



**FICCI Survey on
Emerging skill shortages in the Indian industry**

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Emerging skill shortages in the Indian industry

The Indian economy has been growing at a fast clip over the last few years. Figures show that after registering a robust growth of 8.5% and 7.5% in 2003-04 and 2004-05 respectively, the economy's performance further improved to 9.1% and 9.4% in 2005-06 and 2006-07. These figures indicate that the economy has indeed moved on to a 'new' and 'higher' growth trajectory. There has been a robust growth in manufacturing sector in almost all the segments and in high-end products particularly due to structural change. Services sector, including tourism and construction, continue to maintain double-digit growth. All these positive developments have however also resulted in apprehension about the emerging skill shortages due to mismatch between the demand for specific skills and available supply. Infact, of late, **shortage of skilled, semi-skilled and unskilled workers has emerged as a critical factor impacting the competitiveness** of Indian industry.

Skill shortages generally arise in the situations **(a)** when employers face difficulties in finding staff with the appropriate skills, experience or qualifications to fill vacancies, **(b)** when employers find that there are skill gaps as the existing employees lack the required skills, qualifications and experiences and **(c)** when employers are unable to recruit the required staff due to other factors like low remuneration, unsatisfactory working hours, distant location, dearth of sector-specific specialized skills. **The findings of the quick survey conducted by FICCI show that similar situations of skill shortages exists across many segments of the industry and economy of the country.** We have infact moved from a position where not only the technical qualified professionals in various streams are in short supply but there also exists an acute shortage of shop floor workers.



To get an impressionistic picture of the trades and professions, across different industries, where the demand supply gaps are huge and rising, FICCI conducted an industry wide survey. Based on the feedback received from individual companies as well as industry associations FICCI has identified for 20 sectors some key areas, which deserve immediate attention in terms of promoting skill development and meeting industry requirement.

The results of the survey, presented in the following pages, provide important insights into the areas where both the government and the industry need to focus their time and resources to address the issue at hand. Analysis of the responses received from various companies shows that **we should have a twin approach towards skill and human capital development. While development of ‘trades’ has a numerical aspect attached to it, development of ‘professions’ has a quality aspect attached to it.** On one hand the industry needs a large number of skilled workers to perform various functions at the shop floor, on the other hand the industry requires world-class professionals of excellent quality.

The twin requirements as mentioned above are important for **increasing technical absorption, reducing rejection levels and enhancing the quality level of products** both for the domestic market as well as for the international market. **Industry participant in the FICCI survey have reported that the basic building blocks for promoting innovation in the industry are the human resources.** Respondents to the FICCI survey have reported that the need to create a more skilled workforce for employment in high performance workplaces producing high quality / high value products and services has become an important priority. The country needs to commit itself to the development of a high and improved skills economy if it wants to prosper in an increasingly globalised world.

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Sr. No.	Sector	Trades short in supply	Professionals short in supply	Industry comments and suggestions / Projections
1	Biotechnology		<ul style="list-style-type: none"> ☉ Scientists ☉ Researchers ☉ Production staff ☉ Regulatory experts ☉ Legal experts ☉ Marketing professionals 	<ul style="list-style-type: none"> ⇒ In the case of Doctorate and Post Doctorate Scientists (Molecular Biology, Biochemistry, Biotechnology, Analytical chemistry) there is an acute shortage to the tune of 80%. ⇒ Companies face shortages of people with Masters degree in biotechnology to the tune of 20%. ⇒ In the case of production staff shortage exists to the tune of 18%. ⇒ In the case of regulatory and legal experts demanded by the industry shortage exists to the tune of 22%. ⇒ Companies have reported that on an average they have to spend Rs 2- 6 lacs per person per year on the training of candidates possessing Masters Degree in Biotechnology, Organic Chemistry / Biology. ⇒ According to industry representatives the government should put a lot of emphasis on increasing qualified professionals (particularly doctorates) in the following areas – molecular biology, biochemistry, biotechnology, assay development – biology, medicinal chemistry, analytical chemistry, synthetic organic chemistry. <p style="text-align: right;"><i>(Source – FICCI Industry Survey)</i></p>

