NEXT BIG WAVE SUBMISSION

IIM BANGALORE -VILLAGE PEOPLE

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1.0 Introduction:

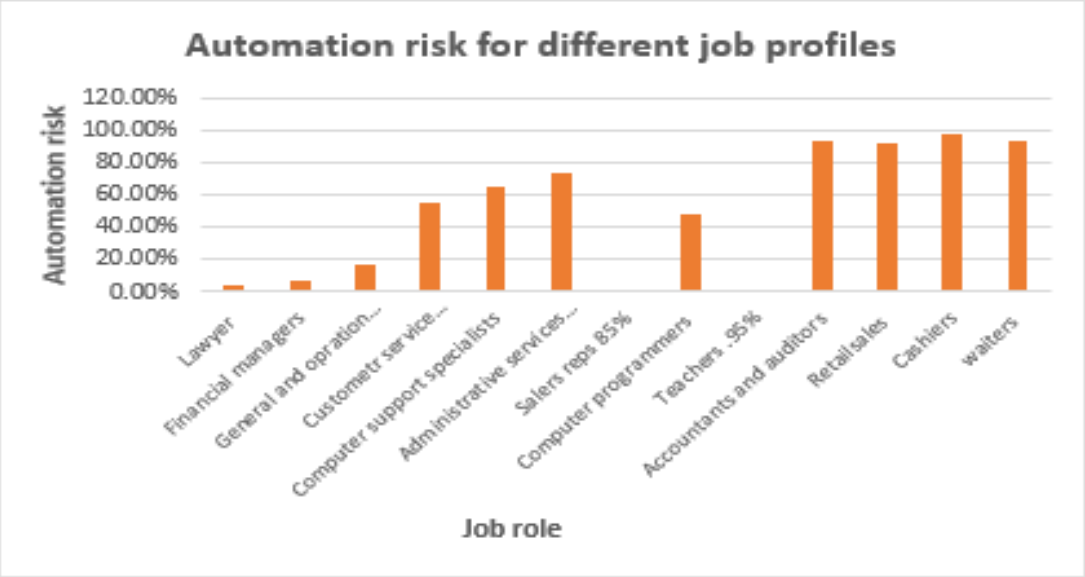
Automation and Artificial Intelligence have recently become two of the most used words in business, social and political contexts. There is growing debate across business circles on whether automation and AI will change the way industries produce and deliver goods and services; and whether that will change their competitive environment. In political circles, this debate boils down to the future of human employment; whether this will create or destroy jobs. Policymakers as well as the working population is concerned about how to reskill people in the face of these growing developments so that they do not become redundant.

These issues have gained more traction now that industry leaders are increasingly airing their views on public forums. Recently, industry heavyweights like Elon Musk, Mark Zuckerberg, and Bill Gates have expressed their views on various forums. While Gates had called for a tax on robots which take away human jobs [9], Musk has gone ahead and predicted a third world war arising due to AI [10]. Amongst all this clamor, there has been growing confusion on what AI can and cannot do.

Hence, it is right time to bring some context into this picture and analyze what the advent of AI entails for specific industries in general and individual roles and jobs in those industries in particular. In this study, we will try to analyze these aspects by focusing on the Indian manufacturing sector in general. We will study which particular areas in Indian manufacturing are vulnerable to a takeover by automation and AI and what its consequences may be for the Indian economy and employment. We will also study the technical and business feasibility of these technologies in the Indian context.

2.0 Automation and AI across Industries:

There has been widespread research on this topic in recent years by reputed consulting firms, business schools, employment consultancies, as well as public policy thinktanks. Even Government agencies like central bank of UK and US White house have chipped in with reports and white papers on their predictions about its consequences on employment and the economy. A July 2016 whitepaper from the *McKinsey Insights quarterly*, presents in detail the industries and jobs in which AI and automation will have a significant effect in the near future [1]. These have been deduced based on two parameters: *1. Technical feasibility, and 2. Business Value*. Based on parameters grouped under these two broad areas, they have come out with the industries and the jobs in those industries where there are significant chances of disruption from automation. The findings show what is intuitive: that automation will significantly affect those activities that are both predictable and labor intensive like repetitive work in manufacturing, agriculture etc. On the other end of the spectrum, jobs which entail applying cognitive and behavioral skills such as managing others, customer interactions etc., have very less affinity for becoming automated in the short run. These findings give us the required background for choosing our focus industry for study. In addition to these parameters we will also look at the regulatory and policy environment in India to analyze what impact automation will have on the manufacturing sector in India.



