ERC
Enterprise Research Centre

The State of Small Business Britain 2021

Enabling the Triple Transition

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UKRI Economic and Social Research Council

The Enterprise Research Centre (ERC) is an independent research centre focusing on growth, innovation and productivity in small and medium-sized enterprises (SMEs). The ERC is a partnership between Warwick Business School, Aston Business School, Queen's University Belfast School of Management, Leeds University Business School and University College Cork. The Centre is funded by the Economic and Social Research Council (ESRC), The Department for Business, Energy & Industrial Strategy (BEIS), Innovate UK, the British Business Bank, and the Intellectual Property Office (IPO). The insights expressed in this report are those of the authors and do not necessarily represent those of the funders.

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Executive Summary

The State of Small Business Britain report is the Enterprise Research Centre's annual review of trends affecting small and medium-sized enterprises (SMEs) in the UK. The report discusses the findings from research and analysis carried out and/or published by the ERC in 2021.

The COVID-19 pandemic has continued to dominate the research agenda this year, with its many ongoing implications for entrepreneurs and SMEs. In this report we draw together and summarise the different strands of our research to give a picture of how UK SMEs have responded to the challenges and opportunities that they have faced. We do this by focusing on the ways in which SMEs are adapting to what we call the 'Triple Transition'. By this we mean the combined shifts in business digitalisation, adoption of net zero practices and productivity upgrading that business are navigating. We also consider the implications of our research insights for policymakers aiming to maximise the resilience of the UK's SME community in 2022 and beyond.

Key insights from the review include:

Overall trends

The financial situation for many SMEs remained challenging in 2021. According to the ONS Business Insights and Conditions Survey (BICS) data, the proportion of businesses in the UK reporting that they have 'no cash reserves' increased between 2020 and 2021. The highest percentage of firms with no cash reserves is found among micro-businesses employing 0-9 employees. Late payment and rising costs are on-going problems for small businesses, and this exacerbated in the last quarter of 2021.

Micro-businesses and small businesses were also less likely to report that they had 'high confidence' in business survival compared to larger firms. However, a larger proportion of micro-businesses reported high confidence in survival at the end of 2021 than did at the end of 2020 (nearly 53 per cent at the end of 2021, compared to 38 per cent at the end of 2020).

It is widely acknowledged that self-employed people have been amongst the hardest hit by the economic consequences of COVID-19. Although throughout 2020 movement out of self-employment was the prevailing trend, in 2021 inflows into self-employment started to pick up again, although incomes and profits were still below pre-pandemic levels. Overall, however, self-employment is still markedly lower at the end of 2021 than at the end of 2019.

Data from the latest Global Entrepreneurship Monitor (GEM) UK survey undertaken in late 2020 showed a sharp fall in the number of individuals in the early stages of setting up a new business compared to the pre-pandemic high in 2019. However, ethnic-minority communities demonstrated their resilience by maintaining their previous levels of early-stage entrepreneurial activity (TEA rate).

SMEs trading internationally not only encountered unprecedented challenges associated with the COVID-19 pandemic, but also had to deal with the implications of Brexit during 2021. SMEs have been disproportionally disadvantaged by the disruption caused to global supply chains.

The digital transition

SMEs face several barriers when it comes to the adoption of digital technologies. Where digitalisation can be implemented effectively, however, it has the potential to drive radical changes in productivity and business models, even where these are well-established.

The COVID-19 pandemic and associated moves towards home and hybrid working have accelerated digital adoption in firms. However, OECD statistics suggest that UK firms have been slower adopters of digital technologies than those in other countries. Limitations in UK SMEs' absorptive capacity are reflected in their level of 'digital readiness' – or their pre-disposition or propensity to adopt digital technologies.

The digital transition has a role to play in supporting moves towards more sustainable business models. ERC research suggests a positive link between some digital technologies and moves towards net zero, indicating there is complementarity between digital adoption and the net zero transition.

There are synergies between the use of CRM technology and firms undertaking environmental reports and audits, switching to renewable energy, and introducing low carbon products and services. The customer-centred approach enabled by modern digital CRM solutions helps firms to improve their understanding of customer needs and expectations on environmental issues.

ERC research also finds complementarity between

the use of advanced digital technologies - such as augmented and virtual reality and AI and machine learning – and investment in R&D related to the environment.

The net zero transition

Recent research has shown that most SMEs are at an early stage in their transition to net zero. The vast majority have taken at least one physical action to reduce emissions, although they tend to be simple, such as installing a smart meter, rather than more complex, such as introducing very-low-emissions vehicles.

SMEs have varying levels of awareness and different degrees of engagement with the net zero transition. ERC research has explored the factors which drive the intensity of SMEs' engagement with net zero practices. This emphasises the importance of owner-managers personal values and attitudes towards net zero, as well as the importance of customer pressure.

Personal motivations are important in driving relatively low-cost organisational changes associated with net zero, but it is external drivers – related to market or regulatory changes – which prove more important in driving more costly technological interventions.

Customer demand for low carbon products and services appears to be one of the most important drivers of environmentally friendly behaviour across nearly all organisational and technological practices.

The productivity transition

ERC research has shown that high productivity, high-growth SMEs tend to implement effective leadership and management practices, particularly in terms of people management. As a result, management and leadership skills will continue to be important to improving the UK's productivity position and it will be interesting to see how the new 'Help to Grow' Management programme, aimed at thousands of SMEs across the UK provided and delivered by Business Schools, will start to change the shape of the productivity distribution at national and local level.

The shock of the COVID-19 pandemic has brought human resource management issues to the fore, particularly when it comes to the mental health and wellbeing of employees. Prior research points to a link between productivity and workplace mental health. ERC research carried out in 2021 indicates that many employers seem to be unaware of the link, however. Although the adoption of positive wellbeing practices has increased since 2020, many firms still do not have these practices in place, and there is considerable room for improvement.

Research has also established that innovation is important for productivity. ERC research in 2021 has provided early evidence that environmental innovation is linked to business growth. This is important as it illustrates a win-win situation is possible where business growth and performance objectives are compatible with environmental goals.

Although innovation is important for productivity, ERC research has also shown that it is important for firms to understand that this is often a longer-term performance benefit, as innovation can initially cause short term disruption effects leading to a fall in both growth and efficiency.

Previous evidence has shown that UK firms tend to under-invest in R&D and innovation. However, ONS BICS data indicates that the pandemic has had an important impact on the innovation activities of UK businesses, with SMEs employing 50-99 employees being the group with the highest proportion of positive shift in innovation, an indicator perhaps of their agility and ability to pivot to new circumstances and demands.

When looking at the types of innovation spurred by the pandemic, the ONS BICS data shows that these were often related to adoption of digital technologies, changes in management practices and improvements in existing or introduction of new products and services.

Firms surveyed in early 2021 as a part of the ERC's longitudinal survey of innovating firms were marginally more optimistic about the outlook than they were in the previous survey conducted in Autumn 2020. However, these innovative firms were still experiencing significant challenges constraining their abilities to engage in innovation and complete projects on time, with collaboration between firms and most types of partners falling. The majority though still classified their R&D capacity as "disrupted".

Policy implications

The concept of the **Triple Transition** - moves to digitalisation, net zero and productivity upgrading - will be valuable in the development of national and local enterprise policy in the UK and internationally, contributing to rebuilding strength and resilience following the shock associated with the COVID-19 pandemic.

Policies to promote digital innovation are largely recent introductions in the UK and remain either localised or small-scale interventions. There is potential for

a more comprehensive range of policy supports for digital diffusion comprising a combination of demand side and supply side measures. Both have the potential to accelerate digital adoption in UK SMEs enabling both the net zero and productivity transition.

Policy supports for the net zero transition also need to be more comprehensive and targeted depending on the point in a firm's journey. For example, at the initial stages the focus should be on organisational changes rather than the more expensive technological net zero practices. Regulatory and financial incentives are likely to be more relevant to sustaining progress towards net zero and helping firms to finance the necessary investment.

