FICCI

Skills & Jobs Pre & Post Covid Perspective

Manufacturing Lens



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Executive Summary

Even before the pandemic, there were discussions around implications of Industry 4.0 on **'Future of Work'**. We were also in the midst of a reversal of globalization, which was earlier, one of the largest enablers of job creation in emerging markets. This was being de-accelerated by the increased adoption of exponential technologies by developed markets, and protectionist measures that were affecting the flow of goods, services, labor, and capital. Covid-19 has further affected every aspect of the economy, regardless of manufacturing and services. The biggest challenge faced by the organizations, especially manufacturing, for recovery will be getting back to work and 're-imagine work' as we embrace the new digital reality.

There is no denying that future has arrived sooner than anticipated as many countries and sectors have shifted to remote working in order to contain the transmission of COVID-19, dramatically changing how we work. The growth in computing speed and storage is making virtual and global collaboration possible in many organisations. People across time zones and countries are able to work remotely while staying connected to their teams virtually via Skype, VoIP, email, and cloud-stored files. However, this transition is not uniform for every sector of the economy. Labour intensive manufacturing sector depends on large workforce on the shop floor for their operations. But new 'social distancing' norms would require different approach to resume manufacturing activities. Emerging new business models and swift shift towards producing healthcare & medical equipment would also require workers to be re-skilled and up-skilled.

In manufacturing sector, we could also witness mass adoption of technologies. Usage of Industrial Internet of Things (IIoT) was already on the rise, now shortage of shop floor manpower due to COVID-19 impact on migrant labourers, will fast track companies to integrate it to adapt to the new normal. Robots can play a vital role in reducing health risk for workers and optimizing assembly operations and improving manufacturing production cycles through their accuracy, speed, reach, and any material handling capacity. 3D Printing, Artificial Intelligence (AI) driven machines and Machine Learning will also be in demand. In fact AI will be integral to Future of Work. These changes in the sector, would require comprehensive effort to re-skill and upskill the existing workforce as well as the new recruits.

Despite all the odds there is no denying that Covid-19 has fundamentally 're-defined' the new work order. From Tele-Health to Robotic Process Automation and from Online Classes to Virtual Internship - Technology Transition is reshaping the consumer behavior patterns and business models. But as we get used to the 'New Normal', building secure digital infrastructure, capacity building, effective R&D collaboration between industry & academia, social & health orientation, ongoing data-driven future forecasting, talent mapping & tapping, building new decision making system frameworks etc would require immediate attention. A comprehensive approach of all the stakeholders will ensure better transition towards the approach of 'new habits and higher possibilities.



Summary of the Key Recommendations

Skilling, Re-Skilling & Up-Skilling on Industry 4.0 Technologies (Artificial Intelligence, Internet of Things, Block-Chain, 3 D Printing & Design, Augmented Reality & Virtual Reality, Robotics, Data Sciences, Quantum Computing and Cyber Security) along with the enforcement of 'social distancing' norms as more companies are expected to move towards automation.

Action:

- Sector Skill Councils (SSCs) to identify New and Future Job Roles, develop National Occupational Standards(NOSs) & Qualification Packs (Qps).
- Ministries/Departments like Heavy, Industry, Electronics (for Medical Elec-tronics), Textiles etc. could work with Industry organisations and target level 5-9 Skill Development courses. These could also be for existing work force to upskill.
- These QPS should be benchmarked against corresponding qualifications in advanced manufacturing countries, Germany, Russia, or even competing countries like Thailand, South Africa. These studies would either be done under bilateral agreements or funded.
- Instead of approving multiple awarding bodies, the SSCs should be supported and be the only awarding body in the Sector. The aim should be One India One Standard One Certificate (ONE-ISC).
- Universities, Higher Education Institutions (HEIs) & Training Institutions to integrate new competencies into the existing & new programs.
- Industry to provide inputs to SSCs & Academia to develop industry-based programs; mentor interns & apprentices to prepare the new workforce.
- MHRD & MSDE to modify the policy & regulatory framework to facilitate these shifts
- The National Skill Qualification Framework should be reworked to create linkages between certification levels and number of hours of contact classes need to be restructured and the ability to provide Micro Certification / Degrees should be introduced.

Scale up Skill Development Ecosystem with robust online learning infrastructure (Hard and Soft) which will help in online programs, promoting virtual internships, apprenticeships etc.

Action:

- Virtual Centres with usage of AI, ML, AR, and VR to impart accredited and NSQF complaint skilling programs should be funded by NSDC.
- Universities, HEIs & Training Institutions to build capacities to impart online programmes in these areas.
- MSDE & MHRD to notify framework for career guidance to be implemented in educational institutions and industry.
- Industry to implement virtual apprenticeship and virtual internship program.

Skilling for the Creative Economy and Digital Analytics

A shift is expected from a consumption led economy to a creative economy. Products would also be identified with experiences. We need to develop talent for this shift.

Action

- Coding, Creative digital programming (creating videos, digital content), data analytics and cybersecurity courses need to be introduced in schools. The model followed for the Atal Tinkering Labs could be replicated.
- Universities & HEIs to collaborate with foreign universities & Industry to develop programs Big data, Data Analytics, Cyber security etc. Virtual Faculty Exchange could be facilitated by incorporating it in the GIAN (Global Initiative of Academic Networks) programme.
- Autonomy to universities & HEIs to develop industry led new programs & research

Changing behavioural pattern of customer, adoption of industry 4.0 technologies, unforeseen disruption

in supply chain and focus towards health, safety and environment will give rise to jobs and skills in new areas in sectors like **automobiles; auto components; capital goods; pharmaceuticals; food processing etc:**

- With the current crisis where customer orientation and backend support are entirely moving towards digitization, more data scientists/analysts would be required hence a pool of **Data Scientists/Data Analysts** need to be trained.
- Increase data sharing on digital platform will raise the need for securitisation of cyber space and therefore need for trained **Cyber Security Specialist**
- To mitigate the global supply disruptions in the future **need to create a pool of Strategic Supply Chain Managers**
- Focus on use of green technologies and carbon imprint will need Environmental Specialists.