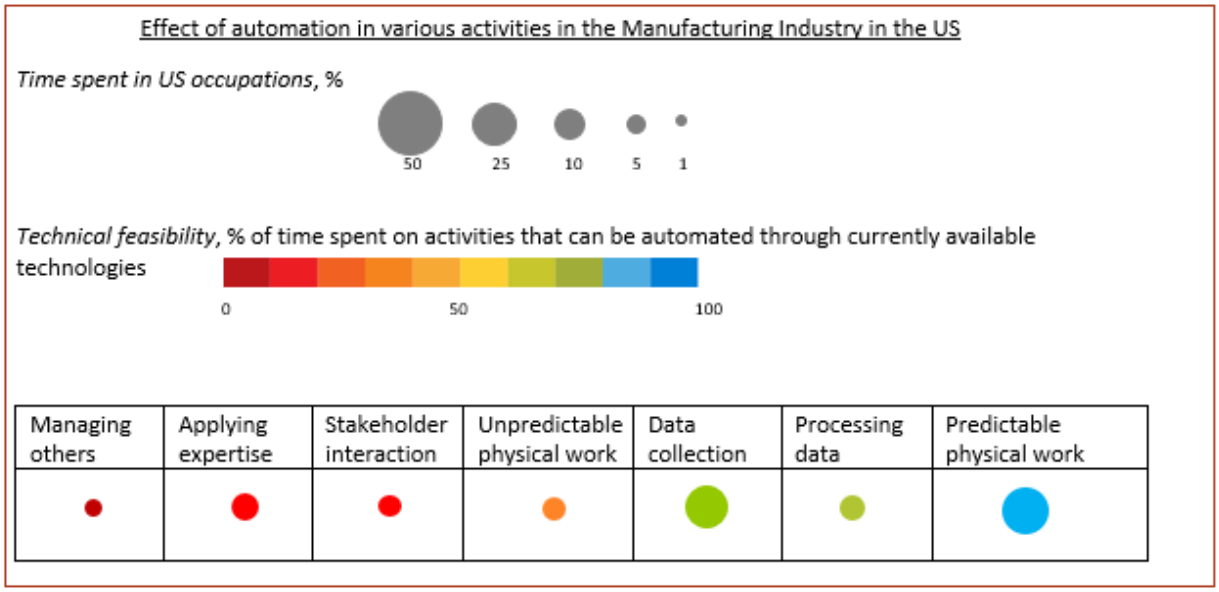
Adapted from https://www.bloomberg.com/graphics/2017-job-risk/

3.0 Why Indian Manufacturing: Perspectives & Pain Points

As per our secondary literature study, most thinktanks identify manufacturing as one of the sectors where AI and automation will have significant impact on jobs and organizational design. Most jobs in the manufacturing sector are predictable and repetitive. This applies more to jobs in the shop-floor or the assembly line. Many of these jobs have already been automated in other parts of the world. In India, most manufacturing jobs are of this nature. A recent report of the job consultancy ManPower group has also identified India as one of the countries where automation will affect jobs negatively (up to -30%) [2]. Consequently, there is growing concern that the competitive advantage of outsourcing manufacturing jobs to India would be lost to AI.

The second reason for our choice is that in recent years Government policies have widely promoted India as a manufacturing hub. India is said to have skipped the industrial growth phase and directly entered services growth. However, agriculture still makes 15% of our GDP. Manufacturing, as a component of total Industrial output makes up only 16% of our GDP [11]. Hence, Make in India, Skill India etc. all focus on growth of manufacturing as a driver of the Indian economy. The government's goal is to take manufacturing to 25% of the GDP by 2022 and create 100 million jobs in the process [11]. This high target could be derailed if the predictions of automation come true.