The need for productivity upgrading in SMEs has been recognised in several recent UK policy measures designed to enhance leadership and management skills (such as Help to Grow Management and Help to grow Digital). There is increasing evidence that these initiatives may well impact positively on firm level productivity but not in the very short-term – it is observed to be a slow burn creating impacts after 3-4 years. These schemes often also have a positive influence in terms of employee mental health and wellbeing – which will be a crucial consideration in achieving productivity upgrading.

The UK has a well-developed set of policy measures to support leading edge or frontier innovation. Diffusion of new innovations across the entire population of firms has received less policy attention, however, and is critical for maximising the social value of innovations. This applies both to green or eco-innovations which may help with moves towards net zero as well as digital innovations which may support resilience and productivity upgrading.

Although 2021 was an extremely challenging year for UK those SMEs trading internationally, there are still new internationalisation opportunities for businesses, with potential benefits for productivity upgrading. To seize these new opportunities, policy needs to help businesses to build and capitalise on their competitiveness in engaging with the global market. For small businesses which wish to export, targeted government support would be beneficial particularly where firms are engaged in developing new innovations which might create an opportunity in export markets.

As we begin 2022, the challenges of the pandemic are still hitting many businesses in key sectors of the economy. These are being exacerbated through new issues including increased absenteeism and rising costs, and for those firms exporting, the implications of full Brexit customs checks. In this difficult context, it is vital that effective support and advice networks are in place dedicated to supporting SMEs and enhancing the remarkable resilience they have demonstrated through the course of the pandemic.

Introduction

The State of Small Business Britain report is the Enterprise Research Centre's annual review of issues affecting the performance of small and medium sized enterprises (SMEs) in the UK, drawing on insights from new research and analysis undertaken and published by the Centre over the past year.

The impact of the COVID-19 pandemic dominated all aspects of life through 2021 with Brexit also creating challenges for many SMEs. Through 2021 ERC research documented these impacts and examined potential policy responses focusing on innovation, trade, productivity and workforce mental health and productivity. Working from home and hybrid working during the COVID-19 pandemic have also focused new attention on digital technologies and the way in which they are transforming our working lives as well as the products and services we use.

Digitalisation is one aspect of what we call the 'Triple Transition' - which forms the central theme of our report this year. The existential challenge of climate change and the transition towards net zero is the second aspect of the Triple Transition. Both have been the focus of ERC studies during 2021. The third aspect of the Triple Transition is productivity upgrading which represents a significant challenge (and opportunity) for many UK SMEs. Reinvesting for digitalisation and net zero creates the potential for productivity improvement, and ERC research has also investigated these linkages.

Much ERC research in 2021 was undertaken in partnership with other organisations, and with the financial support and participation of policy colleagues in national and regional government. We are grateful to everyone for their involvement and support and look forward to working with you through 2022.

During 2021 the ERC team published over 40 separate research outputs. We provide an overview of our research insights in this report. We hope you find the material interesting and useful. Please do get in touch if you would like to discuss our research programme further or find out more about what we do. You can find our contact details on the ERC website at: https://www.enterpriseresearch.ac.uk/

1. Understanding the impact of the COVID-19 pandemic on SMEs

There is no doubt that the COVID-19 pandemic has had a major effect on the UK's entrepreneurial and SME community. Although when the first wave of the pandemic struck, many hoped that the challenges may have lessened, or even be over by the end of 2020, the effects of lockdowns, social distancing and supply chain disruptions continued, and in some cases intensified during 2021.

Numerous ambitious measures have been introduced by the Government during the pandemic to support businesses (such as the Furlough scheme, the Coronavirus Business Interruption Loan Scheme, and the Self-Employment Income Support Scheme), but at the start of 2022 many businesses still find themselves in a vulnerable position.

In this chapter, we explore what recent research evidence tells us about the overall continued impact of the pandemic on SMEs and how they have responded to the challenges and opportunities they have faced. We do this by drawing on key findings from available secondary data and research, as well as some insights from the ERC's own research.

1.1. SME responses to the pandemic: key trends

The ONS Business Insights and Conditions Survey (BICS, previously called the Business Impact of COVID-19 Survey) continues to provide a valuable source of up-to-date information on what has been happening to SMEs in the UK as the pandemic continues. The survey asks businesses about their perceptions of financial performance and resilience, as well as about issues related to their value chains and workforces on fortnightly basis[1].

SME financial health

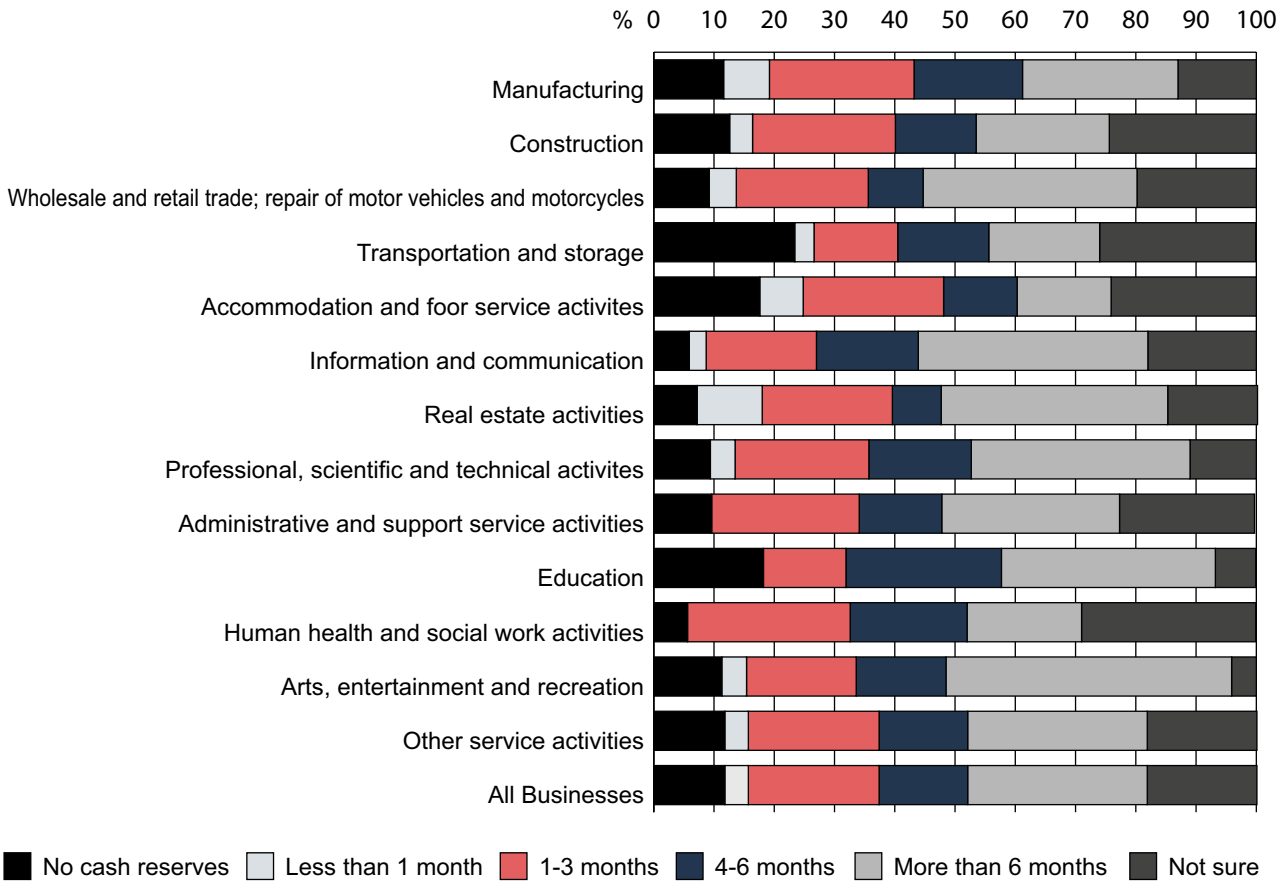
Wave 43 of the BICS (live from 1 November to 14 November 2021) provides some of the most recent data (at the time of writing) on the financial health of UK businesses. One key measure here is cash reserves, or the money firms keep aside to meet their short-term and emergency funding needs. Figures 1 and 2 show how long businesses think their cash reserves will last by sector and size respectively.

