to react in case of changes, whether predicted or unpredicted. This flexibility is generally considered to fall into two categories, which both contain numerous subcategories.

The first category, *machine flexibility*, covers the system's ability to be changed to produce new product types, and ability to change the order of operations executed on a part. The second category is called *routing flexibility*, which consists of the ability to use multiple machines to perform the same operation on a part, as well as the system's ability to absorb large-scale changes, such as in volume, capacity, or capability.

Most FMS consist of three main systems. The work machines which are often automated CNC machines are connected by a material handling system to optimize parts flow and the central control computer which controls material movements and machine flow.

Numerical Control Machines:

Computer Numeric Control (CNC) is the automation of machine tools that are operated by precisely programmed commands encoded on a storage medium (computer command module, usually located on the device. In modern CNC systems, end-to-end component design is highly automated using computer-aided design (CAD) and computer-aided manufacturing (CAM)

programs.

Automated production line:

To reduce the man power and to enhance the productivity.

Pick & Place Robots:

SMT (surface mount technology) component placement systems, commonly called pick-and-place machines or P&Ps, are robotic machines which are used to place surface-mount devices (SMDs) onto a printed circuit board (PCB). They are used for high speed, high precision placing of broad range of electronic components, like capacitors, resistors, integrated circuits onto the PCBs which are in turn used in computers, consumer electronics as well as industrial, medical, automotive, military and telecommunications equipment.

Other robots:

Welding, automobile assembly, high temperature furnace area, high accuracy needed, precision component assembly.

Automated material handling:

To handle material from one place to other place without manual intervention.

Automated storage/retrieval:

Utilising the storage space effectively.

Automated sensor-based inspection:

It is for medical tablet medicine manufacturing, food items inspection, levels inspection.

Electronic Data Interchange

(EDI) is an electronic communication method that provides standards for exchanging data via any electronic means. By adhering to the same standard, two different companies or organizations, even in two different countries, can electronically exchange documents (such as purchase orders, invoices, shipping notices, and many others).

ISO:

ISO, the International Organization for Standardization, is an independent, non-governmental organization, the members of which are the standards organizations of the 162 member countries. It is the world's largest developer of voluntary international standards and facilitates world trade by providing common standards between nations. Nearly twenty thousand standards have been set covering everything from manufactured products and technology to food safety, agriculture and healthcare.

SPC:

Statistical process control (SPC) is a method of quality control which uses statistical methods. SPC is applied in order to monitor and control a process. Monitoring and controlling the process ensures that it operates at its full potential. At its full potential, the process can make as much conforming product as possible with a minimum (if not an elimination) of waste (rework or scrap). SPC can be applied to any process where the "conforming product" (product meeting specifications) output can be measured. Key tools used in SPC include control charts; a focus on continuous improvement; and the design of experiments. An example of a process where SPC is applied is manufacturing lines.

Computer Integrated Manufacturing (CIM):

Computer-integrated manufacturing (CIM) is the manufac-

turing approach of using computers to control the entire production process. This integration allows individual processes to exchange information with each other and initiate actions. Although manufacturing can be faster and less error-prone by the integration of computers, the main advantage is the ability to create automated manufacturing processes.

Accounts payable/receivable:

Accounting software is a type of application software that records and processes accounting transactions within functional modules such as accounts payable, accounts receivable, payroll, and trial balance. It functions as an accounting information system.

Sales Analysis Software:

Sales management is a business discipline which is focused on the practical application of sales techniques and the management of a firm's sales operations. It is an important business function as net sales through the sale of products and services and resulting profit drive most commercial business. These are also typically the goals and performance indicators of sales management.

Sales manager is the typical title of someone whose role is sales management. The role typically involves talent development and leadership

Payroll:

A payroll is a company's list of its employees, but the term is commonly used to refer to:

- the total amount of money that a company pays to its employees
- a company's records of its employees' salaries and wages, bonuses, and withheld taxes
- The company's department that calculates and pays these.
- Payroll - a summary of "money paid to employees" plays a major role in a company.

