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Nathaniel Ware – Hybridization as an augmentation strategy

Hybridization as an augmentation strategy

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Introduction

Human history is littered with false dichotomies. The list is endless, from George Bush's "us or them" rhetoric, to the still common mindset that there is necessarily a trade-off between doing good and generating profit. The assumption that jobs will be undertaken by *either* humans *or* robots is the latest in that long line of false dichotomies.

This dichotomy is false because of the potential for hybridization. We often assume that employers will decide between human capital and physical capital in their business processes. Indeed, neoclassical economic theory has traditionally distinguished between those two forms of capital (Caballé & Santos, 1993). However, this need not be the choice facing business executives. If employees properly employ strategies to augment themselves, hybrid human-physical capital will be the optimal input into business processes. Not only is this hybrid form of capital possible and beneficial, but it is also necessary to prevent major societal division and upheaval.

The Necessity of Hybridization

In the past two decades, the world has witnessed dramatically rising income inequality. Now the wealthiest 62 people have more wealth than the poorest 50% of the world's population combined (Thomson, 2016). This has been due to a range of factors, including business models that favour firms with economies of scale, the burgeoning market capitalization of technology start-ups and giants alike, and investment trends that exacerbate existing wealth imbalances.

In the next two decades, such wealth imbalances are likely to be further reinforced via technological advances, including AI, machine learning, virtual reality, blockchain, and quantum computing. This is because the most replaceable jobs are those that are repetitive, which are mostly undertaken by those from lower socio-economic backgrounds. Conversely, the people whose jobs are least likely to be replaced are those that design and control the technology, who are generally wealthier.

As such, if nothing is done to augment populations at risk of mass unemployment, inequality will get worse. If Brexit, the rise of Trump, and the resurgence of Le Pen have taught us anything, it's that growing inequality is likely to result in a rise in nationalism, protectionism, and technology resentment, which threatens to undermine the widespread benefits that globalization has brought.

Not only is hybridization necessary to prevent greater inequality and an undermining of globalization's benefits. It is also necessary due to the exponential nature of technological improvements. Artificial intelligence is improving at a faster rate than human intelligence, so it is only a matter of time before they are equiva-

lent – something referred to as "technological singularity" (Goertzel, 2007). Once this occurs, AI is expected to diverge, rather than converge, with human intelligence (Nilsson, 2014). Because AI is following an exponential trend, is it essential for humans to ride that trend if we are to have a place in the workplace.

The key challenge, therefore, is to make a binary economic system into a hybrid economic system. This can be achieved via the following five strategies. In some cases, these strategies can be adopted by individual employees. In other cases, a collective response, a political response, or advocacy by employees is needed.

Strategies to Make Hybridization a Reality

a) Evening the Playing Field via Taxation Equalization

One of the key problems at the moment is that robots have an unfair advantage when it comes to taxation. In short, human labor is taxed, while machine labor is not taxed. This distorts the allocation of resources and the production process. To illustrate this, suppose that a specific manufacturing task cost €55 for a machine to perform, but that a human is prepared to do that same task for €50 worth of benefits. Without any taxation, an employer would choose human labor and save €5. However, if the labor tax rate is 23%, then a human would need to receive a €65 payment to keep €50 worth of benefits, as €15 goes to the government as taxation. If the human is taxed but the machine is not, the employer would opt for the machine, and save €10. However, if both the machine and the human were taxed at 23%, then it would cost the employer €65 to use the human and €71.43 to use the machine. In this case, the employer would use human labor in the production process. This example illustrates that current taxation arrangements, which tax human capital but not physical capital, give robots an unfair advantage.

Given this, it is important for employees to persuade governments to have taxation equalization. If this is obtained, then the rate at which robots take human jobs will be delayed, giving human employees more time to retrain and augment themselves.

b) Bringing School Curricula into the Modern Era

Many education systems around the world have had the same school curriculum for years, or even decades. This often involves compulsory study of Latin-based languages like Italian and French, with voluntary or non-existent options for studying programming languages. In Australia, a different Shakespeare play is studied in every year of high school, yet the terms *artificial intelligence, quantum computing, machine learning,* and *blockchain* are not mentioned once in any subject curriculum (Flaherty, 2011; Gilmour, 2015). Political bureaucracy and teaching traditions make changes to curricula difficult. However, such changes are desperately needed. Programming languages should be more widely taught – or should be compulsory. Technological trends should be a focus. Students need to know about the world that they will grow to live in.