2	Food processing	<p>Operations</p> <ul style="list-style-type: none"> ☉ Refrigeration mechanics ☉ Refrigeration plant operators ☉ Electricians ☉ Fitters 	<p>Plant operations</p> <ul style="list-style-type: none"> ☉ Production managers or supervisors to manage food production and processing facilities <p>R&D</p> <ul style="list-style-type: none"> ☉ Product development technologists to assist in designing, researching, and developing new food products ☉ Food engineers to design and manufacture machinery and packaging necessary for production of processed food that is safe and nutritious ☉ Research technicians to help government and university scientists in performing food related research <p>Food safety and quality assurance</p> <ul style="list-style-type: none"> ☉ Food microbiologists to assess the microbiological safety of foods and use microorganisms to develop new kinds of foods ☉ Quality assurance scientists to inspect and determine the quality of food in one or more stages of manufacturing 	<ul style="list-style-type: none"> ⇒ Shortage of refrigeration mechanics, electricians and fitters exists to the tune of 65%. ⇒ Shortage of food safety professionals exists to the tune of 70%. ⇒ Shortage of agricultural scientists exists to the tune of 60%. ⇒ There is a shortage of certificate holders and persons trained in short term courses. The infrastructure at existing organizations like FPTC, ITIs, NCDC, NABARD etc., needs to be strengthened so that need-based, application-oriented courses can be organized. These need to be strengthened in terms of infrastructure, faculty, course contents etc., to make them more effective in promoting need-based training for the FPI sector. ⇒ There are no specialized institutes for R&D and for imparting specialized skills in bakery, confectionery. At present, besides CFTRI, there are very few institutions, which provide qualified manpower for these sectors. These sectors being highly diversified and having great potential for development, need qualified and trained manpower across levels for various products like biscuits, cookies, snack foods etc. ⇒ At present, education facilities for wine manufacturing in the country are not available. There is an urgent need for providing qualified manpower for this sub-sector and reduce the manufacturing cost of wine so as to be able to compete in the global marketplace. ⇒ Foodgrain milling is a vast area and there is a need to start Milling Technology courses in other parts of the country. More institutions like CFTRI need to be established in the country. <p style="text-align: center;"><i>(Source – FICCI Industry Survey and Rabobank)</i></p>
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3	Oil and gas	<ul style="list-style-type: none"> ☉ ITI diploma holders Mechanical ☉ ITI diploma holders Electrical ☉ ITI diploma holders Civil 	<ul style="list-style-type: none"> ☉ Chemical engineers ☉ Electrical engineers ☉ Mechanical engineers ☉ Civil engineers ☉ Instrumentation engineers ☉ Finance professionals (CAs / MBAs) 	<i>(Source – FICCI Industry Survey)</i>
4	Environment	<ul style="list-style-type: none"> ☉ Fitters ☉ Welders 	<ul style="list-style-type: none"> ☉ Civil engineers ☉ Chemical engineers ☉ Chemists ☉ Environment scientists 	<i>(Source – FICCI Industry Survey)</i>

5	Health	<ul style="list-style-type: none"> ☉ Doctors ☉ Nurses ☉ Paramedics <ul style="list-style-type: none"> ▪ Radiographers ▪ Physiotherapists ▪ Radio-physicists ▪ ECG technicians ▪ OT technicians ▪ Audiometrists 	<ul style="list-style-type: none"> ⇒ Number of doctors available in the country in 2005 – 5,92,215. Current additions to the pool per year 22,000. Projected demand in 2012 – 1,200,000. ⇒ Acute shortage of doctors is expected over the next few years particularly anaesthetist, radiologist, gynaecologist and surgeons (particularly neurosurgeons). ⇒ Skills where large gaps would emerge over the next few years include basic cardiac life support, advanced cardiac life support and advanced trauma life support. ⇒ Number of nurses available in the country in 2005 – 929,826. Projected demand in 2012 – 1,109,826. ⇒ In the case of training imparted to nurses special focus should be given in the areas of OT, post dialysis training, trauma management, first aid training, basic cardiac life support, advanced cardiac life support and advanced trauma life support. ⇒ In the case of paramedics, shortages are likely to emerge in the case of radiographers, physiotherapists, radiophysicists, ECG technicians, OT technicians and audiometrists. <p style="text-align: right;"><i>(Source – FICCI Industry Survey)</i></p>
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6	Education		<ul style="list-style-type: none"> ☉ Faculty (particularly engineering and management) ☉ Non – teaching positions ☉ Library staff ☉ Technical staff 	<p>⇒ In central universities there is an acute shortage of faculty especially in disciplines like engineering, management, economics, computer science and IT. The shortage of faculty members in the aforementioned fields ranges from 25% to 40%.</p> <p>⇒ In the central universities even the non-teaching positions are difficult to fill. For example in University of Delhi, while the total sanctioned positions of non-teaching staff were 1824, only 1437 have been filled. Similarly, the total requirement of library staff was to the tune of 305 against which only 188 seats could be filled. In the case of technical staff, the total requirement in the University was 989 but only 759 seats could be filled.</p> <p>⇒ Even in the private sector educational institutions there is an acute shortage of faculty members in disciplines like engineering, management, computer science, electronics & communications, etc. The shortage of faculty members in the aforementioned fields ranges from 33% to 75%.</p> <p><i>(Source – FICCI Industry Survey)</i></p>
7	Information technology		<ul style="list-style-type: none"> ☉ Design engineers ☉ Software engineers ☉ Project engineers ☉ Programmers ☉ Chip designers ☉ Software developers ☉ Systems and network administrators ☉ ERP, CRM, SCM and SAP professionals 	<p>⇒ IT industry in India has the requirement of 350,000 engineers per annum against 150,000 highly skilled engineers available each year. It is estimated that there would be a shortfall of 500,000 technology professionals by 2010.</p> <p>⇒ There is demand for 8,000-10,000 engineers in the embedded software and chip design space, but the supply is just a third of that number. In the wireless segment, there is an annual shortfall of 8,000 engineers.</p> <p><i>(Source – FICCI Industry Survey)</i></p>
8	Civil aviation		<ul style="list-style-type: none"> ☉ Pilots ☉ Air traffic controllers ☉ Ground handling staff ☉ Aeronautical engineers 	<p>⇒ India would need 5400 pilots by the end of the 11th Five Year Plan. Thereafter, there would be requirement of at least 150 pilots per year as replacements for retirements and normal attrition.</p> <p>⇒ India would need approximately 1150 controllers and an additional 1000 new personnel between 2005 and 2015 to keep up with the increasing number of flights and the new airports.</p> <p><i>(Source – Working group on Civil Aviation for the 11th Five Year Plan)</i></p>