Labour intensive manufacturing industries such as textile & apparel; white good electrical and electronics; leather & foot wear; gems & jewellery etc must be incentivised to set up manufacturing units in States with high-working age population.

- Effective industry - academia engagement for developing industry focussed training and education programs; apprenticeship/ internship, mentoring, research & innovation
- Migrant labourers who have returned to their native states to be reskilled and upskilled for local manufacturing industry
- Training in basic digital technologies & coding, soft skills and language proficiency will be essential.
- Environment, Societal & Health orientation of workforce particularly during and after COVID 19 pandemic.

Action

Union Government to expedite work on identified 10 Mega clusters and come up with fiscal incentive package for the industry.

- State Governments to create the infrastructure for the mega clusters, fiscal & non-fiscal packages,reforms in labour laws and collaborate with stakeholders.
- State Skill Development Missions (SSDMs) to collaborate with respective SSCs and training ecosystem to mobilise talent, train them in advance and get them placed in the local industry.
- Industries to collaborate with local Universities, HEIs and Training Institutes to develop Skill Development programmes needed for these sectors.
- Local academic institutions to develop industry relevant programs, counsel local students & youth to opt for these programs and engage with local industry for apprenticeship, internship, and placement.

Nurturing of Traditional Clusters will help providing livelihood opportunities in native states to check mass migration. Traditional skills can be nurtured and passed on to next generation in a traditional manner; however training on **design; digital technologies; business planning; financial management & sales and marketing techniques** are extremely important to help these micro business to grow and contribute effectively to the rural economy.

- **Collaboration with local NGOs, schools, colleges & training providers** for developing such programs and deliver
- **Effective engagement with large retail platforms** to provide support in ware housing; access to international markets
- **Connectivity with Financial Institutions and Banks** for grants and soft loans etc.
- Digital workplace leading to facility to 'Work from Home' should be considered as an opportunity to **induct more women into workforce**. However, with rapidly changing ecosystem; reskilling progr-ams must be made available.
- Universities & HEIs to develop reskilling and upskilling programs for life long learning
- Organisations to develop short induction programs for women re-entering the workforce after few years of break

Five Key Skills required for Post-Covid Employment:

Skills	Description
Data Literacy	Making sense of data and in-depth understanding of business trends and shifting customer needs
Digital and Coding Skills	Digital skills, including coding, web development, and digital marketing for continuation of businesses
Critical Thinking	Objectively evaluate information from diverse sources to determine what is credible will be valued
Creativity & Innovation	Quickly innovation skills i.e. shift to new products/offerings
Technology Knowhow	Technologies such as artificial intelligence, big data, the Internet of Things, virtual and augmented reality, and robotics will make businesses more resilient to future pandemics, and anyone that can help companies exploit these technologies will be in demand.



Industry 4.0, Skills and Job Roles (Pre-Covid-19 Scenario)

1.1 As Industry 4.0 was unfolding and Industry 5.0 knocking the door, companies were seeking to harness new and emerging technologies to reach higher levels of efficiency of production and consumption, expand into new markets, and compete on new products for a global consumer base composed increasingly of digital natives. More and more, employers were therefore also seeking workers with new skills from further a field to retain a competitive edge for their enterprises and expand their workforce productivity. This trend is there to remain as 'social distancing' will further force 'technology adoption'.

1.2 Even as technological advancements pose challenges to existing business models and practices, over the coming years, these same dynamics of technological change are set to become the primary drivers of opportunities for new growth. According to the global employers survey quoted in WEF 2018-19 report, four specific technological advances —ubiquitous high-speed mobile internet; artificial intelligence; widespread adoption of big data analytics; and cloud technology—are set to dominate the 2018–2022 period as drivers positively affecting business growth.

1.3 Compared with traditional companies, new-age tech driven digital platforms scale up faster and at lower cost. IKEA, the Swedish company founded in 1943, waited almost 30 years before it began expanding within Europe. After more than seven decades, it achieved global annual sales revenue of USD 42 billion. Using digital technology, Alibaba was able to reach 1 million users in two years and accumulate more than 9 million online merchants and annual sales of USD 700 billion in 15 years.

1.4 The number of robots operating worldwide have risen quickly. By 2019, 1.4 million new industrial robots were added in operation, raising the worldwide total to 2.6 million from previous year. Robot density per worker in 2018-19 was the highest in Germany, Korea, and Singapore. Yet in all of these countries, despite the high prevalence of robots, the employment rate remained high. Recent evidence for European countries suggests that although technology may be replacing workers in some jobs, overall it raises the demand for labor. For example, instead of hiring traditional loan officers, JD Finance, a leading fintech platform, created more than 3,000 risk management or data analysis jobs to sharpen algorithms for digitized lending.

1.5 Evidence also show that when advanced technologies like robots are cheaper than the existing manufacturing processes, firms become more amenable to relocating production closer to consumer markets. This creates more localised jobs like marketing & promotions, retail and customer relations. In 2017 3-D printing technologies enabled the German company Adidas to establish two 'speed factories' for shoe production: one in Ansbach, Germany, and the other in Atlanta in the United States, eliminating more than 1,000 jobs in Vietnam. At the same time Adidas hired 1800 marketing and retail professionals in Germany and US.

