

## Assignment 2: The impact of adopting industry 4.0 technologies by Small-Medium Enterprises in Wales.

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## Introduction

The implementation of new technologies is always hindered by societal, economic and legal hurdles and the adoption of Industry 4.0 (I4.0) is no exception. The classic example is the industrial revolution being opposed and obstructed by luddites, when they campaigned against, and destroyed machines that they saw as taking their jobs (1). In this essay, the barriers and potential solutions will be explored, to learn lessons from past industry disruptors. It will also evaluate how the Welsh government is managing the transition into the future of industry and particularly the manufacturing industry for small medium enterprises (SMEs).

Industry 4.0 is the 4<sup>th</sup> industrial revolution. Characterised by interconnectedness of advanced technology and often focusses on cyber-physical systems that link humans to machines. Frequently using the internet, wireless connectivity, and vast computing power to facilitate rapid communications between machines, humans, and databases/ information storage. The technologies that typically make up the I4.0 toolkit include automated robotics, Augmented Reality, Virtual Reality, cloud computing, system integration, internet of things, big data, computer simulations, and additive manufacturing (fig 1).

| Cluster                        | Key technologies in the context of IR 4.0                                                                                                                                                                                  |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Smart Factory                  | Cyber-Physical, systems/Embedded systems<br>Internet of Things/Services<br>Automation<br>Modularization/Prefabrication<br>Additive Manufacturing<br>Product-Lifecycle-Management<br>Robotics<br>Human-Computer Interaction |
| Simulation and Modelling       | Simulation Tools/Simulation Models<br>Building Information Modelling<br>Augmented Reality (AR)/Virtual Reality (VR)                                                                                                        |
| Digitization and Vitualization | Cloud Computing<br>Big Data<br>Mobile Computing<br>Social Media<br>Digitization                                                                                                                                            |

*Figure 1. Organisational structure of I4.0 technologies (2)*

None of these are particularly new technologies, for example, computer modelling has been around since the 1940s (3) and robotic arms were conceived and installed in the late 1950s (4). What has changed in more recent times is the interconnectivity of devices, relatively cheap computing power and access to live data. (5).

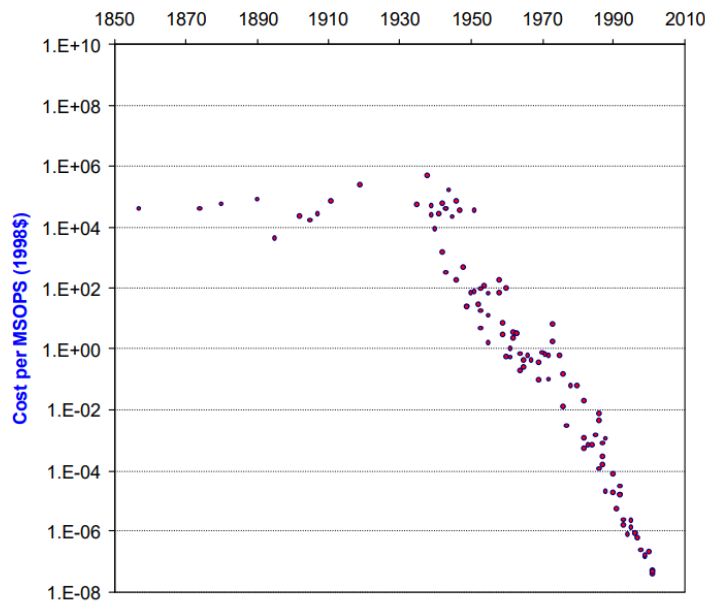


Figure 2. The cost of computing, measured in cost per million standard operations per second (MSOPS). (5).

These associated technologies are no longer limited to giant companies or ICT companies, or even highly technologically advanced industries, but are becoming financially viable for small and technologically undeveloped sectors.

There is often an element moving away from mass production somewhat and of individualisation of customer requirements, thanks to advanced communication and the flexibility and accuracy of advanced systems (6).

Clearly, it is important, when considering these technologies, that they are used appropriately and most SMEs will only be interested in exploiting these technologies, if there is economic gain.

