

# Research Bulletin 20/11 | Covid-19 and the Fourth Industrial Revolution: Challenges, Solutions and Evolution

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## Summary

COVID-19 has resulted in the most rapid and significant economic shock in Northern Ireland's (NI) history. It has acted as a catalyst to accelerate digitisation as large elements of consumption, education, work and social interaction moved online in a few short weeks. This unprecedented disruption moved a large proportion of activity from traditional "brick and mortar" workspaces and educational establishments to digital work and learning spaces as restrictions were introduced to avoid the healthcare sector becoming overwhelmed.

NI benefits from a competitive technological infrastructure based on previous investments by the public and private sectors, which enabled these rapid changes and provided the capacity to deal with increases and geographical shifts in demand. The disruptions caused by COVID-19, Brexit, the climate emergency and the fourth industrial revolution together create significant disruptions adding pace to economic evolution and challenges, but also opportunities as NI looks to the future.

Those who are digitally detached, have low levels of formal qualification and associated with that, generally lower incomes and young people are at most risk due to the pandemic and are likely to require support to transition to new opportunities. In contrast, those who are digitally enabled and highly skilled have, in general, benefitted from an increase in demand for their skills and knowledge, leading to what is referred to as a "K-shaped" evolution of the economy. There are also clear opportunities as these disruptions have illustrated ways in which NI might be able to meet 2050 net zero carbon targets, how levelling-up the sub-regions of NI might support economic opportunity and activity beyond the key economic hubs and possibly most importantly – how quickly changes can happen if the need is great enough.

Digitisation is both a challenge and opportunity as the economy evolves and adjusts to COVID-19 impacts and policy supports. It will be an important strand in NI's recovery, low carbon goals and long-term competitiveness strategies; these challenges must be met, and the opportunities grasped to build a sustainable future for all.

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## Introduction

Traditional forms of working, learning and socialising were disrupted in March 2020 as restrictions were implemented to limit the spread of COVID-19. Society has been resilient during this period, pivoting to a 'new normal' aided by NI's competitive digital position<sup>i</sup> and adopting further technological solutions, accelerating the fourth industrial revolution – perhaps by as much as a decade<sup>1</sup>. The pandemic has highlighted the types of jobs, tasks, skills and ways of life that are vulnerable to technological change, amplifying inequalities across society and creating new opportunities.

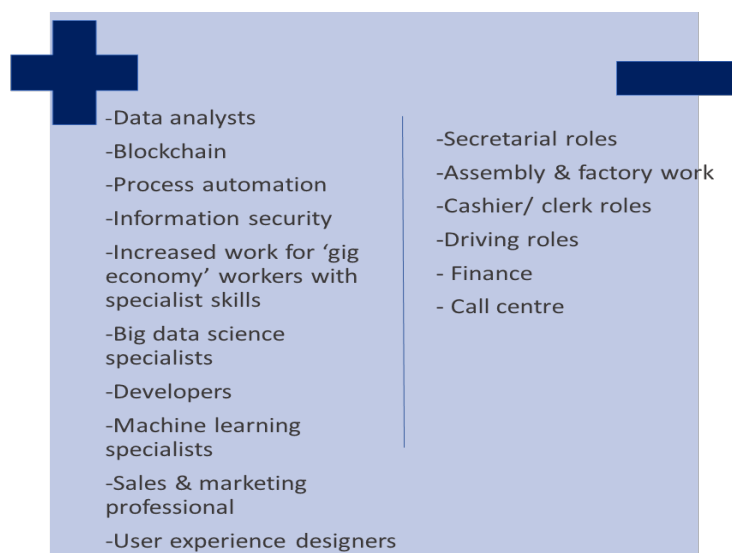
Research demonstrates that automation can benefit society through the creation of new products and services, high value jobs, increase the quality of goods and services, lower prices, boost productivity and improve health and safety<sup>ii</sup>, whilst the owners of digital capital benefit too.

However, there is also the risk that whilst digitisation has supported society through many of the aspects of the COVID-19 pandemic, both disruptions are likely to combine to reduce demand for a range of roles that require lower levels of formal qualification and at the same time, create opportunities for the highly skilled and digitally enabled leading to increased inequalities and a "K-shaped" sectoral evolution of the economy.

## Accelerated digital skill demands

By 2030, 21-33% of the global workforce are projected to be in newly created jobs<sup>iii</sup> due to increased levels of automation and digitisation. In NI, pre-COVID-19 forecasts by UUEPC suggest that around 25,000 new jobs could be created as a result of automation with roles emerging in machine learning, AI, data analytics and cyber security (Figure 1), the vast majority requiring degree level qualifications or more.