1.6 In certain quarters there are increasing concerns that rapid technological innovation and adoption may lead to job losses which will lead to social and economic inequality. But countries Like Germany, Singapore and

China have shown that it is the lack of effective technological innovation that triggers inequality and economic divide. These countries should be carefully studied and benchmarked for phase-wise technology adoption and re-skill the existing and future workforce to meet the demand.

1.7 The top ten most in-demand roles in 2019 are trending year over year. 80% of them were also in short supply in 2018-19. Healthcare professionals enter the top ten reflecting an aging population. Meanwhile office administrators, contact center staff, project managers, lawyers and researchers fall out of the top ten reflecting the rise in automation of routine tasks. As technology disrupts work, the most in demand roles may look similar yet the skills required continue to evolve rapidly.

1.8 Following were top job roles in demand till the outbreak of Covid:

Sectors/Trades	Job Roles
Construction	Mason, Electrician & Welders
Sales & Marketing	Sales Representatives, Digital Marketing Person
Technicians	Quality Control Technical Staff
Engineering	Chemical, Electrical, Civil, Mechanical
Logistics	Drivers, Loaders
IT	Cybersecurity Experts, Network Administrators, Technical Support
Accounting & Finance	Accountants, Auditors, Financial Analysts
Manufacturing	Production & Machine Operators
Healthcare	Doctors, Nurses, Home-care Medical Workers

1.9 FICCI, NASSCOM & EY 'Future of Jobs-2022' report highlighted the impact of exponential technologies in core five sectors including two manufacturing sectors- Automobile and Textile & Apparel:

	Workforce that			
	Would be deployed in new jobs that do not exist today (projected for 2020)	Would be deployed in jobs that have radically changed skill sets (projected for 2022)	Will face an existential threat to their jobs	New job roles
Automotive	5%-10%	50%-55%	10%-15%	Automotive - Automobile analytics engineer - 3D Printing technician - Machine learning based vehicle cybersecurity expert - Sustainability integration expert
Textiles and apparel	5%-10%	35%-40%	15%-20%	- Apparel data analyst/scientist - IT process engineer - E-textiles specialist - Environment specialist - PLC maintenance specialist

Post Covid-19: Skills and Employment Scenario

2.1 As the COVID-19 pandemic threatens health and human livelihood across the globe, the economic effects of the crisis are becoming increasingly apparent. As the necessary public health measures intended to slow the spread of the virus are rolled out and sustained, nations are facing declining demand, rising levels of unemployment, and serious cash flow constraints amongst firms.

2.2 Some organisations have found it challenging to adapt to the unforeseen changes resulting from the wide spread of COVID-19, more especially the introduction of lockdowns which have affected people, organisations and the way of working. Complete/Partial lockdown has affected about 80% of economic activity globally

2.3 The rapid spread of COVID-19 has pushed organisations to respond promptly to the crisis and allow remote working for professionals where possible. Remote working, with the support of technology has been one of the most effective ways to respond to the crisis for some sectors. Sectors such as food and medicine supply chains, as well as retail, have been able to respond by creating the right sanitary environment and social distancing to ensure safety of workers during these times.

2.4 Five Key Skills required for Post-Covid Employment:

Skills	Description
Data Literacy	Making sense of data and in-depth understanding of business trends and shifting customer needs
Digital and Coding Skills	Digital skills, including coding, web development, and digital marketing for continuation of businesses
Critical Thinking	Objectively evaluate information from diverse sources to determine what is credible will be valued
Creativity & Innovation	Quickly innovation skills i.e. shift to new products/offerings
Technology Knowhow	Technologies such as artificial intelligence, big data, the Internet of Things, virtual and augmented reality, and robotics will make businesses more resilient to future pandemics, and anyone that can help companies exploit these technologies will be in demand.

