Creation of Vibrant SMEs for Defence Corridors

J P Dash and Devinder Kumar

Introduction

It is in the strategic interest of a nation aspiring to be a regional power to develop an indigenous and internationally competitive defence industry base. Presently, India is one of the largest importers of conventional defence equipment. According to government statistics, roughly 60 percent of India's defence requirements are met through imports. India has the potential to emerge as a global platform for defence research, manufacturing, supply chain sourcing, software development, and offsets, with the right kind of policy interventions. The Small and Medium Enterprises (SMEs) sector is critical for the success of these flagship initiatives, especially the 'Make in India', as a massive number of ancillary units for large manufacturing plants come from this sector. With the increasing technological intensity of defence platforms, expectations for a self-reliant India can be met from the SMEs, provided they can graduate to become reliable suppliers for the defence supply chain and become a source of innovation. This can happen with the right kind of policy intervention and implementation to overcome the woes of the past and to address the new challenges of a "knowledge-based economy", manifesting in industry through a revolution termed as Industry 4.0.

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The contributions of the SMEs have been significant, as 90 percent of the industrial units in India belong to the Micro, Small and Medium Enterprises (MSME) sector. There are over 11 million MSME units in India that produce more than 8,000 products. They contribute nearly 45 percent to manufacturing and about 40 percent to the Indian export sector. Their contribution to the Indian Gross Domestic Product (GDP) is 8 percent; the sector has registered a growth rate of 10.8 percent, and they contribute 35 percent to Indian industrial exports.[1] The rise of India as a growing power would require not only a macroeconomic uplift but also a thorough realisation of entrepreneurship and innovation by the MSMEs. It is, therefore, essential for India to foster innovation, especially at the firm level, since firms, not countries, are the ones that have to compete internationally. Given this context, the Government of India (GOI) has been trying to catalyse development of defence corridors to drive the advantages of a cluster-based economy to the SMEs. What do the SMEs expect from the defence corridors? What is the special offering from defence corridors to the SMEs? Can the SMEs in the defence corridors drive 'Make in India' in defence? What can be done in defence corridors so that they become a hotbed of innovations and provide an agile, responsive supply chain? This paper is aimed at addressing such issues.

'Make in India': Analysing its Stagnation

While India has attained significant self-sufficiency in production of weapons and equipment for the Navy, such as manufacturing of aircraft carriers, nuclear submarines, radars, etc., the Air Force and Army still

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rely heavily on imported equipment. Indian made equipment and vehicles for the Army and Air Force do not receive the same patronage as the imported equipment. This happens due to a variety of reasons ranging from technical deficiencies, competitive gaps, and the perceived superiority of imported goods.[2] A change in the prevailing order can only happen with a change in the basic mindset.

A Ministry of Defence (MoD) report says that no major 'Make in India' defence project has kicked off. Several projects, collectively worth over Rs 3.5 lakh crore, are stuck at different stages, without the project materialising. Apart from Mine Counter-Measure Vessels (MCMVs), the Future Infantry Combat Vehicles (FICVs), Light Utility Helicopters (LUHs) and naval multi-role helicopters, along with Fifth-Generation Fighter Aircraft (FGFA) are yet to take off.[3] The report says that India's entire weapons acquisition process is plagued with huge delays. Only 8-10 percent of 144 proposed deals in the last three financial years fructified within the stipulated time periods.[4] According to the report, the 'Make in India' project for manufacturing sophisticated weapons systems ranging from warships, submarines to fighter jets "continues to languish at the altar of procedural delays and has failed to demonstrate its true potential."[5]

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general reluctance among technology leaders to share critical technologies with Indian partners and there is relative inability of the Indian counterparts to absorb and upgrade the technology. The best bet for 'Make in India' is to reduce dependence on foreign suppliers by developing an innovative and agile supply chain around the system integrators with active contributions from the SMEs. A defence corridor provides an opportunity to overcome the historical weaknesses of the past and make a competitive and innovative supply chain, integrated to the global network of the future knowledge economy.

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National Innovation System

In a knowledge society, in particular for a sector like defence, technology innovation is regarded as an important factor that drives national competitiveness. The government's efforts to leverage our large defence spending to achieve self-reliance in defence production and simultaneously create a domestic defence industry, provides a platform for the growth of Research and Development (R&D). Defence R&D activity in India is primarily driven by government establishments like the Defence Research and Development Organisation (DRDO) labs, and Defence Public Sector Undertakings (DPSUs). Although India's domestic private R&D is yet to pick up, it has become an attractive destination for foreign defence companies for R&D due to the inherent advantages of a large number of highly qualified, low-cost engineers and scientists.

