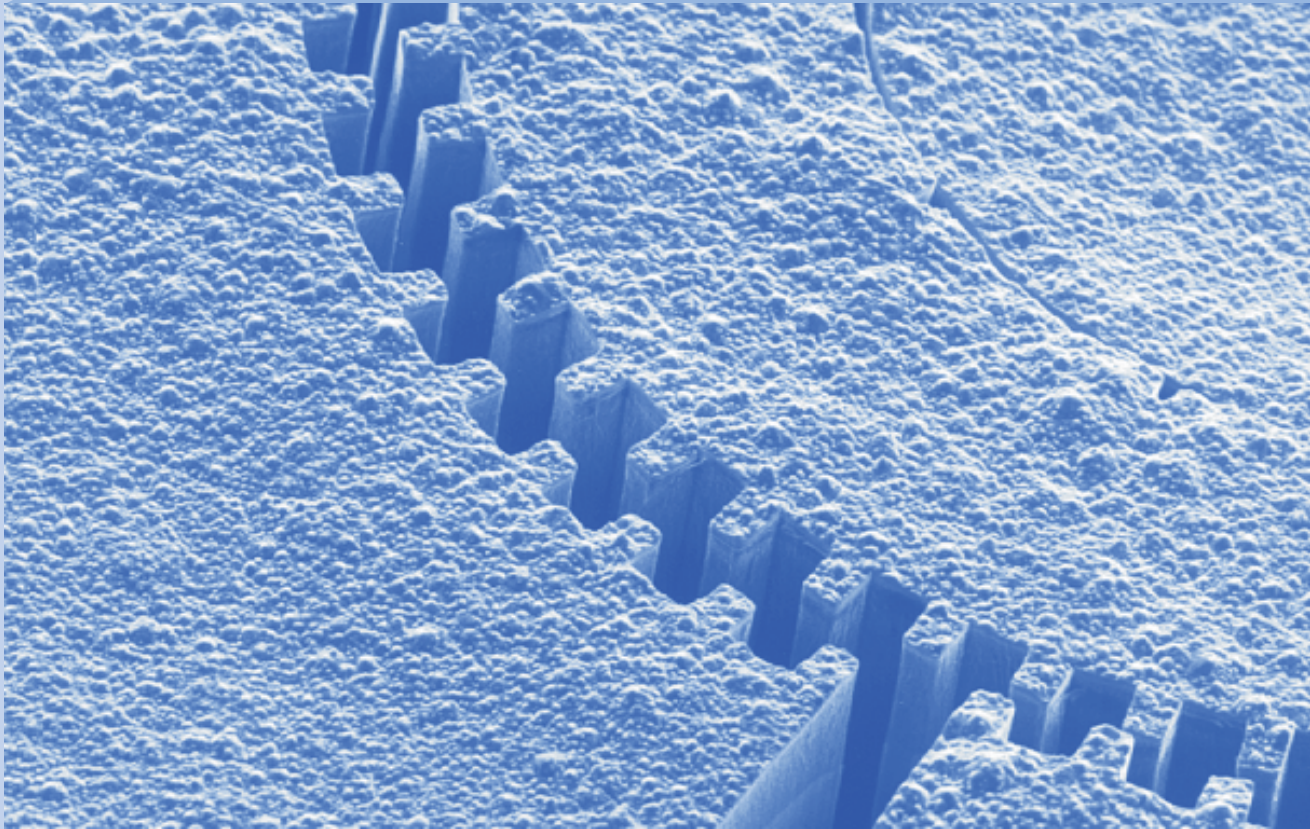




# ENGINEERING





ENGINEERING

## **ENGINEERING**

Market Overview	2
Competitive Advantages	6
Government Regulations and Support	12
Future outlook	16
Contact For Information	16

*A report by KPMG for IBEF*

## Market Overview

### The engineering sector is the largest segment of Indian industry

The engineering sector is the largest segment of the overall Indian industrial sector. India has a strong engineering and capital goods base. The important groups within the engineering industry include machinery & instruments, primary and semi finished iron & steel, steel bars & rods, non-ferrous metals, electronic goods and project exports. The engineering sector employs over 4 million skilled and semi-skilled workers (direct and indirect).