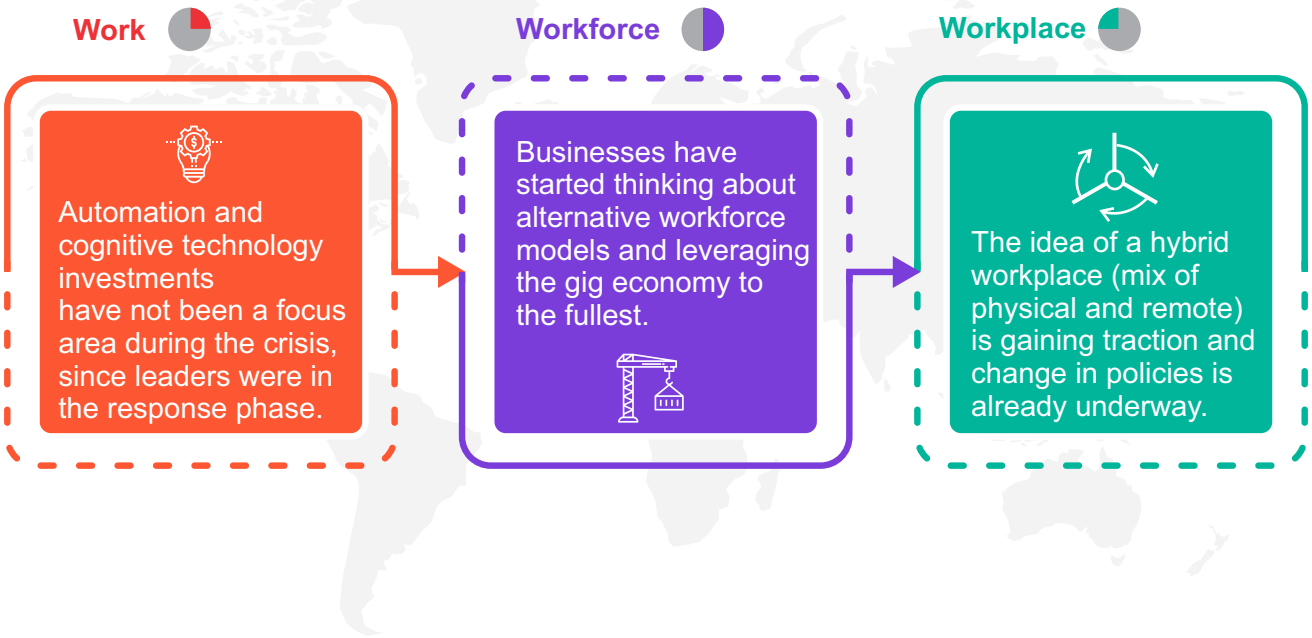
2.5 Scenario of Workplace Post Covid-19

New Norms	Attributes	Changes
Digital Distancing	Innovation in work practices continues	New work paradigm
Touchless Growth	Proliferation of Credentials	Work done by employees with different working relationships
Ongoing Disruption	Multiple forms of working relationships	Significant changes in work processes
New Paradigms	Blurring of Traditional Inter-Enterprise Boundaries	Significant changes in Talent Management

Source: Joseph Fuller, Harvard Business School, Research on Future of Work & Ficci Inputs

2.6 Globally, in addition to re-skilling activities, firms are also focussing on (1) clearly identifying workers needs, (2) Identifying those available workers with skill sets related to the required profile, e.g., flight attendants with basic medical training and an ability to deal with people in stressful situations, (3) determining which specific skills are essential and can be taught using digital modes (4) allocating re-skilled workers to new job roles & responsibilities and (5) ensuring that quality standards are met and controlled as these workers ramp up their skills for the new positions.

2.7 There is a Global shift in workforce and work place transition:



2.8 Pandemic has caused large scale disruption in production. Most organisations have idle operations' roles due to work being linked to physical assets (plants, retail stores, etc.). Conglomerates have most of their production capacity on hold, and many leading organisations have shut down operations proactively to mitigate risks to customers and employees.

2.9 There has been rise in productivity in certain job roles. Roles that require cognitive and creative thinking, independent /project-based work and have low dependence on physical proximity have also seen maintained or even rising productivity levels as employees use their working hours more effectively (functions, such as product design, customer service, finance, and content creation). Significant amount of employee time is saved from commuting, socialising, and other activities. Organisations are looking to aid their workforce with more flexible policies as they move to recovery phase.

2.10 COVID-19 put the need for and ease of access to insightful and future-oriented workforce data in the spotlight. Whether it was data on the capabilities of the workforce, the state of workers' physical and mental well-being, or an assessment of how well the organization's culture was faring, we saw a plethora of vendors come out with ways to leverage technology to get the data and insights needed and get it fast.

2.11 There is a growing need to upskill existing and new workers through refresher virtual trainings, online certifications and gamified solutions. Globally, more than 53% of firms have started orienting their employees on virtual platforms.

Post Covid-19: Impact on Manufacturing Sector - Jobs & Skills

3.1 The manufacturing sector is an integral part of the economy as it accounted for nearly 16% of the global GDP in 2018-19. The Covid-19 situation led to closure of factories in labour intensive sectors like Textile, Chemicals, Pharmaceuticals, Automobiles & Auto Components and Electronics Assembly causing loss of jobs for large scale migrant workers.

3.2 The global spread of COVID-19 has created an unprecedented situation for the manufacturing sector, resulting from mandated lockdowns. Supply chains are disrupted, disrupting the flow of raw materials, intermediate parts and finished goods. Assembly lines are forced to halt or curtail operations due to lack of availability of workforce and components.

3.3 As per the estimation by United Nations Conference on Trade and Development (UNCTAD), the COVID-19 outbreak could cause global FDI to shrink by 5%-15%, due to the downfall in manufacturing sector coupled with factory shutdown.

3.4 The pandemic has affected the majority of India's export market (the US and EU together constitute for approximately, 60% of the total apparel exports from India), causing cancellations of orders and deferrals leading to build-up of unsold inventory and expectation of slower realization of export receivables leading to higher working capital requirements.

3.5 In March 2020, exports fell 32.2% compared with the same period last year. Apparel exports, which were about $16.1 billion in 2018-19, fell almost 4% to $15.4 billion, with the March exports alone dropping almost 35% compared with the same month last year. The potential loss in revenues is estimated to amount US $8-10 billion.

3.6 At present, the companies are grappling with muted growth, sharp decline in yarn exports, unavailability of cheaper imports, profitability issues, currency fluctuations, order cancellations, deferring shipments, inventory piles, increase in working capital and wage payments

3.7 Globally, manufacturing operations for Chemical companies have been scaled down to 40%-60% capacity due to labor shortages and disruptions in the supply of raw material. Global production of chemicals dropped by 2.4% in February 2020, with the Asia-Pacific posting a production decline of 3.9% in the same month. India too registered a decline of more than 11%.

3.8 The crisis has a significantly negative impact on auto sector as well. It has amplified the sector's existing vulnerabilities by disrupting both manufacturing and supply chain. The automotive industry had an expected loss of 7.5 lakh units in production in March 2020 alone, which is ~1% of the total units produced in 2019, because of the lockdowns to combat the Covid-19 outbreak.

3.9 According to the report of Centre for Monitoring Indian Economy (CMIE), only a little over one-fourth (27.7%) of the total working age population (15-59 years) of 1003 million, i.e. 285 million people were working in the week after the lockdown (the corresponding last figure before lockdown being 404 million). This shows that within the two-week period of

lockdown, 119 million workers have lost their jobs. Around 26% were considered to be from Manufacturing sector.

3.10 Idle shop floors, low manufacturing of med tech in the country and health imperatives have driven innovative collaborations to meet the need of the hour.

