

Capital Goods: Productivity & Efficiency Benchmarking

In this section various parameters that are critical to achieve competitiveness in the manufacturing sector have been studied along with the progression of India vis-à-vis competing countries in terms of competitiveness.

Most of the Indian firms are still in the Stage I of the competence protocol and targeting basic conveniences & cleaning up of operations to achieve competitiveness in Capital Goods. Raw-materials and labour productivity are the key issues which are attracting all the attention of Indian firms. Some of the aspects in Stage 1 like energy conservation, clean & safe working environment, etc. are still to be looked up as measures for competitiveness.

Amongst the competing countries, China has already crossed the first stage managing basic clean-up of operations by managing backward linkages effectively and setting up component and raw-material industries supplying to Chinese firms at very competitive rates. Italy & Germany counterparts have already crossed second stage and focus is on total improvement in systems & business processes by achieving total quality enrichment and enhanced value addition.

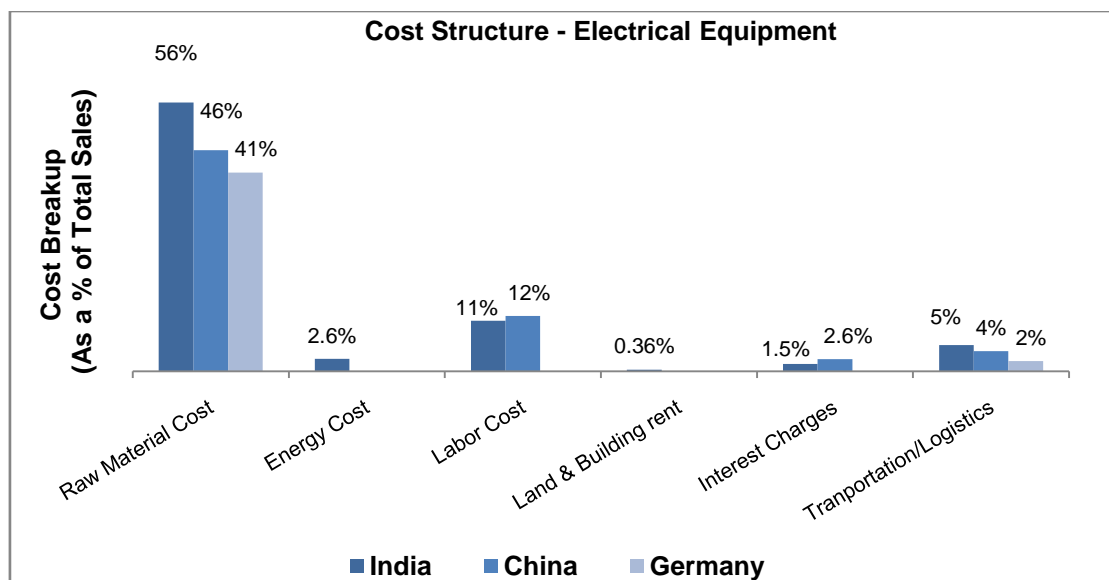
Detailed benchmarking results are formulated below:

Cost Structure – Capital Goods

Cost structure encompasses all the expenses that a firm must take into account when manufacturing & selling a product. Various types of costs that are benchmarked in this section are: Raw material costs, labour costs (including wages), Energy costs, Interest charges, distribution expenses (including transportation & logistics etc.)

Margins can be improved either by increasing sales prices, or by reducing costs. As prices in real terms for many of the industry's staple products have eroded over many years, the focus has long been on reducing costs. Competing countries' (China & Germany for Electrical Equipment and China for Process Plant Equipment) competitive advantage vis-à-vis India in terms of costs is presented in the charts below:

1. Electrical Equipment



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

India has very high raw material cost as compared to China and Germany. India’s advantage as evident from the charts lies in labour costs and interest charges which are lower in India as compared to the competing countries. Logistics/transportation cost in India is very high as compared to Germany.

As can be inferred from the comparisons drawn above, raw material & inputs expenses need to be tightened to make India’s cost structure in Capital Goods sector competitive as compared to competing countries.

India has very high raw material costs as compared to China and Germany. The major raw materials such as Cold Rolled Grain Oriented (CRGO) and amorphous steel which are used to manufacture transformers is not manufactured in India and hence imported from abroad. Further, India does not have adequate stock of copper in ore form. Special processing needs to be done on copper to make it suitable for electrical industry – such processing cannot be done in India and even if it is done in India, the output is not of desired quality. With the dismantling of various price controls on key inputs, Indian Capital Goods manufacturers now procure raw materials at market prices, which move in line with 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 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.

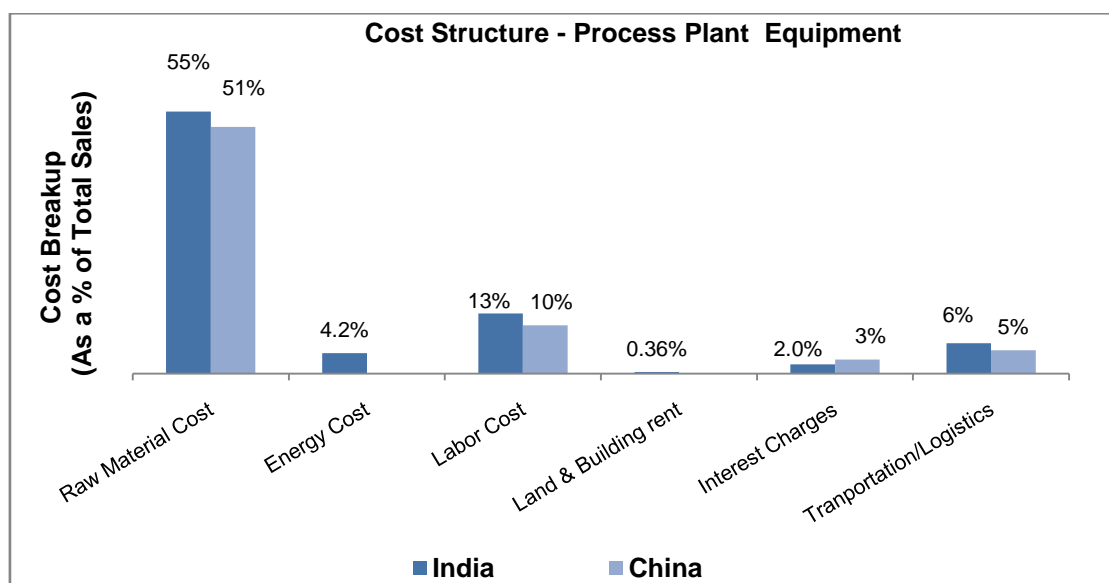
Germany also has comparatively lower raw material costs. Recently, the Minister of Trade, Industry, and Tourism of Germany announced a policy wherein the cost of importing of capital goods and raw materials between August and December 2011 was reduced by approximately USD 140 million. This was the result of the zero tariffs applied on foreign purchases for these goods not produced domestically. This policy led to a drastic fall in the costs of capital goods raw material in Germany.

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 is just 2-4% abroad. This adds to the cost of Indian capital, making the domestic products non-competitive against imports by at least 10%.

Labour in the Indian Capital Goods sector is highly cost competitive, even after discounting comparatively low labour productivity. The labour cost efficiency (which captures the cost and productivity aspects of labour) for Indian Capital Goods sector is 1.32 times that of China's and 1.38 times that of Taiwan's, hence highlighting the fact that labour cost in India is less as compared to China.

The transport and logistics costs in India are the highest as compared to the other two countries. Any electrical 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.

2. Process Plant Equipment



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

India's raw material cost is slightly higher as compared to China. Labour Cost and Transportation cost is also higher in India as compared to China.