The sector can be categorised into *heavy engineering* and *light engineering* segments. Heavy engineering segment forms the majority of the engineering sector in India. In the year 2003-04, out of the total engineering production of US\$ 22 billion, the heavy engineering market contributed over 80 per cent with the light engineering segment accounting for the remaining.

India has a well-developed and diversified industrial machinery/ capital base capable of manufacturing the entire range of industrial machinery. The industry has also managed to successfully develop advanced manufacturing technology over the years. Among the developing countries, India is a major exporter of heavy and light engineering goods, producing a wide range of items. The bulk of capital goods required for power projects, fertiliser, cement, steel and petrochemical plants and mining equipment are made in India. The country also makes construction machinery, equipment for irrigation projects, diesel engines, tractors, transport vehicles, cotton textile and sugar mill machinery.

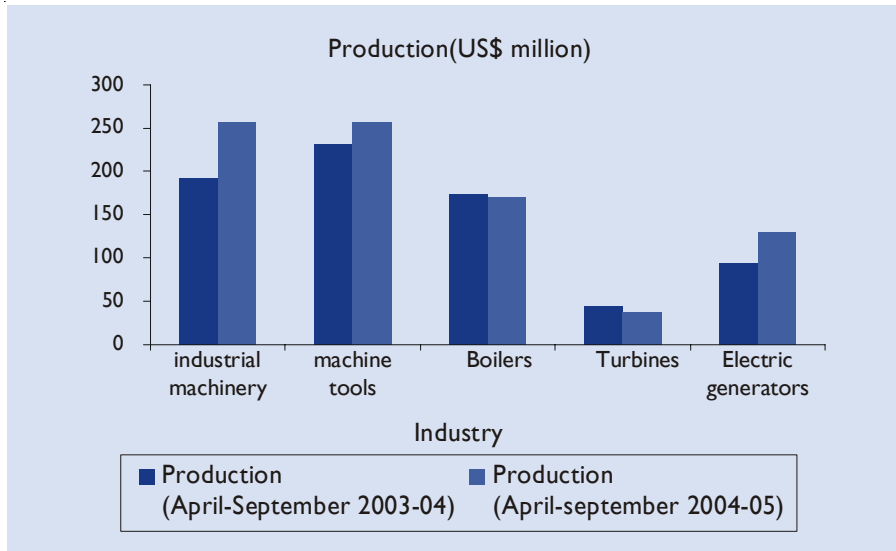
The engineering industry has shown capacity to manufacture large-size plants and equipment for various sectors like power, fertiliser and cement. Lately, air pollution control equipment is also being made in the country. The heavy electrical industry in India meets the entire domestic demand.

Players in the engineering sector in India can be categorised as follows:

- Equipment manufacturers such as Bharat Earth Movers Limited (BEML), Siemens, Cummins India, ABB, etc
- Execution specialists such as Bharat Heavy Electricals Ltd.(BHEL), Larsen &Toubro (L&T), Engineers India, etc and
- Niche players such as Thermax in environmental solutions, Voltas in electro-mechanical projects, ABB for automation technologies and so on.

A large number of multinational companies like Cummins, Alfa Laval, Sandvik Asia, etc. have also entered the engineering industry in India.

### India's engineering industry is dominated by organised players



Source: Ministry of Heavy Industries and Public Enterprises

The heavy and light engineering segments in this sector can be further classified as shown in the table. As the sector demands a high level of capability and investment, it is dominated by large organised players.

Industry segment	No. of organized players
Heavy Engineering Industry <sup>†</sup>	
Cement machinery	18
Sugar machinery	27
Rubber Machinery	19
Metallurgical machinery	39
Machine tool	125
Material handling equipment	50
Mining machinery	32
Dairy machinery	16
Light Engineering industry	
Welded steel pipes & tubes	123
Process Control Instrument	26
Antifriction Roller Bearing	19
Plain paper copier	12

This industry comprises multinational companies, joint ventures, large domestic players, regional players in the organised sector and large number of small players in the unorganised sector. Some unorganised players also exist at lower levels where the technology required is very basic.