9	Textiles	<ul style="list-style-type: none"> ☉ Sewing machine operators ☉ Cutters ☉ Testers, sorters, samplers ☉ Packaging and filling machine operators ☉ Textile machine bleaching and dyeing machine operators ☉ Pressers 	<ul style="list-style-type: none"> ☉ Textile engineers (machinery design) ☉ Production engineers ☉ Extruding and forming machine setters ☉ Fashion designers ☉ CAD designers ☉ Management professionals ☉ Retail sales professionals 	<p>⇒ About one million new jobs would be created in the textiles sector over the next few years with a projected investment of over 90,000 crore.</p> <p><i>(Source – FICCI Industry Survey)</i></p>
10	Mining	<ul style="list-style-type: none"> ☉ Electricians ☉ Overman ☉ Foreman (electrical) ☉ Foreman (mechanical) ☉ Dragline operator ☉ Shovel operator ☉ Dumper operator ☉ Dozer operator ☉ Fitter (mechanical) ☉ Crane operators ☉ Turner / welder 	<ul style="list-style-type: none"> ☉ Mining engineers ☉ Metallurgical engineers ☉ Chemical engineers ☉ Geologists ☉ Mine surveyor / analyst ☉ Drilling engineers 	<p><i>(Source – FICCI Industry Survey)</i></p>

11	Engineering / Heavy equipment and machinery	<ul style="list-style-type: none"> ☉ Mechanical drafters ☉ Computer control machine tool operators ☉ Machinists ☉ Tool and dye makers ☉ Assemblers and fabricators ☉ Shapers ☉ Supervisors ☉ Boiler attendant 	<ul style="list-style-type: none"> ☉ Industrial engineers ☉ Mechanical engineers ☉ Electrical engineers ☉ Combustion engineers ☉ Instrumentation and control engineers ☉ Piping engineers ☉ Structural / concrete engineers ☉ Geotech engineers ☉ Architects ☉ Designers with 3D working capabilities ☉ IT engineers for utilities oriented software capabilities 	<p><i>(Source – FICCI Industry Survey)</i></p>
12	Automotive industry	<ul style="list-style-type: none"> ☉ Maintenance workers ☉ Dye and tool makers ☉ Industrial truck and tractor operators 	<ul style="list-style-type: none"> ☉ Automobile engineers ☉ Rubber technologists ☉ Mechanical engineers ☉ Electrical engineers ☉ Service engineers 	<p>⇒ The industry would require about 2.5 million workers in all categories over the next few years.</p> <p style="text-align: center;"><i>(Source – FICCI Industry Survey)</i></p>
13	Plastics	<ul style="list-style-type: none"> ☉ Boiler attendant 	<ul style="list-style-type: none"> ☉ Chemical engineers ☉ Coating technologists ☉ Dye and tool makers ☉ Plastics and injection moulding engineers 	<p><i>(Source – FICCI Industry Survey)</i></p>