The transformation demanded is huge, thus, calling for support from the government and proactive action by the MSMEs in capitalising on the opportunities through various schemes from the defence corridor and policies under DPP.

India's spending on R&D (about 0.6 per cent of the GDP) is well below that in major nations such as the US (2.8 percent), China (2.1 percent), Israel (4.3 percent) and Korea (4.2 percent). According to a report[6], there are 26 Indian companies in the list of the top 2,500 global R&D spenders compared to 301 Chinese companies. Nineteen (of these 26) firms are in just three sectors: pharmaceuticals, automobiles and software. Not only as a nation, do we need to increase R&D spending, patent filing, and academic research papers, but the SME sector has to be given a special thrust, being a laggard in all these aspects. With the quest for knowhow through the offset route, the SMEs have the potential to contribute significantly in partnerships with global majors, strategic partners and established players like the Ordnance Factories Board (OFBs), DPSUs and DRDO. If the national innovation system has to deliver, the SMEs must be able to rise up to the expectations.

Future Technology Demands of Industry 4.0

In today's world, digital technologies are key to unlocking competitiveness. India has a number of factors in its favour, including a huge and growing market, a large workforce with diverse skills, a demographic dividend, English-speaking scientists and engineers, R&D centres of over 1,000 top global multinationals, the world's third-largest technology start-up base and a government focus on making the nation an easy place to do business. The future technology world would be best evident in Industry 4.0, having the following salient features:

- *Automated,* to gain speed in repetitive processes, with collaborative robots performing tasks of lower value added, and easily changing from one task to another
- *Digital,* incorporating electronics to capture data in a massive way and manage production processes in real-time
- *Intelligent,* interpreting the data of the processes and facilitating decision-making in advance, promoting continuous improvement and innovation
- *Flexible* in design, involving customers in manufacturing and in logistics to adapt immediately to changes in demand
- *Sustainable,* with rational and responsible use of resources and energy.

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The cost economics and competitiveness of manufacturing are fundamentally changing with the trade-off between labour and automation swinging in the latter's favour. This is enabling small-scale, highly automated localised manufacturing close to the end-consumers and, hence, disrupting the existing low-cost labour arbitrage-based global value chain model. Further, with boundaries between products and services blurring, digital services are becoming growth and profit drivers for manufacturers. Thus, it is important to reorient the MSMEs with digital economy skills, infrastructure and processes for leveraging the best from emerging technology. The transformation demanded is huge, thus, calling for support from the government and proactive action by the MSMEs in capitalising on the opportunities through various schemes from the defence corridors and policies under the Defence Procurement Procedure (DPP).

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SMEs' Role and Expectations

The Ministry of Defence set up a Committee of Experts under the chairmanship of Dhirendra Singh in May 2015 to evolve a policy framework for 'Make in India' and to suggest the requisite amendments in DPP 2013. The committee submitted its report in which it mentioned that almost 80 percent of component, aggregates and assemblies of complex weapon systems and aircraft are made by the MSMEs, which are part of the supply chains. The report also mentioned that there are nearly 6,000 MSMEs across the country supplying components and sub-assemblies to the DPSUs, Ordnance Factories (OFs), DRDO and private industries.[7] The global defence industry, dominated by a few Original Equipment Manufacturers (OEMs), works in close coordination with the SMEs and their prime contractors. The reason why OEMs/prime contractors prefer to work with the SMEs is because of their innovative capabilities in niche manufacturing, greater flexibility, lower overhead costs and ability to learn and absorb new technologies. The OEMs require that the SMEs should perform, maintain continuity of supplies and innovate.

The MSMEs face certain distinct challenges because of their very nature. They face stiff competition from two sources: the bigger and more established players in the market, and imports. These make it necessary for the MSMEs to innovate and either introduce a product or a service to fill the void created by the bigger players, or reduce the costs and streamline the processes to enable them to be on a more level playing field against the bigger players.[8]

The MSME sector in India, with some exceptions, is characterised by low technology levels – read as a huge drawback in the emerging global market. Resultantly, the sustainability of a large number of MSMEs will be in jeopardy amidst competition from imports. The MSMEs are located in decades-old industrial estates, are functioning within urban areas or have come up in an unorganised manner in rural areas. The state of infrastructure, including power, water, roads, etc. in such areas is poor and unreliable. Although India has a large pool of human resources, the industry continues to lack formally skilled manpower required for manufacturing, marketing, servicing, etc. For Industry 4.0, there is an urgent need not only to reskill, but recruit quality manpower for design and development of new products and processes.