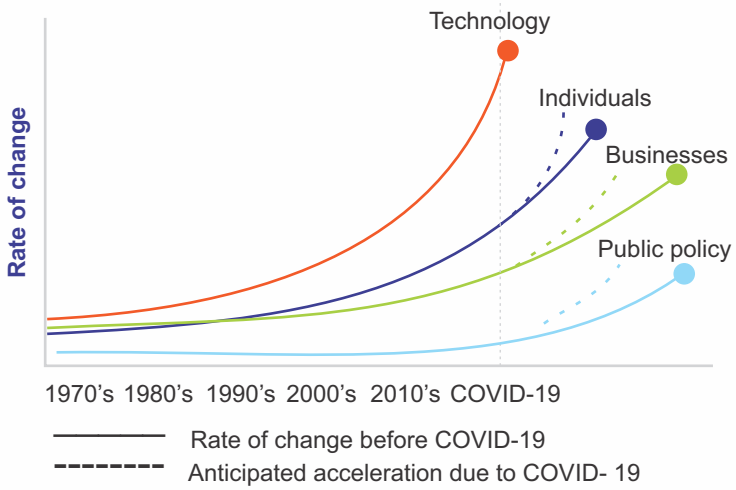
3.11 As India has started unlocking economic activities, all manufacturing shop floors and workplaces will have to develop and follow new Standard Operating Procedures (SOPs) and government guidelines. Sanitisation, Mask and Social Distance (SMS) is the 'New Normal' to be followed at work and elsewhere.

3.12 Abilities like proficiencies in tackling supply chains, team building and leadership skills to deal with any crisis, will gain a lot of attention. Companies will not just expect employees to adopt functional skills but also skills such as creativity, innovation, complex problem-solving, cognitive abilities and social skills. Therefore, focus on building digital skills, productivity and collaboration skills will be critical for continued success.

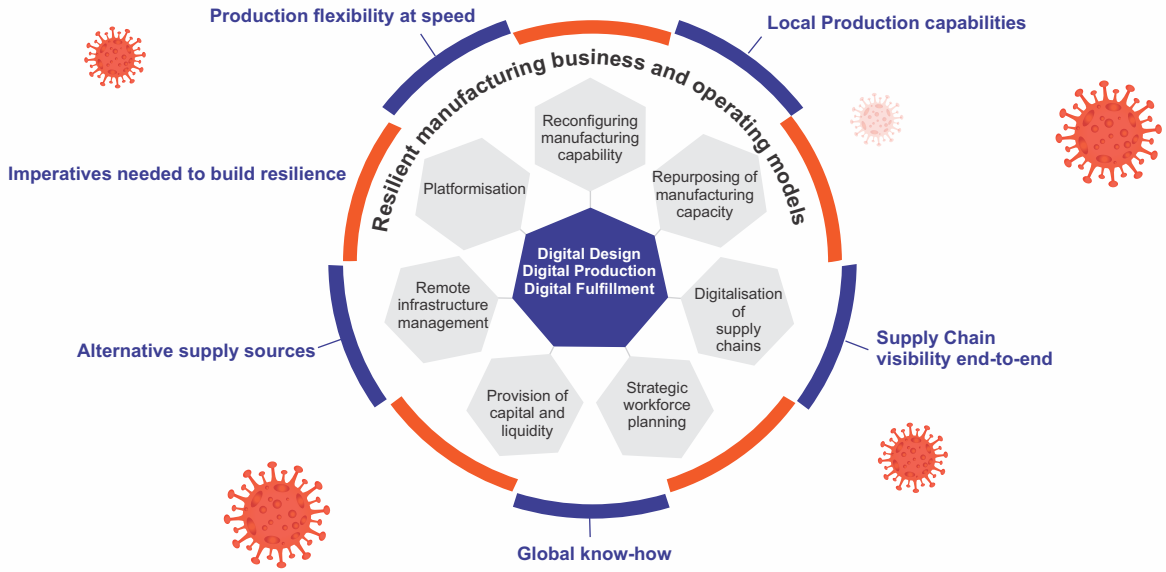


New Business Models post COVID 19: Manufacturing Sector

4.1 Worldwide there is a shift in pace of adoption of new ways of working. Following graph depicts the pace with which individuals and organisations are changing post Covid-19:



4.2 Seven enabling factors are changing and leading emergence of new business models in Manufacturing Sector- Reconfiguring manufacturing capability, Repurposing of manufacturing capacity, Digitalization of supply chains, Strategic workforce planning, Provision of capital and liquidity, Remote infrastructure management, Platformization.



Source: WEF 2020 report on Manufacturing

4.3 Reconfiguring manufacturing capability has been crucial in responding to shortages and has been enabled by the fast-tracking of new technologies such as additive manufacturing and 3D-printing that can deploy various technology solutions across multiple markets at speed. Leveraging existing and local-production capabilities by repurposing capacity to manufacture low-medium complex products has been critical to address shortages in products such as ventilators, sanitizers, medical gowns, etc. Auto companies (Mahindra & Mahindra & Maruti) & Ventilator companies (Skanray & AgVa respectively) have collaborated to ramp up ventilator manufacturing in India- from 3000 piece per annum to 75000 pieces by August. Textile firms are manufacturing PPEs. Various Liquor firms have ramped up to manufacture sanitisers to meet the demand.

4.4 The digitalization of supply chains has been critical to allow early switching of capacity and resources across multiple tiers of the supply network, necessary for the flexibility and resilience of future manufacturing systems. For established retailers offering an omni-channel e-commerce experience, digitalization has been crucial to meeting online demand. In manufacturing operations, Henkel, a company part of our Global Lighthouse Network, has used its real-time connectivity within its manufacturing network to provide the necessary supply-chain visibility to enable efficient and timely integration of supply and demand.

