

The future of work and why we all need to be innovative.

"The stone age didn't end because they ran out of stones."

An essay

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A woman in Australia had a kidney transplant that was substantially less traumatic with a much shorter recovery time than previous bowel surgery. This story in itself is not that dramatic, yet in the context of this paper it indicates a significant change in the way we work. I will come back to why later.

In 1821 David Ricardo argued that machines would make the population redundant. Yet that has not happened. The Luddite disturbances between 1811 and 1812 are a widely known example of resistance to technology. However, we are still as negative and pessimistic today about technology as we always have been. This is because we tend to see the downside of technology, rather than the upside. We can see this when we reflect on how some people saw various technological advances and the impact they may have. Predictions of mental health problems and cancer because of mobile and later smart phones persuaded many people that this was not a good idea.

Scientific American, a renowned journal, said in 1909 that the automobile has practically reached the limit of its development is suggested by the fact that during the past year no improvements of a radical nature have been introduced. Today people predict that driverless cars won't take off, yet it is only our pessimism that is preventing them from taking off. If you are far safer in an airplane without a pilot, why would you not be safer in a car without a driver?

But technology is not the issue, the issue is what we do with it. The most successful innovations we have are successful because they support us rather than replace us. Mobile phones are an example of this, the mobile phone enhances substantially our ability to communicate. Innovations do not change what we do, only the way we do it. So, the use of innovations is essentially a social and political issue not a technological issue. Throughout time innovations have brought significant social changes. These social changes have influenced the social structures

HUNTER GATHERER	AGRICULTURE	INDUSTRIAL	TECHNOLOGICAL
Very small tribal communities Very limited innovation High levels of manual skills and very limited cognitive skills Dependent on environment Dependent on time Entirely self-sufficient No education	Small communities Limited innovation Some manual skills and limited cognitive skills Subject to the environment Subjected to time Mostly self-sufficient Very limited education	Large communities Substantial innovation Significant manual skills and some cognitive skills Environment less influential Time more controlled Limited self-sufficiency Limited to significant education	Global communities Significant innovation Some manual skills and significant cognitive skills Limited environmental influence Time not an influence Almost no self-sufficiency Substantial education

Table 1 Social Structures

As we have evolved from Hunter/Gatherers to agriculturalist through an industrial age to the current technological age the way we work has changed substantially. Each process has seen resistance, but also changes in how we work. As Hunter/Gatherers, living in small self-sufficient tribal communities meant that there was limited innovation taking place. Innovations when they occurred were often small incremental and took some time to impact on behaviours more broadly across the community. Shifting to an agricultural society meant that the influence of innovation was more wide spread but still limited and took time to be fully embraced and for the impact to be widespread, if at all. Today the innovations tend to be life changing, wide spread and impacting far quicker.

These innovations changing the face of business. We are seeing the emergence of new organisations. These new organisations are conducting business using novel methods that is leading to the change in the way we work and the loss of many jobs. 40 years ago, many of the people who were at school with me worked as a fitter and turner, joiners or boiler makers. These jobs hardly exist today. Many highly skilled jobs are no longer highly skilled, pharmacist; chefs, accountants, even doctors. Today most pharmacists simply put a label on a box. Accountants at best are data entry clerks, and even that is disappearing. I trained as a chef and the first 6 months you learn how to use a knife properly. Today knife skills are almost redundant as more and more kitchens buy in pre-prepared products. It has been suggested that up to 47% of jobs in the US will be automated by 2025.

We have new mind sets emerging about the nature of work. The idea of permanent or even long term employment is has almost disappeared. Thanks to online platforms the notion of a gig is becoming widely acceptable. It has been estimated that people under 20 today will have 12 jobs before they are 50, and most of these jobs have not been invented because we don't know what problem we must solve in the future.

New populations are evolving as cultural shifts occur and the make-up of society changes. Mass migration, the aging population and the recognition of various social groups is fragmenting populations into new and different segments.

Driven by new organisation, new mind sets and new populations we are see more and more new markets appearing. We seem to have moved from having thousands of businesses each with millions of customers to millions of businesses with hundreds of thousands of customers.

Supporting the changes is new technology. In my life time, I have seen the telephone move from a luxury item that only the rich had to a device that many people have two personal smart phones that they cannot live without. Thanks to technology today time is not an influence on what we do or when we do it.

This new face of business means that the nature of work has changed too. These changes are changing the nature of work.

Technology now means that you are always available, your work is always visible, your work is always measurable. This is already the case in the travel industry, within one very large travel company work is monitored by a software programme. They measure not just the statistics but also things like how they write emails or speak on the phone. Thus, they need just one operations manager to

manage a team of 80 consultants. There are no team leaders or supervisors. Work has become transparent. Social media will become work media, Boundaries between work and home will disappear, Work colleagues will not share physical space with you, Responsibility for what you do and how you do it will shift to the employee. Work will become far more competitive. Already work in many areas is tendered out. Uber and Airbnb demonstrate this along with thousands of casual job web sites. The best and cheapest will win work. Being creative and innovative will become highly valued. The gig industry shows that work will be come on demand, negotiated on a 24-hour basis supplying your labour as and when needed.

