

BARRIERS TO TECHNOLOGICAL INNOVATION OF MSMEs IN INDIA**Mr. Gopal Krishan Bhargava**

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Abstract

Micro, Small and Medium Enterprises (MSMEs) play a key role in an economy. They are still more important for a developing and populous country like India. They generate huge employment opportunities, help in equitable distribution of income and wealth and reduce regional disparities in economic development of the country. However, MSMEs face certain challenges which hamper their sustenance and growth. Technological innovation is one of those challenges which need to be addressed without delay. The purpose of this study is to find out the present position of technological innovation in MSME segment, the barriers to their technological advancement and the solutions available. The paper is based on extensive literature review on the barriers to technological innovation in India.

Keywords: MSME, Barriers, Technological Upgradation, Innovation.

Introduction

The MSME sector occupies a highly respectable place in India due to its inherent advantages. MSMEs generate huge employment opportunities with less amount of capital. They help in equitable distribution of income and wealth among people. They reduce regional disparities in economic development of the country through industrialization of rural and backward areas.

There are 633.88 lakh MSMEs in India, employing 1109.89 lakh people (*Ministry of MSME Annual Report 2021-22*) and contributing 30.27 per cent to the Indian GDP (*Ministry of MSME Annual Report 2020-21*). The share of MSME sector in India's exports is 49.35 per cent (Soni, 2021).

Indian MSMEs face various challenges like lack of bank credit, competition from multinational companies, poor infrastructure, unavailability of raw material and other inputs, lack of advanced technology, lack of marketing channels, lack of training and skill development and complex labour laws and red tape (Sivasree and Vasavi, 2020).

On conducting a study in Shimogga, Karnataka, Appasaba et al (2013) found that most of the problems faced by MSMEs are related to finance, employees, technology and innovation.

Technology is increasingly seen as business enabler and a vital tool for bringing in process efficiencies and higher degree of standardisation. In order for MSMEs to develop a competitive advantage to operate in the global market, a strong focus on implementing new age technology, developing indigenous technology as well as technology collaboration with global partners is likely to play a crucial role. Technology plays a pivotal role for MSME to help them stand up to the stiff competition from large enterprises. A strong technology-enabled sector levels the playing field, to a great extent, between MSMEs and their established counterparts globally (KPMG, 2015).

India has been on a rising trajectory over the past several years in the Global Innovation Index (GII), from a rank of 81 in 2015 to 46 in 2021 (Sharma, 2021). However, when we consider the innovation in MSME sector in India, the position is not so encouraging.

Today, MSMEs across the globe are focusing on adopting appropriate and innovative technologies to build their path of competitiveness. It is very important for Indian MSMEs to equip themselves with the latest technology to mark their footprint in the global supply chain and increase their export competitiveness. Technology has important effects on business operations of MSMEs. The most formidable problem faced by MSMEs in India has been accessing technology and maintaining competitiveness. Though India has a vast pool of technical talent with well developed intellectual capability, the country still scores low in terms of developing, commercializing and adopting new and innovative technologies. MSME sector in India, with some exceptions, is characterised by low technology levels, which acts as a handicap in the emerging global market. Technological obsolescence is a major problem affecting MSME sector in developing countries like India (Expert Committee on MSMEs, 2019).

Objectives of the Study:

The study aims to:

- (a) Find out the status of technological innovation in the MSME sector of India
- (b) Find out reasons for obsolete technology in major part of the MSME sector
- (c) List the important initiatives taken by government to help technological upgradation of MSMEs
- (d) Suggest steps for a faster technological upgradation of MSMEs

Literature Review:

Technological advancement is a necessity in all manufacturing and service enterprises. According to a research commissioned by the Microsoft Corp. and independently conducted by the Boston Consulting Group (BCG), if more MSMEs in India adopted the latest IT tools, there is potential for MSME revenue to grow by \$56 billion and create 1.1 million new jobs (Aulakh, 2013).

In today's competitive business environment, global competition forces companies to continuously seek ways of improving their products and services. The pressure on organizations to adapt to new technologies and external threats requires resourcefulness, creativity and innovation. Market has become more open, competitive and customers more demanding. Without continuous technology innovation, no organization can ever remain competitive. Innovations reflect a critical way in which organizations respond to either technological or market challenges. The need of the market is to deliver high quality products through continuous changing in features in product, improve existing products, reduce their cost, and improve employee skills, training, technology infrastructure and financial policies. Therefore, the key factor of organization's ability to change is innovation (Singh et al, 2015).

