

Capital Goods - Executive Summary

A strong and large Capital Goods industry is one of the most important prerequisites for manufacturing sector competitiveness and growth. Capital goods industry contributes to the economy both by supporting national security programmes and generating large scale of employment. It provides employment to more than 1.4 million people. The annual turnover of the industry during 2010-11 was US\$ 53 billion¹ and has grown at a CAGR of 14% during the period 2007-11. The industry contributes 12% to the total manufacturing output of India and around 1.8% to the national GDP.

Capital Goods industry broadly consists of five segments viz. Electrical equipment, Process plant equipment, Earth moving, Construction & mining machinery, Machine tools, and Textile machinery. 'Process plant equipment' and 'Electrical equipment' segments have been the engines of growth of the global capital goods industry. They contributed approximately 70% (45% and 25% respectively) in the total world sector export of US\$ 631 billion in 2010. The segments' contribution in the Indian Capital Goods industry has also been similar. Process plant equipment and Electrical equipment segments contributed more than 85% of the total Indian sector export of US\$ 4.5 billion (around 51% and 35% respectively) in 2010. In India, these two segments have also shown highest sector export CAGR in 2005-10. Electrical equipment had export CAGR of around 21%, while process plant equipment had export CAGR of around 24% in 2005-10. Given the current and expected future contribution of these segments, improvements in these two segments are expected to have far reaching and large impact on overall competitiveness of the Indian capital goods industry.

Process plant equipment and Electrical equipment segments have four core manufacturing processes viz. Product design, Raw materials production, Component manufacturing and Product assembly. Absence of strong Raw material production and Component manufacturing are having widespread impact on the overall competitiveness of these segments. An improvement in these two processes, which are the weakest links as well as essential for growth of other processes, would give impetus to overall competitiveness of the industry.

The world process plant equipment exports market is primarily dominated by China. Italy & Germany are the other competitive countries, serving some of the major import markets like Russia, U.K. and Australia. China's contribution was 10.8% to the world process plant equipment exports of US\$ 156 billion in 2010, while Italy & Germany contributed 9.3% & 8.2% of global process plant equipment exports respectively.

The world electrical equipment export market is also dominated by China. Germany is another competitive country serving more than a quarter of the top 20 import markets of the world. China dominates Asia and has substantial share in all other top importing countries. On the other hand, Germany has an edge in European countries and has substantial share in countries like France, Italy, UK, Netherlands, Spain and Czech Republic. China's contribution was 16% to the world electrical equipment exports of US\$ 287 billion in 2010, while Germany contributed 12%.

China's share in world machinery exports increased almost 5 times in a decade (from 2.3% in 1994 to 11% in 2004). China has followed two pronged strategy for increasing their competitiveness in the Capital Goods industry. On one hand they promoted companies having high level technology to set up base in the country through attractive investment policies; while on the other hand they encouraged assembly type manufacturing of low level products which engaged large workforce. The

¹ Department of Heavy Industries

FDI in the sector on the back of favourable investment policies has been a major contributor of such profound growth. FDI has also aided technological up-gradation in the sector. From being a mass producer of labour-intensive and low technology goods, current Chinese export of machinery include the latest innovations and more advanced technology. China's machinery manufacturing industry provides a wide range of products including large gas turbines, large pump storage groups, and nuclear power sets, ultra-high voltage direct-current transmission and transformer equipment. The growth of capital goods industry can be attributed to the overall industrial policy and support measures provided by the government to the companies in this industry.

Germany is essentially an industrial economy and its economic policies are geared towards strengthening of the industry. The government spends nearly 2.6% of its GDP on research and development and is planning to further increase this ratio to 3% by 2015. Additionally, the government has followed wage moderation, wherein wages are kept low to ensure a competitive edge to its companies as a part of its overall export driven industrialisation policy. Further, Germany's investment climate is highly lucrative for manufacturing businesses, owing to the various incentives offered by the government, existence of sound and secure legal framework, open and transparent markets, strong infrastructure, reliable logistics, internationally competitive tax conditions and financial support from the government.

