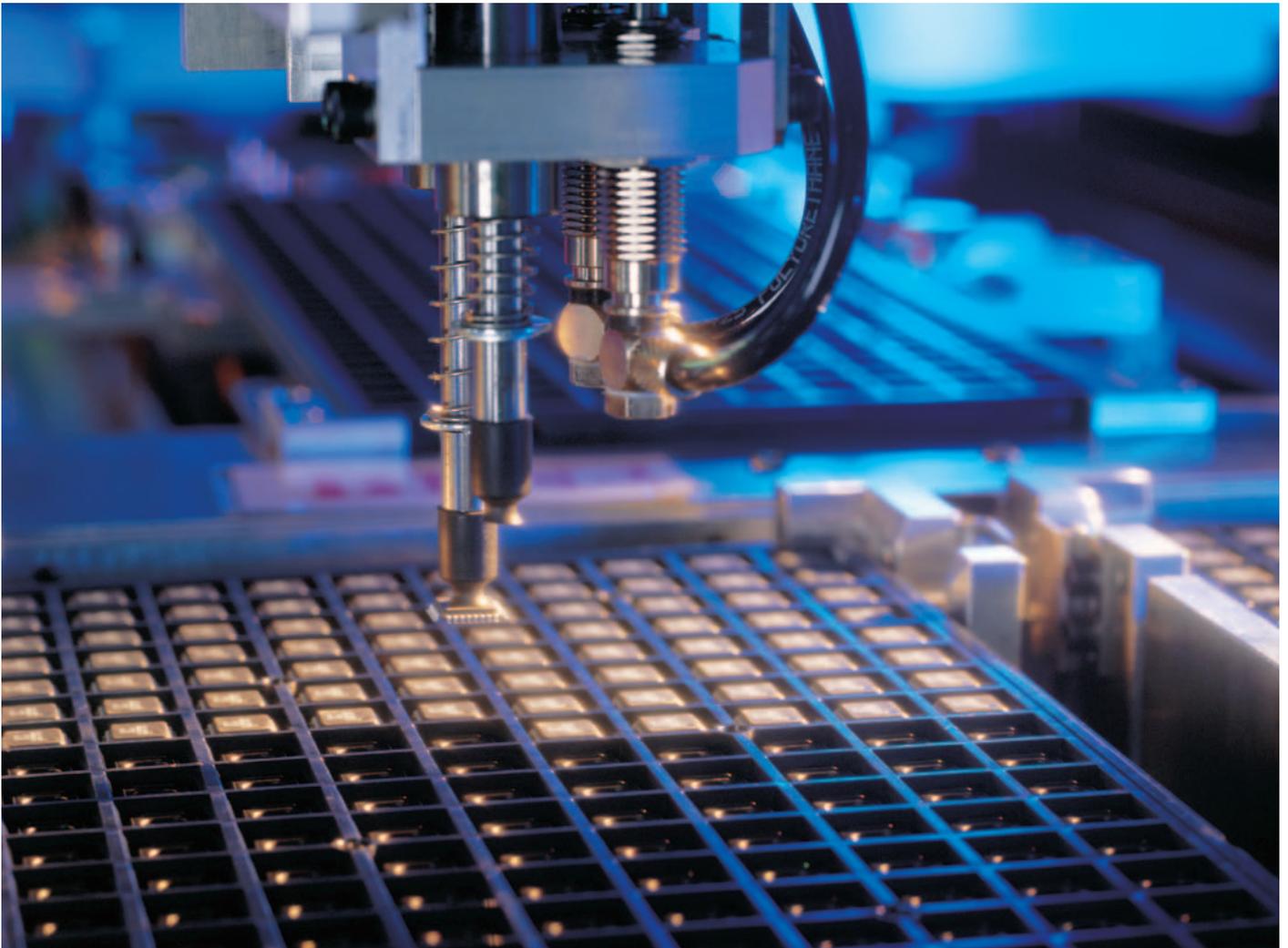


Machine Tools

MARKET & OPPORTUNITIES



Machine Tools

MARKET & OPPORTUNITIES

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Introduction

The global machine tools industry (primarily constituting the top 28 machine tools manufacturing countries), had a turnover of US\$ 51.85 billion in 2005, representing a 14.5 per cent growth by value over the previous year. The machine tools industry in Japan and China witnessed a growth of 14 per cent in 2005. Japan, with a net value of around US\$ 13.25 billion was the leader in 2005, with a 25 per cent increase,

followed by Germany with US\$ 9.5 billion and China with US\$ 5 billion. Together, these three countries shared 54 per cent of the total turnover in 2005. The Asian continent accounted for 48 per cent of the total world output in 2005. China remained the world's largest machine tools market in 2005, with one-fifth of the total consumption.

Indian Machine Tools Industry

India stands 17th in production and 12th in the consumption of machine tools in the world. The country is set to become a key player in the global machine tools industry and is likely to see substantial high-end machine tool manufacturing, even as China keeps its lead in lower end volumes. Several firms have entered the Indian machine tools sector, or announced plans for joint ventures or wholly owned subsidiaries in India. Industry experts say that the phenomenon is linked to the spurt in manufacturing, for which the machine tools sector serves as the mother industry. Since, the manufacturing capacity is stagnating and the growth rate for the machine tools industry falling in developed economies, shifting machine tool capacity to low-cost high skill geographies like India, has become imperative.