The Covid-19 pandemic catapulted the majority of Indian businesses to shift online to scale up and succeed, with small business owners waking up to the need of technology as the only path for sustained growth. However, the majority of India's Micro, Small and Medium Enterprises (MSMEs), unfortunately, are far away from reaping benefits of digitalisation (Verma, 2021).

The businesses have to pay a price for low level of technology engagement – more labour intensive work, resulting in greater inefficiencies and higher costs (Srivastava and Surjan, 2013).

Goyal et al. (2022) surveyed over 1500 manufacturing MSME units that are selling on e-commerce platforms to examine the effect of e-commerce industry on MSMEs in India. The survey was conducted during second wave of Covid-19. The researchers found that 95 per cent of MSMEs were negatively affected due to the national lock down imposed in March 2020 in view of Covid-19. The use of digital technologies to change a business model and provide new revenue and value-producing opportunities has been key to survival and growth of MSMEs. The study found that MSMEs integrated with e-commerce platforms have benefited, as they experienced an increase in sales and profits and increased hiring during the last two years.

Das (2020), Governor, Reserve Bank of India in his address at the 15th ASSOCHAM Annual Banking Summit (March 6, 2020) stated that major challenges of MSMEs are physical infrastructure bottlenecks, absence of formalisation, inertia to technology adoption, capacity building, backward and forward linkages, lack of access to credit and risk capital and perennial problem of delayed payments.

Indian MSMEs are facing many constraints in their development like timely credit, procurement of raw material at competitive cost, inadequate infrastructure like power, water and roads, lack of skilled manpower etc. The most important constraint faced till date is technological backwardness. Indian MSMEs lack up to date information and are often unaware about the latest technologies present in the global market (Mukherjee, 2018).

Methodology:

The method followed for this study is a systematic review of empirical research from the diverse academic journals and other sources like annual reports, newspaper reports, websites of government departments and published reports of various organisations like Reserve Bank of India, Ministry of MSME etc.

What is Innovation:

Innovation is the implementation of a new or significantly improved product, process, new marketing method or new organizational method in business practices, workplace organization or external relations. Innovation activities include all scientific, technological, organizational, financial and commercial steps which actually or are intended to, lead the implementation of innovation. Firms undertake innovation in pursuit of some specific outcomes like increased productivity, enhanced competitive position, reduced costs and meeting regulatory compliance in a more effective manner, etc. Given the importance of the MSME sector, it is critical to ensure that MSMEs in India remain competitive both nationally and globally. One of the principal determinants of MSMEs' competitiveness is innovation. Developing economies such as India face a formidable challenge in this regard due to limited government capacity to foster innovation support mechanisms. Government policy-which touches upon virtually every aspect of innovation including access to finance, technology, market knowledge, and building of R&D and educational institutions-remains one of the most crucial factors in MSME innovation (Pachouri and Sharma, 2016).

Innovation can also be defined as technological progress that leads to the creation of an entirely new product or a reduction in the cost of producing or an increase in the therapeutic value of an existing product. It is a process of adopting a group of activities that help in creating new wealth from the existing resources (Sharma, 2014).

Technology status of an MSME is essentially the firm's ability to take advantage of technology as a driver of growth and competitiveness. Technology has been a major driver of growth in the 21st century. This is because technology streamlines and optimises the use of other complementary resources of an enterprise. At its most basic form, technology is a tool to enhance productivity. Technology enables the enterprise to manage in a structured and planned manner. Large firms generally adopt technology faster as compared to MSMEs. The state of technology adoption among MSMEs in India is far from encouraging and is one of the causes for various other challenges that the sector is facing in global competitiveness (Singh, 2014).

Advantages of Innovation:

Addressing the Silicon Valley CEOs in 2015, the prime minister Narendra Modi had said 'I see technology as a means to empower and as a tool that bridges the distance between hope and opportunity' (The Times of India, 2015).

It is observed that adoption and better utilisation of latest technology helps in improving the production of MSME sector. Technological upgradation and innovation and availability of cheap credit facilities can help in increasing production and efficient utilization of capital (Yadav, 2014).