Over a half of currently trading business report that they only expect their cash reserves to last for up to six months. This varies by sector (figure 1) with around 60 per cent of currently trading businesses in manufacturing and accommodation and food services, and more than 80 per cent in other services only expecting their cash reserves to last for up to six months. An alarmingly high percentage of businesses report 'no cash reserves' in arts and entertainment (11.3 per cent of currently trading businesses), manufacturing (11.6 per cent), construction (12.6 per cent), accommodation and food services (17.6 per cent), education (18.2 per cent), transportation and storage (23.4 per cent), and other services (40.4 per cent). The proportion of businesses reporting that they have no cash reserves has increased since we published our last State of Small Business Britain report a year ago.

When looking at the breakdown by business size (figure 2), the highest percentage of firms with no cash reserves is observed among micro-businesses employing 0-9 employees (12.6 per cent) and small businesses with 10 to 49 employees (5.4 per cent). Less than 30 per cent of micro-businesses and about one third of small businesses estimated that their cash reserves would last more than 6 months compared to around 50 per cent of medium and large businesses.

1 https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/businessimpactofcoronaviruscovid19survey

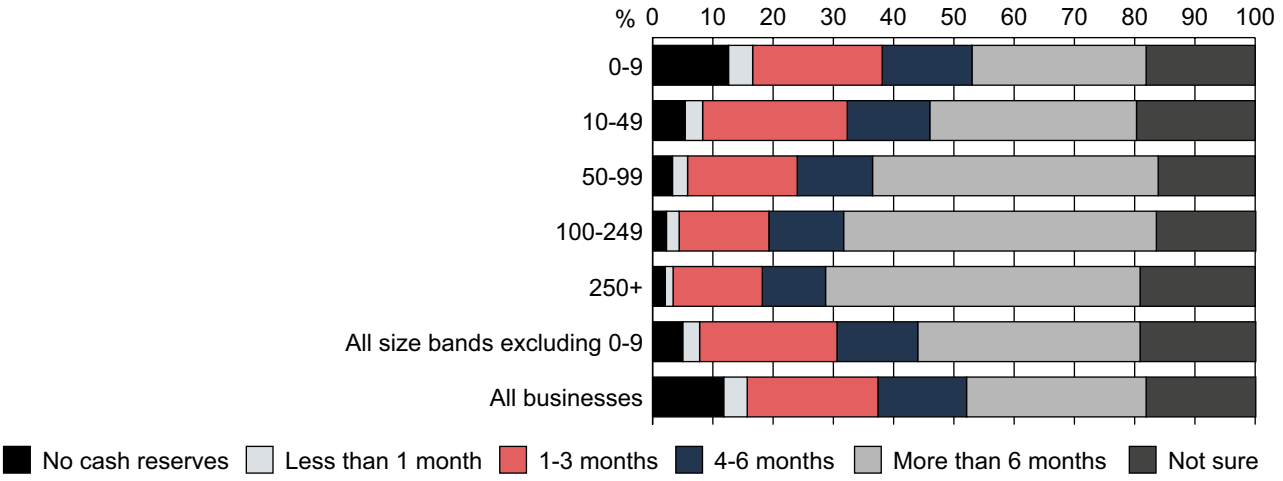
Figure 1. Businesses cash reserves by sector



Source: ONS Business Insights and Conditions Survey data, Wave 43

Notes: Question: 'How long do you think your business's cash reserves will last?'; as percentage of currently trading businesses weighted count, UK; Water supply, sewerage, waste management and remediation activities sector is excluded because of low counts for confidentiality reasons; same for 'less than 1 month' responses for Administrative and support service activities and Human health and social work activities sectors.

Figure 2. Businesses cash reserves by size

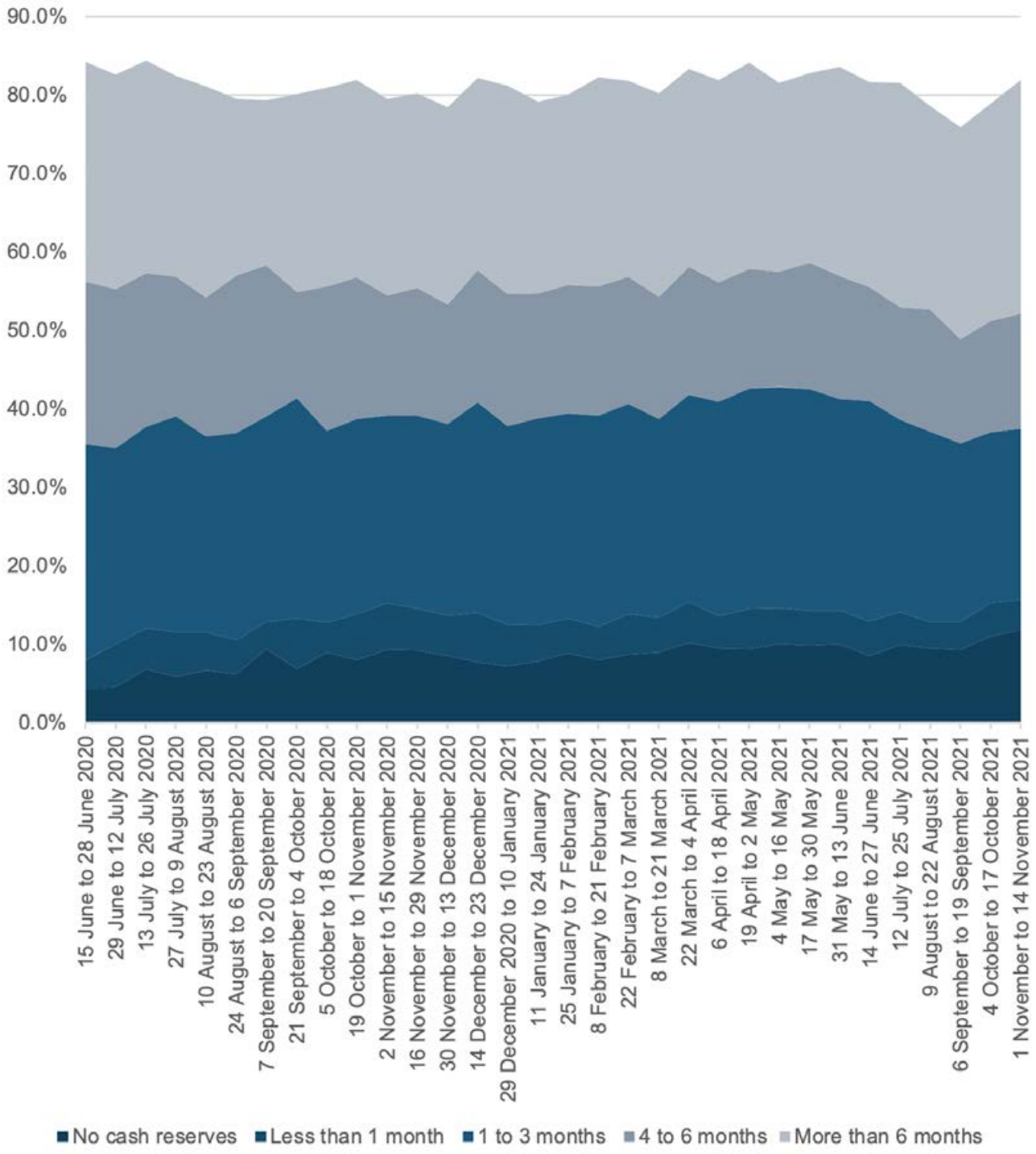


Source: ONS Business Insights and Conditions Survey data, Wave 43

Notes: Question: 'How long do you think your business's cash reserves will last?'; as percentage of currently trading businesses, weighted count, UK.