Public sector enterprises play an important role in the heavy engineering sector in India. There are 34 public sector enterprises in this segment.

## The engineering sector is experiencing robust growth

### Domestic performance

The Indian engineering industry has emerged as a dynamic sector in the country's industrial economy and has made the country self reliant in key areas. The total production of the Indian engineering industry was approximately US\$ 22 billion in 2004.

The performance of the engineering sector is linked to the performance of the end user industries for this sector. The user industries for engineering include power utilities, industrial majors (refining, automotive and textiles), government (public investment) and retail consumers (pumps and motors). The engineering sector has been growing, driven by growth in end user industries and the new projects being taken up in the power, railways, infrastructure development, private sector investment fields etc.

The production of industrial machinery increased from US\$ 192 million in April – September 2003-04 to US\$ 256 million in April – September in 2004-05. The production of machine tools increased from US\$ 231.9 million in April – September 2003-04 to US\$ 256 million in April – September in 2004-05. The growth in production of some of the other segments during the same period is shown in the graph.

Many factors contribute to growth of engineering sector in India. The key growth drivers are:

- The growth of the key end user sectors in India. For example, the domestic sales of automobiles have grown at the compounded annual growth rate of around 14 per cent over the past four year.
- Government's emphasis on power and construction sector has increased for the past few years and thus increasing the demand for capital goods.
- Further, India is being preferred by global manufacturing companies as an outsourcing destination due to its lower labour cost and better designing capabilities. Engineering companies thus have a huge potential for direct exports and outsourcing.

## Indian engineering goods are gaining acceptance in overseas markets

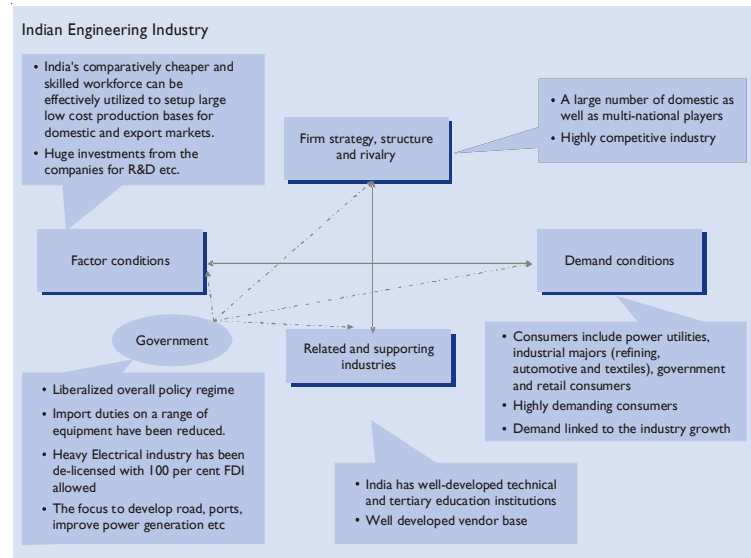
Engineering exports crossed the US\$ 10 billion mark in 2003-04, up 28.33 per cent over the previous year. The engineering sector accounted for 14 per cent of the country's total exports.

The nature of Indian engineering exports is also changing with time. India is moving from low-value goods exported to developing countries to sophisticated goods targeted at developed countries. Capital goods now account for 26 per cent of total engineering exports. The engineering exports to the European Union countries accounted for 15 per cent and to North America accounted for 14 per cent in 2004. Engineering goods worth US\$ 1.34 billion were exported to USA alone in 2003-04. Germany, known for its engineering capability, imported engineering goods worth US\$ 400 million from India in 2004. Engineering exports to UK, Netherlands and France are also on the rise.

A key driver for increased engineering exports is the trend towards shifting of global manufacturing bases to low cost countries like India. This trend is expected to boost exports of engineering goods from India over the next five years. According to Engineering Exports Promotion Council (EEPC), engineering exports could touch US\$ 30 billion by 2008-09. In such a scenario, India, driven by the engineering sector, would emerge as a key global manufacturing hub.