With previous industrial revolutions, there have always been seismic shifts in the world's social landscape. What comes out of I4.0 remains to be seen, but as discussed in (7) professionals now spend more time working due to having easy access to computers (and smart phones) and you might expect similar shifts from the interconnectivity and data availability of I4.0 systems. The movement of people from rural to metropolitan areas seen since the industrial revolution may finally start to reverse, with people able to manage complex processes and systems remotely. And, as seen during the pandemic, people may choose to live away from cities and industrial centres to spend their lives a little nearer to nature or family and friends.

## Current situation

### Wales's SMEs

There are 5.7 million SMEs in the UK. And 261,100 in Wales as of 2021(8). The UK Government's definition of an SME is a small or medium enterprise with no more than 250 employees. When combined, they account for 62.6% of employment and 39.4% of turnover

in Wales (8). (The EUs definition is fewer than 250 employees with turnover below €50m, or total balance sheet below €43m). By comparison, the biggest turnover in Wales was seen by Admiral Group PLC, with £3.4 billion (11).

The Wales government has commissioned reports into industry 4.0. Including Wales 4.0 Delivering Economic transformation for a better future of work (9) and Industry 4.0 – the future of Wales, August 2018 (10). The primary recommendations were:

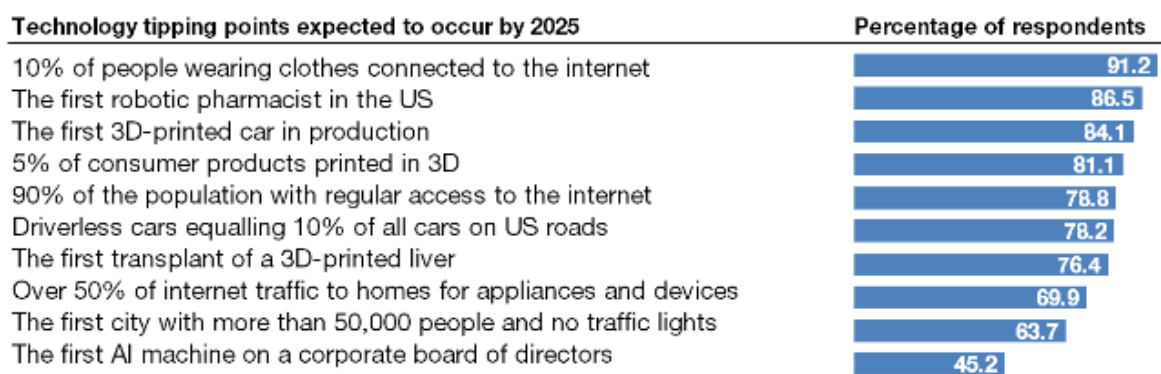
- Identify the expertise and commercial strengths that exists in Wales, for example, in compound semi-conductors, insurance and healthcare.
- Identify Wales' competitive advantages in the anticipated growth areas.
- Where strengths and competitive advantage aligns with predicted future growth, support those sectors to position themselves at the forefront of global industry.

## Industry 4.0

Klaus Schwab is the German economist who coined the term Industry 4.0. He stated, "It's not the *next* technological revolution – it's already here," As mentioned above, all the technology already exists, but the challenge is implementing it, in the right proportions and integrating the chosen technologies to make the factories of the future and industrial internet of things (IIOT). Change is happening fast, and technology is being added to everything: Existing Technology is being retrofitted with sensors that weren't even imagined, when the technology was installed. And I4.0 is still in its infancy, with many experts trying to imagine what will develop, with several tipping points predicted in the near future (Fig 3).

## When will the future arrive?

800 technology executives and experts from the information and communications technology sector were surveyed as part of our *Technology Tipping Points and Societal Impact* report



Source: World Economic Forum, *Technology Tipping Points and Societal Impact* report, 2015

Figure 3. Survey of technology experts. (12)

# Analysis

Typical methods for analysing businesses are Porter's 5 Forces, PESTLE and SWOT

## Porter's 5 forces

Developed by Michael E. Porter at Harvard University in 1979 (13). As a tool for capturing all aspects of a business strategy or development. Originally a counterpoint to SWOT, but often used in conjunction. Implemented here as an overview.