Status of Innovation of MSME in India:

The number of online shoppers is estimated to increase from 150 million in the year 2020 to 300 million by 2025 (Malik, 2021). However, there are only 5 to 6 per cent MSME firms which have registered their online presence. Such lack of adoption of digitalization in business practices by the MSMEs has left them deprived of the potential increase in revenue through improved operational efficiency and broadened customer base. Therefore, the need to put the SMEs on digitalization track has been realized by the concerned stakeholders and the process of digital transformation has started taking shape for MSME firms (Mishra, 2019).

In a study carried out by Price (2019), 77 per cent of venture capitalists surveyed believed that many Indian start-ups lack pioneering innovation based on new technologies or unique business models. Indian start-ups are prone to emulate already successful global ideas.

Covid-19 not only threw a big challenge to MSMEs, it also gave them an opportunity to use technology for their survival. Post-covid, more MSMEs had started to use primary technology tools at least such as social media, online service aggregators, company websites etc. According to a Crisil survey of around 540 micro and small units released in April this year, over 65 per cent respondents adopted or upgraded their use of online aggregators, social media platforms and company websites. While a large number of MSMEs are yet to fully benefit from the technology revolution, there are some that have certainly been warming up to the new age solutions such as artificial intelligence (AI) and using it also for better growth (Soni, 2022).

It is universally accepted that obsolete technology and primitive manufacturing processes are among the primary challenges of MSME sector in India. There is need for technological innovation of the units and modernisation of their processes.

Reasons for Obsolete Technology among MSMEs:

Improving the quality and upgrading the technology are essential for enhancing competitiveness of the MSME sector. Large industries have surplus funds which enables them to have access to all types of information, including information on global markets which helps them in formulating sound strategies for upgradation of technology and improvement of quality. On the other hand, MSMEs have shortage of funds and limited access to relevant information. They try to reduce cost by minimising the capital expenditure. This has made the Indian MSME sector a bit dormant when it comes to the use of latest technology and knowledge of the global market. As a result, they are losing competition at the global level (Biswas, 2015).

Technological obsolescence and sub-optimal scale are two critically distinguishing features of Indian MSME sector which predominantly consists of micro, informal enterprises. These challenges are more intense in the context of micro-enterprises, both in urban and rural India. Technology upgradation and modernization is rather a perennial objective of India's MSME policy, but we have not achieved much success on this front, either at the national level or at the regional levels. Resource deficiency in the MSME sector at large is largely perceived to be the major factor responsible for this. Given their weak internal resources, they are unlikely to appeal to and win over external financiers, private or public (Subrahmanya, 2021).

Main barriers faced by small and medium enterprises in innovation are complex funding procedure, shortage of technical training, high cost of technology, difficulty in procuring technology, shortage of technical manpower, shortage of sources of funds and making innovative products (Sharma, 2014).

Indian MSMEs in general face shortage of financial resources. This problem is more with the Micro firms as most of these firms are very small in size. Micro firms constitute 99.47 per cent of the total MSME firms (Ministry of MSME Annual Report 2020-21).

While assessing the barriers to technological innovations in the emerging economy of Cameroon, Tafor (2020) found that there are three main hindrances to technological innovation of SMEs – energy shortage, unreliable internet and telecommunication services and government red tapes. Although other hindrances like finances, technical know-how, technological awareness and knowledge, and the perceptions of the society are not found to be of much significance, all the hindrances are interlinked because without the internet services entrepreneur-manager cannot get the important knowledge of the available technologies for their line of work. And without the appropriate policies in place, even with creative ideas, much cannot be done. And the government above all must provide the appropriate policies to enable creativity.

MSMEs are not much aware of advanced technology of production, supply, transportation and marketing efficiency. These technological problems in general are related to indigenous machinery, imported machinery, unsuitability of machinery, testing facilities for raw material, excess consumption of raw material and power (Prakash et al, 2021).

In its report submitted to the Reserve Bank of India, the Expert Committee on MSMEs (2019) has, inter alia, pointed out the lack of adequate funding, high cost of innovative technology, lack of skilled manpower and lack of linkages among R&D institutions, academic institutions and MSMEs as the main challenges for innovation of MSME sector.

Hidden (2012) has pointed out 5 barriers to the technology adoption among Indian MSMEs – cost, lack of skilled labour needed to adopt the technology, lack of awareness about benefits of

technology, questions on privacy and data security, concerns over infrastructure, viz., broadband and connectivity.