As can be inferred from the comparisons drawn above, raw material & inputs expenses need to be tightened to make India's cost structure in Process Plant Equipment competitive as compared to competing countries.

Presently, the plant equipment industry 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. There also exists unavailability of certified components.

The cost of capital being high, processors in Small scale sectors tend to select machinery primarily based on price. They end up choosing low to medium technology machines and sometimes opt for second-hand machinery. However, the decision usually proves to be a bad investment as such processors involve high operating cost, consume high energy and do not improve productivity.

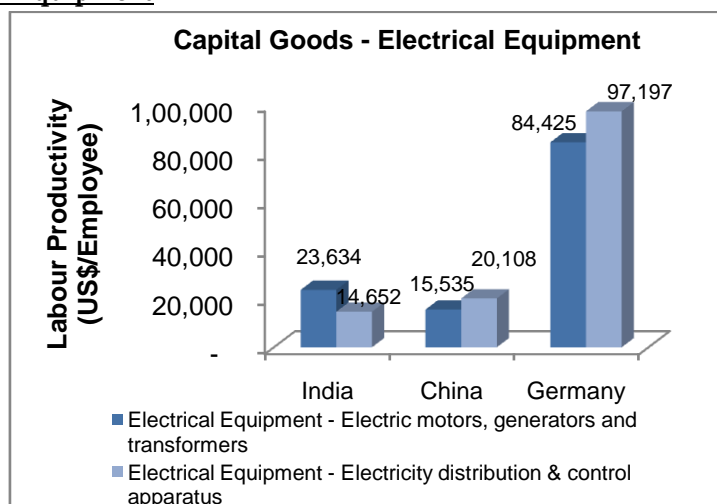
The equipment and components are bulky and heavy and can be exported only through ports. However in India, there are a few ports and the condition of these ports is also not at par with competing countries. Further, the connectivity to these ports between cities is not so good, leading to increased transport costs.

Productivity - Capital Goods

Labour Productivity is the measure taken for benchmarking the productivity of Indian Capital goods industry vis-à-vis competing countries. Labour productivity has been estimated as a ratio of Gross value added (GVA) to the number of workers.

Higher labour productivity of competing countries (China & Germany for Electrical equipment and China & Italy for Process plant equipment) is one of the sources of competitive advantage over India, as shown in the charts below:

1. Electrical Equipment



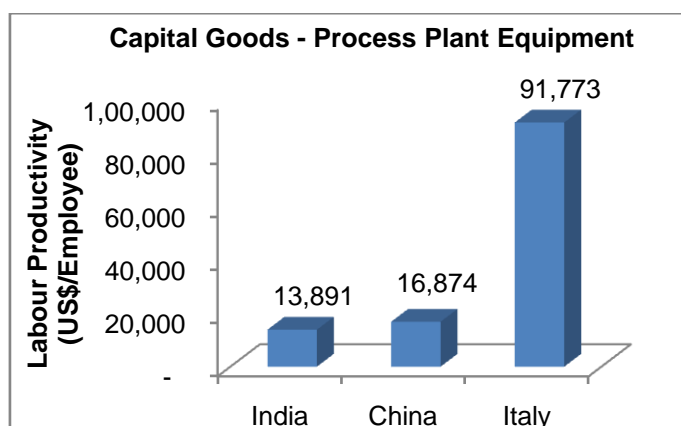
Source: UNIDO's Statistical Country Briefs

India has comparative advantage over China in labour productivity for electrical motors, generators and transformers manufacturing, while the latter has slight advantage in electricity distribution & control apparatus. Germany emerges as a clear leader in both the categories having labour productivity more than four times than both the competing countries. This is due to Germany's higher gross value added which is achieved with lesser workforce.

The labour productivity in India is less as compared to China and Germany. In India the labour factor proportion is low (approximately 7 to 21 per cent) in the total factor usage, which does not translate into a significant relative advantage. Inflexible and restrictive labour policies have also eroded this advantage partly.

India also lacks in automation in electrical machinery sector. In case of China, the automation is aided by the government’s focus on standardisation; the government lays out the basic design and all firms manufacture as per the set standards. Thus, automation in China becomes much cheaper and easier with minimal changeover time and expenditure. Chinese players can produce more from the same machines and whole process time comes down, thereby enjoying a competitive edge.

2. Process Plant Equipment



Source: UNIDO’s Statistical Country Briefs

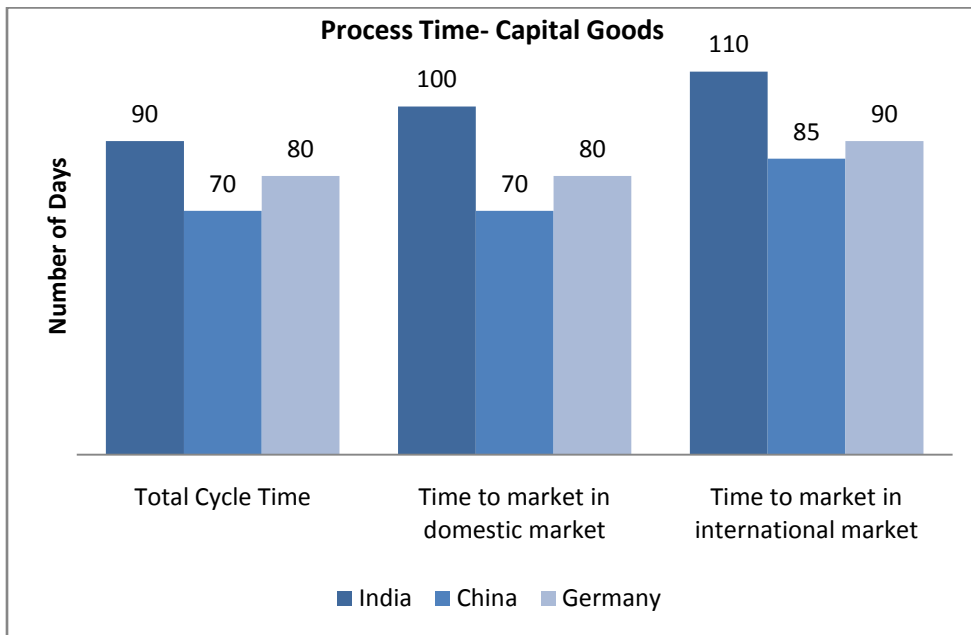
China has slight advantage over India in labour productivity for process plant equipment segment while Italy is the leader in labour productivity in this segment. Italy has been able to achieve gross value added of almost eight times that of India with almost same level of workforce.

There exists huge gap in the availability of skilled manpower in the process plant equipment manufacturing industry. The workers lack skills in welding and fitting which are primary skills required in this sector. Overall, there is very limited understanding of metallurgy which is a primary requisite for this sector. Further, contract labour laws restrict Indian companies to employ contract labour who have proven to be more productive in countries like China. Moreover, the number of ITI’s across the country is not adequate.

Process Time - Capital Goods

Process time is a very important parameter for competitiveness as it is indicative of the overall time a firm uses for production and delivery to the target market. Countries which are able to achieve faster turnaround time and have quicker time to market usually enjoy competitive advantage in the market. Various parameters which are considered for comparison in this section are: Average time taken for exports/imports clearance and Average stock in hand (average inventory held by a firm in terms of number of production days)

India stands at clear point of disadvantage as compared to competing countries (China, Italy& Germany) because of higher process time as depicted in the charts below:



Source: Dun & Bradstreet Analysis

As can be seen from the graph, the average time taken to market electrical equipment in India in the domestic market as well as international market is high as compared to China and Germany. Also the total cycle time in India is high. This clearly depicts India’s competitive disadvantage in the sector.

