

## **JOBS AND OUR INNOVATION CIVILIZATION**

**By George S. Takach**

In my last column, I painted a fairly rosy picture of our “Innovation Civilization”, built upon the foundation of countless scientific and social inventions and improvements over the last few thousand years, and in particular since 1950. Nonetheless, critics abound, especially those who argue that a future of hyper innovation in software infused networked robotics, automation, artificial intelligence, big data and machine learning will produce a dystopian world of mass unemployment and resulting social dislocation. On a more personal level, I am often asked whether I have any misgivings about the high rates of unemployment that will inevitably follow the new IT developments that I am helping clients develop or implement.

My short answer is that that prediction for a bleak future with crippling rates of unemployment is not going to unfold, given the experience of the OECD countries over the last 70 years, during which time massive amounts of IT products and services have been adopted by organizations around the world. Here are some of the longer reasons bolstering my view.

### ***We Have Seen This Movie Before***

History teaches that technology has not produced overall rates of high unemployment. Some technologies do displace some workers, for sure. There are, for example, no more buggy makers (given that about 100 years ago the then new fangled automobile supplanted the horse and buggy as the predominant mode of personal transportation in developed economies). And hundreds, if not thousands, of examples of this “substitution process” can be cited.

But here’s the thing. The lost jobs in the buggy building industry have been more than replaced by jobs in the automobile assembly sector (and the auto parts manufacturing industry), notwithstanding that auto assembly plants are among the heaviest users of robots in the world. And that is not counting the many new jobs created in the factories producing the robots, and in the offices writing the software code for the robots, and the many thousands of well paid technicians employed installing and servicing robots.

We have also seen this shift in employment generally at the macro level. For example, about 100 years ago (i.e., on the eve of World War I), 80% of Canadians were employed on farms – we were, in essence, a nation of farmers. Currently, only about 2% of the population are employed in farming. And yet, the agriculture sector produces far more output – how is that possible?

In a word, automation. The tractors, combines and harvesters that do virtually all of the heavy lifting on the modern farm, need precious few people to operate them. But the result has not been massive unemployment (we do not have a 78% unemployment rate although farming now keeps only 2% of Canadians busy instead of 80% a century ago). Rather, the children of farmers migrated to the cities to work (initially) in factories, and more recently in the “services sector”. So, bottom line, fewer farm jobs, but many more industrial and service jobs.

As an example of a relatively new service sector business, consider the leisure industry. 100 years ago only the rich and famous could afford extended vacations to foreign lands, such as the “European Tour” taken by young aristocrats in the 19th century. Since the 1950’s, however, the democratization of transoceanic travel, courtesy of the invention of the jet propelled airliner (which now flies between Montreal and London in six hours, replacing the ocean liner which

took six days to make the same journey – a period of time only the idle and the rich could afford), has produced a huge industry accessible to the middle classes of OECD countries and countless others. Today, globally, 10 % of the earth's work force are employed in one fashion or another in the leisure industry.

This shift, from farming to manufacturing and services, has occurred in many other industries and segments of the economy. Again, compared to a hundred years ago, many more people in Canada are employed in educational institutions, and it's not merely an explosive growth in the numbers of teachers and professors. Healthcare is another good example. Yes, there were doctors and nurses 100 years ago, but not nearly in the numbers we have today. Or consider the "cultural industries", or retailing, or property management, or the companies that service the energy industry. The list of new and expanded businesses – not to mention the explosive growth of the public sector over the past century - is very long, and the result is fairly low numbers of unemployed.

### ***"But Now Is Different"***

These historical examples, however, do not give certain commentators comfort. They say that "now is going to be different"; that the new IT products and services, including artificial intelligence, machine learning, and big data applications will cause tens of millions to lose their jobs, and there will not be another auto or leisure industry waiting in the wings to soak up the displaced workers.

There have been many studies trying to predict with some precision just how many people will be uprooted from their current positions in the workforce as a result of the new technologies. The range of job loss projections vary widely, from 9% to 75%. Well, that is quite a spread, illustrating to me the confusion around the difference between possibility and probability in this area of social science and predictive analysis.

