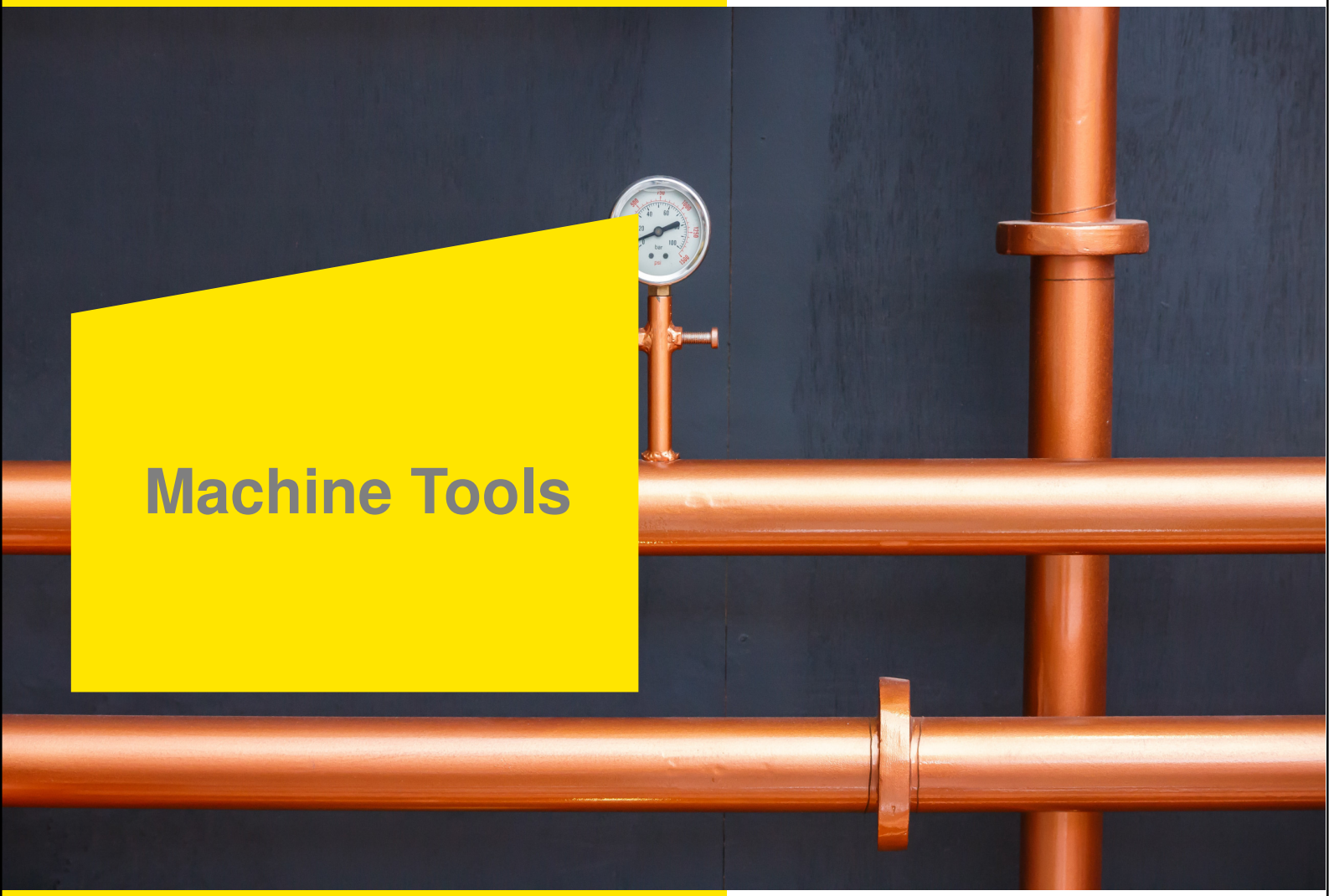
GOVERNMENT OF KARNATAKA



Machine Tools

EY
Building a better working world

Global Machine Tools Industry

Engineering Industry

Engineering industry primarily deals with the design, manufacture & operation of structures, machines or devices. Engineering industry primarily comprise of civil, industrial, mechanical and chemical sectors

Heavy Engineering

Heavy Electrical

1. Boilers – large scale
2. Turbines and generator sets
3. Transformers
4. Switchgear and control gear

Heavy engineering & machine tools

1. Material handling equipment
2. Process plant equipment
3. Earth moving & construction equipment
4. Machine Tools
5. Textile Machinery

Automotive

1. Passenger and utility vehicles
2. Auto Components
3. Agriculture machinery

Light Engineering

Low technology products

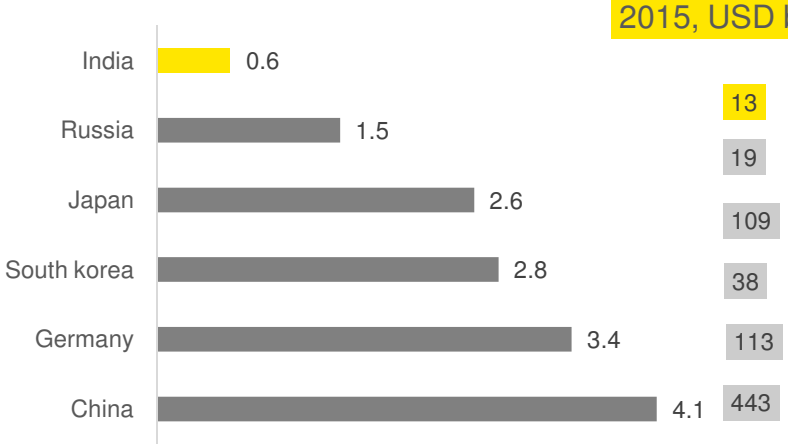
1. Casting and forging
2. Industrial fasteners
3. Miscellaneous engineering products like pumps, motors etc.
4. Roller bearings

High technology products

1. Medical and surgical equipment
2. Process control instruments
3. Domestic appliances
4. Electronics

Countries such as China, South Korea and Germany, contribution of manufacturing value added ranges between 20-30% while India's share of of global manufacturing value added is ~2%

Contribution of Capital Goods sector to GDP 2015, percent



Total value-add by capital goods sector 2015, USD billion

Source: http://dhi.nic.in/writereaddata/Content/NationalCapitalGoodsPolicy2016.pdf

http://ficci.in/spdocument/20790/Accelrating_Growth.pdf

Machine tools are used to cut and shape metals, & other materials to produce a diverse range of products, such as automotive components, industrial machinery and consumer durables

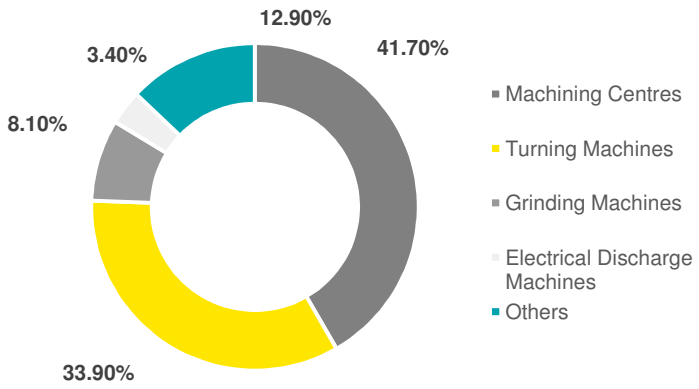
Global machine tools market

- Expected to exceed USD120 billion by 2020
- Large demand from downstream is Machinery Manufacturing, Aerospace & Defense, Automobile industry and other industries

Trends of the machine tool sector:

- Combining additive manufacturing with machine tools
- Integrate metal 3D printing technology
- Technological advancements
- Surge in automation

Category-wise Machine Tools Sector Share



Source: https://www.reuters.com/brandfeatures/venture-capital/article?id=82472

Top 10 Global Machine Tool Consumers (USD Mn.)