Figure 3 provides a snapshot of how business cash reserves have evolved since summer 2020 by summarising data from Wave 7 to Wave 43 of the BICS. It shows, as noted above, that the proportion of businesses with 'no cash reserves' increased over this period, indicating that some businesses that have been tapping into their reserves to overcome the challenges of successive lockdowns and associated virus control measures in 2020-2021 may have no reserves left to help them face further hardship.

Figure 3. Businesses cash reserves: evolution over time 2020-2021

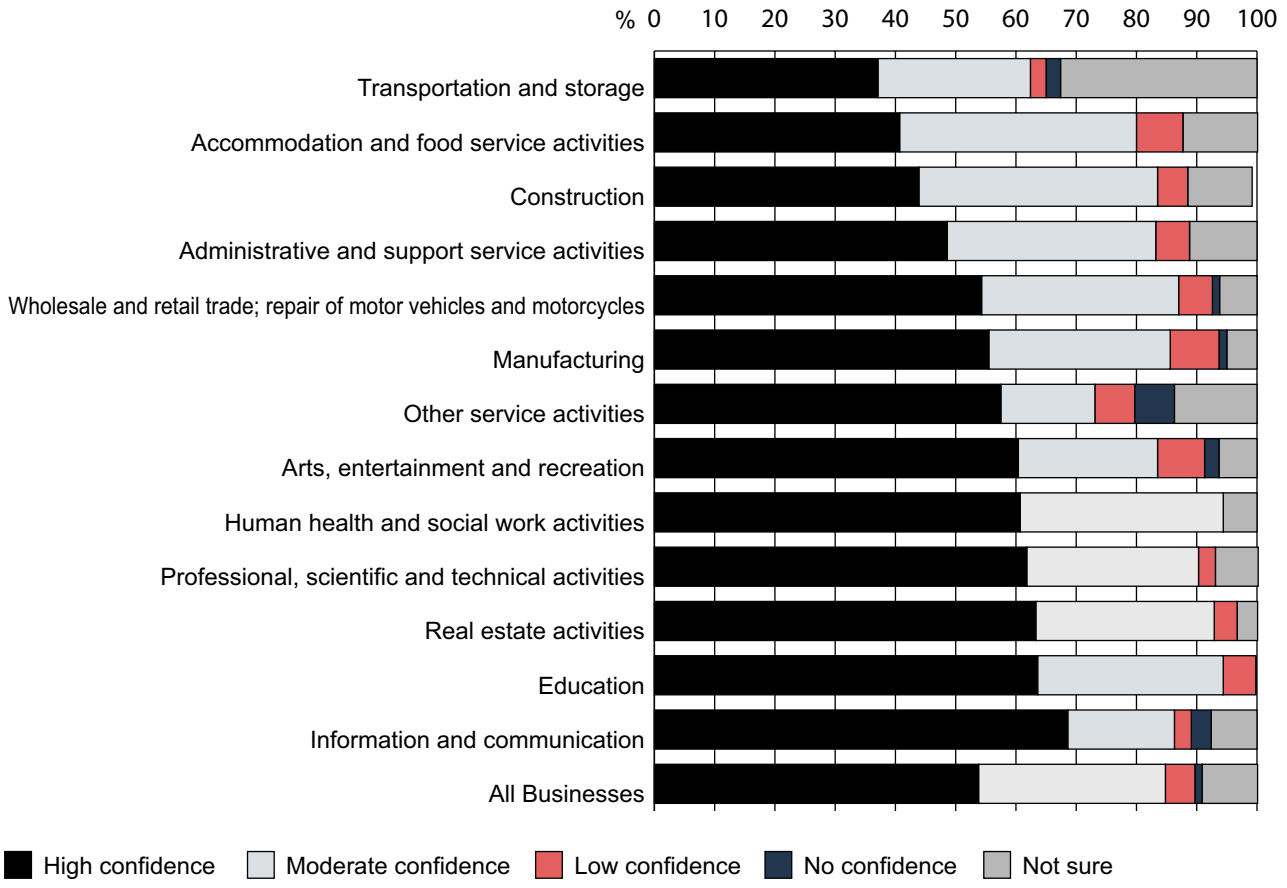


Source: ONS Business Insights and Conditions Survey data, Waves 7 to 43
Notes: Question: 'How long do you think your business's cash reserves will last?'; as percentage of currently trading businesses, weighted count, UK; all businesses.

BICS also captures data on how much confidence businesses have that they will survive the next three months. Figure 4 shows this measure broken down by sector. The transport and storage sector shows the least confidence in surviving, with just 37 per cent of businesses here stating they had high confidence in survival. This is possibly likely to be related to issues around labour shortages and supply chain challenges that have emerged as 2021 has unfolded. This is followed by the accommodation and food service sector, where 41 per cent stated high confidence in survival for the next three months. The human health and social work sector, professional services, real estate, education, and information and communication sectors showed the highest confidence levels with over 60 per cent of businesses in these sectors reporting high confidence of surviving the next three months. The 'other services' sector had the highest percentage, at 6.6 per cent, of those stating 'no confidence' in surviving in the next three months.

Unsurprisingly, micro-businesses and small businesses had the lowest percentages of high confidence, at 52.6 and 61.4 respectively, compared to more than 75 per cent of medium and large businesses. This is consistent with the pattern found when we reported this measure in the last State of Small Business Britain report, although it is notable that a larger proportion of micro-businesses were reporting high confidence in survival in 2021 (nearly 53 per cent at the end of 2021, compared to 38 per cent at the end of 2020).

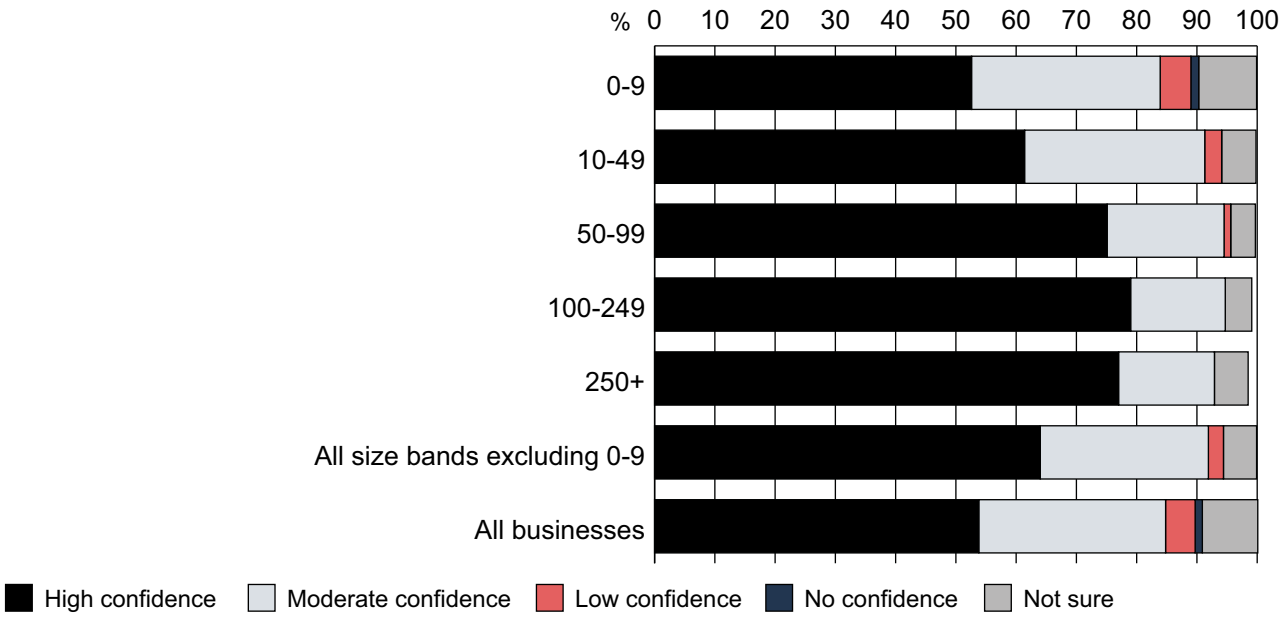
Figure 4. Businesses confidence in survival by sector



Source: ONS Business Insights and Conditions Survey data, Wave 43

Notes: Question: 'How much confidence does your business have that it will survive the next three months?'; as a percentage of businesses not permanently stopped trading, weighted by count, UK; Water supply, sewerage, waste management and remediation activities sector is excluded because of low counts for confidentiality reasons; Same for 'no confidence' responses for Construction and Professional, scientific and technical activities sectors.