The Italian industrial policy has been characterized by heavy state intervention until the 1990s. The government had stake in major sectors like Capital Goods by way of state-owned firms. These state-owned firms enjoyed huge credit incentives on investments. These incentives, by reducing the cost of capital, favoured capital intensive investments. The industrial development in the country followed a dualistic pattern; the small firms received limited credit incentives but benefited from devaluation as it helped increase their exports. The state owned large corporations witnessed a period of instability due to cost rise, growing competition and changing demand patterns but were able to overcome the crisis on the back of government support policies including devaluation, incentives and grants.

A comparative assessment of Indian capital goods industry vis-à-vis that of competing countries point out to the following key points:

1. Privatisation of capital goods industry in major countries have improved competitiveness

The capital goods industry in India is largely dominated by public sector enterprises (PSEs), which has to a large extent, affected the development of this industry. Even though PSEs market share has dipped over the last decade, they command a large market share due to preferential purchase policies of the government. China too was largely dominated by SOEs until late 1970s. However, the economic reforms during 1980s and 1990s which included privatisation drive and labour reforms have improved the industrial performance, efficiency and overall competitiveness of the industry.

2. Focussed product approach improves competitiveness

The Indian capital goods industry includes a wide range of products but lacks depth due to low demand sophistication of the local market, which in turn leads to low competitiveness of its products in the global market. On the other hand, major advanced countries generally do not produce entire range of products rather focus on select segments where they are most competitive.

3. Strong government focus imminent for development of capital goods industry

China has maintained strong focus on development of the capital goods industry and its government has constantly supported the industry by providing policy impetus as well as implementing expedient measures with respect to taxation, subsidies and financial support during the times of

economic crisis. The growth of capital goods sector can also be attributed to the overall industrial policy and support measures provided by the government to the companies in this sector. Germany is essentially an industrial economy and its economic policies are geared towards strengthening of the industry. However several issues in Indian capital goods industry like inverted duty structure, high export transaction costs, and lack of strong institutional mechanisms for export credit and promotion etc. hint towards lack of government focus for development of the industry.

4. Better investment climate in competing countries gives them a competitive edge

Leading countries in capital goods manufacturing have maintained a healthy investment climate which has helped them in attracting substantial foreign capital required for effective development of the capital intensive sectors. China has been amongst the most favoured nations for investments on account of low labour costs, large domestic market, preferential policies for foreign investments, export promotion policies and stable political climate. Germany's investment climate is also highly lucrative for manufacturing businesses, owing to the various incentives offered by the government, existence of sound and secure legal framework, open and transparent markets, strong infrastructure, reliable logistics, internationally competitive tax conditions and financial support from the government. In contrast, India has not been able to attract huge FDI despite liberal investment policies and low labor costs, primarily due to poor physical infrastructure that affects the supply chain and hence adds to the costs. According to industry estimates, infrastructure inadequacies translate into 5 per cent cost disadvantage for the Indian capital goods manufacturers vis-à-vis foreign manufacturers.

5. State subsidies and incentives have played a key role in industry's development

Industry players in China enjoy various subsidies and incentives such as cash grants, interest subsidies, debt forgiveness, extension of non-performing loans, energy subsidies, land subsidies, etc. Moreover, the Chinese government has often negotiated technology transfer from foreign enterprises in exchange of access to government projects. Similarly, in Italy various subsidies are being provided under the National incentives plan to the eligible enterprises including Capital grants, operating grants, interest rate subsidies, tax credits, equity participation and guarantees. In Germany as well, significant company taxation reforms made in 2008 have resulted in a decrease of the corporate tax burden by around 25%. The overall average corporate tax burden has sunk to just below 30%, with a number of federal states providing even more competitive tax rates. Standard corporate income tax has also been reduced by 10% to just 15% on all corporate taxable earnings.

In India, the benefit of interest subsidies available to many industries is not available to the capital goods industry. The cost burden is further aggravated by the high incidence of direct and indirect taxes. According to industry estimates, the cost disadvantage to Indian capital goods manufacturers due to indirect taxes is estimated at nearly 24%. India also allows second hand imports of capital goods at concessional rates for various industries, which has deterred the growth of domestic capital goods industry. Consequently, the capital goods industry is losing its competitiveness to the cheap imports. Besides lack of subsidies, the Indian capital goods industry also does not receive adequate export incentives.