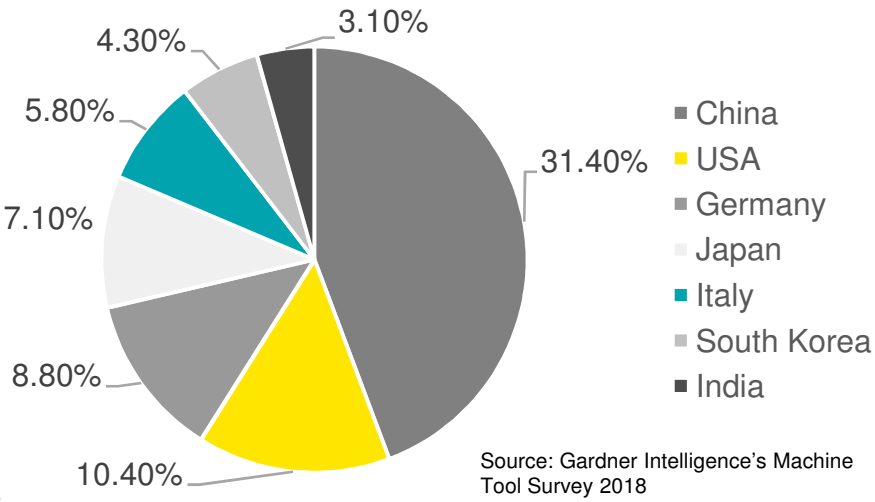
China	28,840
USA	9,579
Germany	8,114
Japan	6,538
Italy	5,363
South Korea	3,942
India	2,883
Mexico	2,273
Taiwan	2,095
Russia	1,807

Source: Gardner Intelligence's Machine Tool Survey 2018

CHINA

- World's largest machine tools industry
- Consumption in 2017: USD 29.8 bn. (7.5% increase)
- Also consumes about 40 % of the total global production.

Top Global Machine Tool Consumers : Global Share



Source: Gardner Intelligence's Machine Tool Survey 2018

Global Machine Tool in 2018:

- Production stood at USD 94.7 bn, an increase of 4.7%
- Production 4th highest in real dollars
- The top 15 producing countries accounted for 93% of overall production
- 13 out of the top 15 increased their production
- Top 5 producing countries—China, Germany, Japan, Italy and the United States—produce more than 70% of all machine tools.

Top 10 Global Machine Tool Producers (USD Mn.)

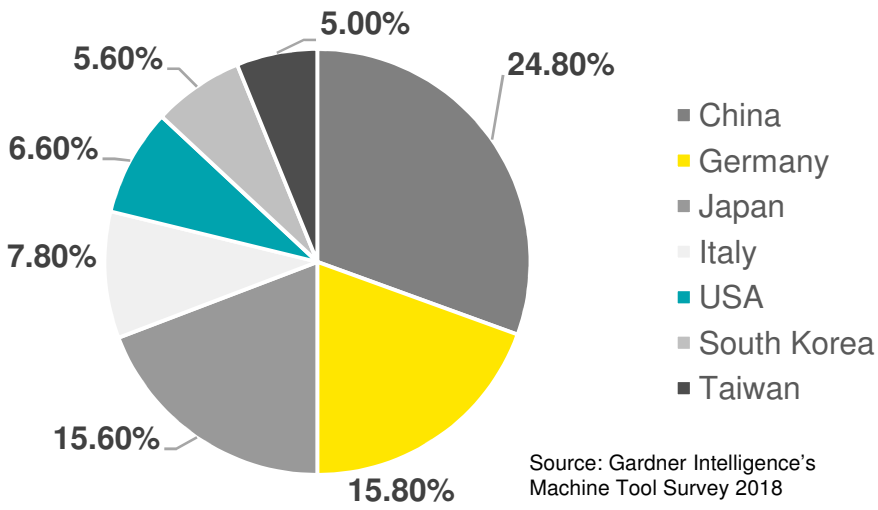
China	23,460
Germany	14,987
Japan	14,765
Italy	7,381
USA	6,220
South Korea	5,287
Taiwan	4,700
Switzerland	3,850
India	1,365
Spain	1,350

Source: Gardner Intelligence's Machine Tool Survey 2018

CHINA

- World's largest producer
- Produced USD 23.5 bn of machine tools
- Production declined by 6.5%
- Global production share below 2% for the first time since 2008.

Top Global Machine Tool Producers : Global Share



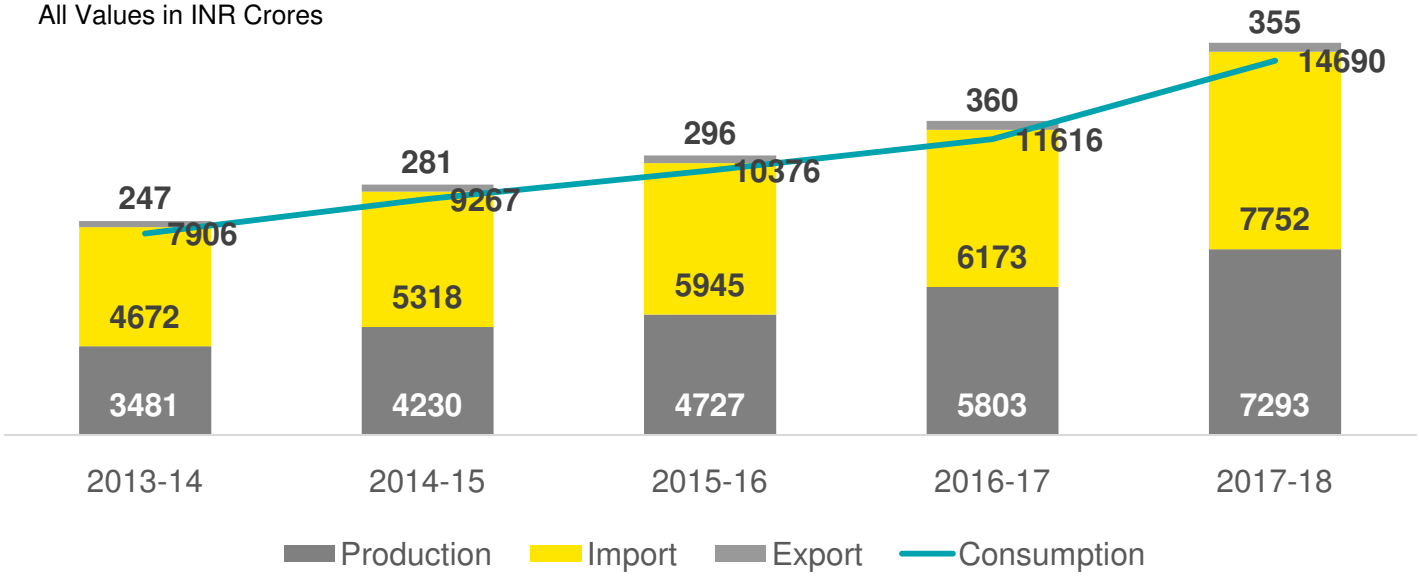
Source: Gardner Intelligence's Machine Tool Survey 2018

Source: https://www.mmsonline.com/blog/post/the-global-machine-tool-boom-continues-except-in-china