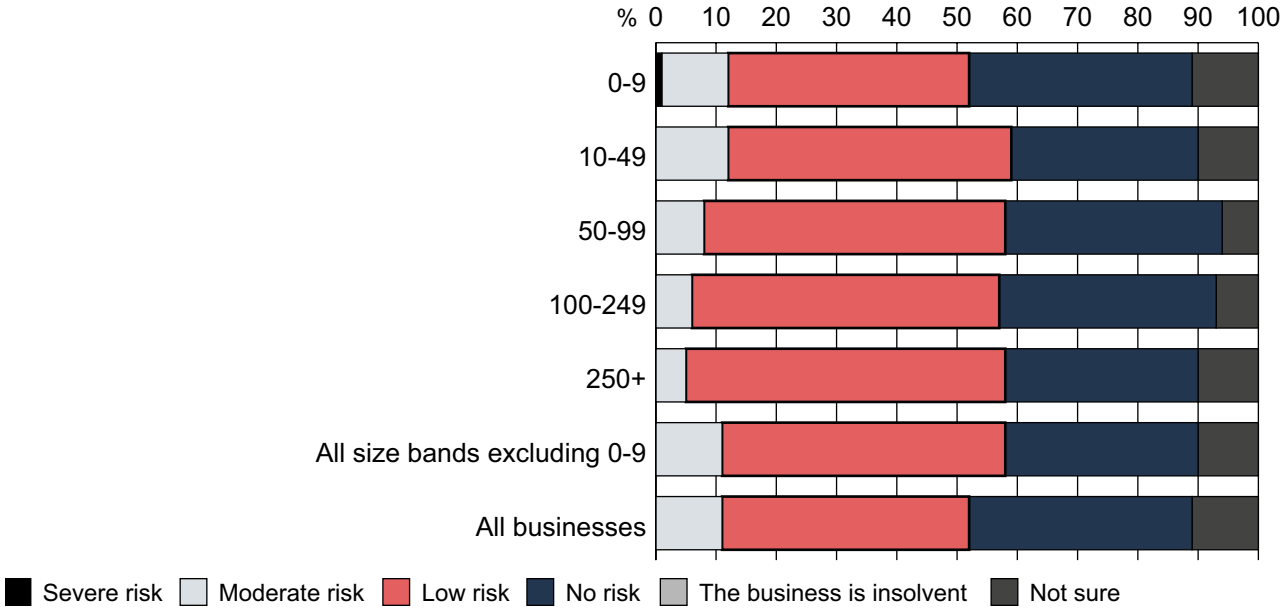
Figure 5. Businesses confidence in survival by size



Source: ONS Business Insights and Conditions Survey data, Wave 43

Notes: Question: 'How much confidence does your business have that it will survive the next three months?'; as a percentage of businesses not permanently stopped trading, weighted by count, UK.

Figure 6. Risk of insolvency by size



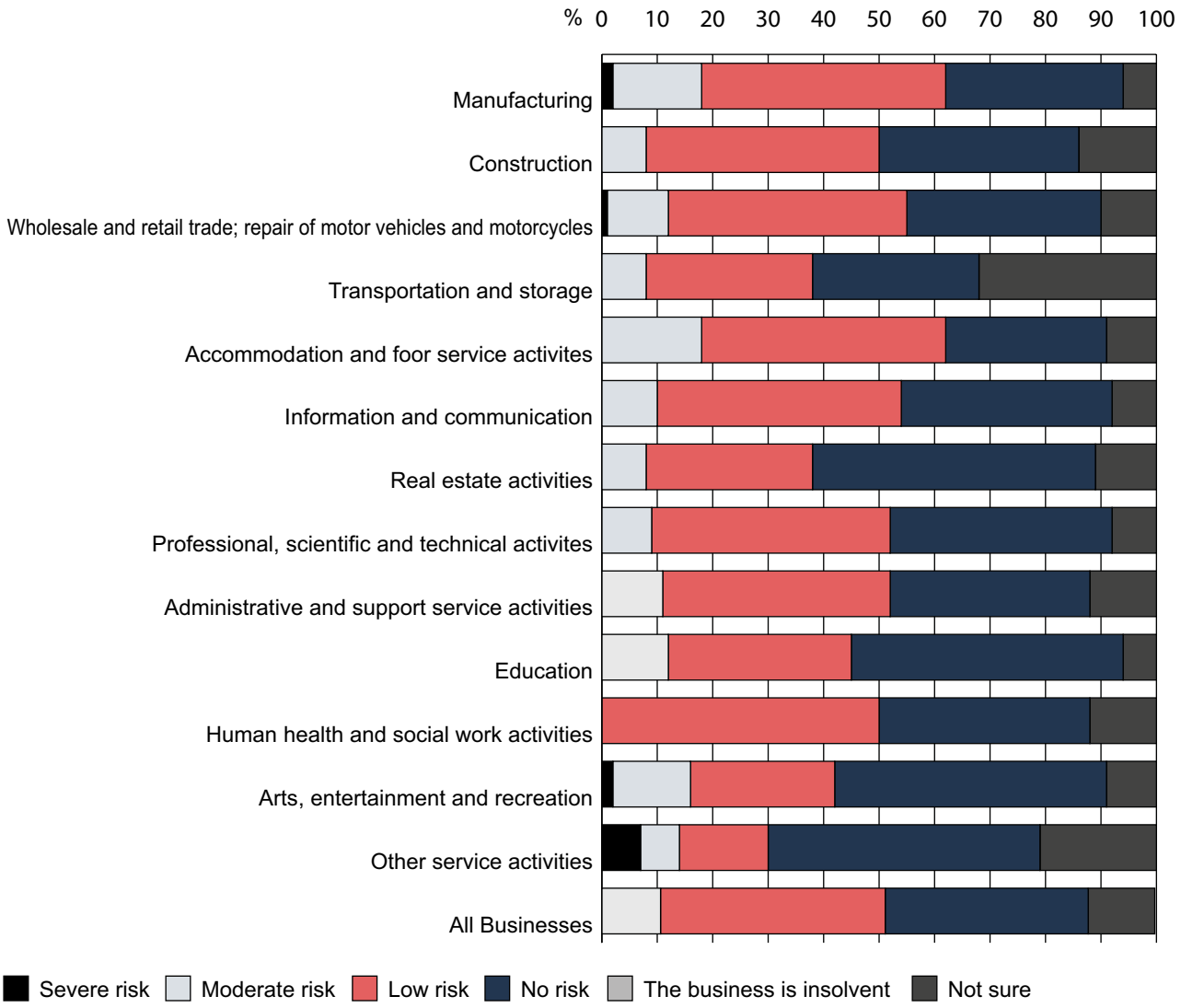
Source: ONS Business Insights and Conditions Survey data, Wave 43

Notes: Question: 'What is your business's risk of insolvency?'; as a percentage of businesses not permanently stopped trading, weighted by count, UK.