4.5 Manufacturers such as Schneider Electric, also part of our Global Lighthouse Network, have used their digital platforms to enable connectivity with customers. Their digital connectivity solutions have enabled technicians to utilize their expertise remotely to address fault resolution and factory-acceptance testing. Highly automated business-to-business industries which can be managed remotely seem less affected in the short term. Backend support on businesses are swiftly moving to digital space.

4.6 Technology's manufacturing sector will face mounting pressure to cut costs, increase efficiency in processes, reduce dependence on humans and become more resilient to future exigencies. This will drive companies to scale up adoption of smarter manufacturing processes powered by Artificial Intelligence (AI), Internet of Things (IoT) and Blockchain, industry experts feel.



Key Recommendations

5.1 Skilling, Re-Skilling & Up-Skilling on Industry 4.0 Technologies

The COVID-19 crisis has accelerated the shift to digital. Companies have started exploring alternatives to integrate new technologies in their operations. Companies like Blue Star, TVS Motor Company, JK Tyre & Industries, Asian Paints and others are already using AI-based solutions and analytics platforms in their manufacturing units in India. Furthermore, with the enforcement of 'social distancing' norms, more companies are expected to move towards automation. Hence, there is an urgent need to skill and train existing and new workforce on Industry 4.0 related technologies.

The 4 Key Challenges

1. The Sector Skill Councils had initially identified job roles for Level 5 and beyond. However, the focus on the National Skill Development Programmes has been on PMKVY, DDUGKY or other State Level Skill programmes predominantly promoted skill development for entry level skill Levels 1-4.
2. Even in Schools and Colleges the add on skills courses were largely levels 1-4.
3. Further up-skilling of persons already skilled under these programmes was discouraged.
4. In the proposed skill development programmes, the role of Sector Councils is being diluted in multiple ways.

The focus on Levels 1-4 is evident as most QPs developed were for Levels 1-4. As a case in point even in the Capital Goods Sector Council out of the 55 QPs developed only 6 were level 5 and the rest were level 1-4. (Annexure Select SSCs Future Job Roles & Qps).

Action:

- Sector Skill Councils (SSCs) to identify New and Future Job Roles, develop National Occupational Standards (NOSs) & Qualification Packs (Qps).
- Ministries/Departments like Heavy Industry, Electronics (for Medical Electronics), Textiles etc. could work with Industry organisations and target level 5-9 Skill Development courses. These could also be for existing work force to upskill.
- These QPS should be benchmarked against corresponding qualifications in advanced manufacturing countries, Germany, Russia, or even competing countries like Thailand, South Africa. These studies would either be done under bilateral agreements or funded.
- Instead of approving multiple awarding bodies, the SSCs should be supported and be the only awarding body in the Sector. The aim should be One India One Standard One Certificate (ONE-ISC).
- Universities, Higher Education Institutions (HEIs) & Training Institutions to integrate new competencies into the existing & new programs.
- Industry to provide inputs to SSCs & Academia to develop industry-based programs; mentor interns & apprentices to prepare the new workforce.
- MHRD & MSDE to modify the policy & regulatory framework to facilitate these shifts
- The National Skill Qualification Framework should be reworked the linkage between certification levels and number of hours of contact classes needs to be restructured and the ability to provide Micro Certification / Degrees should be introduced.

5.2 Scale up Skill Development Ecosystem with robust online learning infrastructure (Hard and Soft)

- For continuity of skilling and training, set up of virtual centres with usage of AI, ML, AR and VR to impart accredited and NSQF complaint skilling programs.
- Online guidance for career opportunities and shifts must be promoted on mission mode. More counsellors need to be on-boarded to counsel trainees, dropouts, mid-career professionals etc. Train the trainer program for Career Guidance must be promoted
- Online support system to counsel and guide apprentices on new opportunities must be promoted to minimise apprenticeship dropouts.

Action:

- Virtual Centres with usage of AI, ML, AR, and VR to impart accredited and NSQF complaint skilling programs should be funded by NSDC.
- Universities, HEIs & Training Institutions to build capacities to impart online programmes in these areas.
- MSDE & MHRD to notify framework for career guidance to be implemented in educational institutions and industry.
- Industry to implement virtual apprenticeship and virtual internship program.

5.3 Skilling for the Creative Economy and Digital Analytics

A shift is expected from a consumption led economy to a creative economy. Products would also be identified with experiences. We need to develop talent for this shift.

Action

- Coding, Creative digital programming (creating videos, digital content), data analytics and cyber security courses need to be introduced in schools. The model followed for the Atal Tinkering Labs could be replicated.
- Universities & HEIs to collaborate with foreign universities & Industry to develop programs Big data, Data Analytics, Cyber security etc. Virtual Faculty Exchange could be facilitated by incorporating it in the GIAN (Global Initiative of Academic Networks) programme.
- Autonomy to universities & HEIs to develop industry led new programs & research

5.4 Create a Pool of Strategic Supply Chain Managers

Manufacturers can no longer depend upon price as the primary criterion to source components globally. Apple had to limit the online sale of its popular iPhones to two per customer, because of component shortages across Asia. To mitigate similar global supply disruptions in the future, regional supply sources need to be developed. There will be growing need of supply chain experts who could make better risk assessment of supply chain disruptions and ability to make trade-offs to optimize product cost while ensuring reliable supply.