India has high value of stock in hand (30 days) signifying the inefficiency in production process. This would also mean that working capital would be blocked in inventory for a larger period of time. Indian firms need to reduce the levels of inventory and work towards just in time production process to have competitive advantage over competing countries.

The insufficient logistics support to the industry in terms of transportation of raw materials and aggregates, lack of quality power supply, lack of quality water supply etc. have added to the operating cost and eroded the competitive advantage of the domestic players with respect to overall production cycle time and overall time to market.

There also exists problems in transporting heavy and Over Dimensional consignments (ODC) on NHAI bridges. As per procedure, various zonal railways are involved in giving clearances for the movement of such ODC's. This leads to delay in projects and congestion at ports further delays delivery.

Any electrical equipment weighing more than 32 MT needs to be transported via vehicles with hydraulic axles only (hydraulic trailers). However, availability of hydraulic axles is limited, as India does not have many domestic manufacturers of same. 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.

It must be mentioned that most of the capital goods are not supplied off-the-shelves and are custom made to suit the requirements of end users. Thus, the delivery schedule to cater to the order is longer than many other engineering products. However, due to various reasons, including infrastructure constraints, the delivery schedules of Indian capital goods suppliers are longer than their foreign counterparts. 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 affecting the overall competitiveness in delivery schedules. The quality of infrastructure (transport, communication, power) is poor, hence companies tend to loose on delivery schedules. In such circumstances, imported capital goods are preferred over Indian capital goods again leading to increased costs and loss of competitiveness.

There are issues with testing laboratories in India especially with respect to power equipment. Most of this equipment has to be sent to Netherlands, which not only increases costs but leads to delays in overall time to market.

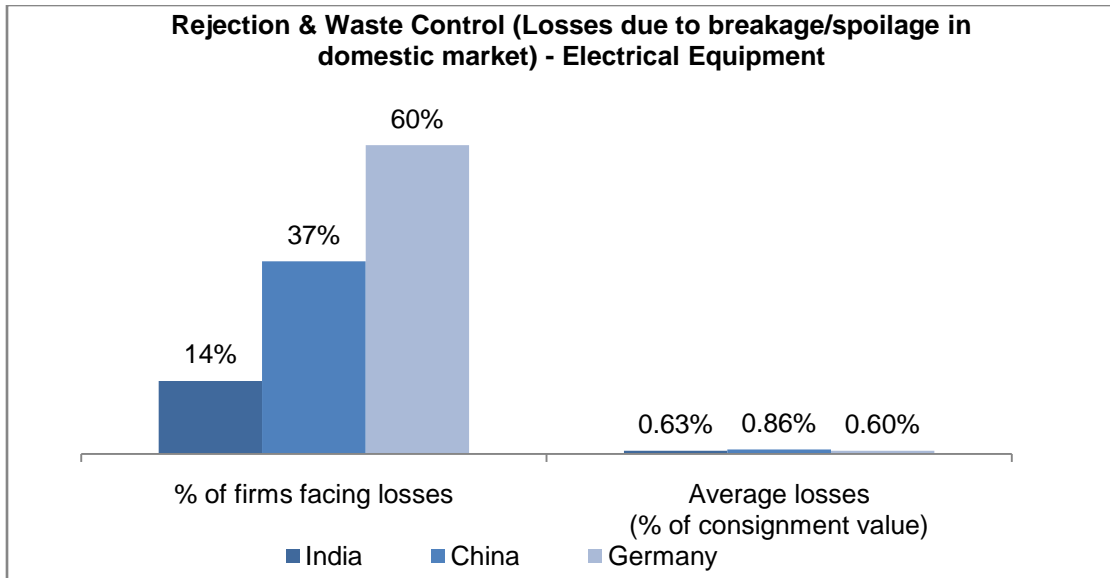
Chinese manufacturers take less time in manufacturing the products and have access to better infrastructure in terms of roads, rail line, and air and sea ports.

India also has a disadvantage in terms of exports and imports clearances. In the case of imports of raw materials, there exists excess paper work and regulations, which are often cumbersome. Moreover, the checking system and other procedures for exports as well as imports take huge time. This leads to delay in the overall production process.

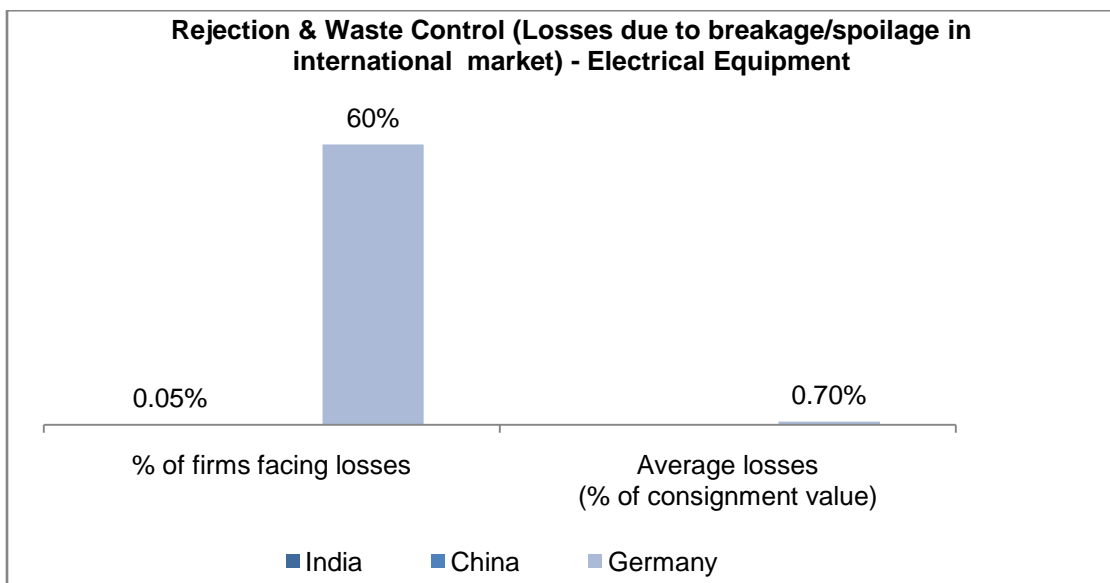
Rejection & Waste Control – Capital Goods

In this section, wastage/losses due to breakage or spoilage have been analysed for India vis-à-vis competing countries. The endeavour of firms has been to keep the rejection and waste to the minimum as it is an extra overhead cost for a firm. The charts below depict India's comparative advantage against competing countries in rejection & waste control process.

1. Electrical Equipment



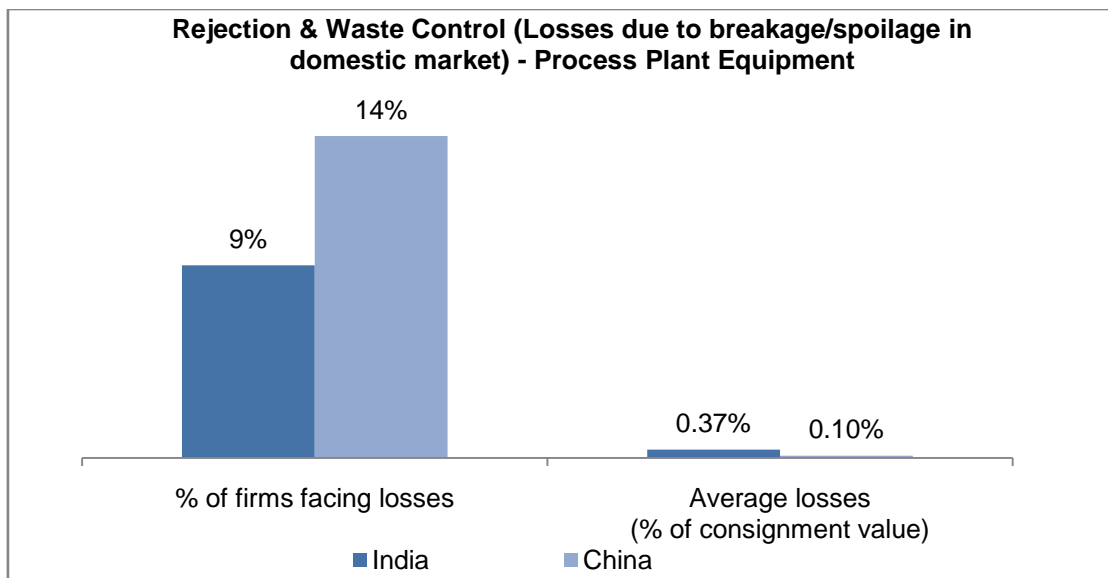
Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

As evident from the charts, India is marginally better in terms of number of firms facing losses due to breakage/spoilage for the finished product in the domestic market and far better in the international markets. In terms of value of losses though, Indian firms have been suffering marginally higher losses as compared to Germany in the domestic market. Although Germany has high percentage of firms facing losses in international market but their average losses is very low.