SECTOR COMPOSITION AND STRUCTURE

The Indian machine tools industry comprises of around 160 players in the organised sector and around 400 units in the small ancillary sector. Ten major Indian companies constitute almost 70 per cent of the total production. The Government-owned Hindustan Machine Tools Limited (HMT) alone accounts for nearly 32 per cent of machine tools manufactured in India. Approximately, 75 per cent of the Indian machine tool producers are ISO certified. While the large organised players cater to India's heavy and medium industries, the small-scale sector meets the demand of ancillary and other units. Many machine tool manufacturers have also obtained CE Marking certification, in keeping with the requirements of the European markets. The machine tools industry employs a workforce totaling 65,000 skilled and unskilled personnel. The Indian Machine Tool Manufacturers' Association (IMTMA), is the sole voice of the Indian machine tools industry, its membership constituting over 90 per cent in the country.

The industry can be segmented in several ways:

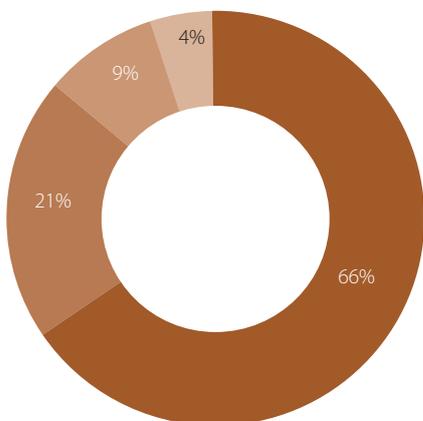
1. Based on how the metal is shaped, the industry can be classified into—metal cutting machines and metal forming machines. Metal cutting accounted for 87 per cent of the total output of machine tools in India in 2005-06.
2. Based on how the tool selection/ movement is controlled, the industry can be classified into – CNC machines and conventional machines. CNC machine tools, which are highly productive and cost effective, comprised nearly 60 per cent of the machine tools produced in 2005-06.
- 3 Based on the usage purpose, the industry can be classified into—general purpose machines and special purpose machines.

The figures below give an idea regarding the structure and size of the machine tool industry.

Forming	Nos. produced: 334; Value : US\$ 12.65 Million	Nos. produced: 583; Value : US\$ 27.59 Million
	Operation	
Cutting	Nos. produced: 4,098; Value : US\$ 199.3 Million	Nos. produced: 2,511; Value : US\$ 64.17 Million
	Technology	
	CNC	Conventional

Source: Annual Report, IMTMA, 2005-06; All Figures as of 2005-06

Percentage Contribution (Revenue)



- Metal Cutting CNC
- Metal Cutting Conventional
- Metal Forming Conventional
- Metal Forming CNC

Source: Annual Report, IMTMA, 2005-06; All Figures as of 2005-06

The major contribution of revenues, nearly 66 per cent, for the Indian machine tool industry comes from metal cutting CNC machines. Within these, the major categories are Numerically Controlled (NC) Machines and Flexible Manufacturing Systems (FMS). In the metal cutting conventional segment, there are General Purpose

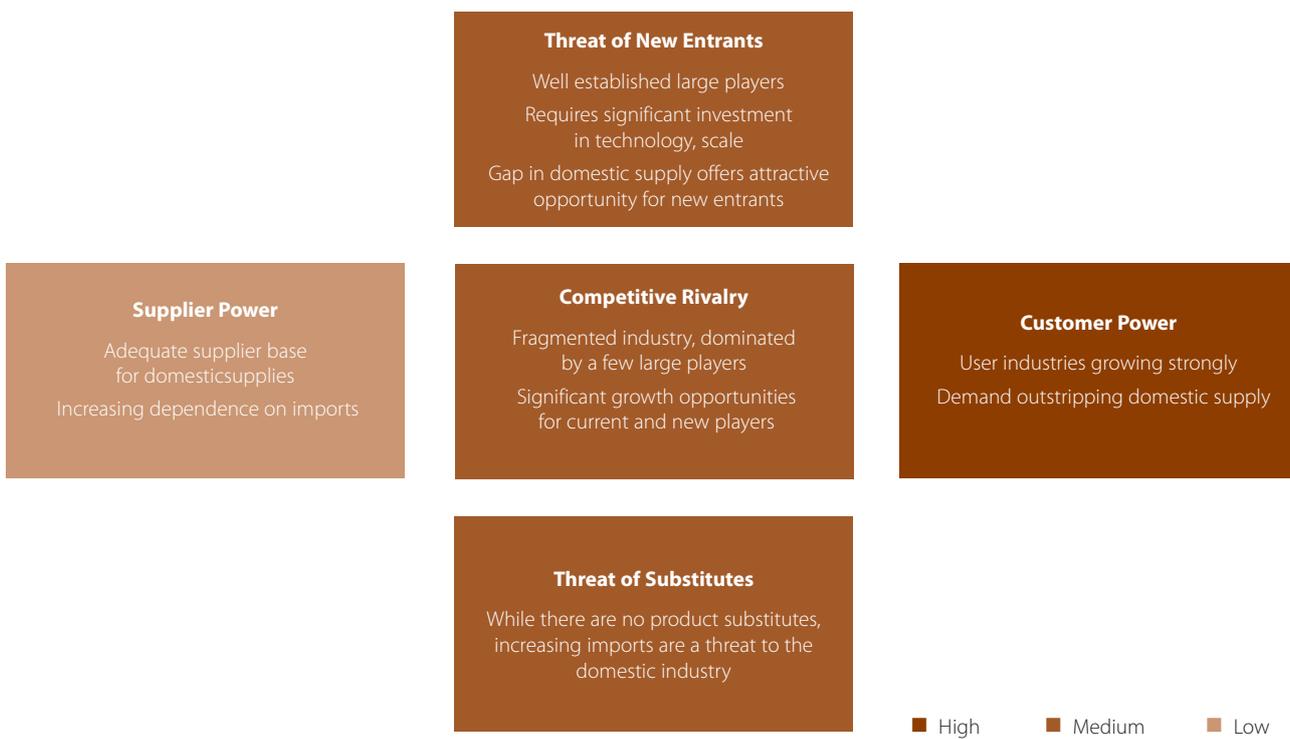
Machines (GPMs) and Special Purpose Machines (SPMs). In the metal forming sector, conventional machines are preferred and they contribute to around 9 per cent of revenues, in comparison to 4 per cent for metal forming CNC machines.