Machine Tools Industry in India

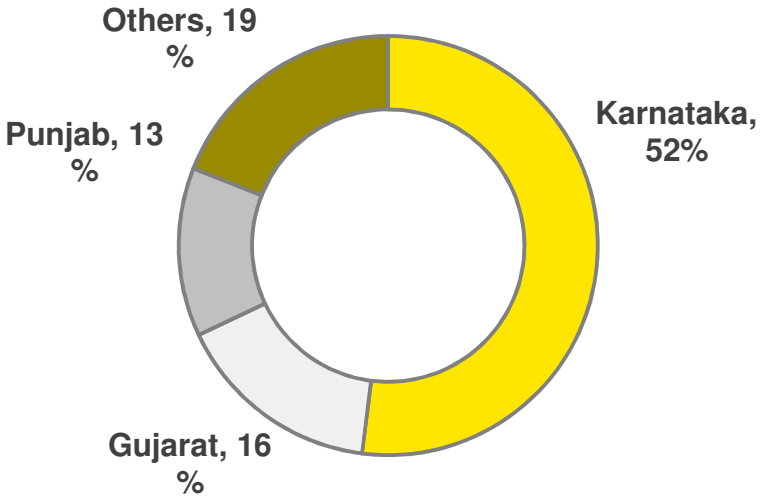
- **India is the 9th largest manufacturer (12th in 2017) & 7th largest consumer (8th in 2017) of machine tools in the world as per Gardner's world machine tool survey report 2018.**
- **Nearly 200 manufacturers in the organised sector along with 400 SSI units**
- **Production of machine tools grew 25.7% y-o-y to UDS 1.13 bn in 2017-18**
- **Exports reached USD 55.08 mn in 2017-18**
- **As per IMTMA estimates for 29018-19: Production: Rs. 9613 Cr. & consumption: Rs. 20,161 Cr.**
- **For 2019-20, production is estimated to grow by 25% and consumption by 20%**

Indian Machine Tool Industry 2013-14 to 2017-18

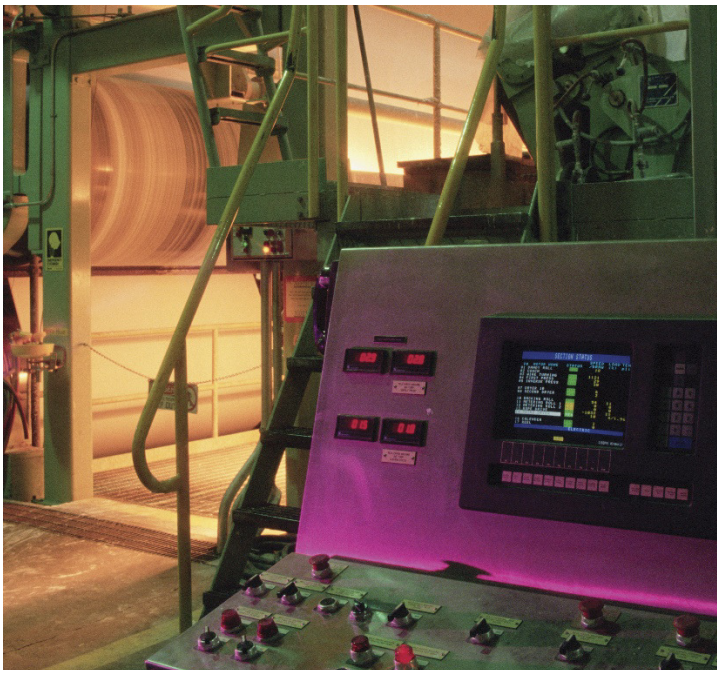


Source: Indian Machine Tool Manufacturers' Association

Major Machine Tools Producing States 2018-19

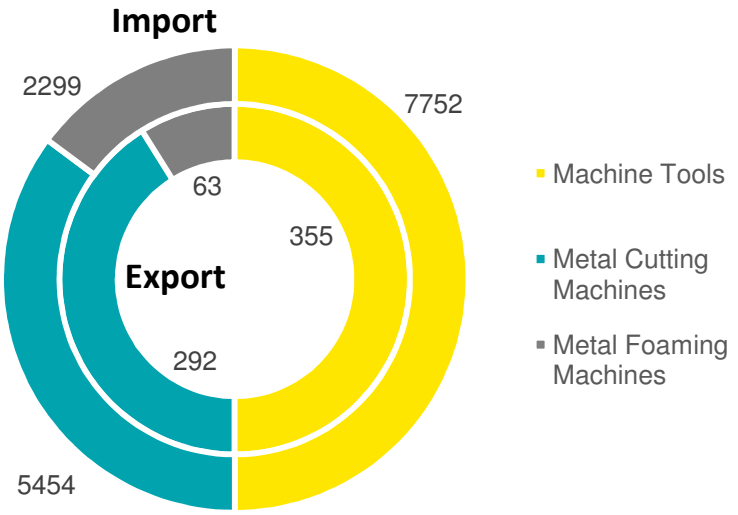


Source: IMTMA



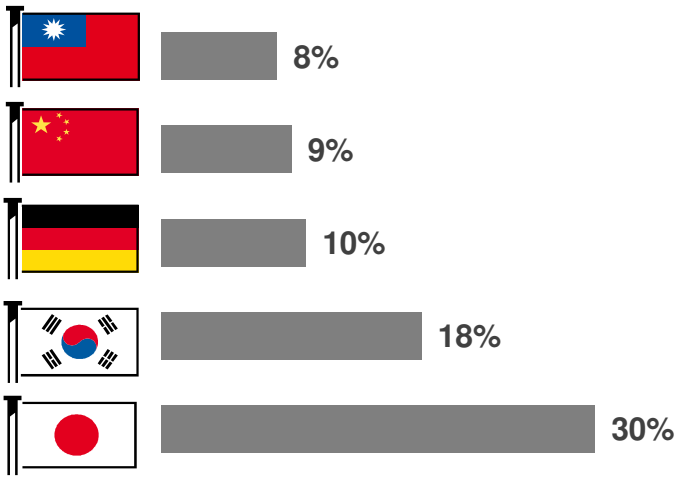
Source: Makeinindia, Department Of Electronics, TechSci Research

Export Scenario 2018-19



Source: https://www.imtma.in/page/29

Import Shares in % of Top 5 Nations



Source: IMTMA. Based on Compiled import data for FY2018-19 is available from April to December, 2018

Key Players

Source: IMTMA

Policy Initiatives by Government of India

Enhancement of Competitiveness in the Indian Capital Goods Sector : Scheme by Department of Heavy Industry

1

Advanced Center of Excellence

- One time grant-in-aid (not equity) not exceeding 80% of the project cost subject to maximum of INR 100 Crore for each Center of Excellence proposed to be set up at the institute. Balance will be released linked to milestone achieved as per the MoU.

2

Integrated Industrial Facilities for Machine Tool Industry and Other Sub -Sectors of the Capital Goods Sector

- One time grant-in-aid (not equity) not exceeding 80% of the project cost subject to maximum of INR 125 Crore. Finances will be release linked to milestones achieved as per the MoU

3

Common Engineering Facility Centers (CFFC) for Sub-Sectors of Capital Goods Industry

- Central Assistance will be by way of one time grant-in-aid(not equity) not exceeding 80% of the project cost subject to maximum of INR 48.96 Crore for two Common Engineering Facility Center (INR 30 Crore maximum in one case). Balance will be required to be invested by the SPV.

4

Test & Certification Center for Moving Machinery

- Central assistance will be INR 100 Crore from DHI during the Pilot phase

5

Common Engineering Facility Centers (CFFC) for Sub-Sectors of Capital Goods Industry

- Central Assistance will be by way of one time grant-in-aid(not equity) not exceeding 80% of the project cost subject to maximum of INR 48.96 Crore for two Common Engineering Facility Center (INR 30 Crore maximum in one case). Balance will be required to be invested by the SPV.