The SMEs need to know their customers well, understand their requirements, gain their confidence and demonstrate a strong commitment to develop a long-term business relationship so that they are fully integrated in the supply chain.

Opportunities for start-ups in the defence sector include not only the manufacture of equipment but also the provision of technical support and integration services in information technology, maintenance, repair, and overhaul, communication and navigation, among other areas. Although exports are a nominal part of the earnings of the defence industry, as the SMEs develop the capacity to manufacture defence equipment, they can be part of the global supply chain. The SMEs are crucial for the Indian defence sector due to their flexibility, diversity, low cost inputs, etc. The 'Make in India' programme is likely to enable the SMEs to become competitive producing units. Large enterprises have joined hands with the SMEs for continuous production of the latest technologies. Considering this new development, the SMEs need to know their customers well, understand their requirements, gain their confidence and demonstrate

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a strong commitment to develop a long-term business relationship so that they are fully integrated in the supply chain. Such initiatives by the SMEs, coupled with the government's policy to enhance the role of the SMEs in the Indian defence industry, including participation in defence R&D, are the need of the hour if India is to emerge as one of the most important defence markets in the world.

The Ernst & Young Study findings[9] say that defence SMEs comprises the future self-sufficient India. Further, "To move up the global defence value chain, SMEs should focus on innovation, building intellectual property, and adopt quality and process standards to be able to offer complete sub-systems or assemblies as well as testing and certification services. Tailor-made courses on specific categories in aerospace and defence should be offered at all levels of education in Indian educational institutes, through industry-government-institute partnerships." There should be rapid development of domain knowledge in the private sector by hiring and training of engineers from leading engineering institutes with support from aerospace and defence sector specialists from abroad. Common facilities for design, testing and simulation should be established in the defence corridors, as required, on a pay-per-use model.

The most significant hurdles to technology adoption in the SMEs are the lack of awareness of the beneficiaries, unfamiliarity with technology, lack of guidance and credible support from governmental institutions and poor technology adoption. Upgrading technology is crucial as it helps businesses to be competitive and enables employees to work better and more efficiently. The SMEs cannot upgrade technology frequently, hence,

technology budgeting is one of the biggest technology challenges for them. Liberal funding support without collaterals, facilitating investment by angel investors and venture capital firms can unlock the potential of the SMEs.

Policy for the SMEs

Simplification of licensing has led to a large number of components, parts, sub-systems, testing equipment, production equipment being excluded from the purview of industrial licensing on the Defence Products List, thus, these are available to the SMEs. The Ministry of Defence (MoD) has divided the "Make" projects into two: (a) Make-I (government funded) and (b) Make-II (industry funded). While the government would bear the cost for funding prototype development for the first category, the industry would shoulder the burden in the latter category. The government has also increased funding for prototype development from 80 to 90 percent, with 20 percent of the cost to be paid in advance. The SMEs have the first right to develop prototypes for projects worth up to Rs. 10 crore. In other words, designated projects would be offered to big industry players only when the SMEs are not interested in taking them up.

In August 2015, services [(R&D), Maintenance, Repair and Overhaul (MRO) and technology transfer] were reinstated as eligible avenues to discharge offsets under the defence offset policy, which can help the SMEs in a significant way. In the discharge of offset obligations, a multiplier of 1.50 has been permitted in cases to where the MSMEs are Indian Offset Partners (lOPs). To aid R&D, the DRDO has set up three centres of excellence: the Centre of Propulsion Technology (CoPT), Indian Institute for Technology (IIT), Mumbai; Jagdish Chandra Bose Centre for Advanced Technology (JCBCAT), Jadavpur University, Kolkata; and Joint Advanced Technology Centre (JATC), IIT, Delhi, in 2016. The SMEs can accrue benefits by associating with these centres. The Government of India, under Skill India initiative, has selected 8 IITs to upgrade their training infrastructure. The

OFB/DPSUs are sparing equipment in working condition for the Skill India efforts. Moreover, the OFB/DPSUs have stepped up training under the Apprenticeship Act from 2.5 percent to 10 percent of the strength. All these Skill India initiatives are going to ensure the supply of a trained workforce to the SMEs.

