



# A STUDY OF THE INDIAN MACHINE TOOL INDUSTRY, KEY TO THE GOVERNMENT OF INDIA'S 'MAKE IN INDIA' INITIATIVE

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**Abstract- Objective of the study:** Machine tools industry plays a key role in the economic development of a country. The author tries to study and analyze the performance, developments, the opportunities and challenges in the Indian Machine Tool Industry, in the context of the Government of India's 'Make in India' initiative

**The Machine Tool Industry:** The Machine Tool Industry is key to the government's flagship 'Make in India' initiatives, given that it makes the machines required for the manufacturing sector. Machine tools are considered a strategic industry segment. It is a part and parcel of manufacturing, particularly discreet manufacturing segments such as Automobiles, Defence, Railways, Plastic machinery, Medical, Electronics and White goods. These products cannot achieve a high level of excellence without the machine tools segment being very strong.

**The future for machine tools in India:** As per one market research analyst, the production of machine tools in India will grow at a CAGR of 13% in the next 5 years. There are more opportunities in high-end manufacturing in sectors like Railways, Defence and Aerospace. Automotive will become bigger, while Medical electronics is also expected to grow. All these would require machine tools playing an important role in productivity.

**Need for improvement:** As many customers prefer to buy imported machines for manufacturing larger-sized components and Components requiring High Precision and Accuracy, there is a need to develop indigenous machine tools to cater to the future manufacturing technology requirements. There is a strong correlation between machine tool and manufacturing globally. If you lose your power in machine tool, you lose power in manufacturing technology.

**Make in India Initiative-**There is a positive sentiment in almost all manufacturing segments, with a direction for people to invest and an opportunity for India to become a manufacturing hub.

*Keywords:* Machine tools, Economic development, Make in India, Manufacturing hub

## **INTRODUCTION:**

Economic developments in India during the past one year have been volatile and full of uncertainties and did not spare any of the sectors especially the manufacturing sector. It has also been discovered that manufacturing sector is the core of the economy which creates real economic and societal value. The financial system of western economies, which was designed to serve the manufacturers, grew far larger than the real economy and exploded suddenly. The manufacturing industry is back on the rise in Europe and other western countries. In present circumstances only manufacturing sector can offer full potential to reboot the economy and to create new jobs, which can't be vanished over night. Therefore, it needs to be developed as a culture. Best manufacturing practices and Productivity Improvement Programmes (PIP) are needed. It will not be feasible without the active role of machine tools industry which is a back

bone of manufacturing sector for sustained economic development and generation of large scale employment. Machine tools have a strategic place within the industry as they enable the production of all other industrial machinery and equipments which are in the area of mechanical engineering.

## **STRATEGIC IMPORTANCE OF MACHINE TOOLS INDUSTRY**

Machine tools are important and critical equipments used in manufacturing sector for basic and precision engineering/processing work. These are characterized by long operating life, high unit price, high technology and a process involving assembly of number of components and critical parts. Machine tools are used in the Automobiles, Tractors, Bearings, Railways, Power, Defence, General Engineering and Heavy Engineering industries and contribute significantly to the development of manufacturing sector. Machine tool industry is an integral part of manufacturing sector and directly affects the economy of the nation. Machine tools are known as mother machines and they enable production of all other machines including themselves. Machine tools were the catalyst for the industrial revolution, which broke out in Britain in 18<sup>th</sup> century.

Developing a strong machine tools industry allows a Nation to take control of its economic development and plays a significant role in determining the status of a Nation whether it is a developing or developed Nation. World over too, industrially advanced and developed countries have created a market niche on the back of a well developed and supported machine tool Sector. Some of the objects we see in our environment: Computers, Mobile phones, Buses, Trains, Cars, Bikes, Scooters, Aircrafts Watches, Refrigerators, Air conditioners, TVs etc. Some of the objects we don't see in our daily life but they make our life easy and comfortable: Wind turbines, Solar panels that generate carbon free energy, Medical implants which improve the quality of life for people with health problems, Satellite that enables us to communicate faster and cheaper, Construction machinery used to make road, buildings, bridges, and skyscrapers etc. All these objects are made by the immense contribution of Machine Tools.