Revanasiddappa (2018) has referred to three types of barriers to innovation for MSMEs, viz. managerial, financial and technological barriers.

Mweta and Suwadi (2021) conducted a study on manufacturing MSMEs in the south eastern country of Malawi. The study revealed that external factors like market competition, difficulty in accessing loans, inadequate government support, labour laws, taxes and regulations and internal factors like inadequate financial resources, lack of qualified personnel and poor financial performance hamper innovation activities. It concluded that government had a major role to play in overcoming most of the innovation barriers encountered by MSMEs.

Khurana, et al (2012) have referred to the following challenges faced by MSMEs in technology transfer:

1. Financial aspects of technology choice
2. Lack of in-house technological capabilities
3. Organisational resistance and communication barrier
4. Lack of infrastructure and technical professionals
5. Hurdles in new technology commercialisation
6. Partner selection for technology choice
7. Market forces and combating competitiveness
8. Intellectual Property (IP) rights and other legal factors
9. Government support

Singh and Singh (2014) uncovered five top barriers to investment in and adoption of the technology by MSME as cost, lack of skilled manpower, low awareness of the benefits of technology, security and privacy and poor infrastructure.

On the basis of a survey conducted among rural MSMEs of eight European countries, Fanelli (2021) concluded that lack of financial resources necessary to make technological innovations and the considerable difficulty in accessing public and private funding are the biggest barriers in adopting the technology.

Indrawati et al. (2020) conducted a study in Indonesia through survey of MSMEs that had been operating for at least five years. They found that there are five inhibiting factors of MSMEs' technological innovation: government support, quality of human resources, funding of technological innovation, economic conditions and business partners. The biggest inhibiting factor remains the funding of technological innovation.

Using the empirical data sourced from the Indian National Innovation Survey published by the

Department of Science and Technology in 2014, Pachouri and Sharma (2016) have classified the barriers to innovation in six categories as under:

- (a) **People and skills:** MSMEs are generally unable to recruit a highly skilled workforce, including internal management, due to financial constraints and lack of adequate infrastructure.
- (b) **Finance:** The high cost of innovation and limited/ non availability of internal and external finance act as barriers to innovation.
- (c) **Information:** MSMEs' inability to access valuable information related to market and technology is a barrier to innovation.
- (d) **Government:** The government has a critical role to play in every sphere of innovation such as access to finance and technology, capacity building and human resources, market linkages, research facilities and access to key information via different policies and schemes. Surprisingly, the MSMEs perceive the government as a barrier rather than as a facilitator.
- (e) **Infrastructure:** Due to shortage of infrastructure, most of the innovative MSMEs do not have access to adequate research facilities and testing laboratories to develop R&D innovation, either in-house or outside the premises, and they view it as a barrier to innovation.
- (f) **Market factors:** Market characteristics such as competition, protectionist nature, dominance and monopoly, Intellectual Property Rights (IPR) and uncertainty of demand affect a firm's ability to innovate, especially product and market-related innovations.

Government Initiatives:

The government of India has taken a number of initiatives and formulated various schemes to facilitate technological upgradation of MSME sector. Some of the important government schemes in this regard are as under:

- (i) **MSME Technology Centres:** The Technology Centres (TCs) have been set up to aid integrated development of MSMEs by providing quality tools, industry ready manpower, consultancy in tooling & related areas and processes & products development. They provide access of MSMEs to tooling facilities for enhancement of their efficiency, process & product development in relevant sector, consultancy and Job works in relevant sector and skill development.
- (ii) **Credit Linked Capital Subsidy for Technology Upgradation (CLCSS):** Under this scheme, MSEs are facilitated for induction of well established and proven technologies through institutional finance in the specific 51 sub-sector/products both for upgradation projects (with or without expansion) and for new projects. Upfront subsidy of 15% is provided on institutional credit upto Rs. 1.0 Crore i.e. subsidy cap of Rs. 15.00 lakh for identified sectors/ sub-sectors/ technologies.
- (iii) **Design Expertise to Manufacturing MSME Sector:** The scheme was formed to bring Indian manufacturing sector and design expertise/ design fraternity on a common

platform and to provide expert advice and cost effective solution on real time design problems, resulting in new product development, continuous improvement and value addition for existing products including new products. The government of India provides financial assistance to the MSMEs for engagement of design consultants for design intervention @ 75% for micro, 60% for SMEs for the professional design project range of Rs. 15 lakh to Rs. 40 lakh.