Billing:

Electronic billing or electronic bill payment and presentment, is when a company, organization, or group sends its bills over the internet, and customers pay the bills electronically

Cost accounting:

Cost accounting is a process of collecting, recording, classifying, analyzing, summarizing, allocating and evaluating various alternative courses of action & control of costs. Its goal is to advise the management on the most appropriate course of action based on the cost efficiency and capability. Cost accounting provides the detailed cost information that management needs to control current operations and plan for the future

Word processing/presentation:

A word processor is an electronic device or computer software application that performs the task of composition, editing, formatting and printing of documents.

Video Conferencing:

Video conference or video teleconference) by a set of telecommunication technologies which allow two or more locations to communicate by simultaneous two-way video and audio transmissions. It has also been called «visual collaboration» and is a type of groupware.

Statistical software is specialized computer programs for analysis in statistics and econometrics.

Decision Support System:

A decision support system (DSS) is a computer-based information system that supports business or organizational decision-making activities. DSSs serve the management, operations, and planning levels of an organization (usually mid and higher management) and help people make decisions about problems that may be rapidly changing and not easily specified in advance—i.e. Unstructured and Semi-Structured decision problems. Decision support systems can be either fully computerized, human-powered or a combination of both.

Management Information System:

A management information system (MIS) focuses on the management of information systems to provide efficiency and effectiveness of strategic decision making. The concept may include systems termed transaction processing system, decision support system, expert system, or executive information system. The term is often used in the academic study of businesses and has connections with other areas, such as information systems, information technology, informatics, e-commerce and computer science; as a result, the term is used interchangeably with some of these areas.

Inventory system:

Inventory control or stock control can be broadly defined as «the activity of checking a shop's stock». More specifically inventory control may refer to:

- In operations management, logistics and supply chain management, the technological system and the programmed software necessary for managing inventory
- In economics and operations management, the inventory control problem, which aims to reduce overhead cost without hurting sales. It answers the 3 basic questions of any supply chain: When? Where? How much?
- In the field of loss prevention, systems designed to introduce technical barriers to shoplifting

Job costing system:

Job costing involves the calculation of costs involved in a construction «job» or the manufacturing of goods done in discrete batches. These costs are recorded in ledger accounts throughout the life of the job or batch and are then summarized in the final trial balance before the preparing of the job cost or batch manufacturing statement.

Manufacturing Information System:

The quantity produced per shift, productivity of the operator and machine utility.

Product Data Management:

Product data management (PDM) is the business function often within product lifecycle management (PLM) that is responsible for the management and publication of product data.^{[1][2]} In software engineering, this is known as version control. The management of version control ensures that everyone is on the same page and that there is no confusion during the execution of the processes and that the highest standards of quality controls are maintained.

Computers:

A computer is a device that can be instructed to carry

out an arbitrary set of arithmetic or logical operations automatically. Their ability to follow a sequence of operations, called a *program*, make computers very flexible and popular. Such computers are used as control systems for a very wide variety of industrial and consumer devices.

Forecasting software:

Forecasting is the process of making predictions of the future based on past and present data and analysis of trends. A commonplace example might be estimation of some variable of interest at some specified future date. Prediction is a similar, but more general term. Both might refer to formal statistical methods employing time series, cross-sectional or longitudinal data, or alternatively to less formal judgmental methods. Usage can differ between areas of application: for example, in hydrology the terms «forecast» and «forecasting» are sometimes reserved for estimates of values at certain specific future times, while the term «prediction» is used for more general estimates, such as the number of times floods will occur over a long period.

Fax Machine:

Fax (short for facsimile), sometimes called telecopying or telefax (the latter short for telefacsimile), is the telephonic transmission of scanned printed material (both text and images), normally to a telephone number connected to a printer or other output device. The original document is scanned with a fax machine (or a telecopier).

QFD:

Quality function deployment (QFD) is a method to help transform customer needs (the voice of the customer [VOC]) into engineering characteristics (and appropriate test methods) for a product or service. It helps create operational definitions of the requirements, which may be vague when first expressed. It prioritizes each product or service characteristic while simultaneously setting development targets for the product or service.