All of this is leading to significant change in the skills required as the figure below shows.

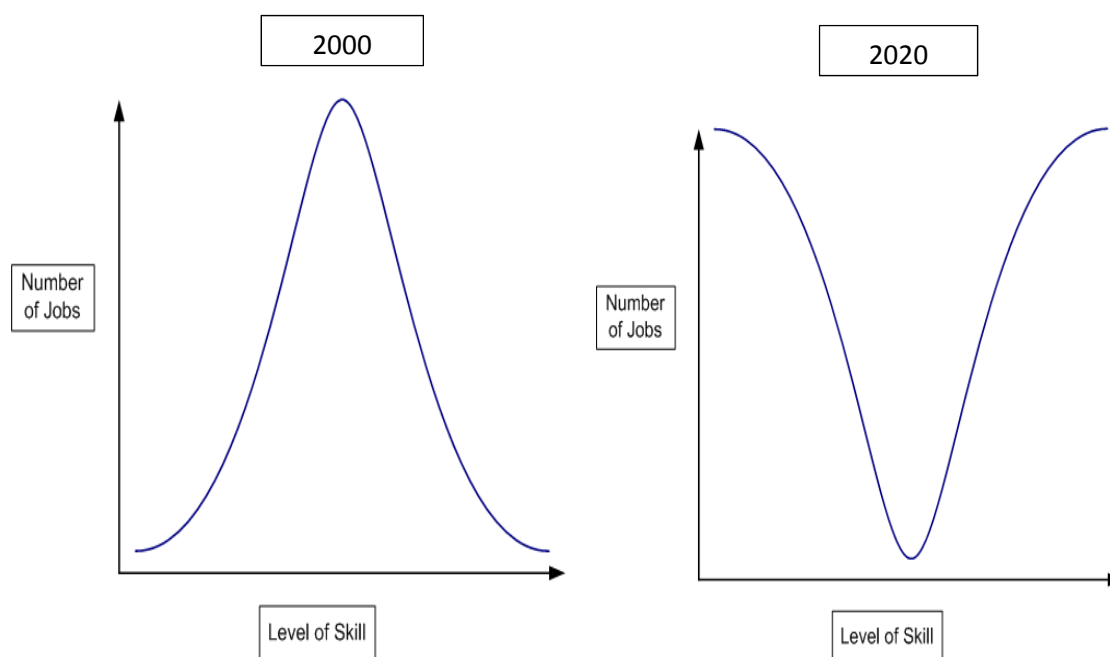


Figure 1 Changes in the number of jobs and the levels of skills.

Up to 2000 the number of jobs available to those with mid-level manual and cognitive skills was at its peak. These are the jobs that require training either through apprenticeships or through university education. By 2020 the bell curve is expected to reverse. The number of jobs requiring limited cognitive and manual skills are expected to grow. These are jobs that require interaction with the public and a learnt skill that once learnt is unlikely to require further training or up-skilling. On the other hand the number of jobs in the middle that need mid-level manual and cognitive skills are already in decline, as mentioned earlier.

These shifts in the way we work are resulting in changes in the relationships between employers and employees. The traditional relationship between employers and employees has been similar to Berne's transactional analyse, as one of Parent to Child. As an authoritative figure the employer gives specific directions to the employee to follow. However, this relationship is likely to change as the way we work and the structures within which this work takes place flattens. Employers and employees are likely to become much more collaborative and the relationship is likely to develop into a Adult to Adult one.

The growth of big data is almost overwhelming us. The pressure to understand and then make effective use of this data is intense as it becomes necessary to make sense of the data and find uses for it. Traditional sciences where maths was not such a critical component have changed and to succeed in science maths has become far more important as the data grows bigger.

Products and services are becoming more and more individualised. There has been some very interesting research recently conducted by PWC, they asked 10 years olds about their future buying habits, what was amazing was that these 10 year olds were saying that they want highly personalised products and services, they did not want to buy what everyone else was buying. The implications for a society where homogenisation is the norm are profound.

Work is and will continue to become more complex as we will need strong social interaction, original thinking and creative ability. In my own field, as an academic, I can no longer go into a class room and read from a text book, students not only expect to learn but also want to be entertained. This makes being an academic far more challenging and complex. The same is happening across most occupations. As mentioned above, to be a biologist a degree in biology is no longer enough, you now need a degree in maths as well.

Coming back to my opening paragraph, the reason the kidney transplant was so much better for the patient was because it was performed by a robot. A surgeon guided the robot, but a robot did most of the work. This automation asks some serious questions about what we are going to do at work each day. For the surgeon, the answer may be simply to perform more operations. But for the rest of us it might not be so simple.

The changes mean that we can no longer believe that all innovations belong to the technologists, we are going to have to find ways to be innovative in what we do, in how we spend our time, in how we find meaningful work. Innovation is not about technology at all, it is about how you efficiently and effectively use what you have in order to produce value for yourself and others.

We have almost come full circle and back to the Hunter/Gatherer and Agricultural social structures. Both these structures saw innovation that was more localised and personal that has local impact. As we shift towards more individualised work so the need to be innovative at a local and individual level will increase.

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