2. Process Plant Equipment



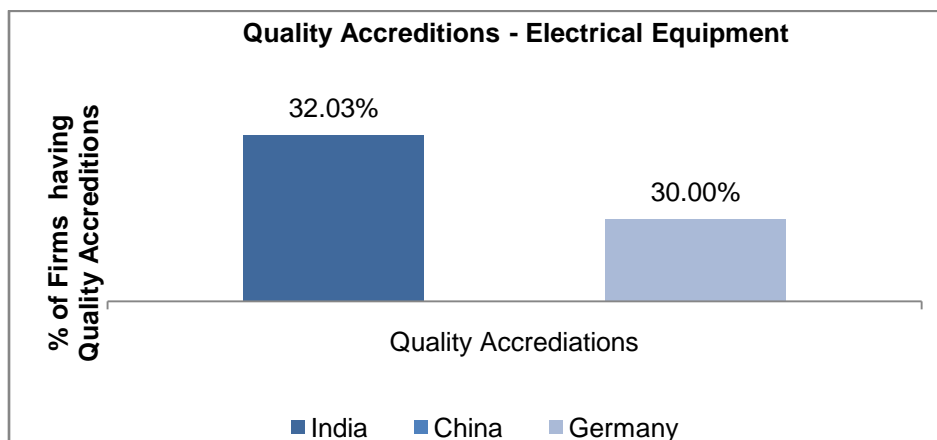
Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

As evident from the chart, India is doing better in terms of number of firms facing losses due to breakage/spoilage for the finished product in the domestic market as compared to China. In terms of value of losses though, Indian firms have been suffering marginally higher losses as compared to China.

Quality Accreditation – Capital Goods

Quality accreditation is an important parameter for competitive advantage as it enables a firm to increase its market reach. Most of the buyers use quality accreditation as a parameter to evaluate a supplier and in some cases they have a mandate to buy only from firms with desired accreditation. Further, quality accreditation has direct impact on productivity as it would require tightening up of processes and giving away inefficiencies. India’s comparison on quality accreditations with competing countries is depicted in the graph below:

1. Electrical Equipment



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

*Germany’s 30% accreditations only include firms which gave got certification last year

In India, only 32% of the total firms have received quality accreditations till date, whereas in case of Germany, about 30% of the firms received quality accreditation in one year itself.

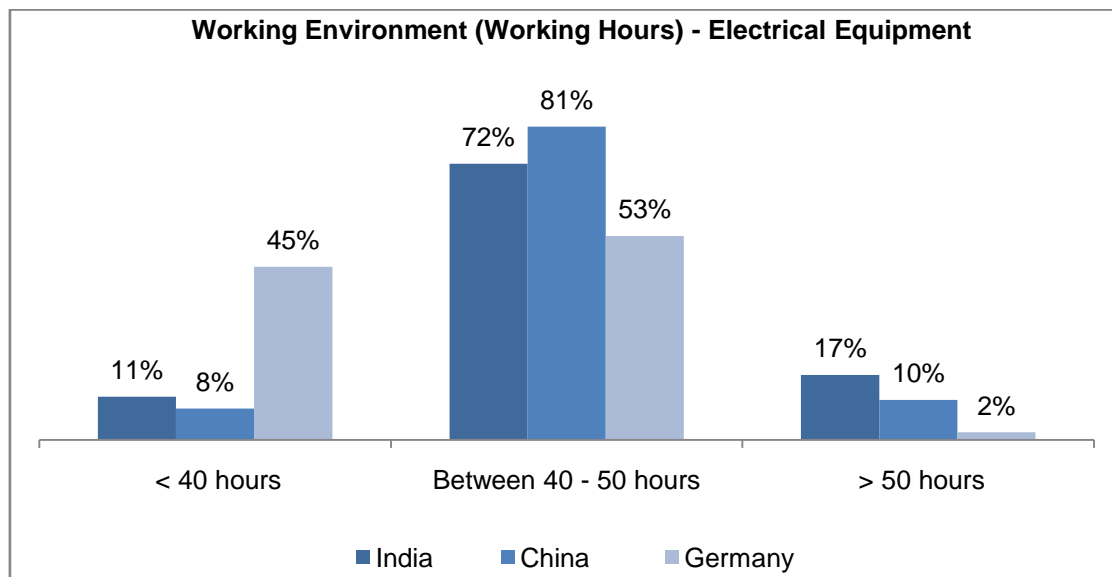
2. Process Plant Equipment

Only 27.6% of Indian companies have got quality certifications in the segment. However, most of the firms get basic ISO certifications. There is no Indian certification that is globally accepted. Hence, firms need to send products overseas to countries like Korea and Netherlands for quality testing.

Working Environment - Capital Goods

The work environment has a huge effect on the performance of employees which in turn impacts the overall productivity of the firm. The type of work environment in which employees operate determines the way in which such enterprises prosper. In this section, India's work environment has been compared to competing countries (China & Germany) by evaluating the working hours in firms within these countries:

1. Electrical Equipment



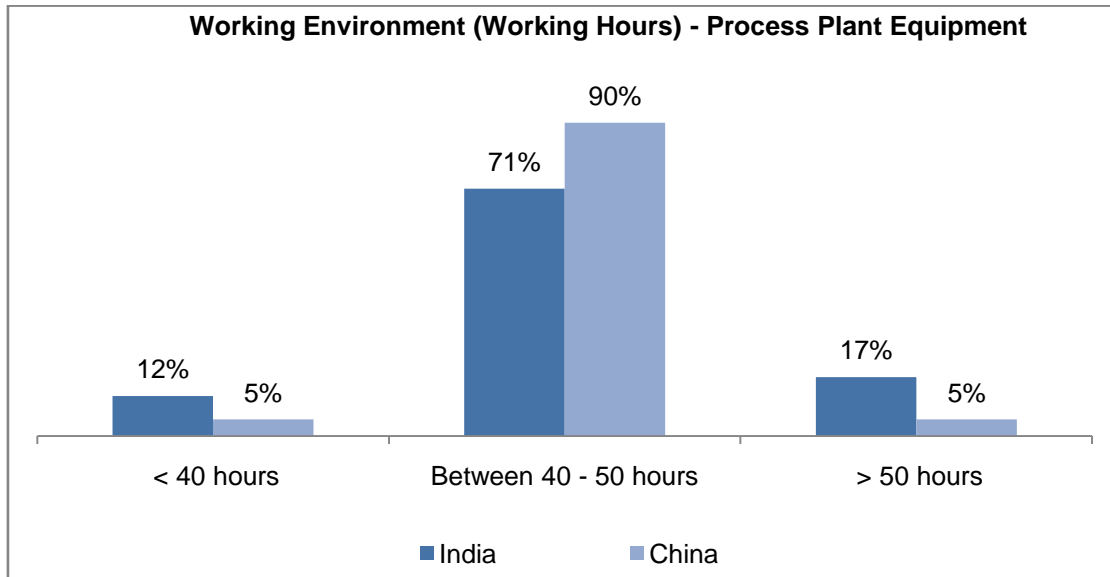
Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

Most of the countries exhibiting higher productivity have strong labour laws and maintain average working hours of below 50 hours per week. As depicted in the chart above, India has higher chunk of firms that maintain average working hours per week of 50 and below. India lags behind both China and Germany as it has very high percentage of firms having working hours of more than 50 per week. Further to this, around 54% Indian firms are using more than 10 year old machinery for production which is another problem area as these machines are generally not highly energy efficient. Further, this also impacts the overall manufacturing productivity of the firms.