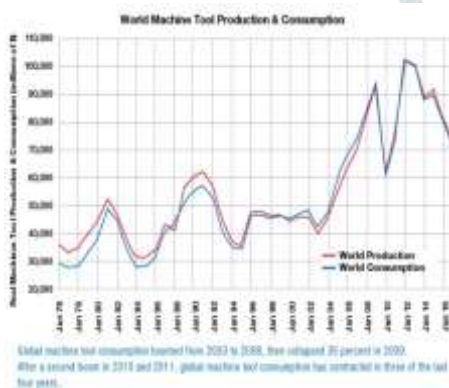
## Role of Machine Tools Industry in Economic Development

Machine tools are the main driving force of industrialization of a country. They are the corner stone of economic development and sustained growth of manufacturing sector. The need of the hour is to strengthen and realise the critical role of Machine tools industry to cater to the rising expectations and requirement of Automobile, Railways, Defence, Aerospace and other Engineering industries to give required boost to manufacturing sector. Being an integral sector, growth of machine tools industry has an immense bearing on the entire economy, especially India's manufacturing industry. It is even more crucial for development of country's strategic segments such as Defence, Railways, Space and Atomic energy and generation of large scale employment.

### GLOBAL SCENARIO OF MACHINE TOOLS:

Global machine tool consumption boomed from 2003 to 2016. Despite the drastic decline in 2009, when it was down 35 percent from the year before, consumption rocketed up the next two years and in 2016 reached the highest level ever. Since then, however, global machine tool consumption has contracted in every year except 2016, including falling 11.9 percent in 2016, as shown in the Table 1.

TABLE 1:



These dramatic swings were largely the result of global trends in Demographics, Finance and Manufacturing.

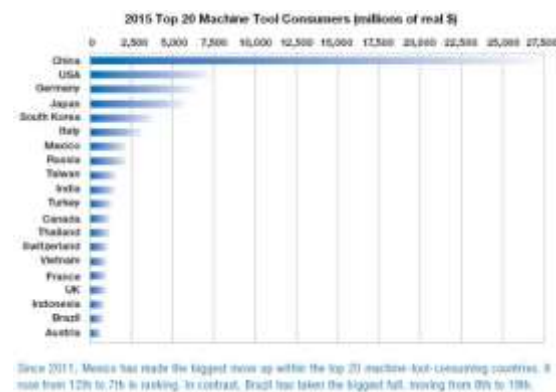
**Demographics:** The huge population in Asia was a source of cheap labor that multinational companies used to reduce costs and maintain, if not boost, profitability

**Finance:** Globally, financial institutions created massive amounts of debt. Consequently, this flood of money impacted the United States, China and Japan by changing their investment strategies. The effect was deepest in Asia, where it enabled countries to devalue their currencies competitively, thus making their products cheaper on the world market. The convergence of these demographic and financial trends resulted in the construction of many new factories in Asia.

**Manufacturing:** The booming growth in manufacturing necessitated a significant increase in spending on capital equipment. The level of machine tool technology being purchased has increased everywhere. Based on anecdotal evidence, four- and five-axis machines, as well as multitasking machines, continue to see a strong demand around the world, while General purpose machines have fallen out of favor.

Table 2 shows the list of top 20 consumers of Machine tools in the world, in the year 2016:

**TABLE 2:**



It is clear from the above that China is ranked no.1 while India is in the 10<sup>th</sup> position.

#### **ASIAN SCENARIO OF MACHINE TOOLS:**

Asia is now being seen as the future destination for global machine tool market and it is expected that next few years will be the years of resurgence for all leading Asian machine tool players.