- Competition in the industry

This is key: If the technology is advancing in other countries and you are not, then you will be left behind (9). Small gains for SMEs, may close the gaps with larger enterprises, but larger companies are likely to have the resources to out-develop an SME. Government aid may close the gap, somewhat.

- Potential of new entrants into the industry

This may be both an opportunity and a threat, as new technology may emerge that overhauls and improves your business. Or a new competitor emerges, uses technology to take or reduce your market share. Wales 4.0 (9) states that "Business as usual is not an option". Going on to say that the rise of a number of newer Asiatic economies is directly attributable to adoption of new technologies.

- Power of suppliers

Supply chain could be improved and streamlined with I4.0. But your suppliers may be more or less committed to technology than you are. This would lead to discontinuity in the supply chain and create problems for logistics.

- Power of customers

Technological advancements may need to span the value chain. If, for example, customers demanded RFID tracking of the product, through the process, this might be a cost that is too much for an SME.

Working with customers for bespoke solutions could be better achieved with I4.0 technologies.

- Threat of substitute products

Counterfeiting could be reduced and prevented using RFID and blockchain-mediated value stream tracking.

## SWOT

Swot analysis was developed by a team at Stanford Research institute in the 1960s (14). The acronym stands for Strengths, Weaknesses, Opportunities and Threats, and can be applied to many echelons of businesses, from higher level strategies to individual processes and products.

Applied here to I4.0 broadly for SMEs:

### *Strengths*

Gains in efficiency, profit.

Technological advancement and engagement of customers, suppliers, and employees.

### *Weaknesses*

Is there a business case: Does the cost outweigh the benefit? Is support sufficient?

### *Opportunities*

Growth and ability to compete with larger- but less technologically advanced- companies.

Make improvements to businesses.

Develop a culture of innovation.

Facilitate the analysis of customer demand, providing innovation, skill augmentation and providing efficient and effective services or products.

Early analysis of trends, to retrain staff at risk of automation-related job losses

### *Threats*

Lack of qualified personnel, training, employee and employer engagement, and awareness of I4.0.

Lack of business support from public or private sector.

Failure of support to keep pace with rapid advancements.

Overstating the importance of I4.0 for businesses who have no need for it.

In summary, the Opportunities are numerous and substantial, and the threats must be approached with open-minded, forward-thinking approach. Primarily, with targeted grant-funding and knowledge transfer strategies.

## PESTLE(S)

When considering cultural and workforce factors that may contribute to delivering authentic economic and societal benefit, a PESTLE(S) analysis the most complete tool. This technique was developed as PEST analysis by Harvard professor Francis Aguilar (15) (and expanded, more recently to include Legal, Environmental and Security. The acronym stands for Political, Economic, Social, Technological, Legal and Environmental factors (and Security) and can be broadly applied to businesses and their strategies.

Challenges of IR 4.0.

| No. | Factor            | Details                  | Explanation                                                                                                                                                                                                                                                                                                                                                                 |
|-----|-------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Political (P)     | Governance               | Companies within the construction support industry are mostly made up of SMEs, which restricts their ability to invest in technologies which provides with unclear benefits. The construction companies would have to rely on governing bodies and authorities to provide support towards these implementations through funding programs and also collaborative partnership |
| 2   | Economical (E)    | Financial transparency   | The implementation of innovative technology is costly. Further worsened by the uncertainty of a return of investment. Other hidden costs such as training and equipment maintenance would also add up to the list making it harder to implement                                                                                                                             |
| 3   | Social (S)        | Cultural habits          | The adoption would have a widespread effect throughout the construction processes involving multiple parties                                                                                                                                                                                                                                                                |
| 4   | Technological (T) | Technical challenges     | Standards and processes would have to be redefined and enhanced to suit the construction environment. Equipment utilized elsewhere would have to be robust and the need for enhanced skills to operate these innovative technologies would increase the challenges in implementing it to normal daily practices                                                             |
| 5   | Environmental (E) | Organizational processes | Changes within organizational processes (horizontal, vertical and end-to-end) would somehow distort common execution processes. Common practices would now require to be redesigned to successfully adapt to the new changes and enhance growth                                                                                                                             |
| 6   | Legal (L)         | Uncertain regulatory     | Unclear separation of responsibilities withheld by each stakeholders and legal concerns through shortcomings adds up to the complexity                                                                                                                                                                                                                                      |
| 7   | Security (S)      | Threat risk              | Information and data exchange would be prone to threats and placed under risky situations raising multiple IT security concerns relating to data privacy and data protection                                                                                                                                                                                                |