The industry’s prospect mainly depends on the growth of the engineering sector. The user sectors of machine tools are, the automotive, auto ancillaries, railways, defense, agriculture, steel, fertilisers, electricals, electronics, telecommunication, textile machinery, ball & roller bearings, industrial valves, power-driven pumps, multi-product engineering companies, earth moving machinery, compressors and consumer durables like washing machines, refrigerators, television sets, watches, dish washers, vacuum cleaners, air conditioners, etc.

INDUSTRY SNAPSHOT

India’s machine tools industry offers opportunities for growth that need to be tapped to reduce dependence on imports. The competitiveness in the sector can be assessed using the following framework:

Industry Competitive Analysis



■ High ■ Medium ■ Low

The industry has been growing in both volume and value terms

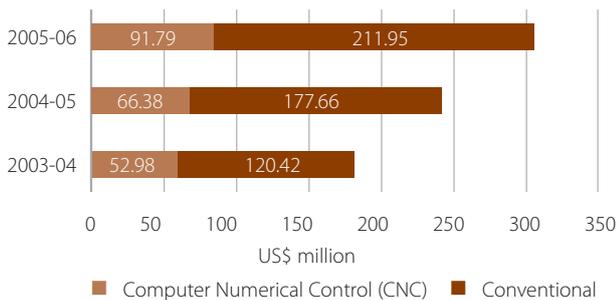
The production of machine tools has been continuously increasing over the past three years. It has increased in value terms at a 32 per cent Compounded Annual Growth Rate (CAGR), from US\$ 173.2 million in 2003-04 to US\$ 303.74 million in 2006-07. The growth in volume terms (number of machine tools produced) over the same period has registered a 7 per cent CAGR.

Category-wise growth

Production of CNC machine tools has increased in both value and numbers, at a CAGR of 33 and 24 per cent, respectively. While there has been a reduction in the number of conventional machine tools produced, their value has increased at a 32 per cent CAGR, indicating an increase in value add per machine. Metal forming machine tools have increased in number and value at a CAGR of 7 and 48 per cent, respectively, over the past three years, while metal cutting machine tools have grown at CAGR of 7 and 30 per cent in number and value, respectively.

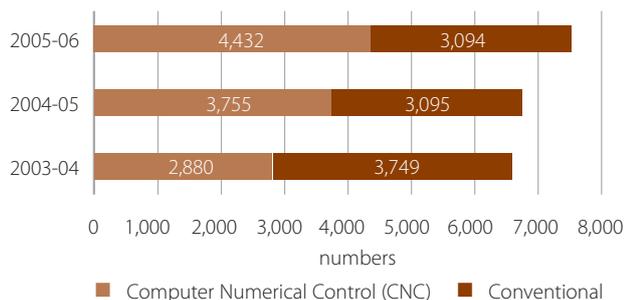
The following charts illustrate the growth of CNC and conventional machines in value and volume. As evident, CNC machines have been growing faster.

Machine Tool Production (Value)



Source: IMTMA Annual Report, 2005-06

Machine Tool Production

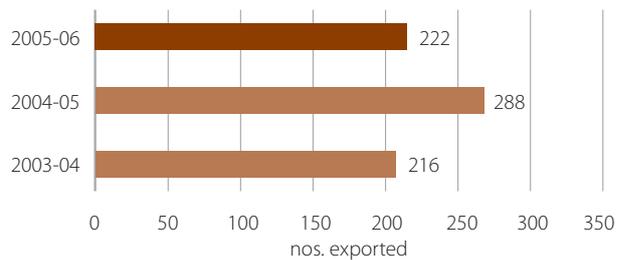


Source: IMTMA Annual Report, 2005-06

Industry Exports

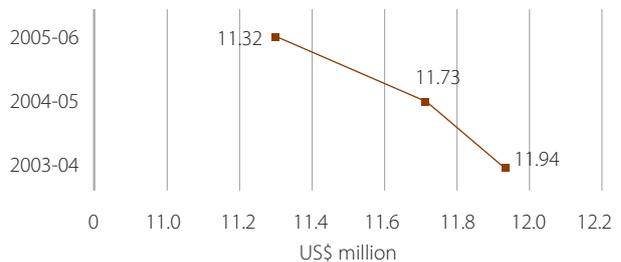
Exports of machine tools have shown a dip in both, volume exported as well as revenues, from US\$ 11.94 million for 216 machine tools in 2003-04 to US\$ 11.32 million for 222 machine tools in 2005-06. The key segments contributing to exports were machinery and instruments, followed by transport equipments and machine tools, respectively.