## Competitive Advantage

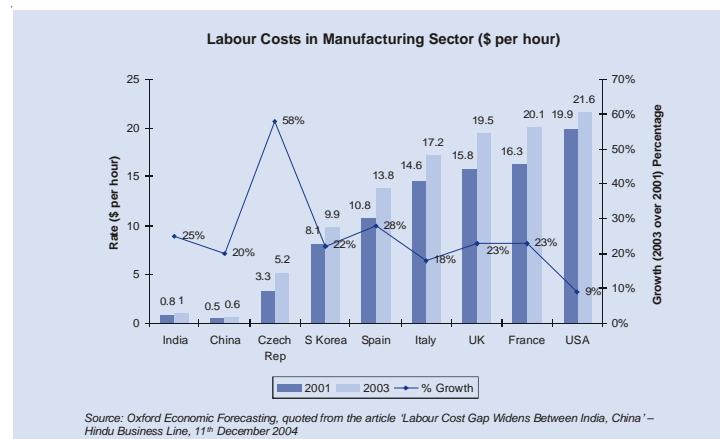
India's competitiveness in engineering industry can be assessed using the following illustration:



### Factor conditions

Among developing countries, India offers the best combination of low costs, availability and skills and capabilities of manpower for the engineering sector. In terms of availability and skills, India produces over 500 PhDs, 200,000 engineers, 300,000 non-engineering postgraduates and 2,100,000 other graduates each year, thereby ensuring a steady supply of qualified manpower for the sector.

India also has a significant labour cost advantage over other countries, as shown in the figure below:



Several companies in the engineering sector have leveraged India's advantages in labour effectively.



- In order to leverage India's intrinsic technology strengths and the vast pool of highly qualified software professionals, ABB has set up a global corporate R&D centre in Bangalore, which focuses on industrial IT development and deployment. It also helps maintain and support a range of software intensive products and partners with the ABB R&D centres as well as business areas within the group. This was the first such centre to be established outside the US and Europe.
- The combination of ABB's global know-how and India's highly qualified people enables the Indian subsidiary to produce world-class products. The Indian subsidiary is a 'global' factory for high voltage 72.5 KV circuit breakers, medium voltage outdoor circuit breakers and magnetic actuators. It also exports several other products including transformers.
- Cummins, taking advantage of India's technical know-how has opened a new R&D centre in Pune, Cummins Research & Technology India Pvt. Ltd., which would offer engineering design and analysis capabilities for the company's' technical centres worldwide.

Apart from skilled labour, India also has the raw material resources to meet the demands of the engineering industry. Key raw materials required by the engineering sector - ferrous and non-ferrous metals such as mild steel and aluminium - are available in India. Ready availability of these materials gives India a major cost advantage, as materials account for nearly 50 per cent of the industry's operating costs.

### Competitive industry with well developed capabilities

The Indian engineering industry is highly competitive with a number of players in each segment. A large number of multinational companies such as Cummins, ABB and Alfa Laval have also entered the industry.

The intense competition has led to Indian players developing improved capabilities that have made them more competitive. Companies have become more quality conscious and upgraded their technology base, besides diversifying their manufacturing range in tune with global market requirements. For example, more than 2500 firms in the engineering sector in different areas such as casting and forging, automobile parts, machine tools, electrical machinery, pumps, textile machinery, etc. to name a few, have acquired ISO 9000 accreditation. Other areas where firms are becoming more competitive include R&D, Product Development and Service.

This has resulted in MNCs increasingly leveraging their Indian arms to support their global operations. For example,

- ABB Group is plans to invest about US\$ 100 million in India during 2004-06, to leverage its Indian operations as a production and resource base for its global operations. The Group has recently set up a manufacturing facility for its new range of ACS 550 drives in Bangalore to reduce lead delivery times for the customers.

- Cummins India Limited (CIL) is aggressively looking at becoming a global sourcing hub for its parent company, Cummins Inc, in the engine and component segment. The company is the single worldwide source of K-38 power-generation engines (that was shifted from England), apart from the V-28 engines, for Cummins and is looking at opportunities in the area of components as well. The parent company Cummins Inc also recently started sourcing 50 litre power-generation engines (K-50) exclusively from India for worldwide use.