Action

- Universities & HEIs to integrate supply chain and logistic management in engineering & management programs; initiate advance programs for specialisation
- Industry to engage with academia to develop such programs based on competencies required

5.5 Manufacturing Industries to be incentivised in states with high-working age population

Government has drawn up a list of ten mega clusters across nine states as the most

attractive destinations for companies to set up manufacturing units based on sectoral requirements and tax incentives to promote the country as an alternative business continuity plan destination amid the ongoing Covid-19 pandemic. This intervention must be expedited. Furthermore, labour intensive manufacturing companies must be incentivised to set up plants in states like UP, Bihar etc. which have high density of working age population.

Action

- Union Government to expedite work on identified 10 Mega clusters and come up with fiscal incentive package for the industry
- State Governments to create the infrastructure for the mega clusters, fiscal & non-fiscal packages, reforms in labour laws and collaborate with stakeholders
- State Skill Development Missions (SSDMs) to collaborate with respective SSCs and training ecosystem to mobilise talent, train and get them placed in the local industry
- Industries to collaborate with local Universities, HEIs and Training Institutes to develop skill developments programmes needed for these sectors
- Local academic institutions to develop industry relevant programs, counsel local students & youth to opt for these programs and engage with local industry for apprenticeship, internship and placement.

5.6 Effective collaboration for Research & Innovation

Adaptability would be key to rebound after Covid-19. Product and services would have to change due to changing consumer behaviour. In the changed scenario where large physical interface is prohibited, industry and academia can utilise virtual mediums to work on joint research and innovation projects.

Action

- Universities & HEIs to build digital infrastructure and capacity of academia to carry out research and innovation projects on both physical and digital platforms.
- Industry to collaborate with Academic institutions by providing real time challenges, knowledge inputs and mentorship of researchers

5.7 Effective Talent Management is needed

COVID-19 hasn't just changed the workplace, but has changed the very complexion of the workforce and nature of work itself. The opportunity and challenge for HR leaders is to respond and move from a static to an agile planning approach, one that can continually reshape the workforce to incorporate changes in business and skill needs during the pandemic and beyond. In the new 'talent management' system, workforce planning for future strength, fueled by technology and labor market analysis, developing greater flexibility would be some of the key focus areas.

Action

- Industry to relook at their internal HR policies, re-skilling & upskilling and redeployment strategies
- Government to bring in labour law reforms

5.8 Environment, Societal & Health orientation

A Manufacturing unit has to deal with multiple level of supply chain and raw materials, hence it will be extremely important to skill and train the workforce in accordance with the Environmental, Social and Health Standards, particularly during and after COVID 19 pandemic.

Action

- Government to bring health & safety guidelines and monitor compliance
- Industry to train the workforce on health & safety practices

5.9 Development of Traditional Clusters

Local traditional clusters also engage in light manufacturing/production activities and provide livelihood opportunities. Developing such local clusters could help working towards vision of 'Aatm Nirbhar Bharat'.

Action

- Government to expedite organization of the traditional industries into clusters to make them, competitive and provide support for their long term sustainability
- Government to further engage and encourage self-help groups to work with local clusters
- Industry and Industry Associations to work with relevant stakeholders to re-skill and up-skill locals through training on various skills (digital, financial, production innovation, supply chain etc.)

5.10 Induct more Women Workforce to Drive Transformational Change

In the current crisis where there is growing shift towards 'anytime-anywhere work arrangements', there is an opportunity to increase women participation in workforce. Equally, narrowing gender-based education gaps and ensuring women remain in and expand their participation in the formal labour market will play a significant role in providing the economy with the capacity to 'rebound' with stronger, more equitable and sustainable growth.

Action

- Government can consider expanding pre-existing national social protection programs and adapt targeting methodologies to ensure income for groups affected by COVID-19 and especially where women are heavily represented (teaching, healthcare, entertainment, retail, hospitality, etc).
- Government may also consider introducing measures to alleviate the tax burden on women owned businesses
- Industry to be more sensitive towards flexible working hours, prioritising capacity building etc.



Annexure

The SSCs want to develop higher qualifications and need support for example of roles being proposed by the Capital Goods Sector Council (CGSC) is given below:

List of Hitech and Future Job Roles proposed under CGSC for level 6 and above

S. No	Job role Name
1	Additive Manufacturing Technologist
2	Design for Additive Manufacturing (DfAM),
3	Advance Data Analytics Scientist
4	Big Data Analyst
5	Advanced Mechatronics Engineer
6	Artificial intelligence and Machine Learning Specialist
7	Assembly &Testing Engineers for Industrial Machinery
8	Augmented Reality/Virtual Reality Application Engineer for machine tool (Sector based)
9	Cloud Computing
10	Cyber Data Security Specialist
11	Digital Quality Engineer
12	Digital Twin Designer
13	Factory Automation Engineer
14	FMS (Flexible Manufacturing Systems) Engineer
15	IIoT Engineer
16	Image Processing and Machine Vision system
17	Industrial Design
18	Industrial Vision based Applications
19	Machine Connectivity specialist
20	Machine Designers (Industrial Machinery)
21	Modelling and Simulation (Digital Twin)
22	PLM (Product Life Cycle Management) System Analyst
23	Precision Machine Design and Development
24	Predictive Maintenance engineer
25	Process Automation engineer
26	Prototype Machine Builder (design, manufacturing, assembly, testing)
27	Robotics & Automation Engineer
28	Robotics Process Automation engineer
29	Simulation Software Specialist
30	System Integrator Technologist
31	Visualisation App Designer
32	VR/AR/MR Designer

The Electronics Sector Skill Council has also developed Level 5 and above QPS:

Designing	VLSI Design Engineer	ELE/Q1201	5
Verification	Verification Engineer	ELE/Q1301	5
Designing	Physical Design Engineer	ELE/Q1401	5
Design	Embedded Product Designer - Technical Lead	ELE/Q1403	6

A good initiative worth replicating across other sectors is the 38 Future Skills QPs developed by the IT & ITES Sector Council. The Ministry of Electronics & Information Technology is supporting the training of candidates in this sector with financial support.