Machine Tool Industry in Karnataka

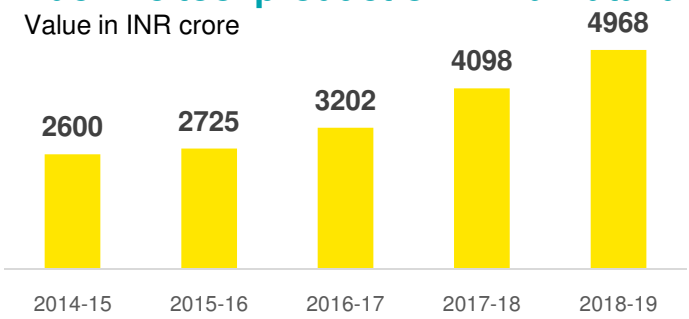
Karnataka's Unique Advantages

State's ecosystem & synergistic effect with other industries

- Congenial ecosystem for heavy engineering manufacturing including PSUs, MNCs and MSMEs
- Karnataka specializes in producing high value engineering products
- Home to one of the five identified foundry clusters in the country
- Further potential for heavy electrical machinery manufacturing due to capacity addition plans of the State Government
- Good connectivity to the largest national and global markets
- Direct employment generated by heavy engineering sector in Karnataka – 90K

Machine tool production in Karnataka

Value in INR crore



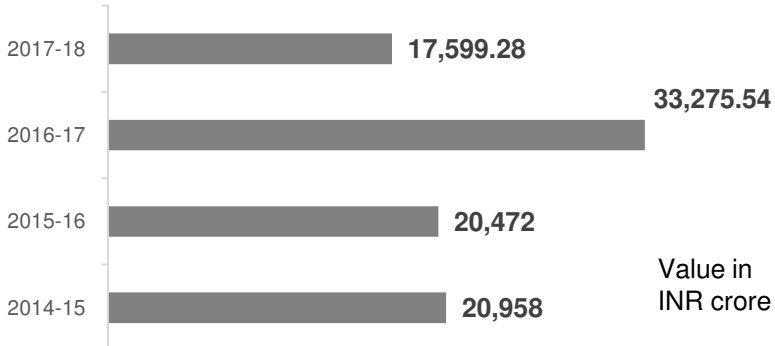
Source: IMTMA

3rd highest contributing state to heavy engineering industry in India

52% of India's machine tools production happens in Karnataka

Exports

- Share in Karnataka's exports in 2016-17 that is 62%
- Majorly exported to Germany, China, South Korea, Brazil, USA, Malaysia, Thailand, South Africa, Singapore

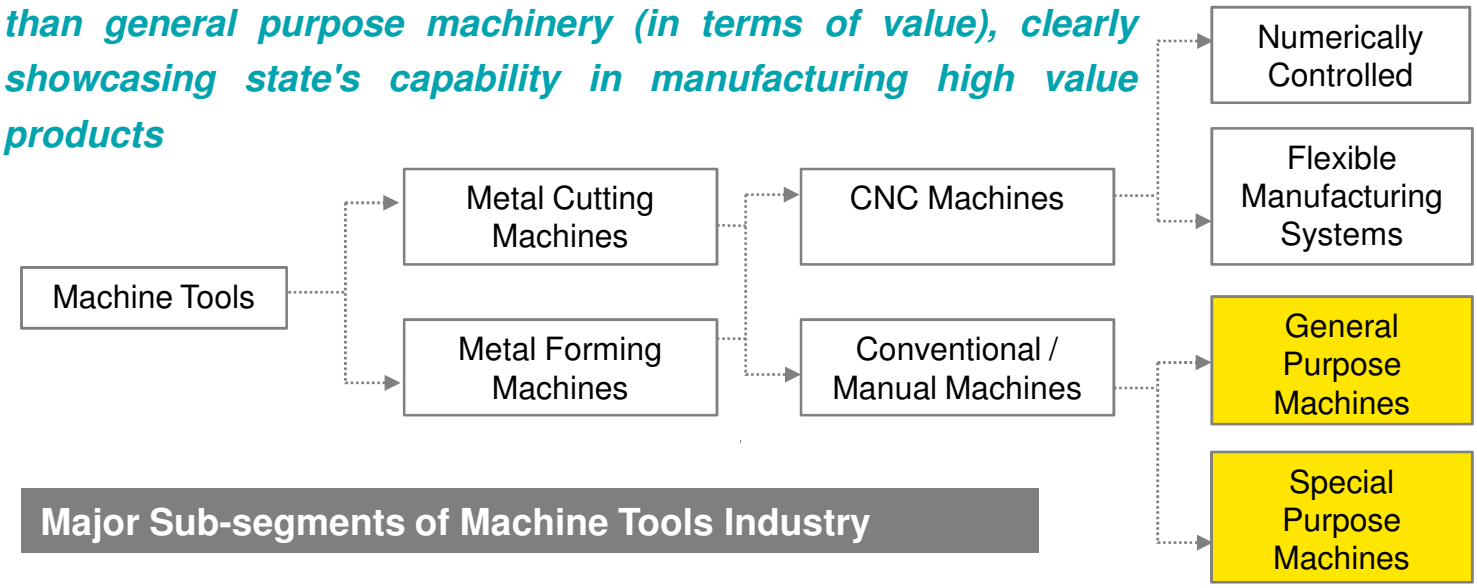


Source: Economic Survey of Karnataka 2017-18, https://www.vtpckarnataka.gov.in/engineering_sector_aerospace_automobile_and_machine%20tools.php

Machine Tools in Karnataka

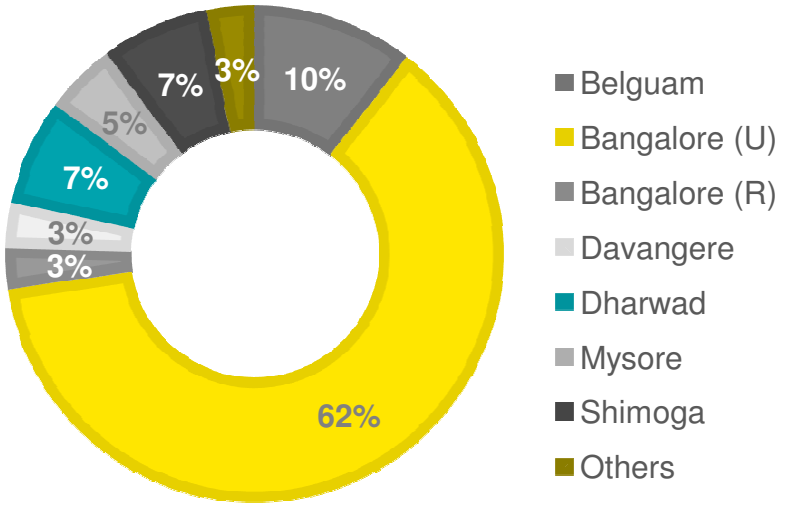
- **Second highest producer of Special Purpose Machinery and Heavy Electrical Machinery in the country**

Karnataka is the only state among the top five capital goods producing states to produce more special purpose machinery than general purpose machinery (in terms of value), clearly showcasing state's capability in manufacturing high value products