Figures 6 and 7 show the perceived risk of insolvency by size and sector. Seven per cent of businesses in 'other services' estimated the risk of insolvency as 'high' compared to 2 per cent of businesses in manufacturing and arts, entertainment and recreation, and just 1 per cent of businesses in wholesale and retail trade. Just under one in five business in accommodation and food services estimated risk of insolvency as moderate (18 per cent) followed by 16 per cent of businesses in manufacturing, and 14 per cent of businesses in arts, entertainment and recreation. The highest proportion of businesses with 'no risk' was recorded in real estate sector (over 50 per cent).

A higher proportion of micro and small firms evaluated the risk of insolvency as high or moderate (12 per cent) compared to medium-sized (6 to 8 per cent) and large businesses (5 per cent).

Figure 7. Risk of insolvency by sector



Source: ONS Business Insights and Conditions Survey data, Wave 43

Notes: *Question: 'What is your business's risk of insolvency?'; as a percentage of businesses not permanently stopped trading, weighted by count, UK; Water supply, sewerage, waste management and remediation activities sector is excluded because of low counts for confidentiality reasons; idem for 'severe risk' responses for Construction, Accommodation and food service activities, Information and communication, Professional, scientific and technical activities sectors; 'The business is insolvent' was reported by 0 per cent of businesses in Construction, Real estate activities, Administrative and support service activities, Education, Human health and social work activities, Arts, entertainment and recreation, and Other service activities sectors; data for all other sectors was removed for confidentiality reasons.*

Box 1.1. The effect of the pandemic on rural businesses

The ERC is a partner in the National Innovation Centre for Rural Enterprise (NICRE), led by Newcastle University and funded by Research England. In 2021 NICRE undertook a new survey looking at the specific effects of the COVID-19 pandemic on rural businesses, in terms of their experiences and resilience.

This research used a new dataset of over 4,000 businesses, with a focus on rural firms in three English regions – the North East, West Midlands and the South West, to provide an assessment of the performance of rural businesses during the pandemic.

The pandemic has created both winners and losers amongst rural businesses and the most common response from rural businesses was that the pandemic had both positive and negative effects for them.

While COVID-19 infection rates have been higher in urban areas and the reported impacts of the pandemic are stronger in urban businesses, the effect of the virus and related control measures on rural business operations has nevertheless been substantial, with 42 per cent of rural firms experiencing decreased turnover and 37 per cent reporting mainly negative effects.

In general, however, rural firms were less strongly affected than urban firms. They were consistently less likely to have reported a decrease in turnover, and more likely to have maintained or increased their turnover compared to urban firms. The proportion of firms that generated a profit is also higher in rural areas than in urban areas. Nevertheless, almost half of rural firms surveyed reported economic uncertainty as a major obstacle to success, with substantial numbers citing reductions in sales/income and productivity. Disruption to supplies was reported by two-thirds of enterprises reporting negative impacts.

But the pandemic has also prompted enormous market innovation amongst rural businesses. For instance, over a third of the firms surveyed said that they had diversified their business, and of these more than a half developed new sales channels and two-thirds diversified their customer base. Use of government support during the pandemic was widespread in rural firms, with three quarters using at least one form of government support during the pandemic (e.g., furlough, local authority grant). Government support was particularly helpful for supporting cashflow, retaining employees, and survival.

However, COVID business support measures generally have not aided more long-term focused restructuring. Less than 5 per cent of rural firms say that COVID support measures were helpful for creating new products or services or pivoting to a new business plan. Many rural business owners said that they relied on family resources (labour and capital) to help cope with the effects of the pandemic, reflecting the greater prevalence of family-owned and home-based businesses in rural areas.

Importantly, less than 10 per cent of rural businesses engaged with a business advisor or mentor during the pandemic, and only one quarter said that support from a business advisor or mentor would have been useful with dealing with the COVID-19 crisis.

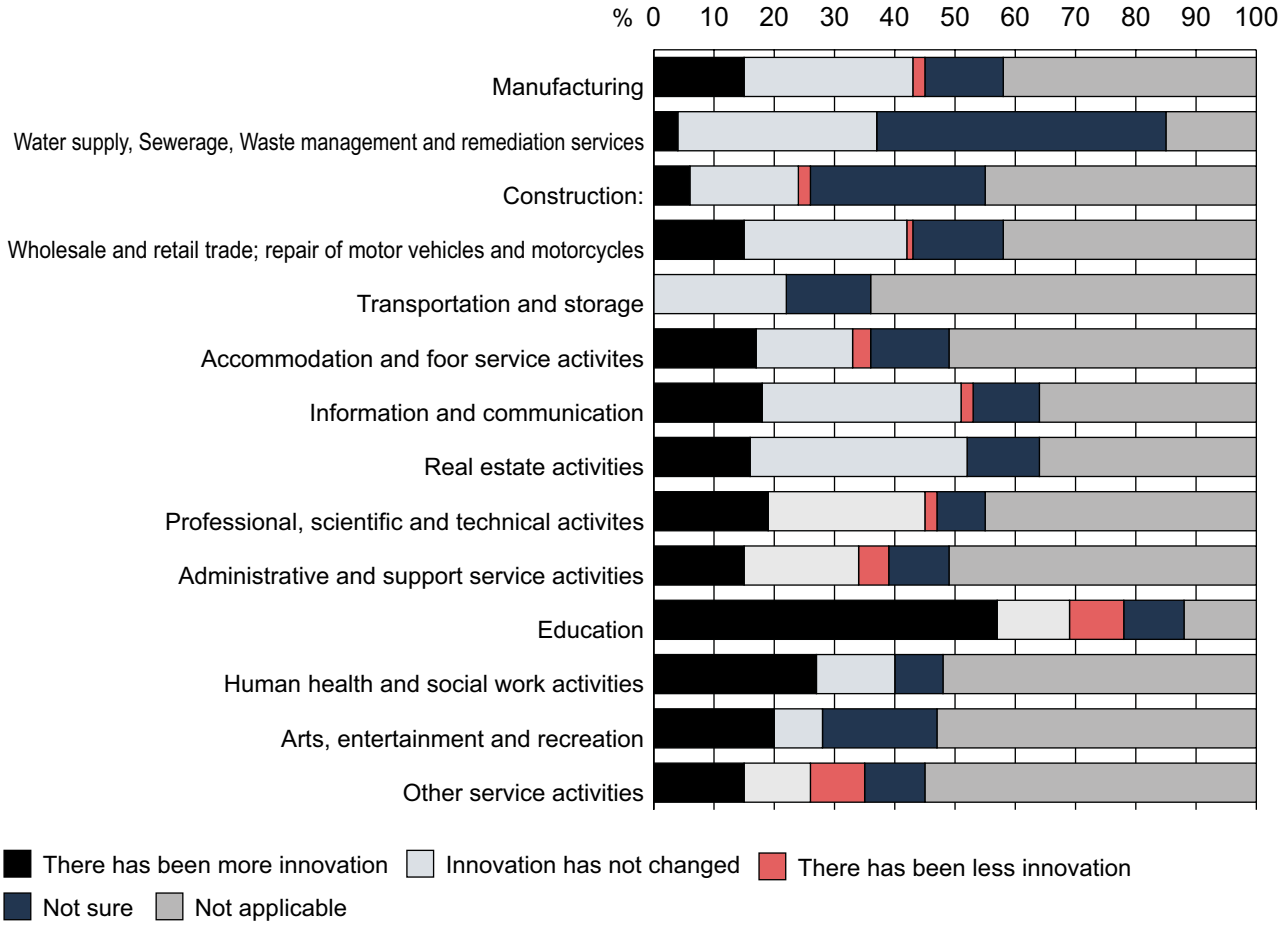
Report link: https://www.ncl.ac.uk/nicre/news/item/covid-effects/

Changes in innovation activity

We know from anecdotal evidence and reports that the pandemic has given many firms a 'push' to innovate as they have had to pivot their business models to the new circumstances the pandemic has brought. Data from Wave 38 of the BICS provides evidence that demonstrates that the pandemic has indeed had an important impact on the innovation activities of UK businesses.