6. Costs and availability of critical input material- raw material, manpower and technology

India has very high raw material costs as compared to China and Germany. The major raw materials for electrical equipment segment such as Cold Rolled Grain Oriented (CRGO) and amorphous steel which are used to manufacture transformers are imported from other countries. Similarly stock of copper in ore form is not enough in India. Special processing needs to be done on copper to make it

suitable for the electrical industry. This processing cannot be done in India so it has to be imported; even if processing can be done it is not of the desired quality.

The process plant equipment segment is dependent on imports for software tools for design, analysis and simulation and the development of new materials for machine tools production. A range of attachments, accessories, sub-systems and parts, alloy, steel and other raw materials are imported leading to increase in raw material costs. With the dismantling of various price controls on key inputs, the Indian Capital Goods manufacturers now procure raw materials at market prices, which move in line with the international prices. The raw material price indices have risen faster than the machinery price index. It is difficult for the Indian Capital Goods manufacturers to pass on the rise in prices to the customers, thereby impacting their profitability and leading to inefficient cost structures.

Comparing the situation with the competing countries, China has built up its infrastructure for CRGO and is catering to many markets now at competitive prices showing its self-sufficiency in the availability of raw material. Germany also has comparatively lower raw material costs. Recently, the Minister of Trade, Industry, and Tourism of Germany announced a policy due to which the cost of importing of capital goods and raw materials between August and December 2011 was reduced by approximately US \$ 140 million. This was the result of the zero tariffs applied on foreign purchases for these goods, which are not produced domestically. This policy led to a drastic fall in the cost of raw material in the capital goods industry in Germany.

7. Lower interest rates

Indian firms suffer a major disadvantage in terms of high interest rates on electrical equipment and other capital goods. The interest rate in India is 14-16% whereas it's just 2-4% in other countries. This adds to the cost of capital in India, making them non-competitive against imports by at least 10%.

8. Lower total process time

India is lagging behind competing countries like China, Italy & Germany in terms of total process time. The average time taken to market and cycle time in the electrical equipment segment in India in the domestic market as well as international market is high as compared to China and Germany. Due to various reasons including infrastructure constraints, the delivery schedules of the Indian capital goods suppliers are longer than their foreign counterparts. There are issues with testing laboratories in India especially in the electrical equipment segment. Most of the equipment has to be sent to countries like Korea and Netherlands for testing which further increases the time to market. The delivery time of locally made Capital goods in many cases is 1.5 to 2 times longer than in industrialized nations like Italy, Germany & China. The poor quality of infrastructure (transport, communication and power) further increases the delivery time.

9. Technological processes and innovation

India is lagging behind competitors in all the aspects of technology and innovation. Very few firms have been involved in developing & incorporating new product line and production technology which signifies the need for product as well as process innovation in the Indian Capital Goods industry. The domestic electrical equipment industry, comprising of a large number of SMEs, spend about 0.5% of sales on R&D as compared to international competitors who spend as much as 5-6% of their sales on R&D. For process plant equipment as well, average spend on R&D as a % of sales is less than 0.5%. German industry excels in sophisticated technology and R&D investments in electrical equipment and engineering; it has also made significant gains in cutting-edge technologies and developed particular expertise in the area of electrical devices equipment and instrumentation. Germany is a world leader in terms of R&D investment as share of GDP, with a figure of 2.8%

outperforming the EU-27 2009 average of 2.1%. The Machinery & Equipment industry counts as one of the most innovative industries in the economy. 70% of M&E companies were active as innovators in the period 2007-2009. M&E innovation outlay reached a new high of US \$ 20 billion in 2008.

India also lacks in support process technologies such as precision measuring, material engineering and process control. The dependence on imports of technology components from Europe, USA and Japan is very high.