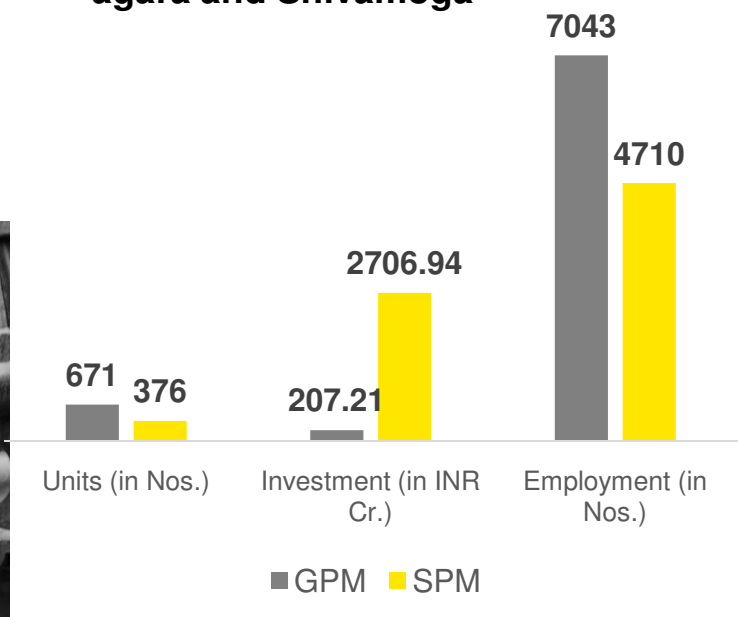


Major Sub-segments of Machine Tools Industry

District Wise Investment of GPM Industries In Karnataka, 2007-08 to 2017-18



Bengaluru Urban has 95% of total Karnataka's investment in SPM industry followed by other districts of Bengaluru Rural, Dharwad, Mysore, Raman agara and Shivamoga



Registration of GPM & SPM Industries In Karnataka, 2007-08 to 2017-18

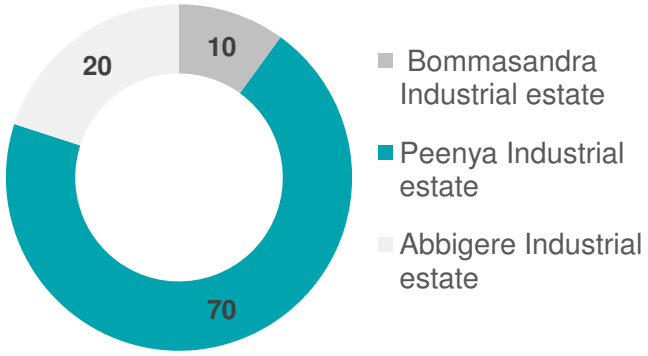
Source: Economic Survey of Karnataka 2017-18
http://sameeeksha.org/pdf/dpr/Bangalore_Machine.pdf

Bengaluru Machine Tools Cluster

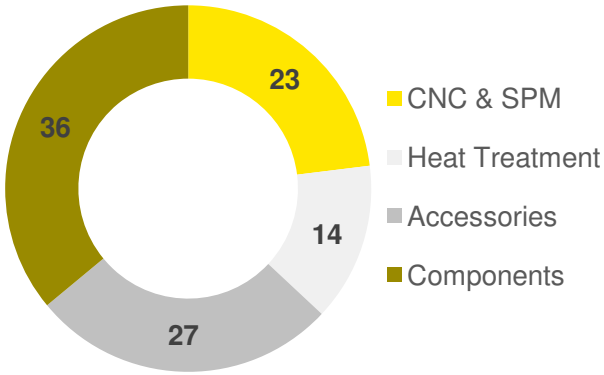
HMT Machine Tools Limited

The **establishment of Hindustan Machine Tools Ltd in 1953 at Bangalore** gave thrust to develop the machine tool sector through collaborations with several reputed manufacturers from Switzerland, Germany, France, Italy and the United Kingdom apart from setting up its own in house Research and Development centre.

Catering to different sectors such as automobile industry, aerospace industry, and CNC Machine industry



Distribution of Machine Tools Industry in Bengaluru (in %)



Product-wise Classification in Bengaluru Cluster (in %)

Karnataka is the leading state in Machine Tools industry with Bangalore is alone producing 60% (in terms of value) of the machine tools in the country

Products are custom made to suit the requirements of OEMs like ISRO,HAL, BEML,MICO,BHEL, Kirloskar Electric, Bayforge Ltd etc

Source; http://sameeeksha.org/pdf/dpr/Bangalore_Machine.pdf

Other Engineering Industries of Karnataka

Precision Tools

- The Precision Tools industry basically caters to engineering, watch, electronics & automobile industry
- Several precision tool units are in Peenya & Bommasandra Industrial Estate in Bengaluru, besides Belagavi
- Aerospace segment occupies a major share
- Leading Players: Goodrich, Dynamatic Technologies, Nasmyth India, Titan, Progressive Ultrasonics

Foundry Industry

•Valuation of foundry industry in Karnataka – 10.4 bn in USD

•Karnataka's foundry cluster concentrated in Belagavi and Shivamogga

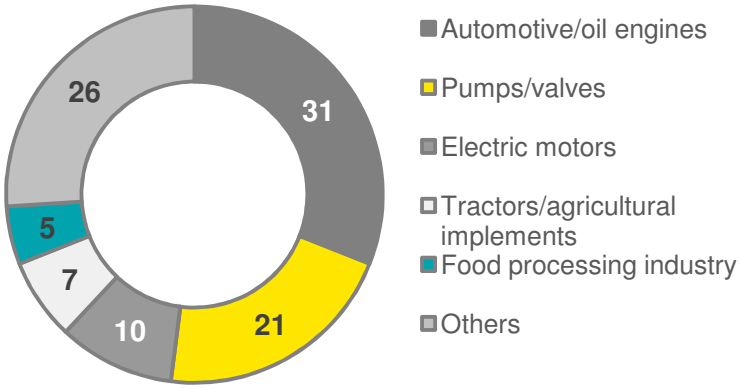
Belagavi

- Belagavi is one of the 5 identified foundry clusters in India with about 160 units
- Estimated turnover INR 20 bn. p.a.
- The geographical spread of the cluster includes Udyambag, Belgaum Manufacturers Cooperative Industrial Estate Limited and Macche industrial areas

Shivammoga

- 45 foundries and associated units producing around 50,000 tonnes of castings every year
- Total annual turnover: INR 650 crores, out of which 12.5% is coming from exports
- Major castings buyer from cluter are Cummins, Kirloskar, KSB, BEML, Godrej, Es corts, Emerson, etc.

Distribution (%) of foundry units by end use market



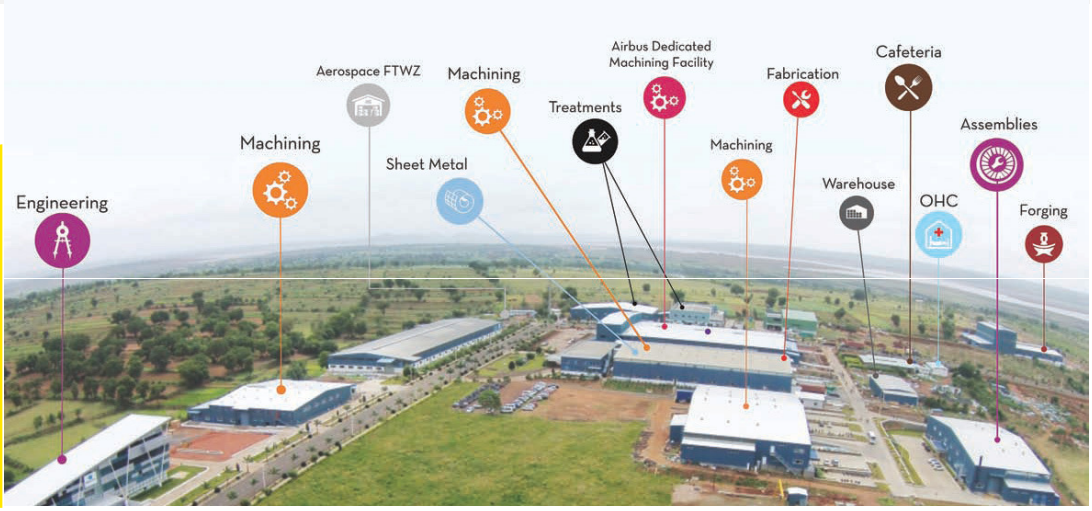
Government also plans to set up Foundry Cluster at Dobbspet (between Bangalore & Tumakuru)