Exports of Machine Tools (Volume)



Source: IMTMA, Annual Report 2005-06

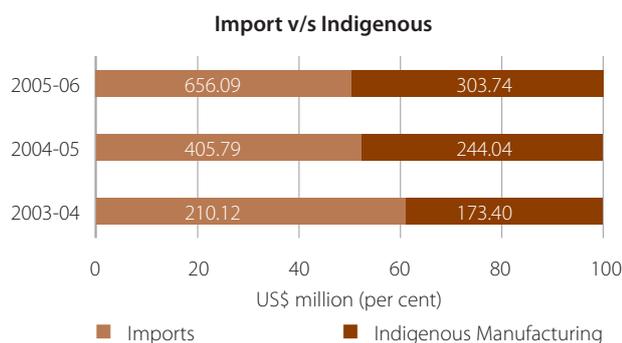
Exports of Machine Tools (Value)



Source: IMTMA, Annual Report 2005-06

Industry Consumption & Imports

The consumption of metal working tools has increased considerably, at a CAGR of 58 per cent, from US\$ 370 million in 2003-04 to US\$ 960 million in 2005-06. Domestic production has not been able to meet the demand of the domestic market and this has led to the drastic increase in imports. In the same period, while indigenous manufacturing has grown at a CAGR of 32 per cent, imports have been growing at a CAGR of 77 per cent. The machine tools sector supports the increasing demand created in the manufacturing, automotive, capital goods, consumer durables and intermediate goods sectors, etc. The increasing imports imply that India's domestic production has not kept pace with the growth in demand for machine tools, indicating a potential for investment in domestic capacity.



Source: IMTMA Annual Report, 2005-06

Sourcing

The key raw materials for the machine tools industry, such as, ferrous and non-ferrous metals, particularly steel and aluminum, are available in abundance in India. The production of iron ore was 120.6 million tonnes in 2003-04, growing at a CAGR of around 14.4 per cent, from 2000-01 to 2003-04. India is the eighth largest steel producer in the world and contributes to one-third of the global output of steel.

Supporting Industries and Institutions

Foundry and Castings

The machine tools industry requires high quality, complex castings and India has a well established foundry industry to support the sector in this regard. India is currently the sixth largest castings producer in the world, with an estimated output of more than 3 million tonnes annually. The Indian foundry industry encompasses different materials, both ferrous and non-ferrous, as well as different technologies, from traditional green sand moulding to advanced die and investment castings.

Engineering institutions

India has a well-developed technical and tertiary education infrastructure of over 250 universities, 1,500 research institutions and over 10,000 higher education centres. Institutions such as the Indian Institutes of Technology (IITs) and National Institutes of Technology (NITs), graduate thousands of qualified engineers every year. The availability of engineering and design skills is a key strength, that the

machine tools industry can leverage. Central Manufacturing Technology Institute, Bangalore has been conducting research for more appropriately designed machine tools.

User Industry & Services

Demand for machine tools accrues from manufacturers of primary and intermediate goods. The primary user industries include the automotive, capital goods and consumer durables sectors. Prominent users of machine tools in the intermediate goods sector, include auto components, ball and roller bearings and electronic components segments. Most of these segments recorded robust growth in turnover during 2005-06. The following chart indicates the contribution of the user industry segments to the machine tools sector:

User Industry Segmentation (2003)	
Automotive	35%
Consumer Durables	20%
Engineering & Capital Goods	15%
Railways	10%
Others	20%

Source: www.strategis.gc.ca; Cygnus Research

Automotive Sector

All key segments of the automotive industry have registered growth in the past few years. The automotive mission plan aims to increase the industry turnover from US\$ 35 billion to US\$ 145 billion, and exports from US\$ 4.1 billion to US\$ 35 billion by 2016. The commercial vehicles segment has been growing at about 27 per cent in terms of volume, with Light Commercial Vehicles (LCVs) growing at 28.7 per cent and Medium & Heavy Commercial Vehicles (M&HCVs) growing at 25.4 per cent in the period 2001-06. The passenger vehicles segment has registered a growth of 18 per cent in terms of volume; with cars registering 18.6 per cent growth and Multi Utility Vehicles (MUVs) registering 16 per cent growth in the period 2001-06. The projected CAGR for production of passenger vehicles in terms of volume is about 9.6 per cent and for commercial vehicles, about 10 per cent for the period 2006-14.

Several factors have contributed to the growth in India's automotive sector. These include demographic changes, such as, increasing disposable incomes and lifestyle enhancements, as well as developmental initiatives,

such as, improvement in road infrastructure and ease of car financing. With India emerging as a key sourcing destination for vehicles and components, exports have also been growing rapidly. Exports of cars and MUVs have been growing at a CAGR of 21 per cent over the period 2002-2007, two wheelers at 35 per cent, three wheelers at 43 per cent and commercial vehicles at 33 per cent.

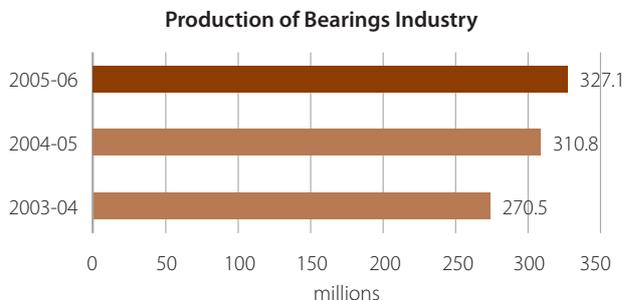
This growth has had a positive impact on the machine tools sector, as automotive manufacturers have been looking to upgrade and expand capacities. This trend is expected to continue in the future as well, with MNCs like BMW, Nissan, Renault and Audi, looking to establish themselves in the Indian market.