c) Making Education a Continuous Cycle not a One-Off Occurrence

At present, education is concentrated in the early stages of one's life. There is the assumption that undergraduate university study is for people between the ages of 18 and 24. Even graduate study, which is less subject to an age-related assumption, still predominantly consists of people between the ages of 22 and 32. This concentration of education in the first third of one's life is consistent with economic theories that find that education has the greatest return the earlier it is undertaken (Shultz, 1988). However, these economic models are based on the assumption that jobs do not become obsolescent. While this assumption may have been mostly valid in decades past, the same cannot be said today. Instead of it being the exception for people aged 35 to 70 to undertake tertiary education (or other forms of training), it needs to be the norm. Rather than a linear progression from training to work, it needs to be a cyclical progression from training to work to training to work to training to work, and so on, throughout one's life. This isn't to say that education and work cannot, or should not, occur simultaneously. In many cases, on-the-job training is desirable. However, to the extent that career transitions are taking place, a cyclical approach may be needed.

To transition from a linear to a cyclical education model, several changes are required. There needs to be a mindset shift. No individual, at whatever age, should be looked down on or stereotyped for going back to university. The duration and nature of courses by universities (and other institutions) also needs to change. Universities cannot expect people to dedicate years to study in the middle of their lives, or to relocate to remote towns where many universities are located in the US and UK. Instead, courses need to be shorter and more convenient location-wise, given the increased probability of family commitments.

d) Reformed Safety Nets to Enable Cyclical Education and Risk-Taking

In order for this education shift to occur, it is also necessary for safety nets to be reformed. At present, it is financially difficult for people to take time off work between the ages of 35 to 60 because (a) in many countries superannuation savings are only accessible after the age of 65, (b) the financial responsibilities of in-

dividuals are often greater at this age, particularly those with families to support, and (c) it is more difficult to obtain education loans later in life when financial institutions may deem the probability of unemployment and therefore loan default to be greater.

Another reason why safety nets need reforming is that technological advances need to be accompanied by a transition from the majority of people simply consuming products and services, to the majority of people designing and controlling products and services. However, designing and refining products and services carries inherent risks. There is a non-negligible chance that any particular innovation will fail to get traction. To make risk-averse individuals willing to transition from being consumers to designers, the potential personal financial downside from risk-taking needs to be reduced.

One proposed new type of safety net is a universal basic income, which would involve all individuals in a society receiving a small salary irrespective of their personal circumstances (Klein, 2016). It is at least arguable that this would both enable a continuous cycle of education, and enable more entrepreneurial risks to be taken by risk-averse individuals.

e) Human Capability Maximization via Technology Utilization

A fifth and final strategy to maintain human relevance in the workplace is for there to be investment, innovation, and adoption of technologies that enable human capabilities to be improved. For example, it is not impossible that in the future brain implants will be viable that will enable knowledge and memories to be stored in the cloud and accessed in real-time. It is also possible that humans could wear exoskeletons to improve strength and endurance (Bogue, 2015). Furthermore, connected contact lenses could enable AI to visually provide analysis and recommendations before our very eyes, which we could then use to improve our decision-making and creativity. For example, a painter could have an AI provide recommendations for paint colour combinations and designs, or a mathematician working on a sheet of paper could have an AI suggest the next steps in solving a complicated mathematical problem. By having humans acquire some of the capabilities typically associated with robots, it potentially enables the best of both worlds – the creativity and emotional intelligence of humans, with the computational power and big data enabled predictive capability of technology.

Overall, these five strategies provide a roadmap to human augmentation. They are the strategies that I will personally be employing via advocacy, communication, collaboration and education, and they are the strategies that I encourage every person to pursue and support. It is not enough to care about a robot potentially taking *your* job, because jobs are constantly changing. If you care about your job, you must also care about everyone's job.

Conclusion

For humans to survive and thrive against exponentially improving technology, the optimal strategy is to make the hybrid option of human-computer work superior to computer work alone. This hybridization is necessary because without it there will be substantial inequality, and humans will soon be left far behind. To make this hybridization a reality, the taxation advantage that robots have must be rectified so that humans and machines are competing on an even playing field. This will buy humans time to become skilled in the right way. Such skill acquisition is possible if more technologically-savvy education curricula are introduced, and if the education system transitions from being linear to cyclical in nature. This will only be possible with better safety nets, which have the added advantage of enabling humans to transition from being product consumers to product designer and controllers. In this way, human employment will be retained in the short to medium term. In the long-term, however, human employment necessitates improvements to fundamental human capabilities. Only by integrating technology and biology as part of the fourth industrial revolution will humans remain competitive with, and sometimes superior to, technology in the long-term. Humans and computers must become inextricably linked via hybridization if there is to be a future that works for all.

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