10. Transport & Logistics costs

The transport and logistics costs in India are the highest as compared to the other two countries. Any electrical or process plant equipment weighing more than 32 MT needs to be transported via vehicles with hydraulic axles only (hydraulic trailers). However, availability of hydraulic axles is low, as India does not have many domestic manufacturers. While axles can be imported, it has proven to be expensive and cumbersome. Further, the central and state Governments have adopted a highly complex procedure for providing registration clearance for movement of consignments on hydraulic axles; this has led to delays and increase in project costs increasing the overall transport and logistics costs.

11. Skilled & efficient workforce

There are huge gaps in the availability of skilled manpower in the power equipment manufacturing industry. The available workers also lack the required skills in welding and fitting and knowledge of metallurgy. The inflexible contract labour laws further increase the problems of the Indian industry.

Based on analysis of the current status and international norms & standards, the gaps & issues in the Indian Capital Goods industry can be summarised as following:

S.No.	Impact Areas	Gaps & Issues
1	Scalability	Dominated by public sector enterprises(PSU), primarily due to preferential policies of the government in the past
		Includes a wide range of products but lacks depth due to low demand sophistication of the local market
		Inability to attract huge FDI despite liberal investment policies and low labour costs, primarily due to poor physical and supply chain infrastructure
		Non availability of interest subsidies, rendering them uncompetitive against their counterparts in other countries which are heavily subsidized
		Frequently varying & changing power plant ratings rendering standardization of the plant design, equipment design and inventory management extremely difficult for equipment manufacturers
2	Cost Efficiency	Lack of export incentives lowers the competitiveness of the industry, which already suffers from high export transaction costs.
		Dependence on imports for critical raw materials such as CRGO steel, amorphous steel because of their constrained availability and volatile raw material prices in India
		Unavailability of high alloy materials for pressure parts in India, resulting in dependence on imports
		High custom duty on raw-materials increase cost of the product by 7-10%
		Very high costs of testing of different equipment and components in order to conform to the relevant standards of Indian Standards (IS) or International Electro technical Commission (IEC)
3	Productivity Optimization	Import and usage of second hand machinery at concessional rates for various sectors, deterring the growth of domestic capital goods industry

		<p>Unavailability of high alloy materials for pressure parts in India results in dependence on imports. This increases the overall cycle time for Indian manufacturers.</p> <p>Huge technology gap exists in high productivity, multi-spindle, high precision (with 5 and more axes), heavy duty machine tools and metal forming machines of modern design leading to prevalence of import in this sub-sector.</p> <p>Lack of availability of vehicles with hydraulic axles in India which are efficient is carrying bulky electrical equipment because there are not many manufacturers of such vehicles in India thus leading to delays in production process.</p> <p>Huge gaps in the availability of skilled manpower in the power equipment manufacturing industry. The available workers also lack the required skills in welding and fitting.</p> <p>Limited government support for R&D. The existing labs and centres for performing tests and R&D are not well equipped and lack modernization; often the machines are old and not working</p>
4	Quality Excellence	<p>Import and usage of second hand machinery at concessional rates for various sectors, deterring the growth of domestic capital goods industry</p> <p>Qualified supervisors and engineers not available in significant numbers</p> <p>Lack of strong understanding of metallurgy.</p> <p>Lack of supporting process technologies such as precision measuring, material engineering and process control.</p> <p>Lack of use of technology to make their business processes like procurement, distribution, marketing and servicing more efficient. The use of techno-managerial processes like JIT, TQM, TPM etc. are also limited to large firms only.</p> <p>Inadequate testing & certification labs in India</p> <p>Issues in procurement policies of utilities. Emphasis is only given to L1 bids and very little encouragement is given for product innovation</p> <p>Lack of strong quality control mechanisms at some Indian manufacturers to test their sub-vendors 'product quality leads to the final product being of poor quality.</p>
5	Sustainability	<p>Lack of export incentives. For instance, export promotion schemes of the government are not easily available for project exports and interest rate subvention provided earlier to the capital goods industry has been discontinued.</p> <p>Lack of awareness among MSMEs and SMEs for global standards and certifications.</p>

The analysis of various facets of the global and the Indian Capital Goods industry clearly shows that India needs to look at multiple interventions including in the areas of Regulatory framework, Investment policies, Trade policies, Fiscal policies, Infrastructure, R&D, Skill, Financing, Process, Collaboration and Technology. These interventions have been detailed in the main report.