Intermediate Goods Sector

Prominent users of machine tools in this sector are auto components, ball and roller bearings, electrical and electronic components, industrial valves, power-driven pumps, earth moving machinery and compressors. The automobile component industry turnover crossed US\$ 15 billion in 2006 and has grown at a CAGR of 27 per cent in the period 2001-06. The expected growth in future (2006-14) is a CAGR of around 13 per cent. Exports have grown at a CAGR of 40 per cent from US\$ 760 million to US\$ 2,930 million in the period 2002-03 to 2006-07. Imports have shown similar growth, with a CAGR of 46 per cent from US\$ 740 million in 2002-03 to US\$ 3,350 million in 2006-07. As most auto component manufacturers in India are looking at an aggressive growth in export markets, exports are expected to continue growing at about 24.4 per cent CAGR in the period 2006-15.

Electronic components segment, likewise, posted a 31 per cent growth during the year 2004-05. The ball and roller bearings industry is growing because of increased

demand from the automotive industry. The bearings industry has grown at a CAGR of around 10 per cent. Following are the production details of the bearings industry in India:



Source: Indiatat

Consumer Goods Sector

The consumer goods sector grew at 10 per cent in FY 2006-07, with a growth of 10.3 per cent in consumer non-durables and 9 per cent in consumer durables segments. In the consumer durables segment, the prospect remains bullish with all key segments experiencing robust growth rates. For example, washing machines, refrigerators, colour televisions and air-conditioners have grown at CAGRs of 13.7 per cent, 23.2 per cent, 39.9 per cent, and 35.1 per cent, respectively by volume from 2002-03 to 2005-06.

Capital Goods Sector

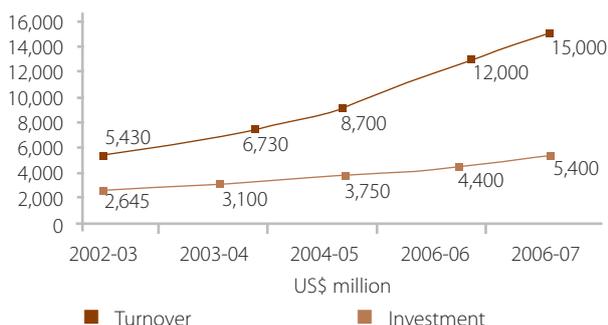
The capital goods sector has been growing at 7 per cent, largely supported by imports. As domestic capacity does not match demand, nearly 70 per cent of the sector's machine requirements are met through imports. The capital goods sector is in a growth phase, with segments such as diesel engines, electric motors, industrial furnaces, textile machinery, tractors and pumps experiencing growth rates ranging between 20 per cent to 38 per cent in the FY 2004-05.

To reduce the dependence on imports, given the sector's growth potential, many machine tool manufacturers are expected to invest significantly in expanding capacities.

CRITICAL SUCCESS FACTORS FOR MANUFACTURERS IN INDIA

The Indian machine tools sector is being shaped by a few key features that will have a significant impact on the sector's future growth. These include:

Growth of Auto Component Industry



Source: ACMA

- Increasing dominance of CNC machines: CNC machines already form the bulk of machine tools used in India and their prevalence is expected to increase as manufacturing companies focus on productivity improvements and product innovation
- User industries becoming more demanding and sophisticated Key user industries such as automobiles and auto components and consumer durables are getting more competitive and demanding. Entry of multinational players and globalisation of Indian players have led to these industries making rapid strides in technology advancement. As a result, the demands from the machine tools sector have gone up
- Domestic demand far outstripping supply: Domestic demand for machine tools is currently much higher than supply, leading to dependence on imports. With most players in the user industries looking to expand capacities, this gap could widen further

These features indicate the critical success factors, that industry players need to focus on, for achieving future success. They are discussed below:

Design and Innovation Capability

With user industries becoming more demanding, the machine tools sector faces the need to develop increasingly complex machine tools, to meet their customised requirements. At the same time, product development cycle times need to be crunched. This indicates that it is imperative for players to invest in R&D and develop robust design and innovation capabilities.

India offers a comparative advantage in this regard, over competing economies. Studies have rated India higher in terms of manufacturing capability and availability of quality engineers. This design strength gives the Indian machine tools industry a competitive advantage, in terms of special purpose machine tools. This has been recognised by the European machine tool companies, some of which are now coming forward with joint design and manufacturing projects. For example, recently a leading Swiss maker of machine tools for the aerospace industry and BFW (Bharat Fritz Werner), collaborated in the design of a 5-axis turbine blade making machine, which was manufactured in BFW's Bangalore factory.

Technology and Product Development

Having access to the latest technology is a key imperative for success in the Indian manufacturing sector. As companies look to source manufactured products from India, they expect the same level of technology and product development capability in India, that is prevalent in other global markets.

Indian machine tool manufacturers have responded to this challenge by focusing on improvement in capabilities and performance in technology, design and product development. Most machine tool manufacturers are adapting new manufacturing techniques, like TPM, TQM and Six Sigma, to deliver world class manufacturing solutions.

New products have been developed by Indian machine tool manufacturers. For e.g. HMT Machine Tools Limited, has developed a CNC profile milling machine for railway bogie structure, an axle grinding machine, and axle turning machine, a CNC filament welding machine, etc. The total amount spent on R&D for developing these new products is over US\$ 4.1 million.