Source: http://sameeeksha.org/pdf/clusterprofile/Belgaum_Foundries_Karnataka.pdf
http://metalworld.co.in/focus0107.pdf
http://dcmsme.gov.in/dips/DIPBelgaum.pdf
http://sameeeksha.org/pdf/clusterprofile/Shimoga-Foundries-Karnataka.pdf
https://www.thehindubusinessline.com/economy/policy/karnataka-govt-plans-to-set-up-foundry-cluster-at-dobbspet/article20404851.ece

Driving Growth: Infrastructure Support

- Formally inaugurated in November 2009 to focus on aerospace components and sub-systems by building a precision engineering and manufacturing end-to-end eco-system (supply chain cluster)
- AEQUS has established India's first precision engineering SEZ at Belagavi, Karnataka
- Spread over 300 acres and currently houses an engineering services facility, a precision machining facility and a sheet metal facility propose to expand the SEZ in 500 acres of Land

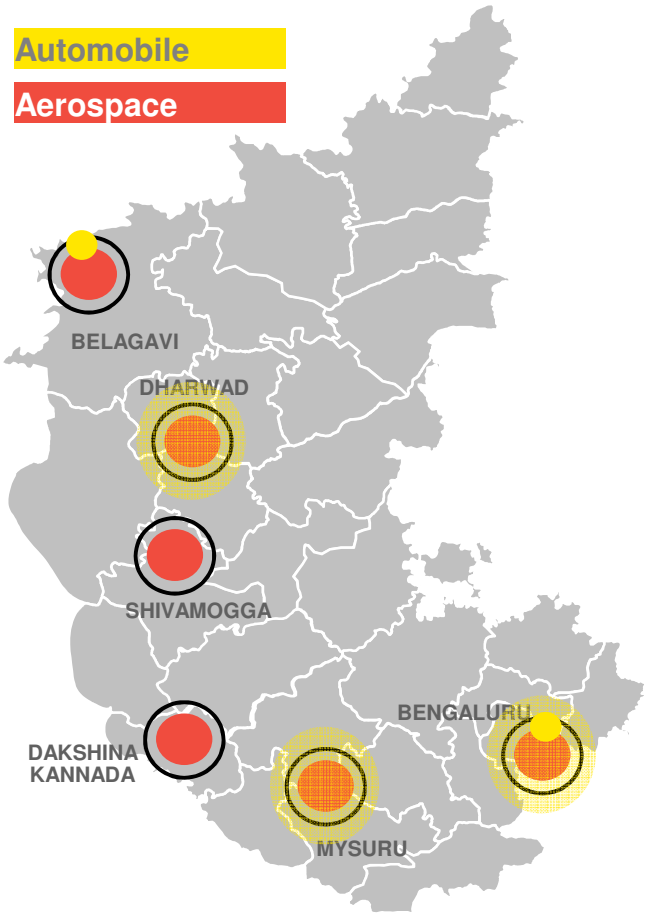
Global Precision Engineering SEZ in Belagavi

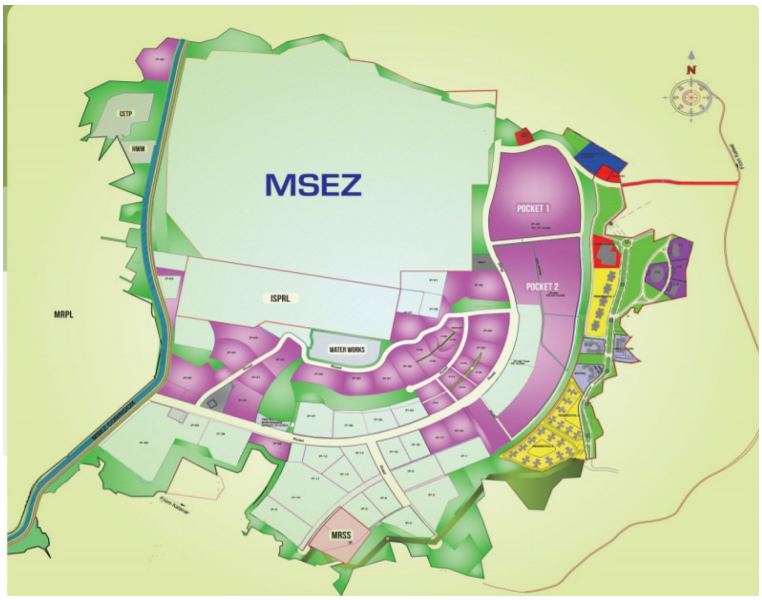


Global Engineering SEZ at Mangaluru

- Integrated industrial development consisting of – Multi Product SEZ –
  - Robust infrastructure with plug & play facility – Planned social infra
  - 14 Kms from Mangalore city center
- 1620 acres project
- Connected to 3 National Highways & 3 railway stations
- International Airport with direct connectivity to Middle East

Heavy Engineering industries are mainly concentrated near the clusters of end users