If you want to read only one good study in this important area, I can commend *Policy Brief on the Future of Work – Putting Faces to the Jobs at Risk of Automation* published by the OECD in March, 2018. In short, it predicts that 14% of jobs will be wiped out by new technology. Now, to the people who are currently in those jobs, that is a very big thing, and society needs to be ready with job re-skilling, training, education and other programmes for the displaced workers. But on a macro, economy wide level, that number is quite manageable.

Interestingly, the same OECD study predicts that another 32% of jobs will be materially impacted by technology. But here's the thing – this will actually be a good thing, with one very important proviso; namely, that workers in this 35% category who want to stay in their jobs will have to develop new skills and attributes if they want to stay employed in them.

Consider bank tellers, for example. When the ATM came into widespread use in the 1970's, many predicted the demise of the human bank teller – why would a customer wait in line in a bank branch on a Friday to withdraw some of their money for the following week-end, when they could just visit an ATM. Soon after, when e-banking took off, and customers could do their banking transactions over the internet from the comfort of their home or office, it was predicted that that was another nail in the bank teller job description. Surely bank tellers would go the way of the horse and buggy maker.

Interestingly, that has not happened. And indeed, the number of bank tellers in North America has increased, from 500,000 to 600,000. But the job of the bank teller has also changed. They

do far fewer cash withdrawal transactions – customers do indeed use the ATM for that. And they don't balance cheque books much anymore (e-banking takes care of that for most people). But what they do engage in more is the provision of higher value services, such as advising clients on investment products, or assisting small businesses with their many banking challenges. In short, technology evolution has resulted in the upskilling of the bank teller job. And so, if you want to be a bank teller today, you better have good social skills (in addition to the previously important maths competencies).

### ***Mainly Different Jobs, Rather than Fewer***

The bank teller example will play out in thousands of other vertical sub-businesses. For example, Canada Post is delivering many fewer letters today, because most written messages are today conveyed by email or commensurate electronic means. But Canada Post is delivering many millions more parcels than previously, as e-commerce starts to really take off in Canada. And the work flow around delivering parcels, versus letters, is actually quite different, and so the job requirements of most Canada Post staff will change over time as well.

Another occupation that will change is trucking. It appears that a very high percentage of truck drivers retiring over the next 10 years will be hard to replace because young people today will not put up with the long hours away from home, and other hardships of driving a long distance truck. Therefore, in a few years, the inter-city leg of the truck delivery trip will be outsourced to autonomous vehicles; but there will still be a requirement for an experienced trucker to effect the last leg of the journey between the truck depot at the edge of town (where the self driving truck will drop its trailer) and the loading dock of the ultimate customer. In short, we'll still have truck drivers, but their jobs will be different (i.e., they will interact more with customers; they will need to understand optimized route scheduling systems; they may well take on certain "sales" functions as they begin to interface more with clients and prospects, etc.).

### ***And More Tech Jobs, Lifelong Learning***

It perhaps goes without saying, but of course in addition to most jobs undergoing technology driven transformation over the next number of years, there will also be created hundreds of thousands of new tech-oriented jobs in this country. So, if your niece is asking you about the future job market four years hence (she is just starting university), you would do well to chat up the tech sector, both in terms of traditional tech companies (but also early stage tech companies, that are all trying to disrupt the traditional companies – point her to the first few screens of her mobile phone that contains the icons for all her apps, and remind her that each tile represents a traditional offline business that has since been disrupted and, usually, replaced).

Tech jobs are also paying relatively well nowadays. A recent comprehensive survey has found that technical architect engineers, software engineers, and persons in related positions have starting salaries in the \$75,000 range, and in a few years, the more successful ones are earning twice that, particularly if they take on management or similar leadership roles.

As for your nephew starting in his non-tech job, your advice to him should be "lifelong learning". Whatever his last stage of formal education, let him know it should just be one of several phases of education and training; that if he wants to remain meaningfully employed after the transformations inevitably coming to his business, his best bet is to keep honing and fine tuning his skills so he stays indispensable to his employer. It's the best strategy for staying in the perpetual change 35% of the workforce, and avoiding becoming one of the displaced 15%.