Figure 4. Example of summary PESTLE(S) analysis From (2)

Clearly, everything businesses-related is politically sensitive, with corporation tax, employment and salaries being a big part of the political-industrial landscape. For example, the UK sets its tax rates lower than all the other G7 countries as a strategy designed to attract businesses to the UK by decreasing their tax burden. (Fig. 5)

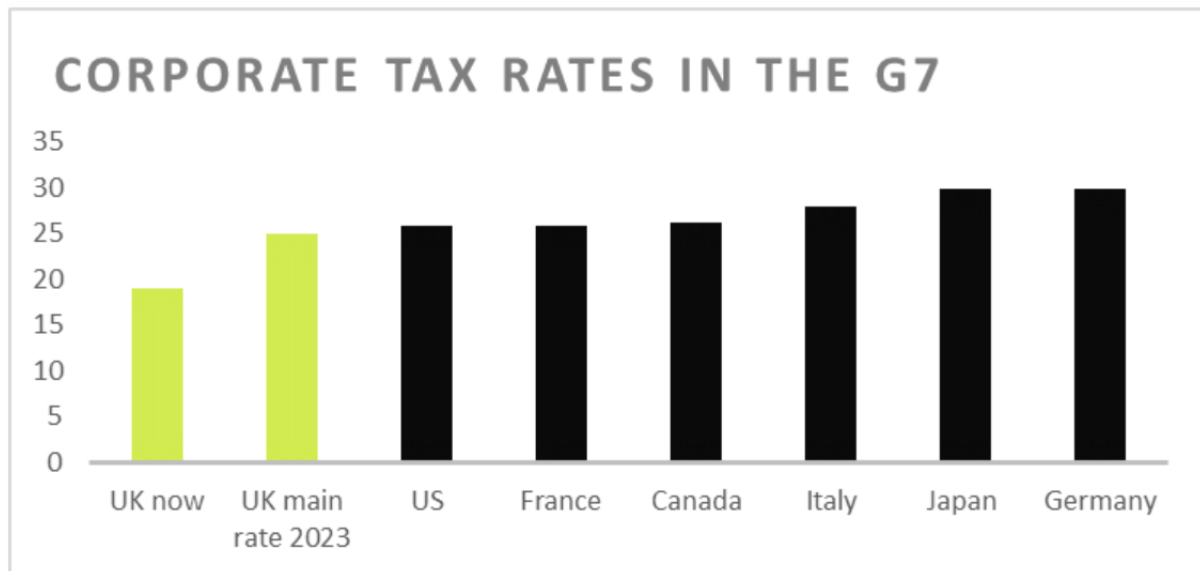


Figure 5. Corporate tax rates in G7. (16)

There is a perception that Wales needs to keep up with other countries and governments. As stated in Wales 4.0 (9), “if you don't keep up you may be left behind”. As a devolved nation, The Wales government offers further incentives to attract and keep businesses: (17)

- Low-cost office and industrial space.
- Skilled, well-educated workforce, with good quality of life.
- Government financial incentives, such as relatively low corporation tax, grants and investment in infrastructure.
- Good transport links.

This list may soon need to expand to include more specific I4.0 incentives, such as technologically advanced, good communications networks and interconnectedness, targeted funding available for digital transformation and graduates with the skills to deliver I4.0.