The public procurement policy seeks a mandatory 20 percent share for the MSMEs in all government and public sector unit purchases over a period of three years. The Ministry of MSMEs has set up an Intellectual Property (IP) cell which provides a range of IP related services such as prior art search, validity search, patent landscape, studies on technology development, etc. The implementation of a proper intellectual rights regime will help the SMEs gain access to newer markets, avoid wasteful investment in R&D and marketing, negotiate licensing, franchising or other IP-based contractual agreements and increase market value to lead to other potential benefits. A design clinic, an initiative by the Ministry of MSMEs, will help the MSMEs develop product, process and business expertise through design intervention at multiple levels of interaction. This model brings design exposure to the doorstep of industry clusters for design awareness, improvement, evaluation, analysis and design-related intervention. While there are a lot of policies, the outcome of the policies would depend on the SMEs availing of the benefit of these policies and the policy-makers fine-tuning the policies to address the implementation issues.

Cluster Emergence in SEZs, NIMZs and Defence Corridors

The cluster approach comprises a remarkable intervention for the design of innovation policies to support the SMEs. In contrast to other more atomistic approaches working with the same variables but in isolation, the cluster approach considers the links and dependencies of different institutions and organisations. 'Systemic' thinking enables selective interventions in the weakest as well as the most critical nodes in the

system. Selectivity is crucial for a country like India, with competing resource demands for addressing issues related to infrastructure—physical and digital, skill gaps, innovation ecosystem, public-private partnership, support for the MSMEs, data security and privacy, standards-based interoperability and a conducive regulatory framework. Selectivity helps policy-makers avoid policy interventions focussing on just one variable of the system, leading to decreasing returns, unless supported by complementary investments.[10]

Industry clusters are groups of geographically proximate firms in the same industry. Clusters are groups of firms and sectors grouped according to their technology and networking characteristics and they provide competitive advantage through innovation to be able to increase sustainability. Various cluster related interventions like Special Economic Zones (SEZs), National Investment and Manufacturing Zones (NIMZs), and industrial corridors have been attempted from time to time – the latest being the defence corridors. The investment required for creating a new cluster is pretty high. However, it is not known whether there will be Foreign Direct Investment (FDI) flow resulting in the new facility, shifting of the existing facility under large industry to this hub and, finally, the MSMEs shifting to this hub. Thus, it would be more prudent to improve existing clusters rather than create new ones. The financial costs of implementing these projects will be much lower than those for developing numerous new smart cities. Additional economic and social benefits will also accrue from strengthening the existing clusters instead of building new ones. In the long run, gains from strengthening the existing clusters in the form of defence corridors may far outweigh the gains expected from new ones.

Defence Industrial Production Corridors

A defence corridor refers to a route or a path along which domestic production of defence equipment by the public sector, private sector and

MSMEs is lined up to enhance the operational capability of the defence forces. The budget for 2018-19 proposes development of two defence industrial production corridors: the locations of these corridors have been strategically decided, taking into account the natural ecosystem. The first corridor plans to link Chennai and Bengaluru and will pass through Coimbatore and several other industrial clusters. This southern corridor will extend from Chennai, Hosur, Coimbatore, Salem and Tiruchi. The MoD has initiated a consultation exercise with the industry and MSMEs at the five nodal points in the Southern Corridor. A Detailed Project Report (DPR) will be prepared by a top consultancy firm for the "Tamil Nadu Defence Quad". The second corridor will be in Bundelkhand—a region divided between Uttar Pradesh and Madhya Pradesh. As per a news report, this will be a Rs 20,000-crore defence industrial production corridor, which will generate 2,50,000 jobs.

As most of the design and prototype building centres are concentrated in Bengaluru and Chennai, with a concentration of DPSUs and DRDO laboratories, it is logical and strategic to have the first brown field corridor here. However, the intention behind the second corridor is regional development. Thus, the first corridor, compared to the second, will benefit from the existing industries, academic and research laboratories around the same. To yield the best results, the defence corridors must incorporate the best practices from the SEZs and NIMZs. However, the same need to be blended with the needs and aspirations of the industries operating in the defence domain or aspiring to join the defence bandwagon.