CRM:

Customer relationship management (CRM) is an approach to managing a company's interaction with current and potential future customers. The CRM approach tries to analyse data about customers' history with a company, to improve business relationships with customers, specifically focusing on customer retention, and ultimately to drive sales growth.

Nevertheless, SMEs are a very heterogeneous population of firms, and can include everything from the corner hairdresser and grocer to high technology firms. In some industries the bulk of innovations – be they new products or processes – are introduced by new entrants or start-ups who challenge incumbents' market shares (and occasionally displace incumbents entirely). But in many other industries, SMEs contribute to the innovative process in a very different way. Relying on a minimum of internal R&D, SMEs can create innovative products by using non-R&D inputs. So while some SMEs in high tech sectors can make intense use of science-based knowledge and are active technology developers, most SMEs operate in medium to low technology environments and innovate without using formal R&D inputs. This is consistent with economic theories of innovation and technical change where inputs to the innovative process are understood to be heterogeneous and not limited to formal R&D investments. In a more systematic approach to understanding innovation in SMEs.

CONCLUSION

In contrast, many SMEs do not see innovation as part of their business strategy. They often use old manufacturing processes; rarely work with other companies; have no development activities; and rarely bring new products on the market. The size of the SMEs is a critical reckoning factor and predominantly a constraining factor also. While the ability to employ higher educated people [with an University degree or equivalent], is a limiting factor, with financial abilities to invest in R & D and innovative production methods is also limited, to survive and sustain in a competitive market it is necessary for the SMEs to use the supportive steps of the Department of MSMEs. The Financial Institutions have to make available funds at a concessional rate with softer lending terms as because the SMEs, which would mostly belong to the first generation entrepreneurs would not be able to meet the stringent collateral terms of the lending Institutions to avail finance for investing in adopting innovative technologies. The afore listed innovations can be resorted to by the SMEs selectively as would be suitable to their scale and size. These would definitely lead to a gradual build up of the ability to improve the market reach amidst competition.

SMEs are thus a large and very heterogeneous group of firms whose investments in and use of innovations cannot be uniformly characterised. SMEs fall roughly into four sub-groups. Less than 20% of all SMEs – the technology developer and leading technology user groups – are active innovators. Over 80% of SMEs are technology followers, but close to half of these have the potential to be more innovative. However, each of these sub-groups of firms has very different innovation needs. Thus any discussion of how to increase the innovative capacity of SMEs must start from an understanding that technology policies for SMEs must be targeted to different user groups, have different objectives, and use several approaches and tools.

A second strategy SMEs can use to improve their competitiveness involves the application and adoption of new technologies that effectively serve to reduce costs. A number of significant new technologies, which include the Internet and the microprocessor, help mitigate economies of scale and the gains traditionally associated with large-scale production. A classic example is the adoption of numerically controlled (NC) machine tools in the manufacturing industries. NC machine tools have contributed to a reduction in the minimum efficient scale (MES), or the level of output required to reach scale economies. New web-based information technologies are enabling SMEs to attain global marketing capabilities at very low costs. SMEs are also using electronic commerce and internet-based access to products like financial and accounting management software systems that enhance organisational and management capabilities, while at the same time reduce the high costs associated with managing SMEs. Such products enable SMEs to create virtual warehouses, where they build direct links between manufacturers and final customers. But to properly take advantage of such internet-based financial and accounting systems, SMEs typically need to modify or change their organisational structure. Developers, be they new technology based firms or service organisations. In addition, leading technology users are significantly less R&D intensive. It is interesting that the consulting organisations are quite R&D intensive. These organisations are typically technical consultants and count R&D as a "non-core" activity. Looking at firm growth rates during the three-year period preceding the study, there were statistically significant differences between the three

categories of firms. The new technology based firms had significantly higher growth rates than the service oriented technology developers or the leading technology users.

Governments should encourage such a trend by improving the conditions for private capital investments to support SME innovation. *Grants for business plan development and for non-technical activities*. Since R&D grants are project based and often oriented towards the development of new technologies, SMEs often encounter difficulties putting together successful proposals. The latest generations of new technology based firms are especially in need of business support – such as business plan development, venture coaching.

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