Grants and funding for the digital revolution are arguably necessary for all SMEs, assuming they are generally relatively expensive technologies and SMEs have limited resources compared to larger corporate entities. This is where government intervention could be necessary.

As it stands, there are schemes that help businesses to define their requirements and provide technological solutions, such as the SMART digital accelerator (and the public services version: Nesta's Digital innovation fund for Wales). The skills gap is also being plugged, by funding of Knowledge transfer partnership (KTP) schemes, that provide partial

funding for experts from academia to work within and alongside SMEs to train SME employees in the necessary digital skills. 800 graduates are employed in this way in Wales.

As discussed below, some studies have claimed an enormous amount of job losses are inevitable with automation and this could clearly be a political disaster for a government that was seen to have funded unemployment. Balancing these political issues will be a challenge for the Welsh government and the businesses they support.

## Economic

Arguably the main driver for change and the standard by which all businesses are measured, is improving profitability. Typically, a business would carry out some type of cost-benefit analysis to assess if the initial outlay of changing to I4.0 systems would be justified in terms of usefulness and financial returns. Packages of financial support are available in Wales, for smaller businesses and this could well mean the difference between digital transformation or stuck doing nothing. On a country-wide scale, the potential increases in productivity would increase GDP and hopefully increase the pay and working conditions of the population. This, in turn, is good for the economy with increased spending power for individuals and tax revenue for the government. However, the majority of any profits are the property of the parent company, and it would be up to them if they reinvest in Wales or use the money elsewhere. Ultimately, again, the risk of being left behind by bigger economies, may override or heavily bias any cost-benefit analysis and make the cost of transformation an inevitability.

As an example, an economic analysis was carried out by Simon Kuge and Volkmar Koch of Strategy& magazine in Germany (18). 235 industrial German companies were surveyed, and the research distilled down to economic analysis of the I4.0 zeitgeist. The main findings showed that companies were planning to divert around 50% of their capital expenditure (CapEx) to I4.0 solutions over the next 5 years. This accounts for a total of 40 billion euros in Germany and extrapolating to Europe could be as much as 140 billion euros per annum in 2020.

Their calculation on returns showed around 110 billion euros per year. The projected efficiency gains of 3.3% per year, compound to give 18% gains over 5 years and cost reductions of around 2.6% per annum. Worth noting that this study was a survey of opinions and as such, predictions are likely to be a little circumspect, despite the expert status of the respondents.

The prediction of 50% of CapEx will be a small amount for many SMEs in Wales and funding is necessary to plug the gaps. De minimis funding is a system that limits the amount of support, that the Welsh government can give to a single business. This is to prevent certain businesses from being favoured and preventing fair competition in the marketplace. It cannot exceed €200,000 over any period of three fiscal years. Implementation of I4.0 is a costly process and the decisions to make, for some SMEs, will be how much of their CapEX and De minimis allocation can they divert to I4.0.

The impact of implementing the component technologies of industry 4.0 is well documented and debated in several journals and papers. Some are hopeful that upskilling and improving the financial situations of people would be a good thing, but some are concerned about the potential job losses to automation, computerisation and robotics. I4.0 could reduce the amount of work demanded of a worker, freeing them to do other tasks; but it could also make them redundant.

For some time, there has been a tangible fear of job losses, due to automation and other advanced technology. Automation is defined as including any technology that reduces human intervention and computerisation is defined as automation using a computer. This fear is given credence by an occupation-based approach proposed by Frey and Osborne in 2013 (19). They used a machine learning algorithm to predict which jobs would become obsolete due to technological advancements. They arrived at a figure of 47% of jobs being at risk. It is noteworthy that they chose to model potentially automated jobs based on a broad overview of each job and didn't necessarily delve into the myriad tasks that workers do. For example, much of accountancy or language translation could discernibly be automated, but this doesn't mean the whole job ceases to exist, as certain human aspects of the job would remain. This leads some analysts to claim that for the most part, '*whole*' jobs will not be removed by increases in automation.

In reality, it is hard to know what would happen if 5 workers each had 20% of their job automated: Would the business choose to use 4 employees to do the same work and make one redundant or would all 5 workers be "freed-up" to work on higher level tasks. It seems then, that these predictions may be irrelevant to individual situation and changes will always affect some members of society more acutely than others.