- (iv) **Lean Manufacturing Competitiveness Scheme (LMCS):** The objective of this scheme is to enhance the manufacturing competitiveness of MSMEs through the application of various Lean Manufacturing (LM) techniques by reducing waste, increasing productivity, introducing innovative practices, inculcating good management systems and imbibing a culture of continuous improvement. Government of India provides financial assistance to the lean manufacturing consultant upto Rs 36 Lakhs per mini cluster of 4-10 units for a period of 18 months or till completion. The amount is paid by the government and the MSME units in the ratio of 80:20.
- (v) **A Scheme for Promotion of Innovation, Rural Industry and Entrepreneurship (ASPIRE):** The objective of the scheme is to set up a network of Livelihood Business Incubators (LBIs) and Technology Business Incubators (TBIs) with an aim to create jobs and reduce unemployment by promoting culture of entrepreneurship and innovation in the Agro-rural sector. In case of Livelihood Business Incubator, the government of India provides one-time grant of 100% of the cost of Plant and Machinery, other than land and infrastructure, up to Rs. 100 Lakh for Government agencies. For PPP mode with Govt., one-time grant is 50% of cost of Plant & Machinery, other than the land and infrastructure, or Rs. 50.00 Lakh, whichever is less. In case of Technology Business Incubator, the government provides one-time grant of 50% of cost of Plant & Machinery excluding the land and infrastructure or an amount up to Rs. 100 Lakh, whichever is less. For existing TBIs, it provides one-time grant of 50% of cost of Plant & Machinery excluding the land and infrastructure or an amount up to Rs. 30 Lakh, whichever is less.
- (vi) **Digital MSME Scheme:** The main objective of this scheme is to make MSMEs digitally empowered and motivate them to adopt ICT tools and applications in their production & business processes with a view to improve their competitiveness in national and international market. The government provides assistance in the shape of Digital Empowerment, Adoption of ICT Tools, ERP Softwares, E-marketing, etc.
- (vii) **ZED Certification Scheme:** The scheme envisages promotion of Zero Defect and Zero Effect (ZED) manufacturing amongst MSMEs and ZED assessment for their certification so as to encourage and enable MSMEs to manufacture quality products using latest technology tools and to constantly upgrade their processes for achievement of high productivity and high quality with the least effect on the environment. It promotes the development of an ecosystem for Zero Defect Zero Effect manufacturing in MSMEs, for enhancing competitiveness and enabling

- exports, promote adoption of quality and recognising the efforts of successful MSMEs, increase public awareness on demanding Zero Defect and Zero Effect products through the ZED Rating. The government reimburses 80% of the cost of ZED Certification for micro, 60 % for small and 50% for medium enterprises.
- (viii) Support for Entrepreneurial and Managerial Development of MSMEs through Incubators: The scheme is formed to promote and support untapped creativity of individual and to promote adoption of latest technologies in manufacturing as well as knowledge based innovative MSMEs that seek the validation of their ideas at the proof of concept level. The government provides assistance of up to Rs. 15 lakh per idea to Host Institute (HI) for developing and nurturing of ideas, up to Rs. 1.00 crore for procurement and installation of relevant plant and machines including hardware and software etc. in Business Incubator (BI), up to Rs. 1.00 Crore as seed capital support to appropriate incubates in the form of soft loan, interest free loan, equity participation, grant or a combination of these.
- (ix) Building awareness on Intellectual Property Rights (IPR): The scheme aims to enhance the awareness of Intellectual Property Rights (IPRs) amongst the MSMEs to encourage creative intellectual endeavour in Indian economy. The government takes suitable measures for the protection of ideas, technological innovation and knowledge-driven business strategies developed by the MSMEs. Assistance is provided to MSMEs in effective utilization of IPR Tools for technology upgradation, market and business promotion and competitiveness enhancement. Reimbursement is granted for Patent /GI Registration/Trademarks, for setting up of IP Facilitation Centres, interactive Seminars /Workshops/Exhibitions and Awareness Programmes (e Book of Schemes for MSMEs).
- (x) MSME Innovative Scheme: In March 2022, the Union Minister of Micro, Small and Medium Enterprises launched the MSME Innovative Scheme with the objective to encourage innovation in India by providing a platform to entrepreneurs and to promote the complete value chain from developing ideas into innovation through incubation and design interventions. The Scheme is an amalgamation of the three earlier schemes, viz. Incubation, Design and Intellectual Property Rights which will work as separate units but in tandem. The primary objective of this scheme is to promote and support untapped creativity and help in adopting the latest technologies and methods in the MSME sector (India Brand Equity Foundation, 2022).