Overall, 15 per cent of businesses reported that 'there has been more innovation' since the start of the pandemic, with figures 8 and 9 showing the breakdown by sector and size. Over 50 per cent of businesses in education and just under 30 per cent of businesses in the health and social work activities sector reported having more innovation than prior to the pandemic (figure 8). Data also shows that small businesses and medium-sized business employing 50-99 employees were the groups with the highest proportion of positive shift in innovation, perhaps in part driven by less complex organisational structures and the ability to pivot quickly (figure 9).

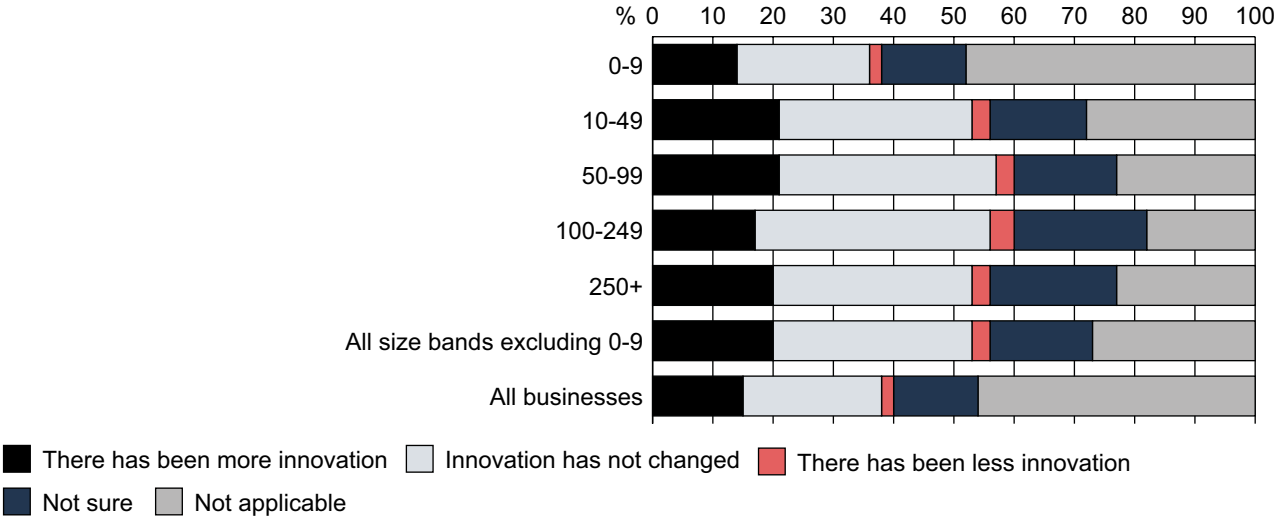
Figure 8. Changes in innovation since the start of the pandemic by sector



Source: ONS Business Insights and Conditions Survey data, Wave 38

Notes: Question: 'How has your business's innovation changed since the start of the coronavirus (COVID-19) pandemic?'; as a percentage of businesses not permanently stopped trading, weighted by count, UK.

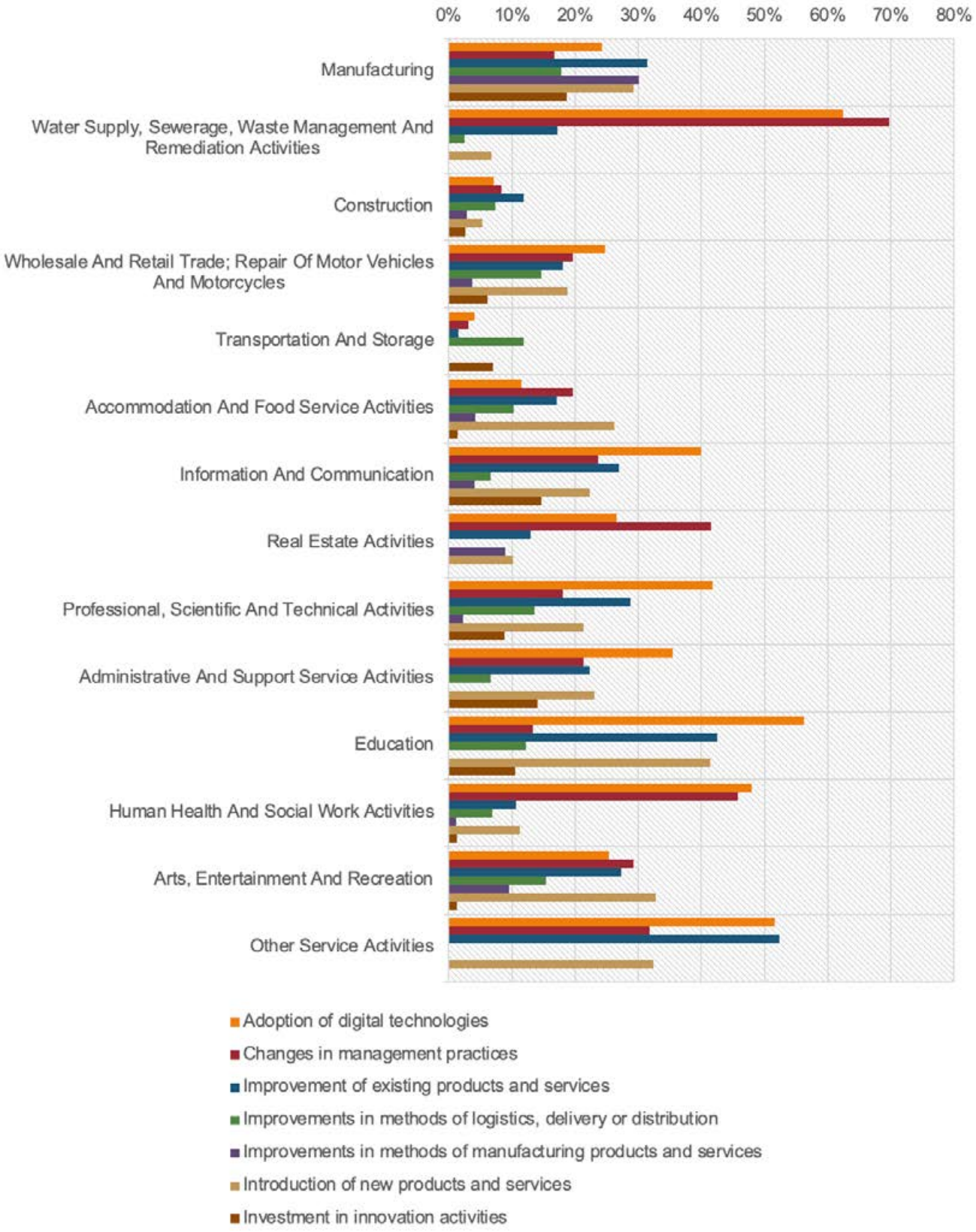
Figure 9. Changes in innovation since the start of the pandemic by size



Source: ONS Business Insights and Conditions Survey data, Wave 38

Notes: Question: 'How has your business's innovation changed since the start of the coronavirus (COVID-19) pandemic?'; as a percentage of businesses not permanently stopped trading, weighted by count, UK.