With most firms getting focused on becoming globally competitive, India has the potential and the ability to become a major global sourcing hub in the engineering sector.

### Growing demand

The user industries of engineering products and services include power utilities, industrial majors (refining, automotive and textiles), government (public investment) and retail consumers (pumps and motors). Thus, the performance of the engineering sector is linked to the industry which in turns depends on the overall economy. Capacity creation in sectors like infrastructure, power, mining, oil & gas, refinery, steel, automotive, consumer durables drives the engineering industry.

Government projects like the World Bank-funded Golden Quadrilateral Project, and the North-South and East-West corridors running across the four corners of the country have fuelled growth in the construction industry and the overall industrial sector.

Industrial growth (measured in terms of the Index of Industrial Production) recorded a rate of 7.9 per cent during the April– September 2004-05 compared with 6.2 per cent during the same period the previous year.

Sectors such as automotive and textiles have benefited from the changing demographic profile of the Indian consumer. Key demographic changes include:

- Increasing income levels and greater propensity to spend.
- Lifestyle changes, driven by trends like increase in nuclear families, working women and exposure to global trends.

These changes have been driving consumption in end-user sectors such as consumer durables. This, in turn, has facilitated growth in the engineering sector.

## Related and supporting industries

The presence of supporting industries provides a conducive environment for the engineering sector to grow and prosper. India's engineering industry has significant support from India's well-established IT sector, as well as institutions of higher education. India has a well-developed technical and tertiary education infrastructure of over 250 universities, 1500 research institutions and over 10,000 higher education centres, which support the engineering sector not only by supplying a steady stream of qualified manpower, but also in areas of research and development.

India has a well-developed vendor base for supporting engineering industries. Industries such as machine tools, textile machinery, auto components, etc., provide ample support to the engineering sector. Some of these sectors have developed global capabilities and help the engineering sector achieve global competitiveness.

## Profile of key domestic and overseas players

<b>BHEL</b>	Public sector enterprise. India's largest engineering and manufacturing enterprise	Sales turnover – US\$ 2,042.89 million in 2004	Caters to power generation and transmission, transportation (especially railways), telecom, renewable energy and industry at large.	14 manufacturing divisions, four power sector centres, over 100 project sites, 8 service centres and 18 regional offices.
<b>Engineers India Ltd</b>	a government undertaking (as 90.39 per cent stake is owned by government), under Petroleum & Natural Gas Ministry	Turnover – US\$ 169 million in 2003	Highways & Bridges, Airports, Mass Rapid Transport Systems, Ports & Terminals, Power Projects, Non-conventional / Renewable Energy Sources, Specialist Materials and Maintenance Services, Intelligent Buildings, Water and Urban Development projects	Besides its Head Office at New Delhi, EIL has branch office at Mumbai, zonal office at Kolkata, regional offices at Chennai and Vadodara and inspection offices at all major equipment manufacturing locations in India. It also has overseas offices at London, Abu Dhabi, Kuwait, Qatar, Malaysia and Australia.
<b>Hindustan Aeronautics Ltd.</b>	Public sector enterprise	Sales – US\$ 827 million in 2004.	Supplies / services are mainly to Indian Defense Services, Coast Guard and Border Security Force. Transport aircraft and Helicopters have also been supplied to Airlines as well as State Governments of India.	Facilities are located throughout India including Nasik, Korwa, Kanpur, Koraput, Lucknow, and Hyderabad.