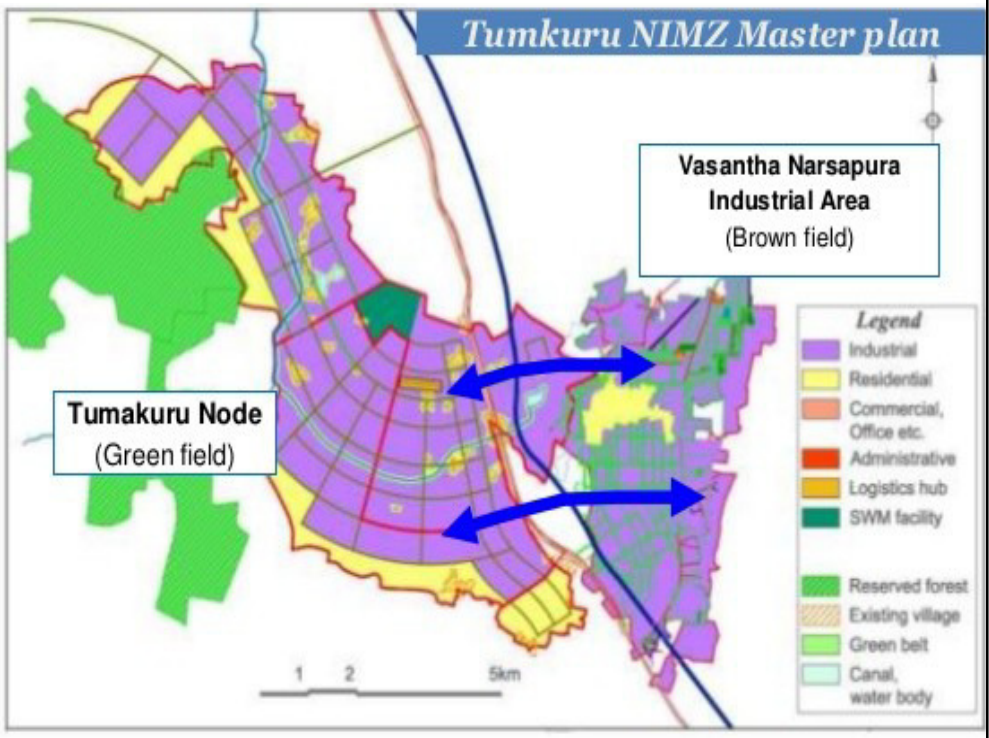


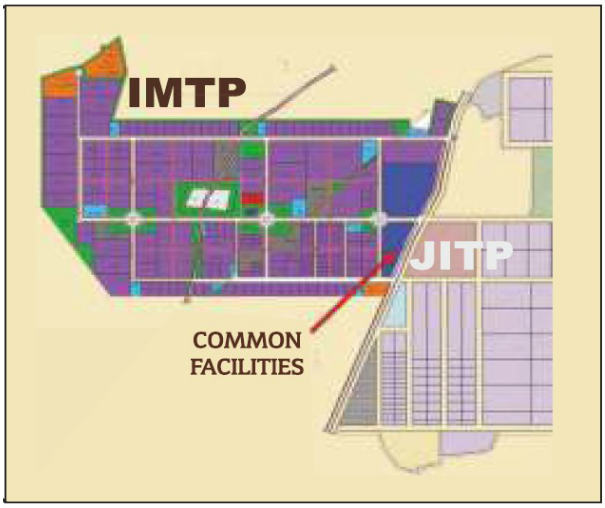


Driving Growth: Infrastructure Support

India's first Integrated Machine Tool Industry Park was set up by India Machine Tools Manufacturing Association at Vasanthanarasapura, Tumakuru District in 540 acres

- National Investment & Manufacturing Zone (NIMZ) to be developed at Vasanthanarasapura and Sira Talukas, Tumakuru District
- 14,191 acres of land identified
- Potential sectors- Electronics, auto components, food processing
- Development of World Class Japanese Industrial Township at phase-3 in NIMZ, Tumakuru





The Japan International Tech Park (JITP) is being developed with following common facilities:

- Common Engineering Facility Centre
- Test & Certification Centre
- Offices of Government organizations, regulatory agencies, and Banks
- Technical centre for training, seminars/conferences
- Fire station, fuel station, police outpost, post office/courier service
- Commercial establishments

Karnataka is home to two Industrial Corridors with provision for state of art common facilities and enhanced connectivity infrastructure

- **Chennai Bangalore Industrial Corridor – Tumakuru**
- **Bangalore Mumbai Economic Corridor – Chitradurga, Dharwad & Tumakuru**

Driving Growth: Government Initiatives

Karnataka Industrial Policy 2014-19 - Incentives and Concessions

1

Ultra mega enterprises: Focused Manufacturing
(Aerospace, Automotive and Machine tools)

- Investment INR 500 Cr to 1000 cr
- Employment 400 to 800, minimum direct employment criteria is linked to the amount of investment

Interest Free Loan

Zone	Loan amount	No. of years	Maximum	Repayment
HK – 1 and HK – 2	100 % of GSt	13/14	95 to 100% eligible fixed assets	After 10 years of each respective year
Other zones	100% of GST	11/13	75 to 90% of eligible fixed assets	

Electricity Duty Exemption

Zone	Period of Exemption
HK – 1 and HK – 2	10 & 9 years
Other zones	7 to 9 years

Stamp duty : exemption in respect of loan agreements, for lease deeds etc. – 75 – 100% depending upon the zone in which the unit is set up

2

Super mega enterprises: Focused Manufacturing
(Aerospace, Automotive and Machine tools)

- Investment : 1000 cr above
- Employment : 800 & above, minimum direct employment criteria is linked to the amount of investment

Interest Free Loan

Zone	Loan amount	No. of years	Maximum	Repayment
HK – 1 and HK – 2	100 % of GSt	15/16	100% eligible fixed assets	After 10 years of each respective year
Other zones	100% of GST	12/14	80 to 100% of eligible fixed assets	

Electricity Duty Exemption

Zone	Period of Exemption
HK – 1 and HK – 2	10 & 9 years
Other zones	7 to 9 years

Stamp duty : exemption in respect of loan agreements, for lease deeds etc. – 75 – 100% depending upon the zone in which the unit is set up

Other Government Initiatives

Karnataka Industrial Policy 2014-19

3 Machine Tool Sector

- To promote an exclusive machine tool park in the State either through KIADB or on a PPP module
- It is proposed to set up a machine tools focused technology incubation centre in the State in association with the industry on a PPP mode
- Skill Development Corporation, Karnataka will offer special tailor made courses in consultation with the user industry to support creation of skilled employable workforce for the machine tools industry
- Upgrading of existing tool rooms and creation of new tool rooms in PPP mode will also be explored

4 Engineering Sector (Automobile, Aerospace & Precision Tools)

- Establishment of R & D and testing facilities would be encouraged at Bangalore, Mysore, Hubli, Dharwad and Belgaum
- Free Trade Warehousing Zone (FTWZ) for the engineering sector including Automobile, Aerospace & Precision Tools would be encouraged through PPP mode

5 Policy Climate for MSME

- Infrastructure Support through earmarking of land for MSMEs in industrial areas
- Financial support for commercial lending through regional banks
- Technical Support for Technology Upgradation
- Marketing support for participation in local & international trade events
- Cluster Development approach for development of entire value chain
- Other incentives and concessions based on size & location
  - Investment promotion subsidy
  - Exemption from stamp duty
  - Reimbursement of Land Conversion Fee, etc.

Enhancing Karnataka's Skill

The Central Institute for Plastics and Engineering Technology at Mysore

The Institute of Indian Foundrymen (IIF) in Bangalore

The state has highly skilled workforce across the value chain of manufacturing owing to **1400+ ITIs, 200+ engineering colleges and 400+ R&D institutes.**

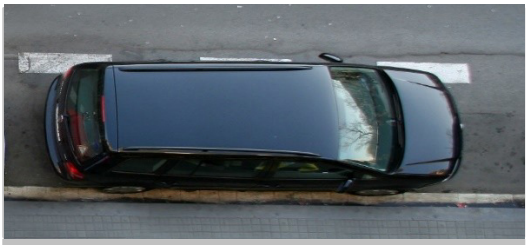
Advanced Machine Tool Testing Facility (AMTTF), a state-of-art equipment facility at CMTI, jointly established in Bangalore by machine tool industry and DIPP, GoI

Central Manufacturing Technology Institute (CMIT), Bangalore, Karnataka is developing Hi- Tech shuttle less looms, are also engaged in working on advanced manufacturing technologies in collaboration with Industry

Manufacturing in Karnataka

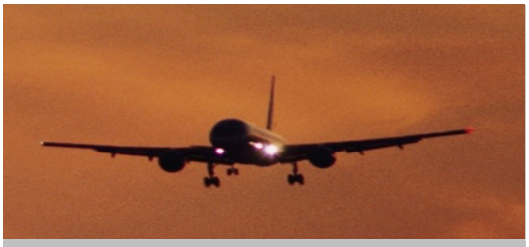
Major Players

Investment Opportunities



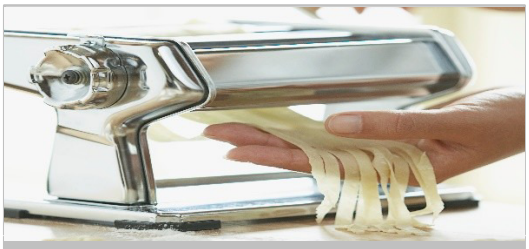
Auto Components

- Engine and engine parts
- Powertrain parts
- Suspension and braking parts
- Lighting and other equipment
- Accessories
- Tyres



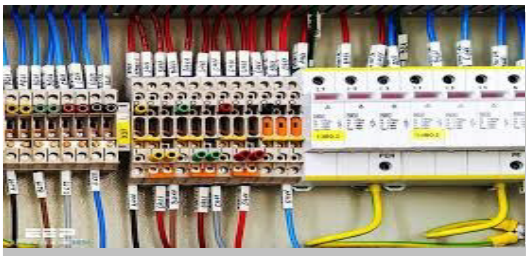
Aviation

- Castings and forging
- Precision Machine parts
- Tubes
- Fasteners
- Bearings and standard parts