Decide with Confidence

2. Process Plant Equipment



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

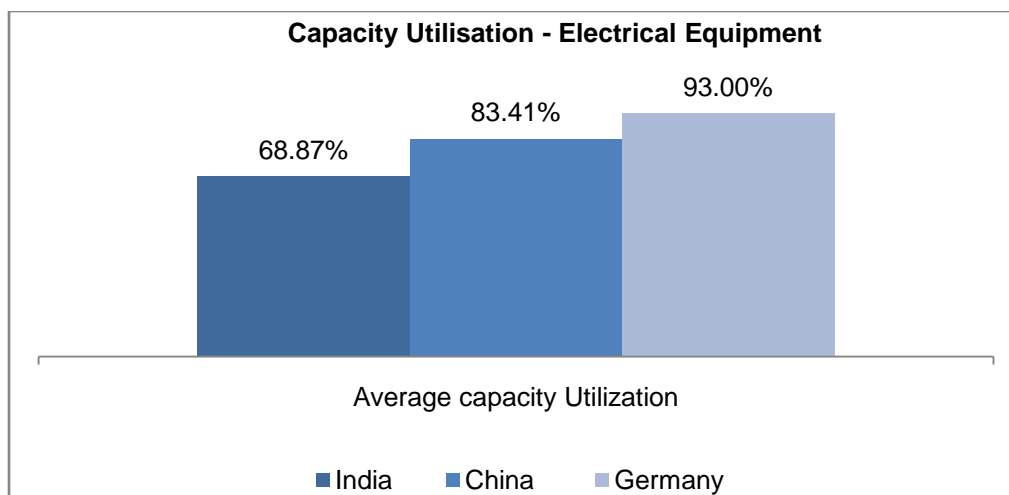
Most of the countries exhibiting higher productivity have strong labour laws and maintain average working hours of below 50 hours per week. As depicted in the chart above, India has lesser chunk of firms that maintain average working hours per week of 50 and below as compared to China. India lags behind China as it has relatively higher percentage of firms having working hours of more than 50 per week. Further to this, around 49% Indian firms are using more than 10 year old machinery for production which is another problem area as these machines are not highly energy efficient. Further, this also impacts the overall manufacturing productivity of the firms.

Capacity Utilization - Capital Goods

Capacity utilization is a metric used to measure the rate at which potential output levels are being met or used. Displayed as a percentage, capacity utilization levels give insight into the overall slack that is in the economy or a firm at a given point in time and refers to the extent to which an enterprise or a nation actually uses its installed productive capacity. Thus, it refers to the relationship between actual output that 'is' produced with the installed equipment and the potential output which 'could' be produced with it, if capacity was fully used.

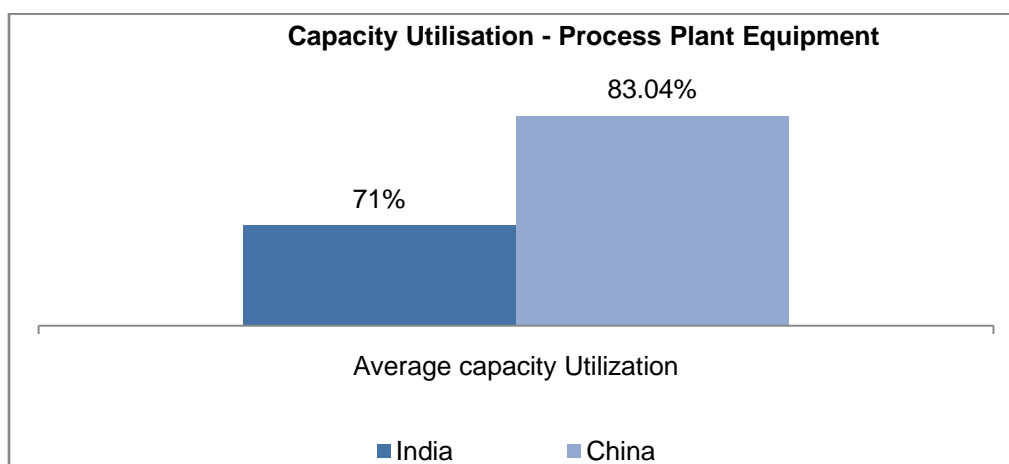
1. Electrical Equipment

India's comparative disadvantage as compared to competing countries (China and Germany) in capacity utilization is shown in the graph below:



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

2. **Process Plant Equipment**



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

As depicted in the chart above, India is lagging behind all the competing countries in capacity utilization while Germany exhibits highest capacity utilization. This means that Indian firms are not producing to the full potential of installed equipment, thus signifying that for the same run of plant & machinery, Indian firms are producing less than competing countries viz. China & Germany. This could be attributed to many reasons such as predominance of old machinery & equipment, power & electricity outages, etc.

The technological competitiveness of the Indian Capital Goods sector is low. Indian Capital Goods firms present a full spectrum of technological capabilities - while there are a few firms close to the international frontier in terms of product design capability and process technology, technological capabilities of most players are extremely limited.

In the case of Indian Capital Goods manufacturers, the number of skilled personnel with design and engineering skillsets is about 20 to 50 per cent less than in other industrialized countries. Although Indian firms are capable of achieving high levels of precision, they are unable to produce high quality products

due to lack of supporting process technologies such as precision measuring, material engineering and process control.

The technological capabilities of a large number of players, especially in the SME sector, who provide components or intermediates to original equipment manufacturers, are limited.

The cost of capital remaining high, processors in Small scale sectors tend to select machinery primarily based on price. They end up choosing low to medium technology machines and sometimes opt for used machinery. Soon it proves to be a bad investment as these processors incur high operating cost, consume higher energy as well as lose on productivity.