#### **INDIAN SCENARIO OF MACHINE TOOLS:**

Machine tools industry in India comprises nearly 1000 manufacturers with about 150 units in organized sector. Almost 80 percent of production is contributed by ten to fifteen major companies of this industry. India has limited capability when it comes to high-accuracy machine tools. Machine Tool industry in India is scattered all over the country. The hub of manufacturing activities are concentrated in places like Bengaluru, Pune, Mumbai, Delhi, Hyderabad, Batala and Ludhiana in Punjab; Ahmedabad, Baroda, Jamnagar, Rajkot, Coimbatore and Chennai. Bengaluru is considered as the hub for the Indian Machine Tool industry. The city houses renowned names such as HMT Machine Tools Ltd, Ace Group, BFW, Kenna Metals. Batliboi, Francis Klein India Pvt.ltd. etc. That is the reason for shifting the venue of IMTEX (Indian Machine Tools Exhibition) from Mumbai to Bengaluru.

Most Indian companies showcase their own products or product improvements at IMTEX, which shows the industry's commitment to 'Make in India' program

Recently, IMTEX 2017 was conducted at Bengaluru from 26th January to 1<sup>st</sup> February 2017.

## **MACHINE TOOL INDUSTRY IS A KEY TO MANUFACTURING SECTOR:**

The Machine tools industry is a critical subsector of mechanical engineering industry. Machine tools have a strategic place within the industry as they enable the production of all industrial equipments and machinery which are in the area of mechanical engineering. Machine tools are the origin of almost every manufacturing process which includes metal. Most of the objects that we see in our daily life from cars to planes, from wind turbines to satellite and from watches to computers and to mobile phones are made by machine tools. The machine tool industry as such, is fundamental to the productivity and one of the key parameter of competitiveness of entire manufacturing base of the country. It plays significant role in the industrialization of the country and transfers production expertise to other manufacturing segments. Machine tool companies join hands with their customers to work on developing new solutions for better production practices in line with the requirement of markets. Therefore presence of strong Machine tool industry is key to triggering innovation in production technologies which enhances industry's ability to develop and produce new products and services. There is no progress without this enabling technology. Machine tools also enable to transfer the latest technology in information and communication technologies or material sciences into production systems, which increase the efficiency of production process and to machine new materials which are later used in new fields and applications.

Advancement in Machine Tools technology helps customer industries achieve greater resource efficiency and significant gains in material, energy consumption and overall productivity. Machine Tools can play a significant role in enabling India to build up the cutting edge infrastructure required for transition to low carbon energy sources in line with European and other western countries. Solar, wind, thermal and hydraulic energy industries rely entirely on components produced by machine tools to build safe and robust power plants. We need faster and safer transport solutions with minimum impact on environment. Machine tools are used at almost every stage of the manufacturing process of the Modes of transportation, from the production of simplest parts to increasingly sophisticated and high precision components. They have significant impact on energy saving potential of Transport vehicles. Railway vehicles, Ship building and Aerospace. Automobile industries have achieved tremendous progress in weight reduction by inventing in new materials which are light and robust. They rely entirely on processing technologies provided by the machine tools to process new materials. Medical aids and equipments are also produced due to extra ordinary advancement in machine tools and ultra precision machining technologies, which play vital role in ensuring better quality of life for citizens and raising standard of living of people by lowering health care cost. Cognitive capabilities, improved human-machine interaction and augmented automation will play a key role in meeting future challenges.

## **BUSINESS PROSPECTS:**

The domestic production of machine tool Industry is around 45% of country's consumption and expected to grow substantially in next five years. There is a huge gap between production and consumption which offers several opportunities for investment and adding capacities in order to yield long term benefits. The government is giving thrust to manufacturing sector at the right time when the world is looking at India as a manufacturing

hub for global requirement. We quite clearly enjoy vast demographic advantage of 50% of population being below 25 years of age. There is a tremendous convergence of knowledge workers. All these transform into a huge volume of consumer demand- a fact being increasingly realized and acted by external market forces. Innovation and Technology development in Machine Tool sector can generate 100 million jobs in manufacturing sector. The growing automobile sector provides very encouraging picture ahead. There is equally a subtle shift in demand in infrastructure, energy, construction, material handling, and health care besides defence, aerospace and medical engineering sectors. These industries are also looking for more challenging manufacturing solutions- some currently out of reach of Indian Machine Tools suppliers.