Productivity Improvement and Cost Reduction

The Indian manufacturing sector is highly competitive and continuous improvement in productivity and costs is imperative for players to sustain in the global market. Indian machine tool manufacturers have been focusing on critical areas such as, reduction of idle time, increased asset utilisation; productivity through quality improvement; optimising processes; leveraging IT to increase productivity and better management of productivity through appropriate performance metrics.

GOVERNMENT POLICY AND REGULATIONS

The Indian Government has been very supportive towards the manufacturing sector, which benefits the machine tools industry as well. While the Government has instituted a series of comprehensive policies and procedures to attract investments and enable growth, some of the key highlights are as listed:

- 100 per cent FDI is allowed
- Exemption from obtaining an industrial licence to manufacture
- Manufacturers are free to select the location of the project

- Only specific items under machine tools are reserved for production by small-scale industries
- Import duties reduced to encourage imports for machine tools industry
- Encourage exports from Export Oriented Units (EOUs), Special Economic Zones (SEZs) and Export Processing Units (EPUs)
- Recognise exports as national priority, by all union and state government agencies and private sector
- Locations with high growth potential to be supported by government, to bridge technology and productivity gaps. Skills upgradation, physical infrastructure, environmental mitigation facilities to be provided by the Government, in selected areas of intervention
- Schemes similar to SEZs can be developed for export oriented units, with capital investment in plant and machinery over US\$ 6 million

Apart from the policies and schemes of the Central Government, the different State Governments in India, have each instituted state level policies to attract investments into their states. In the following sections, we have profiled some of the potential investment opportunities in India's machine tools sector and profiled some of the key states, that could be potential investment destinations.

INVESTMENT OPPORTUNITIES

The Indian machine tools sector offers several opportunities for investment. Given the current gap between demand and supply, there is a clear need for adding capacities in this sector. The industry is moving towards increasingly sophisticated CNC machines, driven by demand from key user segments, such as, automobiles and consumer durables. Machine tool manufacturers need to develop capabilities to cater to this demand and investments in this area could yield long term benefits.

At the same time, R&D and design capabilities are also gaining importance, as critical success factors for the future and this is an area that could see increased investment from Indian and global players. India is already being leveraged as a design hub by a few global automotive players and this trend could extend to other manufacturing sectors, such as, machine tools.

Several states offer attractive locations for setting up manufacturing and R&D facilities in India. In the next section, a few key states are profiled.

ATTRACTIVE STATES/LOCATIONS

The relative attractiveness of different states for the machine tools sector can be assessed on the following key parameters:

1. Presence of key user industries, which could offer easy and assured market access.
2. Availability of key factors of production – labour, supporting industries, etc.
3. Supportive Government policies.

Based on these parameters, Tamil Nadu, Maharashtra, Gujarat, Andhra Pradesh and Haryana could be potential locations for investors in this sector. Also, some states such as Uttarakhand have recently attracted manufacturing investments and could be attractive locations in the future.

A brief profile of each of the key states based on the above parameters is included in the appendix.

Conclusion

India's machine tools sector is a critical part of the overall manufacturing sector, as it provides the machinery that delivers manufacturing output and drives productivity and growth. Growth in the manufacturing sector has led to a rapid increase in demand, especially for increasingly sophisticated CNC machines. While imports have risen to meet the demand, local capacity in machine tools needs to be built to cater to long term growth.

User segments, such as, automobiles and auto components and consumer goods are the key drivers for demand. Machine tool manufacturers will need to focus on the needs of these segments and look at developing customised products. In addition, thrust on R&D and innovation would be required to maintain technological parity with global players and remain competitive. All these

factors indicate several opportunities, where new players can look to invest profitably.

Several states in India are seeking to attract investments in this industry. Among them states, such as, Tamil Nadu, Maharashtra, Gujarat, Andhra Pradesh, Karnataka, Haryana and Punjab have managed to attract sizeable investments and are key industrial hubs. Other states like Madhya Pradesh and Uttarakhand, have been focusing on this area and are emerging as attractive locations.

Players who look to succeed in the sector in the long term, need to focus on key success factors, such as, developing capacity and scale, design capability, acquiring the latest technology and managing costs through productivity improvement.

Appendix

PROFILES OF KEY STATES FOR POTENTIAL INVESTMENT

TAMIL NADU

Presence of User Industries

Tamil Nadu is the third largest economy in India and ranks amongst the first three in industrial output, number of factories and workforce employed in factories. The state is a major hub for auto components and also has large textile and foundry clusters. The state has modern agricultural facilities and supports the agricultural industry with the production of pumps, motors and other important components.

The engineering industry in the state consists of a network of nearly 3,000 units and employs a skilled workforce of more than 250,000 making high quality inputs, such as, castings and forgings and a wide variety of ancillary products. The export from engineering/machinery sector has been around US\$ 346 million and has been increasing at a CAGR of 20 per cent.

It accounts for over 20 per cent of passenger cars and 30 per cent of commercial vehicles produced in India, apart from about 35 per cent of auto components. Multinationals like Ford, Hyundai, BMW and Visteon, have located their Indian operations in Tamil Nadu.

Availability of Resources

The state has good quality manpower, high literacy rates, presence of good education and vocational training institutions. It has over 250 engineering colleges, including the renowned Indian Institute of Technology and Anna University in Chennai and the National Institute of Technology, in Trichy. These produce over 77,000 engineers each year. It has adequate power, a well developed road

network a major port in Chennai and several minor ports. It also has a good communication network and high quality healthcare facilities.