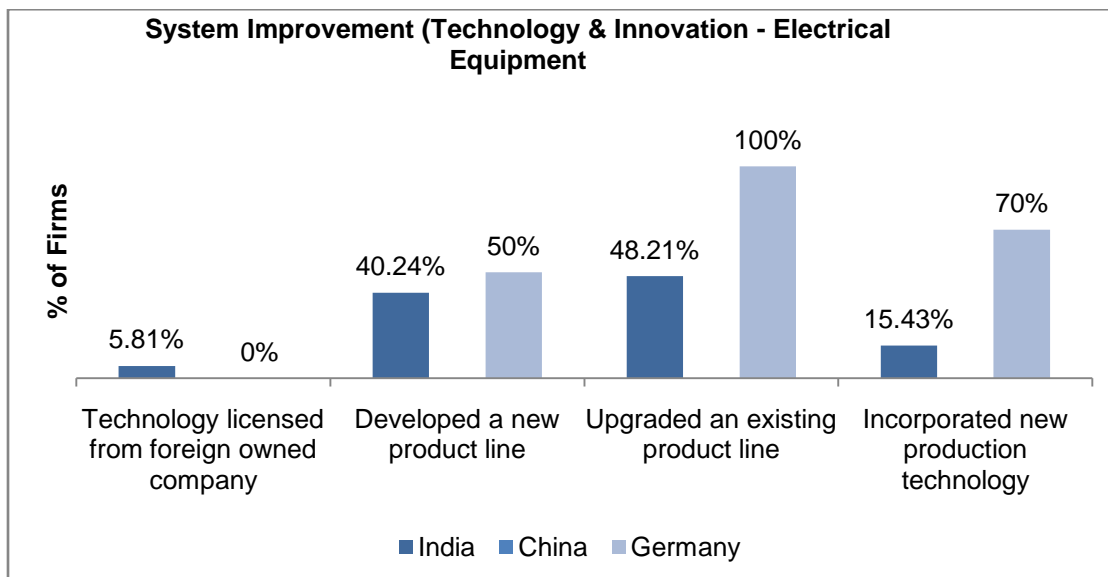
India also lacks in automation in electrical machinery sector. In case of China, the automation is aided by the government’s focus on standardisation; the government lays out the basic design and all firms manufacture as per the set standards. Thus, automation in China becomes much cheaper and easier with minimal changeover time and expenditure. Chinese players can produce more from the same machines and whole process time comes down, thereby enjoying a competitive edge.

System Improvement – Capital Goods

This section examines the extent of innovation and technology being employed by the firms which leads to overall improvement in production systems and has direct impact on productivity and ensures sustainability of the same in the long run. Various parameters used for comparison are: Development/Up-gradation in product line or production technology, Investment in research & development and investment in training & development of employees.

1. Electrical Equipment

India stands at clear point of disadvantage as compared to competing countries (China & Germany) in system improvement efforts as depicted in the chart below:



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank



As evident from the chart above, India is lagging behind Germany 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 that there is a need of product as well as process innovation in Indian Electrical Equipment industry

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.

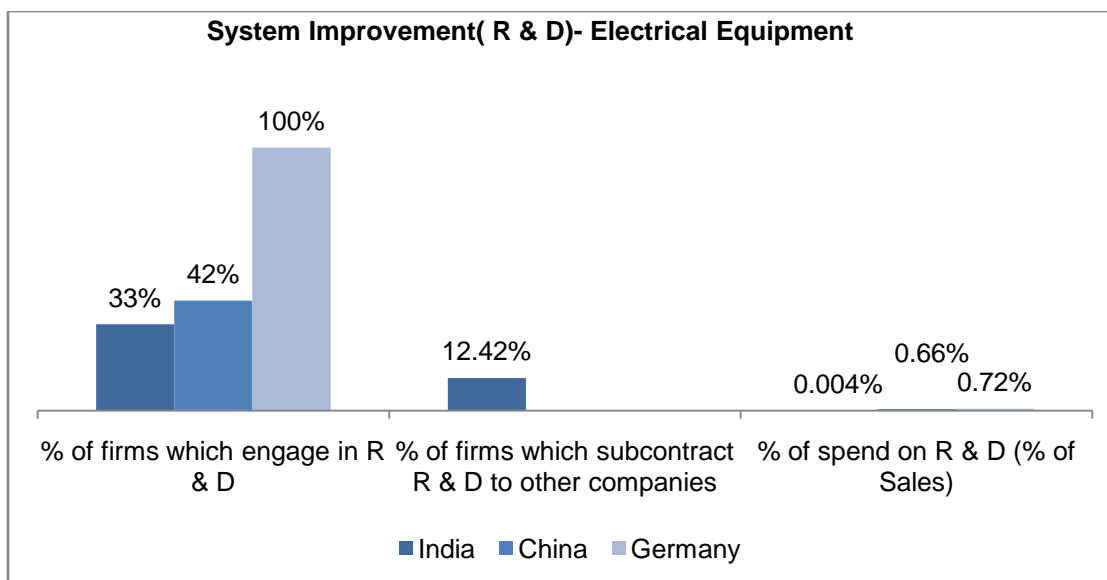
There is slow pace of absorption of new technology by Indian manufacturers of electrical equipment, and also user industries, and low investment in research & development (R&D). According to estimates, less than 1% of the annual turnover of the industry is invested in R&D. Buying practices of utilities do not encourage innovations and R&D. As a result, main focus of the manufacturers of electrical equipment is on cutting costs and not on innovative technologies, on piecemeal short-term tactical measures rather than evolving any strategic action plan for their growth and development. Indian manufacturers need to improve their price competitiveness, adopt global quality benchmarking and meet evolving global standards for efficiency, rapidly absorb new technologies, undertake continuous R&D and innovation and establish a global footprint by building Brand India.

Indian Capital Goods firms' operational efficiencies are comparatively low. Very few Indian firms use technology to make their business processes like procurement, distribution, marketing and servicing more efficient. Also the use of techno-managerial processes like JIT, TQM, TPM etc. are limited to large firms only.

The development of Integrated Machine tool parks in countries like Taiwan, China, Korea have propelled their growth in becoming some of the largest machine tool and equipment producing countries despite a limited local market.

In China, the leading enterprises of Capital goods industry benefit from the government policies such as the "local procurement policies". At the same time banks also provide financial support to the companies. Under the "local procurement" policy, the government gives preference to domestically-produced electrical equipment and products. Products with Chinese-owned intellectual property and brands are given preference for government procurement contracts.

China also has better infrastructure leading to lower cost of power, transportation & cluster approach helping in specialization of labour & engineering skills.



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

India is lagging behind the competing countries (China & Germany) in research & development efforts by a huge margin, with not even half of the Indian firms as compared to Germany actively participating in research & development efforts. Moreover, the average spend on research on development per firm is also very miniscule to make an impact on the innovation & system improvement capability of the firm.

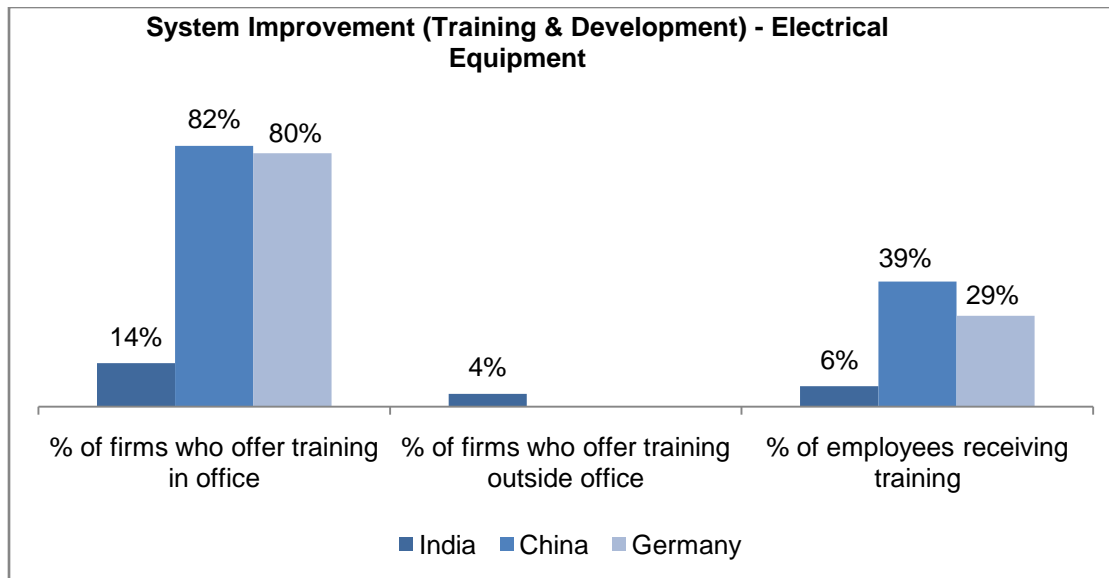
The domestic Electrical Equipment industry, comprising of a large number of SMEs, spends about 0.5% of sales on R&D. This is very low as compared to international competitors who spend as much as 5-6% of their sales on R&D.