Importance of Non-Physical Assets

Proximity to the customer can bring significant benefits to both businesses and customers. For instance, firms are able to respond faster when there is a problem, and get it resolved immediately. As a result, improved customer care leads to happier customers and better retention rates. By setting up locations closer to the customers, firms not only increase visibility, but

also gain a clearer view of their markets. A deeper understanding of the local environment can also lead to improved marketing effectiveness. However, it is well nigh impossible to set up a plant close to the international border or on the heights of mountains or in the sand dunes of deserts, in the context of the military environment.

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Alternatively, proximity can be cultivated by deep insight into the mind of the customer in a simulated environment. Customer proximity is a difficult proposition in the military context. The same is the case with the supply chain. As the demand for technological intensity and the sophistication of the product increase, the quality, agility and innovativeness of the supplier prevail over proximity to the customer. Defence does not produce commodity-nature products for war-fighting, but products that are intelligent, robust and reliable and that can work across differing terrains. A range of inter-disciplinary technology works for the production of a system. Thus, unless there has been sector specific cluster development in the past, the network needs to be connected through virtual means for better visibility of the supply chain. As such, the concept of physical proximity of the entire network may not happen in the desired way, as the players in the domain are niche and specialised in their operations, and spread spatially. This is more so in electronics, embedded electronics and precision munitions, unlike physically distinguishable large products like aircraft, ships and tanks.

In line with Industry 4.0[11], industrial connectivity solutions for the smart factory of tomorrow can be set, based on state-of-the-art information and communication technologies using industrial analytics, cloud services, energy management, digitalisation and networking. Current process information of the products supplied to the customers can be retrieved via

the internet, irrespective of the location. Necessary software adjustments can be undertaken quickly and cost-efficiently. Industrial analytics solutions can collect and process various data from the system in question and analyse it using intelligent processes. On this basis, anomalies and inefficiencies from different applications are reliably revealed, defects can be predicted and maintenance recommendations derived. With innovative communication-capable signal converters, Intelligence Operations (IOs) systems, routers and switches, the lead supplier can make data available in the network and ensure Information Technology (IT) security as a result. In summary, in transformation from a component manufacturer to a solution provider, a lead supplier can combine established and new solutions into an overall solution which is tailored to the requirements of Industry 4.0 without being in physical proximity to its customer or its vendors. These pseudo clusters, widely spread, can be brought together in the virtual mode better, compared to the physical mode, whenever physical proximity cannot be ensured, although it is desirable.

A case in point is the 'Open Source Drug Discovery Process.' It is a remarkable example of a virtual cluster formed by technology enabled 'crowd sourcing' of collaborators converging to respond to an innovation challenge. Such an open innovation model, using an 'open source' and collaborative approach, can enable the creation of affordable solutions unlikely with a conventional, 'in-lab' approach. The US Department of Defence has launched its Code.mil, a new experience to begin operations using the open source way. With the latest move, software developers around the world will get a chance to collaborate on an "unclassified code" written by federal employees to enhance upcoming defence projects.[12] In a UK first, the Defence Science and Technology Laboratory (DSTL) has announced that it is working with Kaggle, the world's largest data science competition community, to source innovative solutions to help intelligence analysts evaluate information more quickly, accurately and effectively, so an algorithm or software can automatically correctly identify and categorise

up to 10 features and objects, such as cars, trees and buildings in a variety of environments. In view of the above, it may be possible to connect other members through the virtual mode and develop solutions for military technologies through a virtual cluster. However, a virtual cluster is not a substitute for the physical cluster, but an alternate satisfying solution to overcome the constraints.

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Smart and Distributed Manufacturing

As the knowledge economy is driving the future, disruptive business models would be built around Industry 4.0 for the future. For intellectual assets, connectivity would be the key factor of differentiation driving creativity and innovation, embedded in effective networks of relationships (for example, with suppliers and universities). The future model questions the viability of the existing physical cluster model of the past with a collaborative, agile, smart manufacturing model of the future. Physical proximity is a medium and mechanism for higher competitive potential, but not an end in itself.

Traditionally, a manufacturer will employ, or own, dedicated factories to create a convenient supply chain for its clients. The capabilities of a company are limited to its talent pool, largely determined by its investment. However, 'distributed manufacturing', the future of manufacturing, overcomes such limitations, of place-centricity and capital investment through open innovation and digital connectivity. 'Distributed manufacturing' enables industry to become a connected force of factories, manufacturers, distributors and end consumers. This network combines to achieve the ultimate levels of efficiency. Distributed manufacturing leverages large

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numbers of 'partner' factories and minds to create agile supply chains.