The papers 'Revisiting the risk of automation' and 'The Risk of Automation for Jobs in OECD Countries' (20, 21), are often cited in this debate. They take a closer look at the Frey and Osborne Paper and go on to claim that automation will free people up to work on other tasks, and that initial estimations of 38-47% job losses due to automation would be closer to 9%. They further claim that skills such as problem solving and influencing will be extremely hard to automate and people will always be needed for these tasks.

Looking at the aforementioned predictions, some job losses seem inevitable and prominent businesspeople, including Bill Gates have suggested a tax on robots, that would help the economy of a nation becoming more automated. Greater unemployment means lost income tax revenue and increased outlay on social security or unemployment "benefits". It has also been suggested that a robot tax could be used to financially support any displaced workers with retraining or upskilling. One example of an advanced economy that has gone down this route is South Korea, who on the 6th of August 2017 introduced the first robot tax. At that time, South Korea had the highest number of robots per capita and was facing increasing unemployment. It isn't possible to say if those statistics are linked, but the net result is that robots had to pay for diminished income tax. Some other Western nations are considering similar taxes.

Not everyone is predicting layoffs: studies such as 'The internet Matters: The net's sweeping impact on growth, jobs, and prosperity'. Published by the McKinsey Institute (22) shows that some of our preconceptions about recent advances in technology could be misguided. They refer to the fact that the internet was one of the disruptors that was once touted as a

potential net-reducer of jobs. In fact, as of 2011, there were 2.6 jobs created for each job lost as a direct result of the internet. This is due to the enormous growth it has facilitated and its far-reaching effect (2 billion internet users in 2011 to 5 billion in 2023 (62.5% of the world)). This implies that the overall growth has resulted in new and extra jobs, despite making some jobs and workers redundant. Further findings showed that 75% of the internet's economic impact arises from existing industries, showing that it is improvement in the working dynamics of existing companies that is driving the majority of growth. Although it is also noteworthy that a large "slice of the pie" is from new internet-created sectors. Extrapolating this internet employment 'paradox' to industry 4.0, there is potential for job losses balancing out, with proper governance and management of change: Growth of the market must be proportional to the potential for job losses. That is to say, if 9% of jobs are projected to go, the economy needs to grow enough to give those people a new job. This may even provide a metric for timescales that are prudent. I.e. Simplistically, 1% growth for 9 years may provide 9% more available jobs. This obviously becomes harder if the worst case of 40% of jobs are at risk, but there is a likelihood that unknowable and unforeseen business ventures will materialise out of the digital transformation.

This message of positivity is echoed in Wales 4.0, with the strong caveat, that any growth should be tempered by environmental and social concerns. Several countries are shying away from GDP as a measure of growth, including Scotland, predominantly to slow down the consumption of (natural) resources. So clearly, this is a complicated political issue and governments will have to weigh growth against unemployment and resource consumption.

Early adopters/ Lighthouses take on more risk but potentially more reward by trialling technologies before they are proven and or established. So, if some of the risk is taken on by the government, it is more attractive to the SME.

Depending on the way I4.0 was implemented, it would be necessary to upskill the workforce or hire qualified technical staff: There would be no point having increased levels of technology, if there were not enough skilled operators, or maintenance or engineers to work alongside the technology. This is where the KTPs can be exploited, as the business gains instant access to personnel with the necessary depth of knowledge required for high-tech solutions. A more qualified, better paid workforce should be good for society, with increased employee satisfaction. But it would also be important to avoid alienating the people with no desire to upskill, leaving them behind or making them redundant. A big part of the lean manufacturing method for integrating new technology and management of change is about inclusivity and getting people of all abilities to engage and contribute to the roll-out of new technology. This can be achieved by a challenge and support mentality as opposed to a traditional control and command mentality.

In the end, there is a real fear of being left behind. 80% of companies surveyed in (18) said that they expect that in 5 years, 80% of their value chains will be digitised. The fear of being in the remaining 20% may make it inevitable that Wales and other smaller countries will be forced to provide financial support for SMEs, to keep them competitive, without demanding that they draw on their own relatively limited resources.