In Electrical industry, there is very little R&D done as there is no government support. For e.g. In Transformers & Switchgear industry, the firms need to do "Type Testing" on their products as per relevant Indian Standards (IS) or International Electro technical Commission (IEC). However in India, there are only 2 state-run labs which perform these tests. The Labs, called Central Power Research Institute, are in Bhopal and Bangalore. These labs can conduct type test up-to 250 KV but unfortunately very little modernization has been done in these labs.

Also the cost of these "type test" is very high – cost ranges from US\$ 20,000-US\$ 30,000 million to US\$ 120,000- US\$ 140,000. These labs are very ill maintained and machines are largely outdated. Thus, companies in India have to go to either Korea or Holland to get the product tested. Although tests in Korea and Holland are cheaper but the overall costs is high due to freight and other charges involved.

Germany is a world leader in terms of R&D investment as a share of GDP, with a figure of 2.8%, outperforming the EU-27 average of 2.1% (2009). The Machinery & Equipment industry is one of the most innovative sectors 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 EUR 13 billion in 2008.

Whereas in India, the infrastructure is poor and there is inadequate investments in R&D to improve the situation. Lack of domestic demand for electrical and power equipment due to failure in implementation of planned power and infrastructure projects has dented domestic firms' revenues, thereby reducing their competitiveness.



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

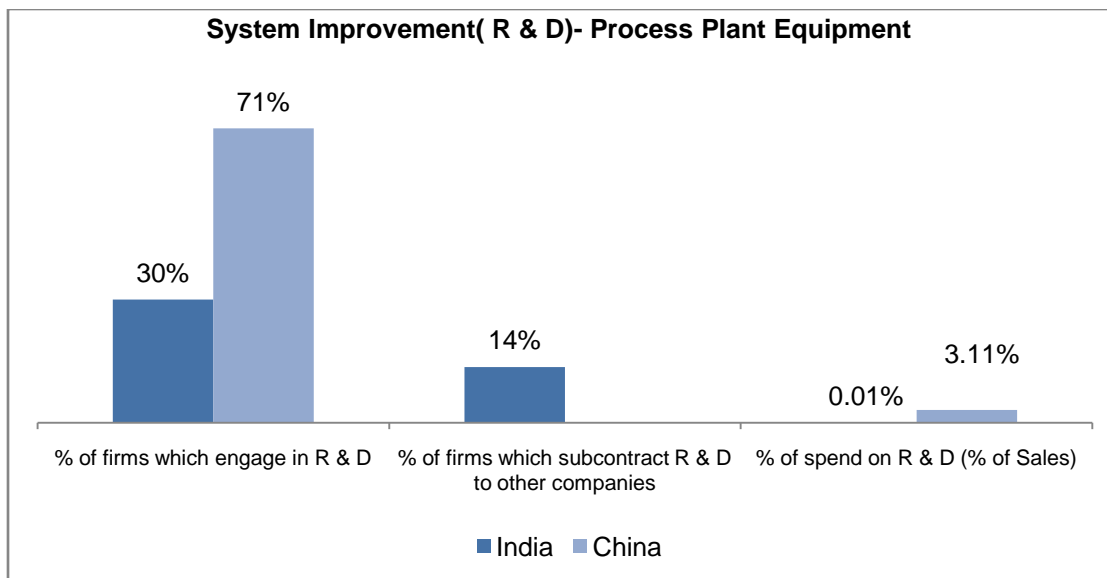
India is lagging behind the competing countries (China, & Germany) in training & development efforts by a huge margin, with not even twenty percent of the Indian firms as compared to China & Germany actively participating in training & development of employees. Moreover, the average number of employees receiving training per firm is also very miniscule to make an impact on the innovation & system improvement capability of the firm.

Germany continues to be the top location for production of high-end complex electrical equipment and components. Almost 800,000 highly-skilled employees helped generate total revenue of EUR 159 billion in 2010. New technologies such as flat panel displays, flexible displays and printed electronics has fuelled the growing demand for machinery and automation systems.

In the case of the Indian Capital Goods manufacturers, the human resources devoted to design and engineering activity is about 20 to 50 per cent less than in other industrialized countries. Firm level innovation is very low in India. Indian Capital Goods firms source technology, but very few of them improve upon it. There is limited number of ITI's and training institutes across the country; addition of such institutes across the country would help in imparting the required competitive skills.

2. Process Plant Equipment

India stands at clear point of disadvantage as compared to competing countries (China) in system improvement efforts as depicted in the charts below:

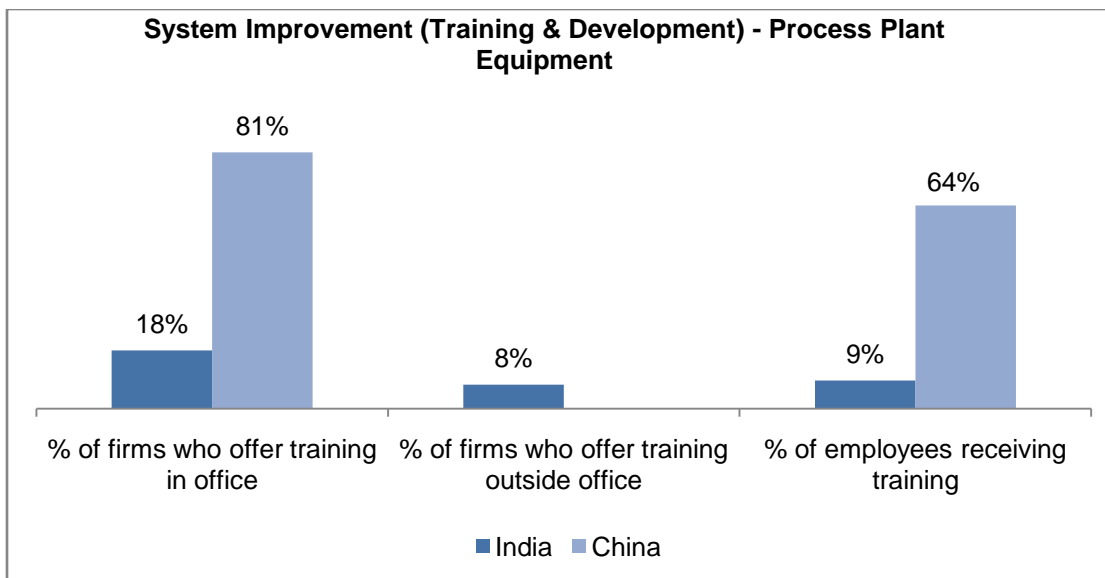


Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

India is lagging behind the competing countries (China) in research & development efforts by a huge margin, with not even half of the Indian firms as compared to China actively participating in research & development efforts. Moreover, the average spend on research on development per firm is also very miniscule to make an impact on the innovation & system improvement capability of the firm.

Although the process plant equipment industry does invest in product development, there is no significant investment in technology development through R&D due to two reasons: lack of academic/R&D support institutions to undertake R&D and the high cost of R&D, especially in modern technology machine tools. While there have been new investments in machine tool units in the last ten years, these are not on a scale required to meet the rapidly increasing domestic demand, or to make India a significant global player.

In contrast, consistent policies in China regarding plants equipment and machinery with respect to R&D and technology innovation have helped many firms improve their competitiveness.