Example of QPs for the sector are below:

SSC/Q8208	IoT - Network Specialist	7	Download (.pdf)
SSC/Q8301	CC - Cloud Consultant	7	Download (.pdf)
SSC/Q8302	CC - Cloud Architect	7	Download (.pdf)
SSC/Q8308	CC - Cloud Risk & Compliance Officer	7	Download (.pdf)
SSC/Q8101	AI - Data Quality Analyst	6	Download (.pdf)
SSC/Q8102	AI - Business Intelligence Analyst	6	Download (.pdf)
SSC/Q8103	AI - Visualization Specialist	6	Download (.pdf)
SSC/Q8203	IoT - Hardware Solution Designer	6	Download (.pdf)
SSC/Q8205	IoT – Software Analyst	6	Download (.pdf)
SSC/Q8206	IoT - Test Analyst	6	Download (.pdf)
SSC/Q8303	CC - Cloud Application Developer	6	Download (.pdf)
SSC/Q8304	CC - Cloud Infrastructure Analyst	6	Download (.pdf)
SSC/Q8305	CC - Cloud Migration Analyst	6	Download (.pdf)
SSC/Q8306	CC - Cloud Administrator	6	Download (.pdf)
SSC/Q8307	CC - Site-reliability Analyst	6	Download (.pdf)
SSC/Q8309	CC - Cloud Security Analyst	6	Download (.pdf)
SSC/Q8209	IoT - Control Room Operator	5	Download (.pdf)

Future Skills in Demand in Food Processing Sector

As the sector continues to transform due to change in demand, consumer behaviour, effect of COVID-19 and several other factors, these are some examples of skills in demand which would emerge in the near future.

Key Skills Area	Specific Skills Requirement
Food Science & Technology	Smart Packaging Food Manufacturing Process & Design Advanced Processing (Integrated) Technology Food Safety Management System (FSMS) Good manufacturing Practices Implementation Hazards & Risk Control Analysis
Automation Skills	Automated Food Manufacturing Systems Artificial Intelligence Implementation Green Manufacturing Implementation Data Analysis & system designs Automation Process control Automated operation Monitoring
Analytical Skills	Advanced Packaging Testing Techniques Advanced e-sensory product analysis
R&D	New Food Product Development 3D Food Printing Techniques Food Product Improvement New Product Introduction
Business Development Skills	E-Commerce campaign management Marketing Programme Management Export Market Entry Strategy Formulation
Management Skills	Supply chain & quality management Innovation Management Strategy Development Change Management Emergency Response Management Project Management Stakeholder Management Systems Thinking Technical Report Writing & Presentation

Authors



Dilip Chenoy
Secretary General, FICCI



Shobha Mishra Ghosh
Asst Secretary General, FICCI



Shiv Shukla
Deputy Director, FICCI

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References

- From Surviving to thriving: Reimagining thepost Covid-19 return, accessed from, https://www.mckinsey.com/featured-insights/future-of-work/from-surviving-to-thriving-reimagining-the-post-covid-19-return
- Emerging business models during Covid-19crisis, retrieved from, https://www.weforum.org/reports/towards-a-new-normal-new-design-rules-for-advanced-manufacturing-business-models/successes-during-the-crisis
- Skills sector response post Cvoid-19, accessed from, https://home.kpmg/content/dam/kpmg/in/pdf/2020/04/covid19-skills-sector-impact.pdf
- Second shift of Manufacturing after Covid-19,retrieved from, https://www.infosys.com/industries/industrial-manufacturing/insights/being-resilient-new-normal-covid19.html
- Covid-19-whatit means for Industrial Manufacturing, accessed from, https://www.pwc.com/us/en/library/covid-19/coronavirus-impacts-industrial-manufacturing.html
- How automotiveshop floors will evolve and embrace digital post COVID-19, accessed from, https://www.ey.com/en_in/automotive-transportation/how-automotive-shop-floors-will-evolve-and-embrace-digital-post-covid-19
- Getting ahead of Covid-19: Saving lives andlivelihood, retrieved from, https://www.mckinsey.com/featured-insights/india/getting-ahead-of-coronavirus-saving-lives-and-livelihoods-in-india
- Ministry of Health & Family Welfare, GoI,INDIA COVID-19 Emergency Response and Health Systems Preparedness, accessedfrom, https://www.mohfw.gov.in/pdf/2EnvironmentalandSocialCommitmentPlanESCP.pdf
- FICCI's Future of Jobs in India: 2022Perspective report, retrieved from, http://ficci.in/study-page.asp?spid=22951&sectorid=74
- Closing the Skills Gap Report, 2020, accessedfrom, https://go.manpowergroup.com/hubfs/MPG_WhatWorkersWant_2020.pdf?hsLang=en

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Established in 1927, FICCI is the largest and oldest apex business organisation in India. Its history is closely interwoven with India's struggle for independence, its industrialization, and its emergence as one of the most rapidly growing global economies. A non-government, not-for-profit organisation, FICCI is the voice of India's business and industry. From influencing policy to encouraging debate, engaging with policy makers and civil society, FICCI articulates the views and concerns of industry. It serves its members from the Indian private and public corporate sectors and multinational companies, drawing its strength from diverse regional chambers of commerce and industry across states, reaching out to over 2,50,000 companies. The chamber with its presence in 14 states and 10 countries, provides a platform for networking and consensus building within and across sectors and is the first port of call for Indian industry, policy makers and the international business community.

CONTACT

Federation House
1, Tansen Marg, New Delhi 110001, INDIA
91-11-23738760-70
www.ficci.in