Solutions:

To overcome the constraints and become globally competitive, MSMEs need to adopt innovative approaches in their work. A culture of innovation on multiple parameters like business processes, product development and technology up-gradation, marketing practices and improving the efficiency of internal operations can bring a sea change in their overall wellbeing. Although the Government of India has taken a number of initiatives like Start-up India and

launching of Innovation hubs aimed at strengthening the innovation capacity of MSMEs, the cooperation between industry, academia and government bodies remains weak, thereby hampering the innovation capacity and sustainability of MSMEs. To bring India to the forefront in the field of innovation and entrepreneurial ventures, it is necessary to build a support system for speedy conversion of innovative ideas into products, processes and services for the global market. Towards this end, following suggestions could prove to be useful:

- Evaluate the present level of technology in various sectors and the desired technology levels sought to be achieved.
- Tap on the innovations and technologies suitable for MSMEs for implementation.
- Set up Information Centres and a Bank for innovations and their transfer mechanism along with support institutions for facilitating such technology transfers and up-gradation.
- Facilitate regular consultations with various agencies, innovation and technology centres and institutions engaged in technology management.
- Encourage Research & Development of indigenous technologies for micro & small enterprises including traditional occupations.
- Create innovation infrastructure in various institutions to encourage and incubate start-ups.
- Organize awareness programs among MSMEs with respect to quality, standardization and import substitution (Multani, 2021).

Khurana et al. (2012) have mentioned that following factors strengthen the technology transfer to MSMEs:

1. Training of employees
2. Vendor participation
3. Financial support
4. Supporting agencies and government linkages

Digitalization needs to be encouraged through the adoption of ICT tools to aid production and marketing. Improved access to finance is needed to boost the widespread technological transformation of MSMEs across the country. In India, we need an exclusive MSME Technology Finance Corporation (MSME-TFC) with branches in all MSME clusters, followed by opening of branches in all district headquarters in the country. Such an institution must exclusively focus on the development of new technology through R&D, commercialization of new technologies and upgrading of manufacturing processes of MSMEs. To cater to the exclusive talent needs of MSMEs, departments of management in Universities and exclusive management institutions should introduce integrated MBA programs for diploma holders who emerge from Industrial Training Institutes. Such MBA programs must have an exclusive focus on “small and medium businesses” in terms of internships, projects, case studies, and application of principles. These institutions must have tie-ups with MSME associations for their internships, project works as well as direct recruitment after their graduation. If technology,

finance, and human resource challenges are overcome, MSMEs will be able to conquer regional to national to international markets gradually and steadily (Subrahmanya, 2021).

Digital technology can significantly enable India's MSME segment, provided the emerging infrastructure has joint buy-in from the government, solution providers and importantly, users. The challenges reside in addressing a complex and heterogeneous MSME segment, dominated by micro enterprises at different stages and different levels of digital readiness. The enticement for business to fully embrace digital technology would be to provide a digital ecosystem that provides end-to-end solutions, from finance access, payments, operations, management to even skilling and knowledge sources that are convenient (Sharon, 2021).

The spirit of innovation can be accelerated by diligently following the three stages as under:

- (a) **Conceiving an Idea:** In order to inspire innovation, it is critical to have an environment of creativity. Training programmes and workshops should be organised for young, skilled and knowledgeable persons to help MSMEs to conduct patent searches across the innovation and technical databases. This will enable them to narrow down the right areas to innovate. The rewards and recognition programmes should be introduced and sufficient funds should be allocated by MSMEs to the R&D and marketing departments.
- (b) **Identifying a Worthy Idea:** Indian MSMEs and start-ups often do not realize the full potential of their great inventions and protect their creation with relevant IP rights. There is a generally a misconception among them that something very complex and of rocket science level can only be patented. In order to identify what can be IP-worthy, MSMEs should conduct searches across patent databases and look at the patents filed by their competitors.
- (c) **Communicating Seamlessly:** Inventions with great potential often wither away in obscurity just because inventors did not effectively convey the idea to consumers. With their limited resources and capabilities, MSMEs find it difficult to capitalize on the power of communication. Conclaves, expos and local exhibitions are great platforms for small businesses to spread their ideas and inventions. The Government of India is also taking initiatives to provide MSMEs with a platform and chance to compete with industry leaders. More such opportunities will only inspire companies to put a spotlight on their creative solutions (Bansal, 2022).