<b>Crompton Greaves</b>	Part of the B.M. Thapar Group	Sales – US\$ 390.06 million in 2004	Largest private sector enterprise in the business of electrical engineering	Bhind, Mumbai, Nashik, Hosur, Goa
<b>Elgi Equipments</b>	Market leader and Asia's largest manufacturer of air compressors and automobile service station equipment.	Sales – US\$ 69.87 million	Elgi products have wide range of applications in areas ranging from mining, defense, transport, pharmaceuticals, power, oil, railways, chemicals, textiles, printing to ship building, paper, electronics, telecommunications, medical, food & beverages and plastics.	Singanallur and Kurichy in Coimbatore
<b>HMT</b>	Public sector Enterprise	Sales – US\$ 34.02 million in 2004	Tractors, Printing Machinery, Metal Forming Presses, Die Casting & Plastic Processing Machinery, CNC Systems & Bearings	Srinagar, Mohali, Hyderabad, Kalamassery and Ajmer
<b>Kirloskar Oil Engines Ltd (KOEL)</b>	Part of the century old Kirloskar group promoted by S L Kirloskar.	Sales – US\$ 2,042.89 million in 2004	2 segments – Engines and Engine bearings & valves. Also in business of manufacturing gray iron castings and trading in oil, power generation	manufacturing facilities in Pune, Nasik, Ahmednagar and Phursungi
<b>Larsen &amp; Toubro Ltd (L&amp;T)</b>	Part of L&T group. India's largest engineering and construction conglomerate.	Sales – US\$ 2,280.06 million in 2004	four segments namely Engineering and Construction (E&C), Cement, Electrical and Electronics and Diversified business. It also has 19 subsidiaries.	Coimbatore in Tamil Nadu, Kurnool District in Andhra Pradesh and Hassan in Karnataka.

<b>Thermax Ltd</b>	originally incorporated as Thermo-Dynamics Pvt., Ltd on 30th June, 1980. On 1st July, 1980 Wanson (India) Ltd. along with Thermax India (Pvt) Ltd. was amalgamated with the Company and subsequently the name was changed to Thermax Pvt.	Sales – US\$ 129.52 million in 2004	6 core businesses - Boilers and Heaters, Absorption Cooling, Water and Waste Solutions, Chemicals for Energy and Environment Applications, Captive Power and Cogeneration systems, Air Pollution and Purification	five manufacturing facilities, 12 sales and service offices and a widespread franchisee and dealer network.
<b>Cummins India Limited</b>	Part of Cummins Inc., world's largest designer and manufacturer of diesel engines	Sales – US\$ 220.26 million in 2004	Power generation, construction & mining, compressors, locomotives, marine, oilfields, fire pumps & cranes, automotive and special applications.	Nashik, Bardez, Sholapur, Pune, Bharuch
<b>Alfa Laval (India) Ltd</b>	Subsidiary of Alfa Laval AB, Swedish Multinational engineering company. The company has approximately 9,000 employees	Net sales – US\$ 77.8 million in 2003	Alfa Laval India has two divisions namely Equipment division and Process Technology division	Manufacturing facilities in Pune, Sarole and Satara.
<b>Asea Brown Boveri Ltd (ABB)</b>	Subsidiary of ABB Ltd - Zurich which is a leader in Power and Automation technologies. The Company operates in around 100 countries and employs about 120000 people.	Net sales – US\$ 303 .4 million in 2003	ABB India caters to power and industry sectors.	Vast installed base, extensive local manufacturing at 8 units and a nationwide marketing and service presence. ABB has also set up a global R&D centre in Bangalore
<b>Siemens Ltd</b>	Flagship of the Siemens Group in India. Siemens AG, the parent company holds 54.63% in Siemens Ltd.	Sales – US\$ 413.33 million in 2004	power generation and distribution equipment, industrial projects and equipment, transportation systems, communication and healthcare products.	Aurangabad, Nashik, Goa, Thane and Parganas North

## Government Regulations and Support

Government of India has reviews its Foreign Direct Investment (FDI) policy regularly, in a bid to attract more investment. Recently, the government permitted 100 per cent FDI in construction and development projects. India has opened up to private sector participation and FDI in infrastructure projects for power, roads, ports, mining sector, and pharmaceutical sector.

Around 36 per cent of the total FDI is directed towards engineering industry through an automatic route, but subject to a limit of US\$ 2 million of lump sum payments. Royalty payment is restricted to 5 per cent and 8 per cent on domestic and exports respectively. Depreciation on general plant and machinery is proposed to be around 15 per cent.