**Figure 1: Emerging and diminishing roles**



<sup>1</sup> McKinsey suggests that digital or digitally enabled products has accelerated by seven years.

Meanwhile, of the jobs that may be disrupted, almost nine in ten require qualifications that are below degree level. These include roles such as cashiers, call centre staff, manual assembly work and secretaries as the tasks encountered are generally more easily automated or digitised.

The World Economic Forum suggests that in the next five years, half of all workers will require some upskilling or reskilling to prepare for changing and new jobs<sup>iv</sup>; it will be important that workers, businesses and government are active in promoting lifelong learning and reskilling towards areas that are in demand. The fourth industrial revolution demands a combination of system-based skills such as STEM, ICT, machine learning and data analytics mixed with human skills such as empathy, judgement and creativity. The demand for these skills has been accelerated and amplified as a result of COVID.

Comparing the roles and sectors that are vulnerable as a result of digitisation reveals that these are also the types of roles which have become increasingly vulnerable during the COVID-19 pandemic due to social distancing requirements and changes in demand patterns. The challenge for society is that whilst technological shifts and demand changes can happen quickly – catalysed by COVID-19 during 2020, these skills take time to deliver through the education system.

### **Increased exposure of vulnerable groups**

Both digitisation and COVID-19 could serve to exacerbate existing inequalities as well as create new opportunities. At present, more than one quarter of young people in NI live in the 25% most deprived wards. There is a clear inverse relationship between those who are entitled to free school meals (FSM) and educational attainment. 3 in 10 children at school in NI receive FSM; 72% of children who received FSM achieve 5 GCSEs A\*-C, compared to 89% for those that do not receive FSM<sup>v</sup>. In addition, COVID-19 has resulted in significant challenges for young people in the labour market, who are on average, in more vulnerable occupations and forms of employment at the early stages of their careers<sup>vi</sup>.

COVID-19 threatens to embed existing inequalities for future generations through reduced access to formal education and support as the pandemic resulted in home-schooling and distance learning<sup>vii</sup>. Whilst the rapid adoption of technology accelerates employment vulnerabilities and skills mismatches, the impact on young people from the most deprived backgrounds could be 'both severe and long lasting'<sup>viii</sup>. Stranmillis University College notes that not all children will have had access to support for learning in the home which will be impacted by their parents' income, education and their key worker status<sup>ix</sup>. Furthermore, distanced learning requires access to technology and a stable internet connection which may be limited for those in lower income groups<sup>x</sup>.

In order to help address these issues, the Department for the Economy announced a £1.7million online skills programme to help address these issues by upskilling and retraining individuals whose jobs have been impacted by COVID-19<sup>xi</sup> with free, accredited courses. The courses range from Technology Management to Social Media to Electric Vehicles.

## Opportunities for levelling up

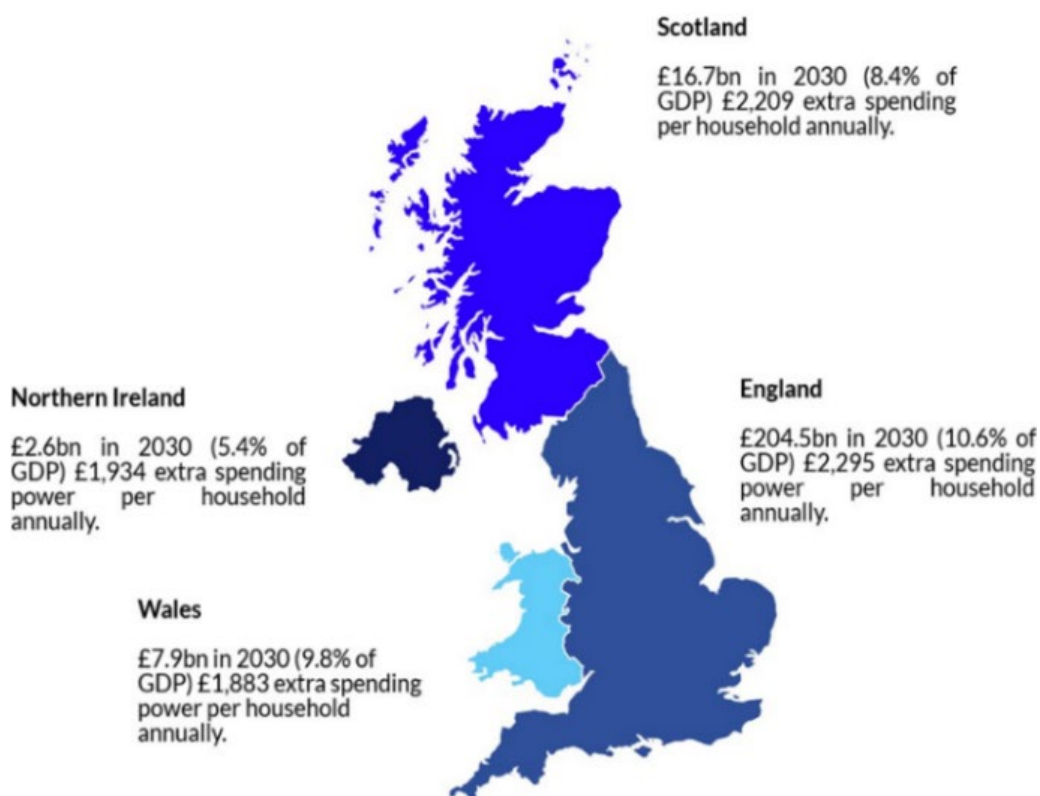
The combination of COVID-19 and digitisation will also provide opportunities as well as challenges. Remote working has delivered an unprecedented reduction in greenhouse gas emissions<sup>xii</sup> as traffic movements reduced due to restrictions, reframing conversations on how NI might play its part in meeting 2050 net carbon zero targets. It also revealed the potential for sub-regional levelling up of economic activity across NI, as many worked and shopped at or close to home, moving activity from city centres to suburban and rural areas.