As mentioned before, we will look at three broad parameters while analyzing jobs and roles in the Indian manufacturing sector to find out which jobs and roles have the highest propensity for disruption by AI and automation. These are: *1. Technical Feasibility, 2. Business value, 3. Regulatory Environment*. We shall look at the possible policy frameworks and organizational design that will serve the dual purpose of helping Indian manufacturing sustain its competitive edge while also maintaining a sustainable employment rate in the economy.



Adopted from Where machines could replace humans—and where they can't (yet) by Michael Chui, James Manyika, and Mehdi Miremadi

3.1 Technical feasibility

Any job or role in manufacturing which has the potential to be automated first needs to be weighed on technical scales. This scale can go from predictable physical work at one end and roles that require human cognition like stakeholder interaction, workforce management etc. at the other end. Figure-2 uses one such scale for representation. In the Indian manufacturing context, shop-floor jobs like assembly, quality check, and hazardous interactions shall come at one extreme. These will have the highest propensity for automation. On the other end, HR, Marketing, etc. roles in manufacturing will have the lowest propensity.

3.2 Business value

The most important aspect is the business value that automation and AI could provide. This involves cost-benefit analysis and detailed NPV calculations to determine whether replacing a human even in a low labor-cost country like India has cost advantages for the organization in the long run. Even if there are no seeming cost advantages either in the short or long run, some manufacturing jobs could still be replaced with AI due to inherent qualities like occupational hazard, regulatory requirements etc. For example, manufacturing nuclear fuel rods, corrosive chemicals etc. have a high propensity for automation even if it could cost more to implement.

3.3 Regulatory Environment in India

Lastly, any business or technical feasibility cannot surpass the regulatory requirements of countries. In India, it is more applicable because, as discussed before, the government has a higher incentive to save existing jobs and create new manufacturing jobs than to let automation take over. Even in advanced economies, governments are doing detailed research on the actual impact of AI on employment [12][13][14]. Based on this, policies can be framed where it becomes difficult for

organizations to implement AI. In India, especially due to its strong labor protection laws, organizations have an unfair incentive in bypassing the hassles of labor and go for automation where possible. This needs to be analyzed further to come to any conclusion on prospects of AI.

4.0 How to Adapt: Skills/ New Opportunities

Learning to work with AI based machines would be the first step towards adoption. An optimal mix of humans and machine based intelligent system will be required for sustenance in such an environment. Task allocation between humans and machines will become an important function of management. [6] Tasks involving human cognition will have to be handled by humans and those involving speed, total enumeration and massive data considerations will have to be handled by machines. On the shop floor, tasks such as data capturing from customers, taking inventory based decisions etc. could be taken care by AI. [7] But contract negotiations with union workers, worker counselling, relationship management, and so on could be better handled by humans.

Already established new opportunities involve cutting down on unplanned downtime, optimizing lifespan and operations of individual machines, enhancing equipment lifespan and preventing equipment failure etc. [15]

4.1 Organizational Design: Human-Machine Collaboration

Hiring the most qualified person would no longer be relevant. Greater emphasis would be on cultural fit & adaptability. Digital and mobile solutions are increasingly being adopted by HR department of leading manufacturing organizations. GE which championed bell curve appraisal system, has abandoned it. The legacy system was replaced by an app PD@GE which provides feedbacks at regular intervals to all the employees. [16] Industrial robots were previously made to perform precise and repetitive functions separated from humans. But this separation is now blurring out. At Amazon's fulfilment center shelves, themselves move now with worker working in the same space. While these are specially designed warehouses to allow human-machine collaboration, robots are now being designed to work in regular warehouses. [17] But some incidents indicate that Human-Machine collaboration is still not foolproof. The Manesar incident in India and the Frankfurt incident in Germany in 2015 are examples. [18] [19]

5.0 References

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