These initiatives of the government serve as a catalyst to further raise the demand for engineering goods and machinery.

Some specific initiatives by the government, which positively impact the engineering sector are:

- Removal of tariff protection on capital goods.
- Delicensing of heavy electrical industry and allowance of 100 per cent FDI.
- Various initiatives focused on infrastructure development and construction.
- Initiatives to increase power generation and improve quality of power supply.
- The reduction of custom duties on various equipments.

These above initiatives are aimed at creating a facilitating environment in which the engineering sector can thrive. They have also helped the sector in becoming competitive.

## Profile of Heavy and Light Engineering segments

Heavy Engineering Industry	Capabilities / capacities of Indian manufacturers
Heavy Electrical Industry	Large electrical equipment used in steel plants, petrochemical complexes and other such heavy industries are being manufactured in the country.

<b>Turbines &amp; Generator Sets</b>	Capacity established for manufacture of various kinds of turbines such as steam & hydro turbines including industrial turbines is more than 7000 MW per annum.
<b>Boilers</b>	Indian industry is continuously upgrading their technology and is introducing better products.
<b>Switchgear and Control Gear</b>	The entire range of circuit breakers from bulk oil, minimum oil, air blast, vacuum is manufactured in India to standard specifications.
<b>Textile Machinery Industry</b>	It has a capital investment of US\$ 326 million (Rs.15000 million) and an installed capacity of US\$ 653 million (Rs.30000 million) per annum. Approximately 120 companies manufacture a complete range of textile machinery in India.
<b>Cement Machinery Industry</b>	The industry is fully capable of meeting the domestic demand of cement machinery. The value of the existing installed capacity has been estimated at US\$ 130.5 million (Rs 6000 million) per annum.
<b>Sugar Machinery Industry</b>	Installed capacity of US\$ 43.5 million (INR 2000 million) to manufacture complete sugar plants and components
<b>Rubber Machinery Industry</b>	There are at present 19 units in the organised sector for the manufacture of rubber machinery mainly required for tyre/tube industry.
<b>Material Handling Equipment</b>	There are 50 units in the organised sector for the manufacture of material handling equipment.
<b>Metallurgical Machinery</b>	At present there are 39 units in the organised sector engaged in the manufacture of various types of metallurgical machinery.
<b>Mining Machinery</b>	At present there are 32 manufacturers in the organised sector both in public and private sector for underground and surface mining equipment of various types. Out of the 32, there are 17 units manufacturing underground mining equipment.
<b>Dairy Machinery Industry</b>	At present there are 16 units manufacturing dairy machinery and equipment in the organized sector, both in private and public sectors.
<b>Machine Tool Industry</b>	There are around 125 machine tool manufacturers in the organised sector as also around 300 units in the small ancillary sector.
<b>Light Engineering Industry</b>	<b>Capabilities/capacities of Indian manufacturers</b>
<b>Welded Steel Pipes &amp; Tubes</b>	There are currently 123 units engaged in the manufacture of welded steel pipes & tubes in the organised sector. There is adequate capacity of the manufacture of these types of pipes & tubes.

<b>Process Control Instrument</b>	There are 26 units in the organised sector manufacturing process control instruments & systems, out of which seven units are capable of taking up complete turn key projects for the entire instrumentation system including software required by process industries. The industry is in a position to meet approximately two-thirds of the country's demand.
<b>Medical &amp; Surgical Equipment</b>	Indigenous manufacturers are currently in a position to manufacture a wide variety of electro-medical equipments such as electro-cardiograph (ECG machine), X-rays scanner, CT scanner, short-wave physiotherapy unit, electro surgical units, blood chemistry analyser etc. The indigenous industry is capable of supplying about 40 per cent of the demand and the rest is met by imports.
<b>Industrial Fasteners</b>	Industrial fasteners cover high tensile and mild steel bolts, nuts, screws, studs and pins. All types of fasteners except high tensile and special type fasteners are reserved for SSI Sector.
<b>Industrial Gears</b>	The Industry is de-licensed as per the current Industrial Licensing Policy and is eligible for automatic approval for Foreign Direct Investment.
<b>Antifriction Roller Bearing</b>	The Indian bearing industry has grown rapidly during the last few years. Today the industry is meeting around 70 per cent of its demand for common varieties and sizes of bearings while rest is being imported. At present there are 19 units in the organised sector manufacturing both ball and roller bearings. The industry has established a highly diversified product range of around 500 types of bearings.
<b>Plain Paper Copier</b>	There are, presently, 12 units manufacturing plain paper copiers. The major manufacturers have technical collaboration with reputed foreign companies.