Agri & Food Processing

- Precision machinery for irrigation
- Spray equipment
- Harvesting machinery
- Equipment for sorting, handling and packing
- Freezing and chilling
- Machinery, equipment for grain handling and processing
- Pulses processing, Bakery equipment, Beverage equipment
- Slicers/cutting equipment



Electrical Machinery

- Electronic Ballasts
- Display boards
- Electric chokes
- Switch boards
- Panel boards
- Street light fittings

Textile

- Spinning machines
- Weaving machines
- Knitting machines
- Processing machines
- Finishing machines

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Top 15 Global Machine Tool Consumers			
Country Ranked	Consumption (millions real USD)	% Change	Global Share
1. China	28,840	-5.9	31.4
2. U.S.A.	9,579	10.4	10.4
3. Germany	8,114	16.8	8.8
4. Japan	6,538	12.4	7.1
5. Italy	5,363	25.8	5.8
6. South Korea	3,942	-3.6	4.3
7. India	2,883	26.2	3.1
8. Mexico	2,273	-7.6	2.5
9. Taiwan	2,095	15.0	2.3
10. Russia	1,807	5.2	2.0
11. Canada	1,516	7.6	1.6
12. Brazil	1,435	5.9	1.6
13. France	1,435	11.4	1.6
14. Vietnam	1,302	4.3	1.4
15. Thailand	1,289	21.9	1.4

China is still the leader in machine tool consumption. However, in 2018, China's consumption declined while the share of machine tool consumption by each of the other

Top 15 Global Machine Tool Producers			
Country Ranked	Production (millions real USD)	% Change	Global Share
1. China	23,460	-6.5	24.8
2. Germany	14,987	9.8	15.8
3. Japan	14,765	10.3	15.6
4. Italy	7,381	16.3	7.8
5. U.S.A.	6,220	4.2	6.6
6. South Korea	5,287	3.4	5.6
7. Taiwan	4,700	7.1	5.0
8. Switzerland	3,850	14.4	4.1
9. India	1,365	33.5	1.4
10. Spain	1,350	3.5	1.4
11. Austria	1,241	15.5	1.3
12. Brazil	1,087	-8.7	1.1
13. France	886	4.3	0.9
14. Singapore	738	3.7	0.8
15. U.K.	734	14.7	0.8

Top 10 Global Machine Tool Consumers (USD Mn.)


China 28,840


USA 9,579


Germany 8,114


Japan 6,538

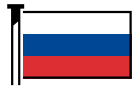

Italy 5,363


South Korea 3,942


India 2,883


Mexico 2,273

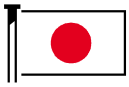

Taiwan 2,095


Russia 1,807

Top 10 Global Mac Producers (USD M


China 23


Germany 14


Japan 14


Italy 7,


USA 6,


South Korea 5,

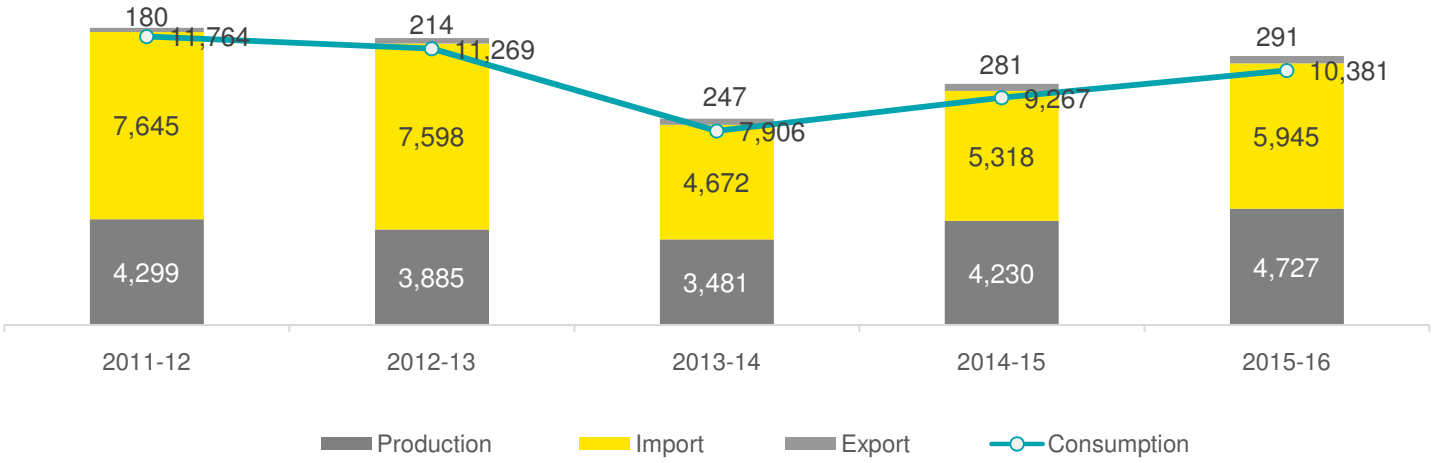

Taiwan 4,

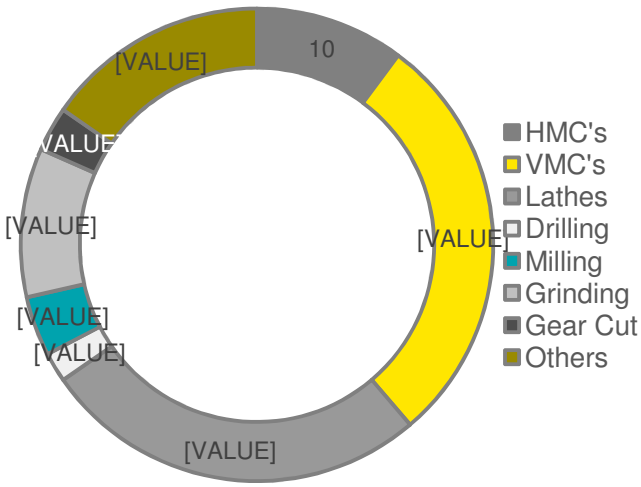

Switzerland 3,


India 1,


Spain 1,

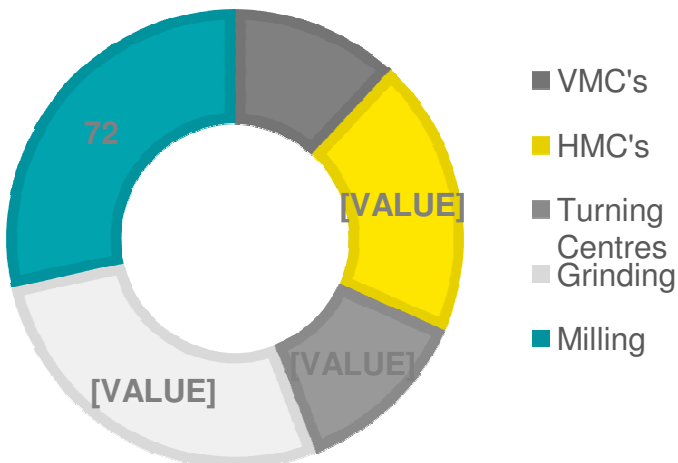
- India is the 13th largest manufacturer of machine tools in the world as per Gardner's world machine tool consumption survey report 2016
- The Indian machine tool industry consists of around 1000 manufacturing units covering large, medium and small companies
- Domestic manufacturers have 43% share in consumption





Machine wise demand for metal cutting machines in (%) during FY16

Share of Imports in Consumption (%)



Source: Makeinindia, Department Of Electronics, TechSci Research