



# The Future Of Jobs

Why India must embrace the new era of artificial intelligence, blockchain and robots

Amitabh Kant



The ancient Chinese game Go, which has a very high number of possible moves, was considered almost impossible for a computer to beat humans two years ago. Last year Alpha Go (a Go programme designed by two Go players) beat the best professional Go Player Lee Sedol in a five game match. Machine learning had breached even the bastion of strategic thought.

Impossible Foods, a fourth industrial revolution technology company, makes a plant based food that smells, tastes, looks like real meat. It threatens the future of the \$90 billion meat industry. If only 20% of world population switches from eating real meat to alternative proteins it would free up 12% of total fresh water, free 400 million hectares of land and 960 megatonnes of CO2 emission.

Traditional manufacturing and service oriented industries are being disrupted in a manner we have never seen before. The first industrial revolution was triggered by the invention of the steam engine, which led to mechanical production. The second industrial revolution, catalysed by electricity and the assembly line, made mass production feasible and was catalysed by the discovery of electricity and assembly line. The third industrial revolution, from the 1960s onwards, was driven by computers, digital technology and the internet.

The fourth industrial revolution is being driven today by ten technologies that are transforming industrial production: autonomous robots; simulation; big data and analytics; augmented reality; the cloud; cyber-security; additive manufacturing; horizontal and vertical integration; the internet of things and artificial intelligence (AI). These technologies are impacting the entire production value chain from design to productivity, speed and quality of production.

There is widespread concern over the potential impact of the fourth industrial revolution on employment. A vast range of jobs are at risk of extinction and rapid scaling could lead to accumulation of job losses. The other fear is that new technologies would lead



Chad Crowe

to increase in inequalities and lack of social cohesion. Elon Musk has stated AI represents an essential threat to humanity and has suggested tight regulations. Bill Gates has said that robots need to be taxed to compensate for greater efficiency compared to humans and suggested the pace of automation should be slowed down.

A McKinsey report estimates that 400-800 million people around the globe could be displaced by automation and will need to find new jobs by 2030, for which they will require new skills. There will be considerable need for re-skilling and training.

Let us look at what new technologies could do to enable India to technologically leapfrog. The two indicators holding ease of doing business in India back are enforcement of contracts where India is 164th, and registering property where India is 154th out of 190 countries. About 3 crore cases are currently pending in Indian courts. Two-thirds of all civil cases in district courts relate to registering land. Blockchain based smart contracts could radically reduce litigation, bring transparency in land registry and eliminate corruption relating to land.

## India needs massive upgradation programmes in new technologies. Our IITs and IIITs must redefine themselves as institutes driving cutting edge technologies for the fourth industrial revolution

India has a billion biometrics on Aadhaar. We have a unique opportunity to leverage our public identities to have many applications on a blockchain network.

According to a PwC report, AI will contribute as much as \$15.7 trillion to the world economy by 2030. Given India's strength in technology, favourable demographics and structural advantages in availability of advanced data India can be an AI pioneer. AI has the potential to add \$957 billion to India's economy by 2035, lifting it by 15% (Accenture report). India's data diversity is a big draw for global AI implementers. AI can be a game changer in government

where "scale" and "quality" need to be addressed simultaneously.

What does India need to do to embrace technology, create new jobs and meet the requirements of the changed scenario?

Firstly, we must realign India's education system to emphasise skills rather than mere degrees. We must move away from the Anglo-Saxon system of education with emphasis on academic degrees, toward hands on learning in practical subjects. A beginning has already been made by Atal Innovation Mission. By 2018 end, nearly 2000 schools will have Tinkering Labs with robots, 3D printers, additive machinery, Internet of things and mentors so that children from class 6 onwards can build and experiment rather than only imbibe.

Secondly, we must constantly upgrade skills. There is a severe shortage of skilled manpower. India needs massive upgradation programmes in new technologies. Our IITs and IIITs must redefine themselves as institutes driving cutting edge technologies for the fourth industrial revolution.

Thirdly, we must create a highly flexible, resilient and adaptive workforce which is multi-skilled and has the capacity to undertake digital tasks from anywhere rather than a fixed location.

Fourthly, we must initiate measures to ensure that Indians are fully prepared to embrace the new era of AI, blockchain, additive manufacturing and emerging technologies. India cannot afford to bypass this revolution. This requires a new mindset. Our policies must drive this change.

Fifthly, we must work across disciplines and institutional boundaries. We must break silos. Medical data is an example. Life saving opportunities can be utilised by sharing large sets of genomic data across different health providers and research organisations.

Sixthly, our focus must be on social sector - education, health, nutrition where new technologies will enable us to improve the quality of life and enhance our human development index. These are also the sectors where maximum jobs will be created. Countries are still navigating the early stages of this new industrial revolution. Can India jumpstart this transformation?

The writer is CEO, NITI Aayog. Views are personal