**Sewing Machine**

The major source of production of sewing machines in the country is from small scale sector as manufacture of conventional "hand operated" sewing machine is reserved for this sector. The demand for conventional domestic machines is being fully met indigenously. The industry has potential to undertake export to developing countries.

---

**Bicycle Industry**

The bicycle industry is mostly in the small scale sector. Large-scale units have been permitted to manufacture bicycle frames, chains and rims for captive consumption only. The bicycle manufacturing is an established industry in the country with well accepted quality standards in the international market. The export for the year 2001-02 was to the tune of US\$ 33.9 million (Rs 1620 million) and import was negligible.

---

**Steel Forgings**

This industry is well established in the country having modern manufacturing facilities. Besides meeting the requirement of domestic market, it is well established in export market also.

---

## Future outlook

The engineering sector's future outlook is promising. Drivers like infrastructure development, industrial growth and favourable policy regulations will ensure growth in manufacturing.

Emerging trends such as outsourcing of engineering services can provide new opportunities for quantum growth. Engineering and design services such as new product designing, product improvement, maintenance and designing manufacturing systems are increasingly getting outsourced to countries like India. It has been estimated that the present market potential for outsourced engineering services is between US\$ 7 billion and US\$ 12 billion, while the value of work currently undertaken by vendors in India is estimated between US\$ 400 million and US\$ 500 million.

India's engineering sector has a significant potential for future growth, both in manufacturing as well as services.

## CONTACT FOR INFORMATION

Information on the market and opportunities for investment in the engineering sector in India can be obtained from the Confederation of Indian Industry (CII), which works with the objective of creating a symbiotic interface between industry, government and domestic and international investors.

Confederation of Indian Industry (CII)

6, Netaji Subhas Road

Kolkata 700 001

India

Tel: + 91 33 2231 5571-4, 2261 0575(D)

Fax: + 91 33 2231 5577

Email: [subrata.niyogi@ciionline.org](mailto:subrata.niyogi@ciionline.org)


## **DISCLAIMER**

This publication has been prepared for the India Brand Equity Foundation (“IBEF”). All rights reserved. All copyright in this publication and related works is owned by IBEF. The same may not be reproduced, wholly or in part in any material form (including photocopying or storing it in any medium by electronic means and whether or not transiently or incidentally to some other use of this publication), modified or in any manner communicated to any third party except with the written approval of IBEF.

This publication is for information purposes only. While due care has been taken during the compilation of this publication to ensure that the information is accurate to the best of IBEF’s knowledge and belief, the content is not to be construed in any manner whatsoever as a substitute for professional advice.

IBEF neither recommends nor endorses any specific products or services that may have been mentioned in this publication and nor does it assume any liability or responsibility for the outcome of decisions taken as a result of any reliance placed on this publication.

IBEF shall in no way, be liable for any direct or indirect damages that may arise due to any act or omission on the part of the user due to any reliance placed or guidance taken from any portion of this publication.



The India Brand Equity Foundation is a public-private partnership between the Ministry of Commerce and Industry, Government of India and the Confederation of Indian Industry. The Foundation's primary objective is to build positive economic perceptions of India globally.

India Brand Equity Foundation  
c/o Confederation of Indian Industry  
249-F Sector 18  
Udyog Vihar Phase IV  
Gurgaon 122015 Haryana  
INDIA

Tel +91 124 401 4087

Fax +91 124 401 3873

E-mail [ajay.khanna@ciionline.org](mailto:ajay.khanna@ciionline.org)

Web [www.ibef.org](http://www.ibef.org)