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Robots and the Future of Higher Education

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ABSTRACT:
Software technology is at the core of understanding global unemployment. Workers in transportation and logistics, production occupations, administrations and services are at risk. Some disciplines could leave graduates at much greater risk of being replaced by artificial intelligence.

KEY WORDS
AUTOMATION, GRADUATES, RISK, UNEMPLOYMENT

Software technology is at the core of understanding global unemployment. A report by McKinsey Global Institute (MGI) shows that 44 per cent of companies that reduced their number of employees since the global financial crash in 2008 did so by means of automation.

Oxford University academics, Carl Benedict Frey and Michael Osborne published, in 2013, the most comprehensive estimate of susceptible jobs to computerization. Their methodology estimates the probability of computerization for 702 detailed occupations analyzing the number of jobs at risk. Their results predict that most workers in transportation and logistics, production occupations, administration and services are at risk. Agricultural, construction and cargo handling vehicles are automatable and hospitals already use robots to transport food and prescriptions.

Their Analysis reveal that some disciplines could leave graduates at a much greater risk of being replaced by machines in the future.

Accountancy and finance personnel, and to a slightly lesser degree, chartered surveyors and auctioneers are just some examples of
For example, a Chicago based company Narrative science uses software powered by artificial intelligence, as an advanced natural language generation (advanced NLG) for companies that goes beyond reporting the numbers—it creates perfectly written, meaningful narratives for any intended audience. Forbes, the business and finance magazine, now uses this software to generate reports on company earnings.

A company called Kensho, uses software that can find answers on questions on company reports and global economic data in a matter of minutes – something that would take highly paid finance graduates many hours to do. Robo advisers create personalized investment portfolios removing the need for stockbrokers and financial services.

However, some economists argue that if massive automation of jobs happens it doesn’t mean that massive unemployment is inevitable. When cars displaced coachmen and stable boys many new jobs in highway and road construction were created.

And while computerized trading has reduced the numbers of stockbrokers who trade over the phone, new programming jobs designing new trading algorithms have emerged.

The desire to generate wealth is driving this investment in labour saving technologies, and this incentive for wealth creation will have a dramatic impact on the numbers employed. Wall Street profits were 70% higher in 2013 than they were in 2000 but the numbers employed were one-third fewer in the same period. The valuations of technology companies are indicative of the premium companies are prepared to put on labour saving technology. Instagram was valued at $1bn by Facebook or $77m per employee. Facebook now uses a software package, cyberg, that requires one human to manage 20,000 computers.
Robot prices are declining and robot sales worldwide grew from 99,000 units in 2000 to 248,000 units in 2015. Expansion in production and declining costs of production mean new uses of robots are possible in construction, agriculture, and manufacturing. With declining costs robots are substituting for labour. It seems no jobs are secure. A book published last year, *The Future of the Professions – how technology will transform the world of work*, the authors David Susskind and Richard Susskind argued that increasingly capable machines could replace even relatively highly skilled jobs such as doctors and lawyers. David Matthews of *THE* (Times Higher Education) has written that 100,000 legal jobs in the UK will be automated in the next 20 years. Artificial Intelligence (A.I.) is now used that finds answers to legal queries in seconds. No more (very expensive) wading through case law.

The transportation revolution and electrification of the early 19th century lowered costs of shipping, raised productivity and market size and raised demand for skilled blue collar and white collar workers. Improved educational standards meant that workers could adapt to the new skills required. However, even though the numbers with higher education qualifications continue to grow, high skilled workers are moving down the occupational ladder pushing low skilled workers out of the labour force. One third of US STEM (science, technology, engineering and maths) graduates are in occupations that do not require a degree (think coffee shops). Human resource personnel departments will equally be streamlined with algorithms representing unbiased advantages over human recruitment personnel.
At the turn of the century agriculture employed half of the American workforce. Today only 2% are employed in agriculture thanks to changes in agricultural production and in technology. Manufacturing employment absorbed those ex farm workers and services absorbed ex manufacturing workers.

But in his book *Rise against the robots: technology and the threat of a jobless future* Martin Forde is, to say the least, pessimistic about the IT revolution because of its ‘creative destruction.’ Technological creative destruction, while creating wealth destroys the demand for work carrying with it a multitude of social costs.

But does education support humans in the race against technology? Large complex data sets, known as big data is giving technology a clear lead. Where big data is available even non-routine tasks are being computerized.

Big data will revolutionise education, traditionally labour intensive. The recent growth in MOOCs (massive open online courses) use large data sets detailing student interaction on forums, diligence in viewing lectures, submitting assignments and they allow machine learning algorithms to serve as interactive tutors.

Some Universities such as MIT have embraced this ‘massive disruption’ to universities and have 100 million learners and increasing by one million each month. The cost effectiveness of MOOC delivery is appealing because administration and layers of academic leadership roles take up over 50% of third level funding.

There are worrying signals coming from policy makers of imminent student loan systems. MOOCs have the capacity to significantly
depress the cost of getting a degree. Faced with tight budgetary constraints the MOOCs revolution will be with us soon. Computers have the edge in managing big data calculations and are able to detect patterns in big data better than humans. The other advantage that computers have is that they don’t need to sleep or eat or rest and algorithms are free of irrational biases. Studies show that judges are substantially more generous in their rulings following a lunch break, demonstrating that computer algorithms can be more impartial than humans.

In health care computers are using big data (medical evidence reports, patient records) to compare individual patients symptoms, genetics, medication history and family history to diagnose and provide the highest probability of successful treatment. As Dr Gregory House might say (sarcastically) ‘who needs to go to medical school when you have WiFi’.

New improved sensing technology has made sensing data a major source of big data rendering many tasks computerisable. For example, medical staff monitoring patients in intensive care and CCTV operators. No rest breaks needed by the computers and no human errors like lapses in concentration.
The list shows jobs typically done by graduates and their likelihood of automation over the next 20 years. The methodology used is based
on skills the authors think is hard for machines to replicate and will therefore remain within the domain of humans – creative intelligence, social intelligence, caring for others, manual dexterity and manipulation/perception of objects.

It will come as a disappointment to some of my colleagues that it is quite unlikely that the architect will be replaced by some algorithm. But as *THE* notes jobs linked to a specific degree, like architect, are less at risk than the accountant, which is open to graduates from many backgrounds. It also that notes that it might also come as a surprise that pharmacy is low risk, although the author David Forde would disagree citing that pharmacy at the university of California medical centre is entirely run by robots.

So what future homo sapiens? The advantage humans have over machines (so far) is social intelligence, empathy and creativity and perhaps it is the study of the humanities and liberal arts that will provide the more flexible and creative graduate.