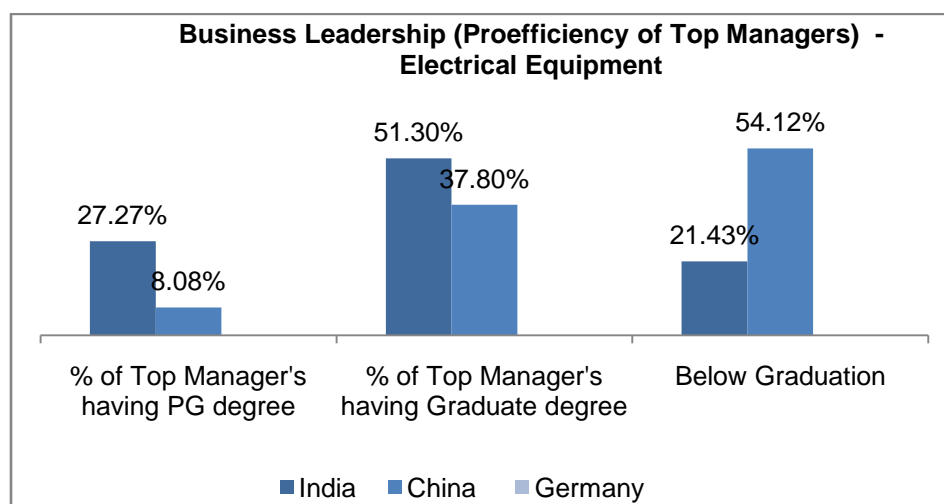
Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

India is lagging behind the competing countries (China) in training & development efforts by a huge margin, with not even twenty percent of the Indian firms as compared to Italy, China & Germany actively participating in training & development of employees. Moreover, the average number of employees receiving training per firm is also very miniscule to make an impact on the innovation & system improvement capability of the firm.

Business Leadership - Capital Goods

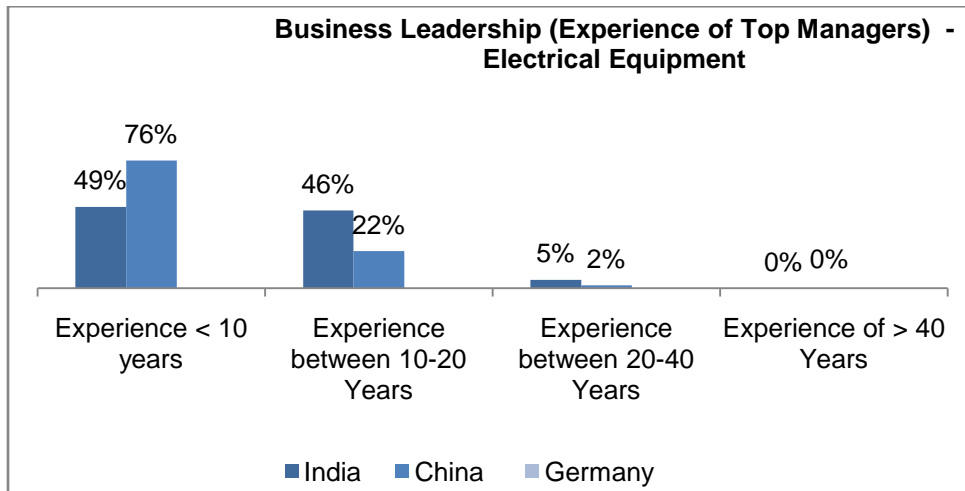
Effective business leadership is a critical element in any organization and impacts the overall organizational culture and plays an important part in productivity of the organization. Various parameters that have been compared in this section to measure business leadership are: Proficiency of top managers (measured by educational capabilities) and Experience of the top management.

1. Electrical Equipment



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

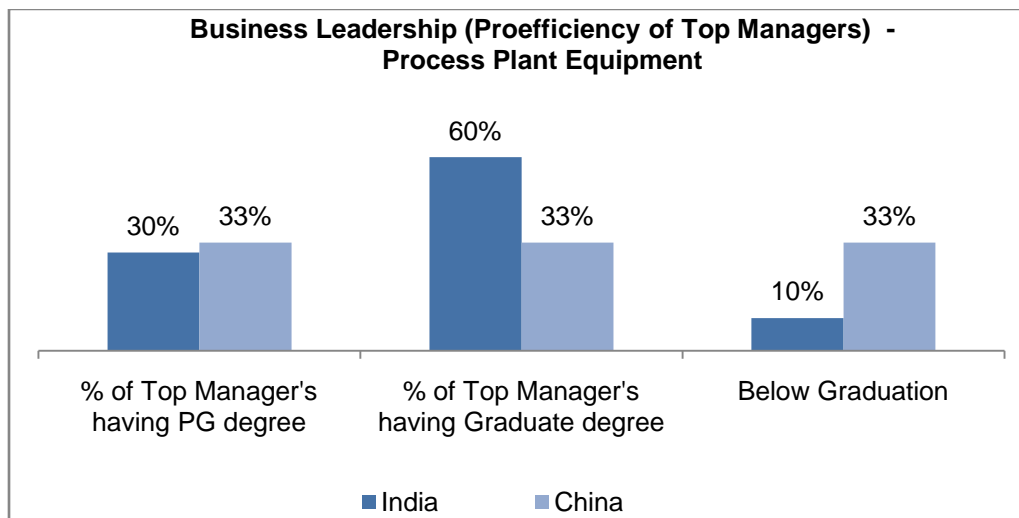
As evident from the chart above, India fares better than China with respect to percentage of top managers having higher education degrees with around 80% of Top managers having higher education degree as compared to 46% in China.



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

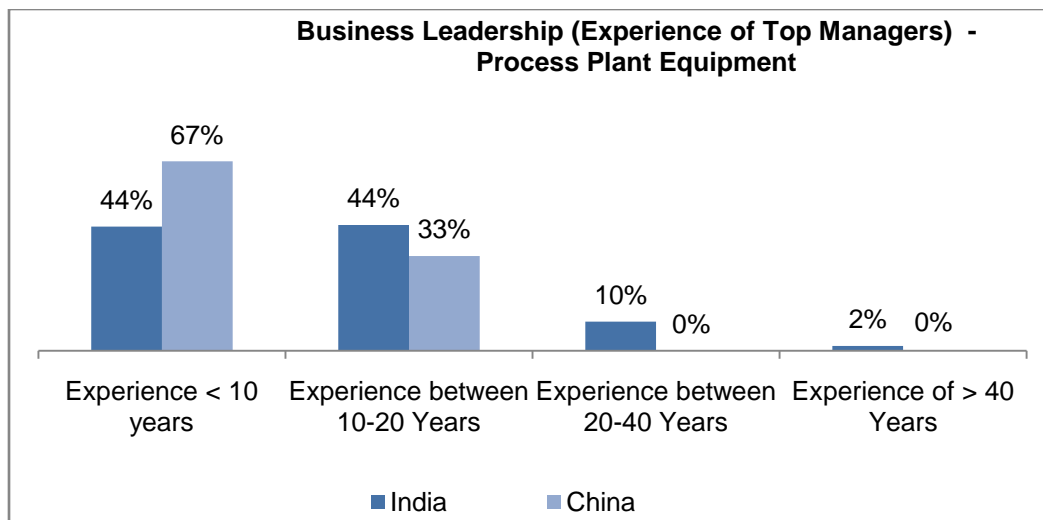
Indian firms have a fairly experienced top management as compared to other competing countries viz. China with around 46% of top management having experience of 10-20 years as compared to 22% of China

2. Process Plant Equipment



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

As evident from the chart above, India fares better than China with respect to percentage of top managers having higher education degrees with around 90% of Top managers having higher education degree as compared to 66% in China.



Source: Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank

Indian firms have a fairly experienced top management as compared to other competing countries viz. China with around 10% of top management having experience of 20-40 years.