Supportive Government Policies

The State Government is focused on attracting FDI to support the state economy to grow at 8 per cent. To achieve this aim, it is focusing on infrastructure development, power generation, labour law reforms and fiscal reforms. It has instituted a series of incentives for different kinds and sizes of investments. Some of the key incentives include:

- Slab-wise subsidies and exemption from Electricity Tax, for investments exceeding US\$ 12.5 million
- One-time reimbursement of patent registration
- Critical infrastructure subsidy for setting up effluent treatment/waste disposal plants
- Back-end subsidy claim of 10 per cent of investment for approved industrial parks, with over 50 units and employing at least 2,500 people

The state also has a comprehensive SEZ policy, to promote investment in special economic zones.

MAHARASHTRA

Presence of User Industries

Engineering, automobiles and textiles are among the key industries in the state. The state accounts for around 22 per cent of India's value add in the industrial sector and 38 per cent of the country's output of automobiles, by value. It has established manufacturers in automobiles and auto components. The state also contributes around 23.1 per cent to the country's total engineering output. The contribution of exports from the state has been substantial.

Availability of Resources

The state has a diversified and productive industrial workforce, with a positive work culture. It is the home of institutions like C-DAC, Indian Institute of Technology and several top ranked institutes of management studies. It has 616 industrial training institutes, that churn out more than 160,000 technicians each year.

Maharashtra has abundant power to support industrial growth, with an installed power generation capacity of more than 14,000 MW. Mumbai, the state's capital, is also India's financial capital- nearly 70 per cent of India's stock transactions happen in Mumbai.

Supportive Government Policies

The State Government has implemented several policies for supporting industrial investment and growth. The state has been focusing on development of Special Economic Zones and Special Industrial Areas, to attract investment. It also offers several tax exemptions/refund for specific industries and has progressive policies on labour management, infrastructure development and captive power, making it one of the most attractive states for investment in India.

ANDHRA PRADESH

Presence of User Industries

Many global players, like Tecumseh, BPL, Electrolux, among others, have established their manufacturing facilities in the state. The automobile sector is one of the emerging sectors in the state, with more than 20 auto-component manufacturing companies. M&M has a modern facility with a capacity of over 10,000 units per annum. In addition, Chennai and Hosur/Bangalore- two key hubs for the automotive sector in India, are located in neighbouring states and are easily accessible.

Exports from the engineering sector stood at US\$ 237 million in 2002-03. Andhra Pradesh is the largest compressor manufacturing centre in the country. The state ranks second in the number of industrial estates in the country. The contribution of exports of machinery has been around US\$ 35 million, which has grown at CAGR of around 50 per cent.

Availability of Resources

The state has been performing well in the engineering industry, producing a range of intermediate and final goods such as foundry and forging items, machine tools, auto components, testing machines, material handling equipment and components for defense production. Andhra Pradesh promises good quality manpower with high literacy rates, supported by good education and vocational training institutions.

Supportive Government Policies

The state is keen on encouraging private sector participation in improving R&D infrastructure. It also promises to offer 100 per cent reimbursement of Stamp Duty and Transfer Duty paid by the industry on purchase of land meant for industrial use, for small-scale and tiny industries. It gives 100 per cent reimbursement of Stamp Duty for lease of land/shed/buildings. There is 100 per cent reimbursement of Stamp Duty and Transfer Duty paid by industry on financial deeds and mortgages. The Government extends tailor made benefits to suit particular investment of mega scale, i.e. more than US\$ 22.2 million requirements, on a case to case basis.

GUJARAT

Presence of User Industries

Gujarat is home to several discrete and process manufacturing industries, including oil refineries, pharmaceuticals, textiles and automotive. Pune, a key automotive and manufacturing hub, is also close to the state and easily accessible.

Availability of Resources

The state offers quality manpower and infrastructure facilities, such as, power, water supply, ports and gas grid. Along with a number of engineering colleges and training institutes, Gujarat is home to a few renowned institutions of higher learning, including the Indian Institute of Management in Ahmedabad and National Institute of Design.

Supportive Government Policies

The State Government has been proactive in supporting industry and attracting investments. The state accounted for around 7 per cent of total FDI approvals in India till 2004. This has encouraged many multi national companies to set up manufacturing operations in this state.

OTHER POTENTIAL STATES

HARYANA

Haryana is another key automotive hub in India. The state produces half of the two-wheelers and passenger cars in the country with around 20 per cent of the workforce in the state engaged in the automotive sector. Gurgaon and Faridabad are among the major automobile centres. The state has established manufacturers in the automobiles and auto components sector. In Haryana, auto component suppliers are increasing their base. The state also has small and medium enterprises in textile and garment manufacturing. In the past, the state has attracted investments in textile & apparel, manufacturing and machinery & equipment.

KARNATAKA

The state has good man-power, high literacy rates, good research organisations and some of the best academic institutions which ensure well qualified manpower. The engineering and automotive sectors are attractive in this state. The proactive policies along with capability and natural resources drive attractiveness for these sectors. The state has sizable presence in readymade garments and textiles, automotive and engineering sectors. The investments in the engineering and hardware sector in this state have been the highest compared to other sectors.

MADHYA PRADESH

The state is an attractive destination for automobile and auto components industry. It has immense production facilities for a number of automobile manufacturers. Most of the plants in this state have an established network of vendors, supplying auto components.