Humanism is the final piece of the societal strategy. It is defined as a philosophical stance that emphasises the individual and social potential, and agency of human beings, whom it

considers the starting point for serious moral and philosophical inquiry. The worker who no longer needs to do heavy manual lifting due to automation or the worker who is freed from mind numbing data entry to do something more creative would be happier, healthier and enjoy a better quality of life. The movement of people is a characteristic of industrial revolutions and people may move away from industrial hubs to their ideal situation, facilitated by improved communications with smart machines. This may well increase society's happiness.

But the paradigm shift of sociotechnical theory needs to be addressed, to educate business leaders away from a technological imperative, where machines and technology are seen as the end goal, with a lights-out factory as the ideal. Instead, personnel should be seen as crucial to the development of the business, developing alongside the technology and complementary to the machine. Also providing skills that the machines cannot. Then, hopefully, people would feel connected and valued by the business.

## Technological

Technological is arguably *the* main point for debate and may require large, in-depth analysis. Possibly consultants and proper costing and financial forecasting. Implementing sweeping technological changes requires proper planning and many key questions would have to be answered. What technology is needed? Is it necessary/ can we measure its impact? What will it cost and when will that cost be recouped? Is it feasible?

Clearly certain industries will respond with far higher needs for new technology than others. Some SMEs may have been established a long time ago and haven't changed in decades. Persuading them to change may be impossible. Introducing sweeping changes to industries that are well established and seem to not need changing. Construction for example is a primarily manual job. But, for example, supply chains and project management can be improved with I4.0 technologies. Or collaborative robots could be utilised for lifting heavier loads.

It is predicted in (18) that success at the individual business scale would require investment across a range of solutions and along the entire value chain to make any kind of success. This implies that each company would need to implement a number of Industry 4.0 technologies and that their supply chain would have to do the same. Failure to do so may mean that your company becomes the slow step in a chain and people look elsewhere for faster, cheaper, and more compatible solutions.

A second survey attempted to ascertain when these breakthroughs would appear. (23) They asked 816 executives and experts from the information and communications technology sector when tipping points would occur. With tipping point defined as the moment specific technological shifts would arrive in the mainstream. Showing in Fig 6

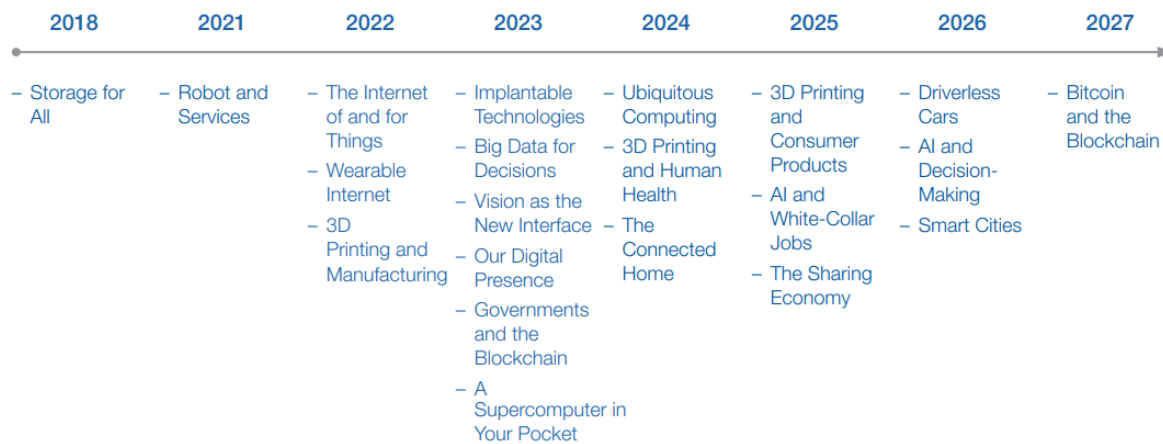


Figure 6. Tipping point years for technology emerging into the mainstream.