### **KEY ISSUES AND CHALLENGES:**

Technology-gap is one major issue. To have an efficient model or mechanism for companies, they need to improve their own technology. Supply-chain is another issue. Machine Tool industry is capital, technology and knowledge intensive field with high R & D intensity. It requires deep understanding and knowledge of mechanical engineering, hydraulics, process engineering, software engineering, kinematics and other disciplines. The machine tool knowledge base is built on multidisciplinary scientific legacy and engineering expertise which cannot be easily acquired or copied. Those who master the engineering expertise in production technology also benefit from first mover advantages in the development of future products.

R & D and Innovation have always been a neglected aspect of Indian industry. Due to this reason India is not competitive in global arena. This is because of the increase in the demand for high technology machine tools, over a period of time. The Indian companies are not able to keep pace with the technology advancements elsewhere. Several cases of supply of high end CNC systems being denied to Indian machine tool companies are on record, which have affected the production of hi-tech machine tools. These instances bring out the vital importance of developing these competencies and advanced technology within the country and reduce dependence on imported machines. A large investment is needed for R & D and technology development. Given the fragmented nature of the industry, the SMEs find it difficult to invest money in technology because of limited availability of funds. While there have been new investments in Machine Tools sector in the last ten years, these are not on a scale required to meet rapidly increasing domestic demand, or make India a significant global player. Reducing/Zero Duty Imports under FTAs/PTAs: During recent years a number of FTAs and PTAs have been signed with different countries whereby the import duty on machine tools imported from these countries is gradually reduced to zero. This places domestic producers at a disadvantage due to high input costs

**Cyclic Business:** Machine tools purely produce investment goods. All the fluctuations and uncertainties in general economy are immediately reflected in this sector with increased magnitude. Customers tend to defer investment decisions during economic down turns and they increase their spending on production machinery during upturn. The machine tool industry is usually the first to be affected by economic recession as the first reaction of the customers is to cut the budget on capital expenditure. "The Machine Tools industry is often the first to be affected by economic recession and last one to recover.

**Technology Gaps:** Although India is one of the major consumers of Machine tools, the indigenous machine tool industry holds only around 45% of market share. The most obvious

reason is that user industries depend on imports for several types of technologically advanced and high end Machine tools. Even though industry has good design and manufacturing competence for a wide range of products. The product range and the manufacturing capabilities in India have a substantial gap with the present levels abroad. Current global trend requires:

- Highly reliable and productive CNC machines with zero down time.
- Linear motor technology for high rapid speed and high acceleration.
- Large size machine tools for Power, Steel, Railways and Defence sectors.
- High speed machining with intelligent collision protection.
- CNC profilers for Aerospace industry.
- Intelligent machines with remote diagnose to avoid dependence on after sales service.
- Machines with plug & play feature to reduce installation time.
- Multi tasking machines to reduce per piece cost.
- Compact machines with minimum foot print to save costly floor area.
- Ultra precision machines with sub micron accuracy (for Defence & Aerospace).
- High degree of automation to increase productivity.
- Extensive use of Robotics for automation and material handling activities.

### Conclusion:

The year 2016-16 has been encouraging for India's machine tool industry. Production reached about ₹4,727 crore from ₹4,230 crore in 2016-15. Consumption touched about ₹10,376 crore in 2016-16 against ₹9,267 cr in 2016-15, vide table 3 for details:

**TABLE 3:**

<b>Indian Machine Tool Industry 2016-15 &amp; 2016-16</b>			
<b>(INR Crores)</b>			
	<b>2016-15</b>	<b>2016-16</b>	<b>Growth Rate</b>
<b>Production</b>	4230	4727	12%
<b>Exports</b>	281	296	5%
<b>Imports</b>	5318	5945	12%
<b>Consumption</b>	9267	10376	12%

of the market size of ₹10,376 crore, domestic production is worth ₹4,727 crore, which is about 45 per cent. There is some momentum in sectors like Railways, Aerospace, and Defence. The Department of Heavy Industries has allocated ₹100 crore to kick-start the machine tool segment. We need to see results in the

Policies like GST, Policy on Land acquisition, Policy on Acquisition of foreign firms by Indian companies, Capital Goods Policy and Ease of doing business. The developments in these areas will make 'Make in India' initiative truly successful.

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