The Expert Committee on MSME (2019) has proposed following steps to Reserve Bank of India for technology upgradation of MSMEs:

- (i) **Launching of Technology Mission:** A technology mission should be launched by the Ministry of MSME for converging the efforts of various stakeholders for the technology upgradation of the MSMEs across the country to act as one-stop solution for all technological needs of the MSMEs.
- (ii) **Setting up of more Industry specific Technology Centres:** Ministry of MSME has a successful model of Technology Centres for providing training and tools, consultancy

- and common facility support to MSMEs. There is a need to set up more product specific Technology Centres in the hitherto unserved fields.
- (iii) FDI policy must focus on development of local MSME sector to facilitate capacity, capability and technology development of MSMEs. In respect of all large projects involving FDI, ancillary development should be made a condition.
 - (iv) The government should set up a mechanism in organisations like Defence Ministry, Railways, Airlines, Surface Transport, etc. to ensure that the offsets under their purchases are suitably focused to support MSMEs in upgrading their capacities, capabilities and technology by providing handholding support to them.
 - (v) Incubation Schemes of Ministry of MSME, Biotechnology, NITI Aayog, Department of Science and Technology (DST), other departments/state governments should be strengthened and synergised.
 - (vi) The Government should constructively encourage more R&D investment and resources from global corporations and the domestic corporate sector.
 - (vii) The government should conduct workshops for MSMEs in partnership with institutions and programmes which help promote science, technology and innovation and enable them to interact with experts who can help them better understand consumer demand and emerging trends.
 - (viii) Opportunities should be provided for international partnership of Indian MSMEs. Also, large enterprises should be encouraged to act as mentors for MSMEs.

Conclusion and Recommendations:

Expansion and development of MSME sector is crucial to India's economic progress and upliftment of poor. Obsolete technology among MSMEs, in general, is a major cause of obstruction in their progress. Technology upgradation in MSME sector is hampered due to various reasons. It is primarily attributed to financial constraints of MSME firms due to which they are unable to carry out research and development work and adopt higher technology for operations. Other reason is the lack of coordination among the R&D institutions, government authorities and the MSME firms.

If we wish to ensure a faster upgradation of technology among MSMEs, the following recommendations can be very helpful:

- (a) There are primarily three stake holders in the process of technology upgradation, viz. the MSME sector, the research and development institutions and the government. There is a need to have a strong coordination among these three stake holders. The technological upgradation process can be expedited only if these three stake holders work in tandem.
- (b) The government should set aside sufficient amount of budget for research and development. The amount should be allocated to various recognised research institutions and IITs.

- (c) An MSME Technology Upgradation and Finance Institution should be established with an office/ branch in each district of India. It should have the technocrats and financial experts as its members. The Institution should promote research and development in various products and processes related to MSMEs all over India. The Institution will allocate funds to various organisations for research and development. It will be responsible for overseeing the research and development work and ensuring optimum utilisation of funds for research purpose. It will approve appropriate technology and ensure dissemination of the approved technology among concerned firms. The process will also include training of the employees for usage of the new technology. The Institution will ensure regular interaction between R&D organisation and the MSME owners during research to ensure pragmatic solution to the problems of MSMEs. Transfer of approved and upgraded technology to the concerned MSME firms will be one of the responsibilities of the Institution.
- (d) The MSME firms should also be assisted financially for carrying out in-house research and development. The patents for the approved technology should be provided to the firms expeditiously.
- (e) Registration of all MSME units, irrespective of their size, with the government is a pre-requisite for extending any type of government assistance or benefit to the firms. Therefore, an exercise to register all firms should be done through field surveys all over India expeditiously.

Above steps will bring the desired upgradation in the technology of MSME sector which will go a long way in progress of the sector.

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