PUNJAB

The state has a good textile industry base. The other strong sectors in the state are; light engineering goods, which include bicycle and its parts, tractors, auto components, and hand tool industries. The export from the state is largely concentrated on yarn and textiles, engineering goods, cycle and its parts. The manufacturing sector (including textiles and chemicals) has received the major part of the investments.

UTTARAKHAND

The state is into manufacturing various things like machinery, equipment, rubber and plastic products, paper and paper products, chemicals and chemical products, electrical machinery and apparatus and others. The contribution of machinery and equipment manufacturing to the total is around 33 per cent. The state is also famous for its traditional industries of handicrafts, handloom etc. It has a huge potential for hydel power generation. Big companies like M & M have invested in the state for its three wheeler manufacturing base. The state is also host for the biggest manufacturing facility base for air conditioners.

KEY PLAYERS

Asea Brown Boveri Limited (ABB)

ABB India was incorporated in 1949 as Hindustan Electric Company Limited. In 1965, the company's name was changed to Hindustan Brown Boveri Limited (HBB). It became a subsidiary of ABB Ltd.– Zurich in 1989. The parent company is a leader in automation & power technologies. The company operates in around 100 countries and employs more than 120,000 people. The company had net sales and other income of US\$ 984 million in 2006 and had retained earnings of US\$ 66 million in 2006. ABB India caters to the power industry and has vast installed base, extensive local manufacturing in 8 units and a nationwide marketing and service presence. ABB has set up a global R&D centre in Bangalore, to leverage India's intrinsic technology strengths and vast pool of highly qualified software professionals.

HMT Limited

HMT Ltd., was incorporated in 1953 by the Government of India, as a machine tool manufacturing company. HMT has diversified into watches, tractors, printing machinery, metal forming presses and others over the years. HMT has collaborated in all product groups with world-class manufacturers and also has an in-house R&D. It comprises of six subsidiaries under the ambit of a holding company, which also manages the tractors business directly.

Siemens

Siemens Ltd. is under the flagship of Siemens Group in India. Siemens AG, the parent company holds 54.63 per cent in Siemens Ltd. The company was incorporated in the year 1957. The company is into power generation and distribution equipment, industrial projects and equipment, transportation systems, communication and healthcare products. It has 5 plant locations. The sales for the FY 2003-04 were around US\$ 413 million and the cash profit was around US\$ 38 million.

Larsen & Toubro (L&T)

L&T is India's largest engineering and construction conglomerate with additional interests in IT and electrical business. The four major segments of L&T are Engineering & Construction, Cement, Electrical & Electronics and diversified business. It has 19 subsidiaries. The company had an income of around US\$ 4000 million for the FY 2006-07 and the net profit after tax was around US\$ 450 million.

Bharat Heavy Electrical Ltd. (BHEL)

The company is a public sector enterprise and was incorporated in 1964. It caters to power generation and distribution equipment needs of the country. BHEL today is a major single point supplier of all systems and equipment required in the power sector. It has 14 manufacturing plants, 8 service centres and 4 power sector regional centres besides project sites and regional offices spread all over India and abroad. The company has taken several steps to enter into new business areas where its existing infrastructure, skills and capabilities can be most gainfully utilised. It registered a turnover of US\$ 3,288 million for the

FY 2005-06 and the profit after tax for the same period was US\$ 380 million.

Crompton Greaves

Crompton Greaves Ltd. is part of the B.M. Thapar Group. The company is India's largest private sector enterprise in the business of electrical engineering. The products produced by the company are – power systems, industrial systems, consumer products, and digital products. It has plants in 5 locations. The company registered an operating revenue of US\$ 1,316 million for FY'06-07, which is 37 per cent more than the previous year. The profit after tax for FY'06-07 was around US\$ 62.5 million registering around 21 per cent increment over the previous year.

Cummins India Limited

Cummins India manufactures a variety of engines operating on diesel, natural gas & dual fuel. The applications of these are in power generation, construction & mining, compressors, automotives, fire pumps & cranes, etc. The company has 5 plant locations. The sales in FY'03-04 were US\$ 220.26 million and the company earned cash profit of US\$ 29.7 million.

Kirloskar Oil Engines

The company has 5 manufacturing plants. It is the leader in engines, engine bearings, valves, diesel generating sets, etc. The company's engines are preferred choice when it comes to agricultural machinery, construction & material handling equipments, marine applications and military. The company registered sales income of US\$ 446 million in FY' 06-07. It has around 2,000 employees working in its manufacturing plants.

Elgi Equipments

The company is a market leader in air compressors and automobile service station equipment. The company's products have wide applications. They are used in mining, defence, transport, pharmaceuticals, power, oil, etc. It has 2 manufacturing units in India. The total income in FY'06-07 was US\$ 85 million and the profit available for appropriation was US\$ 14.5 million.

Bharat Fritz Werner Limited (BFW)

BFW was incorporated in the year 1961. The company had a turnover of US\$ 61 million in FY'06-07. Some of the customers of BFW are Automotive Axles, Bharat Forge, L&T Komatsu, M&M, Rane, Maruti Udyog, JCB India and others. The company is the largest machine tool manufacturer in the private sector. The company has German collaboration. The head office is in Bangalore and there are regional offices in 7 locations in India. The company specialises in horizontal and vertical machining centres, CNC milling machines and special purpose machines.

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Exchange Rate Used

Year	Exchange Rate (INR/US\$)
2000-01	45.75
2001-02	47.73
2002-03	48.42
2003-04	45.95
2004-05	44.87
2005-06	44.09
2006-07	45.11

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