Traditional manufacturing processes work well for large organisations that want to mass manufacture products for the lowest price possible – considered not as friendly to small businesses or newly developed products. In traditional manufacturing, raw materials are brought together, assembled and fabricated in large centralised factories into identical finished products that are then distributed to the customer. The distributed approach to hardware manufacturing improves the process and makes it possible for more innovators to get products to the market. In distributed manufacturing, the raw materials and methods of fabrication are decentralised, and the final product is manufactured very close to the final customer, using local 3D printers and local materials. The concept of distributed manufacturing is to replace as much of the material supply chain as possible with digital information. Distributed manufacturing is expected to enable efficient use of resources, with less wasted capacity in centralised factories. It lowers the barriers to market entry by reducing the amount of capital required to build the first prototype and product. Importantly, it should reduce the overall environmental impact of manufacturing: digital information is shipped over the web rather than physical products over roads or rail, or on ships; and raw materials are sourced locally, further reducing the amount of energy required for transportation.

In this context, the differences between the strengths of the proposed two defence corridors can be a source of advantage. New units, as part of distributed manufacturing, can be located in the Bundelkhand corridor,

while the southern hub can be a source of design and innovation. Corridors can assist in setting up an information bank connecting the two corridors for facilitating adoption of future factory technology and distributed manufacturing. Thus, a defence corridor, coupled with virtual connectivity for distributed manufacturing, is a better solution.

Orienting research and technology transfer to fit the needs of research-driven SMEs, providing access to markets, finance and venture capital, improving the regulatory environment and reducing costs and burden for SMEs, are primary boosters for performance of the SMEs.

Recommendations to Create Vibrant SMEs in Defence Corridors

The benefits proposed to be made available for the NIMZ, such as job loss policy, expeditious approvals and clearances, 'green' incentives, etc., should be extended to brown field clusters. The important issues faced by the industries need to be researched and common issues like testing facility, Computer Aided Design (CAD) and Computer Aided Engineering (CAE) facility for R&D, Internet Protocol (IP) management services, co-location of the Quality Assurance Evaluator (QAE) establishments and defence PSUs, and talent upgradation specific for emerging technologies, need to be addressed. However, considering the relative state of development of the two proposed corridors, the approach for each corridor needs to be different. From a generalistic SME policy to adopting specific policies for high-growth innovative SMEs, and from promoting entrepreneurship to improving the business environment for SMEs can be helpful in supporting the SMEs. Orienting research and technology transfer to fit the needs of research-driven SMEs, providing access to markets, finance and venture capital, improving the regulatory environment and reducing the costs

and burden for the SMEs, are primary boosters for the performance of the SMEs.

As the MSMEs are bogged down in routine operations, reporting for regulatory compliance, an integrated IT system taking care of non-core functions will allow them to concentrate on core areas, improving employee productivity. Adoption of Information and Communication Technology (ICT) is a key enabler for migration to Industry 4.0. The government should play the role of a facilitator for delivery of cost-effective solutions such as Software as a Service (SaaS), Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) through cloud computing. A special fund to provide up to 50 percent funding support for hiring external experts to improve management and operations can make the SMEs more efficient. As part of the intellectual property management support programme, the necessary support can be given for developing new products, processes, ideas and business models. Better linkage to the venture capital and angel investors would help the SMEs to learn and grow by tapping onto the expertise of these special categories of investors. The MSMEs have a huge challenge in accessing capital and when they manage it, it is at prohibitive rates. Thus, it is imperative to provide a non-collateralised technology fund for Make II projects.

Knowledge and technology transfer from the universities to the SMEs and innovative start-ups can be facilitated by the government under an appropriate scheme. A symbiotic relationship between the MSME clusters and technical institutions would help solve the technical and design-related problems of the MSMEs. A manufacturing and system audit by the corridor experts can highlight the technical gaps of the SMEs and provide them food for thought for reorienting to the needs of the future. In the age of open innovation and crowdsourcing, it is important for businesses to tap into external knowledge, knowhow and ideas from the networks. The need for physical proximity, although an added advantage, can be managed through virtual networking. Connection between the

two proposed corridors through distributed manufacturing can overcome critical land issues. The SMEs, with enhancement of their capabilities and unlocking of their innovation potential, backed with offset technologies, driven by high capital acquisitions, and empowered with the cluster competitiveness of productivity can play a new role in the success of the 'Make in India' mission.

Notes

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