As mentioned above, Complexities of adopting new technology can be numerous and seeming overwhelming. There are a dozen I4.0 technologies and certainly not a one size fits all approach. Clearly the level of personalisation for each business would require a lot of data, feasibility studies and maybe consultancy. Again, this service could be provided by the digital accelerator-type programmes from the government or private consultancy.

#### Legal

Issues may arise in terms of licensing and IP or non-disclosure. How much is the process altered by automation and does this require separate legal protection?

Further laws that protect people in future society will certainly be required. For example, working outside of normal hours will become possible for increasing proportions of society and the right to disconnect may need to be addressed with legislation.

#### Environmental

Environmental is hopefully a virtually neutral term in this 'equation', but some analysis into the impacts of using more energy or potential efficiency savings of leaner manufacturing could be worthwhile. Growth is inextricably tied to consumption of resources but, hopefully technology would provide boosts to circular economy approaches and other environmentally minded industries. Wales 4.0 (9) identifies the need to balance growth with sustainable circular-economy approaches.

#### Security

Cybersecurity is another headline-grabbing issue. Regular reports appear in the news of companies being held to ransom after a cyberattack. When you have more Wi-Fi-enabled, expensive equipment, you are inevitably open to more potential breaches of security. Clearly this needs to be addressed and may well be an additional cost to staying secure. Blockchain systems are a possible novel avenue for improving security, by tracking every individual change to the value chain and alerting upstream users to any downstream changes that may compromise quality or security.

### Next steps and challenges

Typical hurdles include Siloed implementation, Failure to adapt, Analysis paralysis, Technology driven strategy rather than value driven strategy, and letting the 'perfect' defeat the good. (24) Also, complexity, uncertainty, fragmented supply chain, short-term thinking, and culture (25) So, clearly, it is a huge task to move industry forward in Wales in 2023 and managing the change requires a workforce with a depth and breadth of skills and the open-mindedness to address the challenges above.

## Conclusion

Progress is defined as the movement towards a refined, improved or otherwise desired state. Franklin D. Roosevelt said "There are many ways of going forward, but only one way of standing still". And in that sentiment, lies the dilemma for modern industries: progress must be continuous and successfully implemented, or you are going to be left behind. The products, the technologies and the way of operating are always in flux. The only choice, then, is *when* to adopt the new technologies and the answer must be sooner rather than later. There are clearly exceptions to this, where some companies don't have the desire or the resources, or the necessity for any further technology.

The cost of computing power and advanced technology has typically been prohibitively expensive for SMEs. The complexities of building the factory of the future, may only apply to larger companies. Whereas smaller, slower changes may be favourable for SMEs, in terms of being placed and resourced properly. There may be a danger that industries try to do it all at once and miss the opportunity to learn properly by small, incremental, 'Kaizen' change. The benefit of which would be learning each system more completely as you go, rather than learning a breadth of systems with little depth. The economies of scale, therefore, apply to these improvements: a large multinational, with seemingly endless resources will be better placed to adopt I4.0 than a grant-funded SME.

Smaller countries and smaller enterprises will always have limited resources compared to bigger ones. But, they may also have smaller problems to solve. There are, and always will be problems for smaller businesses, when it comes to industry changes and indeed seismic shifts in global manufacturing. Examples include: Large outlays on methods that may not have quick returns; and data gathering could take a long time.

The Wales government has several grants, incentives and learning resources for Welsh businesses. The societal impact will remain to be seen, but 9% job losses seems to be the best case scenario. Growth and 'robot tax' may be required to balance this, but since this affects the bottom line of businesses, they may argue that tax is anti-growth. Wales has the challenge to upskill its workforce to meet demand and advertise the skilled workforce to attract new businesses.

The challenges of navigating the transition to I4.0 are great. There are many facets to the changes and the political, societal and economic considerations explored in this report are far from trivial, and the world will be a different place afterwards. Starting with awareness

and understanding and moving towards proper implementation, small businesses in small countries can go on to compete with larger businesses and larger economic entities using technology to become more efficient and improve profitability.

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