In terms of gender, the impact of COVID-19 is more mixed as it presents both opportunities and challenges for females as retail, arts, entertainment and hospitality are negatively impacted while healthcare opportunities have grown in number. Digitisation presents a challenge in terms of STEM and leadership roles as well as roles in digital sectors, in which females are traditionally underrepresented.

## Reaping the rewards of digitisation

Digitisation is projected to increase GDP and the average household spending power across the UK (Figure 2). Nevertheless, there is the potential that the benefits of automation will remain concentrated with those who own the capital. The IPPR suggest this could lead to the poorest households experiencing a decline in the standard of living<sup>xiii</sup>.

**Figure 2: Impact of digitisation on GDP and consumption per household in 2030 by UK region**



Evidence by Marsh and McLennan<sup>xiv</sup> indicates that a greater share of income is being earned by capital rather than labour. As digitisation increases, if real wages do not keep pace with real productivity, the share of income from labour will decline relative to that from capital, which will amplify income inequality<sup>xv</sup>. As a result, the IPPR suggests that ownership of capital should be broadened to support wealth redistribution<sup>xvi</sup> and includes ideas such as increased taxation on capital or profits to be redistributed through welfare programmes.

## Conclusion

COVID-19 has resulted in the most rapid and significant economic shock in NI's history. Its impact and the pace of change are unprecedented, as are the policy responses. The fourth industrial revolution is viewed as both an opportunity and a threat, but clearly, it has enabled society to continue to function and economic activity to continue in many ways that would not have been possible just a couple of decades ago.

How and where work, learning and social interaction take place has changed markedly and it is unlikely that ways of working will ever revert back fully to pre-COVID norms. The use of technology has grown very rapidly, and consumption patterns have changed, altering the types of jobs available and skills that are in demand<sup>xvii</sup>. The pace of disruption has been rapid – some changes that might have been expected to occur over a decade happened in less than a year – and it takes time to reskill or upskill those whose jobs have been impacted. Online reskilling programmes are a welcome addition; however, more broadly, the education sector will need to be flexible and react swiftly in order to significantly increase the output of qualifications and skills sets that are in demand in the Future of Work.

Whilst the fourth industrial revolution has been able to support the rapid changes in many areas to maintain economic activity, it and the impacts of COVID-19 restrictions have combined to amplify existing vulnerabilities in certain groups. Those who are digitally detached, have low levels of formal qualification and associated with that, generally lower incomes and young people are at most risk and are likely to require support as labour market frictions could be significant and transitions difficult<sup>xviii</sup>. Despite the pace of change and scale of the challenges however, there are opportunities as these disruptions have illustrated ways in which NI might be able to meet 2050 net zero carbon targets and how levelling-up the sub-regions of NI might support economic opportunity and activity beyond the key economic hubs.

In conclusion, COVID-19 has accelerated the evolution of the economy and a range of existing trends, some of which are aligned to the challenges that the fourth industrial revolution brings. However, digitisation has enabled a range of economic activity to continue and is an important strand in NI's recovery and long-term competitiveness strategy as society learns to live safely with COVID-19 and looks towards a low-carbon recovery.

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- ii [UUEPC, Intelligent Futures Report, 2019](#)
- iii [PwC, 2020, Workforce of the future.](#)
- iv [WEF, 2020, Don't fear AI it will lead to long-term job growth.](#)
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