14	Banking and Finance		<ul style="list-style-type: none"> ☉ Risk management professionals ☉ IT – professionals for programming, security management, delivery channel, DBA, support and system ☉ Forex / Treasury management professionals ☉ Credit operations professionals ☉ Insurance professionals ☉ Financial analysts ☉ Wealth managers ☉ Economic and planning analysts 	<p>⇒ Responses received from companies from the banking and finance sector show that in the year 2006 companies faced an acute shortage in several professional categories –</p> <p>Risk managers – Shortage to the extent of 90% IT professionals – Shortage to the extent of 65% Treasury managers –Shortage to the extent of 50% Credit operations professionals –Shortage to the extent of 75% Financial analysts – Shortage to the extent of 80% Wealth managers – Shortage to the extent of 80% Economic and Planning analysts – Shortage to the extent of 80%</p> <p><i>(Source – FICCI Industry Survey)</i></p>
15	Insurance		<ul style="list-style-type: none"> ☉ Actuaries ☉ Insurance underwriters ☉ Chartered accountants ☉ Legal professionals 	<p><i>(Source – FICCI Industry Survey)</i></p>
16	Retail		<ul style="list-style-type: none"> ☉ Customer care and sales executives ☉ Category / line / floor managers ☉ Merchandisers ☉ Visual merchandisers ☉ Store managers 	<p>⇒ Responses received from companies from the sector show that in the year 2006 companies faced shortage in the following professional categories –</p> <p>Operations / shop floor executives – Shortage to the extent of 20% Visual merchandisers – Shortage to the extent of 50% Purchase managers / Merchandisers – Shortage to the extent of 30%</p> <p><i>(Source – FICCI Industry Survey)</i></p>

17	Pharma	<ul style="list-style-type: none"> ☉ Boiler attendants ☉ Electricians ☉ Fitters ☉ ITI attendant operator for chemical plants ☉ ITI instrumentation technician ☉ Machine maintenance workers ☉ Wimco machine operators 	<ul style="list-style-type: none"> ☉ Quality assurance professionals ☉ Quality control professionals ☉ Process development chemists ☉ Regulatory affairs experts ☉ Formulations development experts ☉ Aerosol development experts ☉ API research scientists and discovery / NCE scientists ☉ Biologics professionals ☉ IPR and legal experts (for regulated markets) ☉ Bio-Analytical research professionals ☉ Packaging development professionals ☉ Supply chain specialists ☉ Clinical research professionals ☉ Mechanical engineer ☉ Electronics and instrumentation engineers ☉ Medical representatives 	<p>⇒ Responses received from the companies from the sector show that in the year 2006 the shortage in different professional categories was to the extent of</p> <p>Quality control and quality assurance officers (BSc / MSc Chemistry) – 30% Regulatory officers (B Pharm / M Pharm) – 50% Process development chemists (MSc) – 55% API research scientists – 35% IPR and legal experts – 40% Packaging development professionals – 30%</p> <p>⇒ The industry believes that for solving the problem of skill shortages the pool of experienced B Pharma, D Pharma, MSc (Organic chemistry) and MSc (Analytical chemistry) professionals needs to be enhanced.</p> <p><i>(Source – FICCI Industry Survey)</i></p>
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18	Chemicals	<ul style="list-style-type: none"> ☉ Attendant operator chemical plant (AOCP) ☉ ITI – Electrical ☉ ITI – Instrumentation ☉ Boiler operators and attendants 	<ul style="list-style-type: none"> ☉ Chemical engineers ☉ Electrical engineers ☉ Instrumentation engineers ☉ Research scientists ☉ R&D IPR specialists ☉ Regulatory affairs experts ☉ Project design / execution managers ☉ Quality control professionals 	<p>⇒ Responses received from the companies from the sector show that in the year 2006 the shortage in different professional categories was to the extent of</p> <p style="margin-left: 20px;">R&D IPR specialists – 40%</p> <p style="margin-left: 20px;">Regulatory affairs experts – 30%</p> <p style="margin-left: 20px;">Process engineers – 25%</p> <p style="margin-left: 20px;">Project design / execution managers – 25%</p> <p style="margin-left: 20px;">Engineers – Utilities – 15%</p> <p style="text-align: right;"><i>(Source – FICCI Industry Survey)</i></p>
19	Paper		<ul style="list-style-type: none"> ☉ Forestry experts ☉ Paper makers ☉ Coating experts ☉ De-inking experts ☉ Extension experts 	<p>⇒ Only about 5 out of a total of 607 engineering colleges in the country offer a degree course in paper technology</p> <p>⇒ Only 6 out of 1118 polytechnics offer diploma in pulp and paper</p> <p style="text-align: right;"><i>(Source – FICCI Industry Survey)</i></p>
20	Glass	<ul style="list-style-type: none"> ☉ Fitters ☉ Machinists ☉ Diesel mechanics ☉ Turners 	<ul style="list-style-type: none"> ☉ Glass bottles production engineers 	<p style="text-align: right;"><i>(Source – FICCI Industry Survey)</i></p>