However, recommendations only related to technology and research & development have been detailed which could form part of several schemes undertaken by Department of Science & Industrial Research in this section.

Intervention 1 : Centralized fund for improving raw-material technology	
S.No.	Tasks
1	Create a centralized fund for SMEs which could be utilized for acquisition of international companies/assets/technologies operating in various raw-material categories like CRGO/CRNGO steel, amorphous steel, high alloy materials etc. For the same designate an implementing agency to invite, shortlist and grant the funding to the SMEs. The scheme will supplement the objectives of the Cluster Innovation Centres to bridge the demand-supply gaps in multiple aspects of a business and drive need-based innovation in the industry clusters in a localized manner, by prioritizing the needs of the industry and enable agencies like the Government and others in directing their efforts for increased efficacy.
Intervention 2 : Foster R&D in the industry	
S.No.	Tasks
2	<ul style="list-style-type: none"> Set up a technology fund to help Electrical Equipment & Process Plant Equipment manufacturers in developing product technologies and modernizing manufacturing infrastructure. They should be incentivized to champion various process technologies like precision measuring, material engineering & process control etc. Formulate a list in consultation with the sector industry associations for technology available for improving the energy efficiency and recycling. Further, 100% depreciation should be permitted for promoting investments in equipment & technology for energy efficient and recycling equipment Set up some private & public players to champion the R&D and technology innovation in electrical equipment & process plant equipment sector in identified areas. Further, these champions may be incentivized for diffusion of the technology to all the industry stakeholders.
Intervention 3 : Database & technology support to domestic firms	
S.No.	Tasks
3	Provide database & technology support to domestic firms in the following areas: <ul style="list-style-type: none"> Quality standards followed globally for various components & products. Technology- and innovation-related international journals from major publishers. Country wise/OEM wise SOPs for testing the products. Details of testing infrastructure available in India and globally. The details need to include testing labs availability and tests conducted by them, machinery employed for testing, fees for conducting the tests etc. Database of industry experts (either retired or from the industry) who can be contacted by domestic firms for any kind of technical support required. For the same, profiles of the experts need to be invited and kept in a repository.
Intervention 4 : Incubation support to conduct prototype & material development	
S.No.	Tasks
4	Provide incubation support to conduct prototype and material development for special castings and forgings used in power generating equipment as they require infrastructure supplementation at national level to improve their development pace.
Intervention 5 : Foster technology adoption & promote domestic machinery manufacturing	
S.No.	Tasks
5	Program to accelerate manufacturing of critical machinery currently not available in India. Various steps required are: <ul style="list-style-type: none"> Compile a list of critical machinery which is not indigenously available. (e.g. high productivity, multi-spindle, high precision , heavy duty machine tools and metal forming machines) Encourage foreign investors to collaborate with Indian counterparts to create

	<p>machinery manufacturing facilities in India for the identified machinery. (Same model was adopted in China)</p> <ul style="list-style-type: none"> • Invite proposals from individual innovators/incubates for manufacturing the machinery from the compiled list and extend financial support to approved projects
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The interventions mentioned above are further prioritized on the basis of their role in fulfilling various objectives* of the Government of India for the growth of the manufacturing sector. Each intervention is tagged with the objective that it may help achieve. The intervention impacting maximum number of objectives has been prioritized for implementation.

*These objectives have been picked up from “PM’s Group Report on Measures for Ensuring Sustained Growth of The Manufacturing Sector”, “National Manufacturing Policy 2006” and “National Manufacturing Policy 2011”.

Intervention	Government Objectives					
	Employment	Building Strong Capacity & Scale	R&D Facility	Local Value Addition	Technology Adoption	Skill Development
Centralized fund for improving raw-material technology	✓	✓		✓	✓	✓
Foster technology adoption & promote domestic machinery manufacturing	✓			✓	✓	✓
Foster R&D in the industry			✓	✓	✓	✓
Database & technology support domestic firms				✓	✓	✓
Incubation support to conduct prototype & material development			✓	✓		



Capital Goods: Framework for Global Competitiveness & Promotion of Innovation