Figure 10. Types of innovation since the start of the pandemic by sector

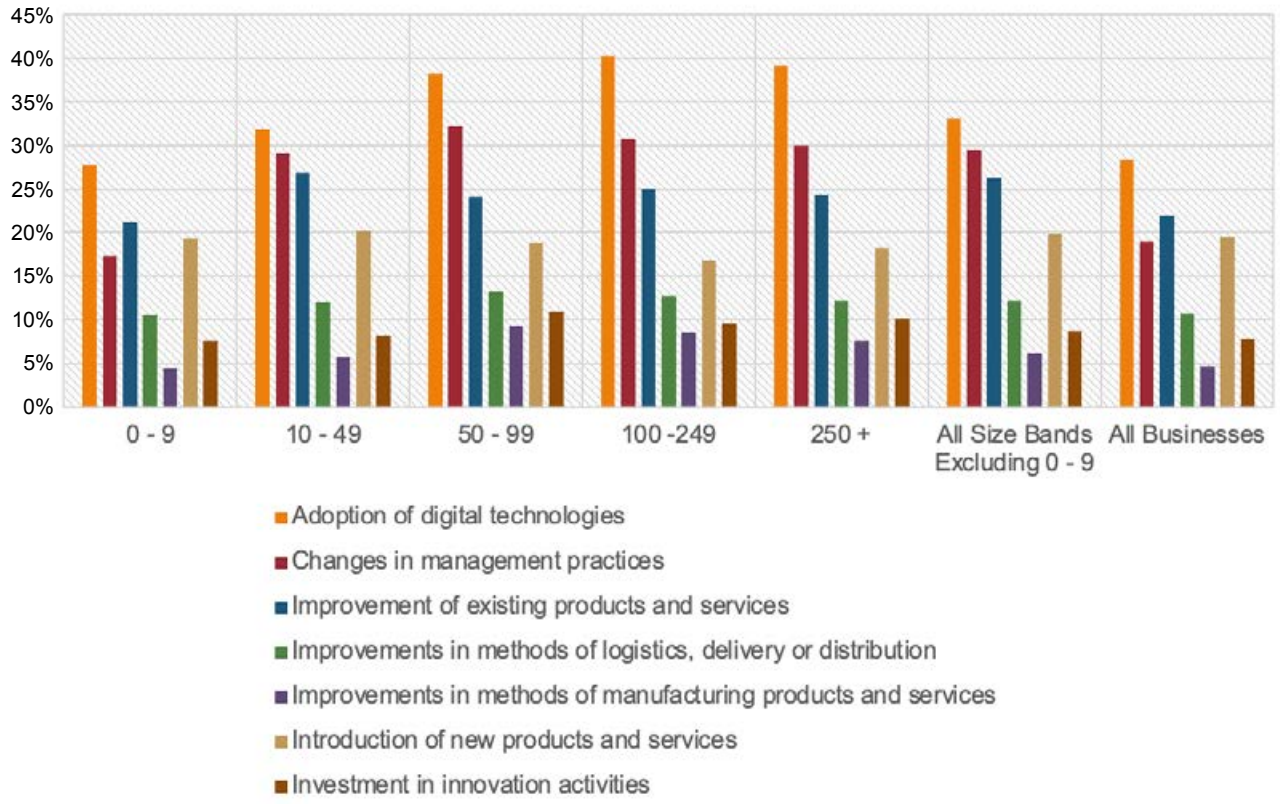


Source: ONS Business Insights and Conditions Survey data, Wave 38

Notes: Question: 'Since the start of the coronavirus (COVID-19) pandemic, which of the following did your business innovate?'; As a percentage of businesses not permanently stopped trading who indicated a change, no change or not sure if there was a change in innovation, weighted by count, UK.

When looking at the types of innovation spurred by the pandemic, data shows that these were often related to adoption of digital technologies, changes in management practices and improvements in existing or introduction of new products and services (figures 10 and 11).

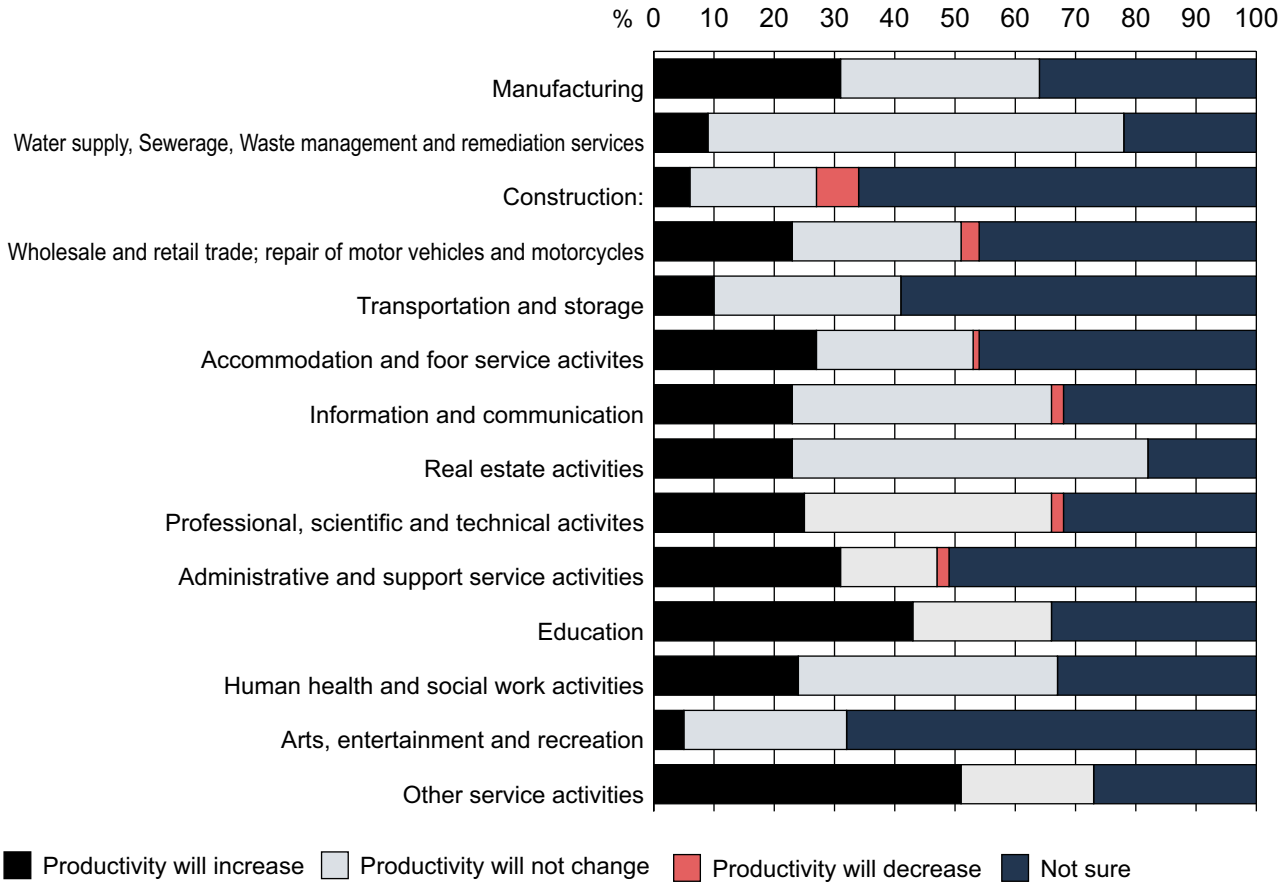
Figure 11. Types of innovation since the start of the pandemic by size



Source: ONS Business Insights and Conditions Survey data, Wave 38
Notes: Question: 'Since the start of the coronavirus (COVID-19) pandemic, which of the following did your business innovate?'; As a percentage of businesses not permanently stopped trading who indicated a change, no change or not sure if there was a change in innovation, weighted by count, UK.

Interestingly, despite the increase in innovation activity overall, only 23 per cent of innovating businesses said that they expect that these innovations will affect business productivity in the next twelve months (figures 12 and 13), although there is wide variation by sector. Under 10 per cent of innovating businesses in water supply, sewerage, waste management, construction, transportation and storage, arts and entertainment and recreation sectors expect an increase in productivity due to innovation. The highest proportion of innovating businesses expecting a positive change in productivity due to innovations introduced since the start of the pandemic was observed among medium-sized and large businesses (over 30 per cent) compared to 22 per cent among micro-businesses and 28 per cent among small businesses.

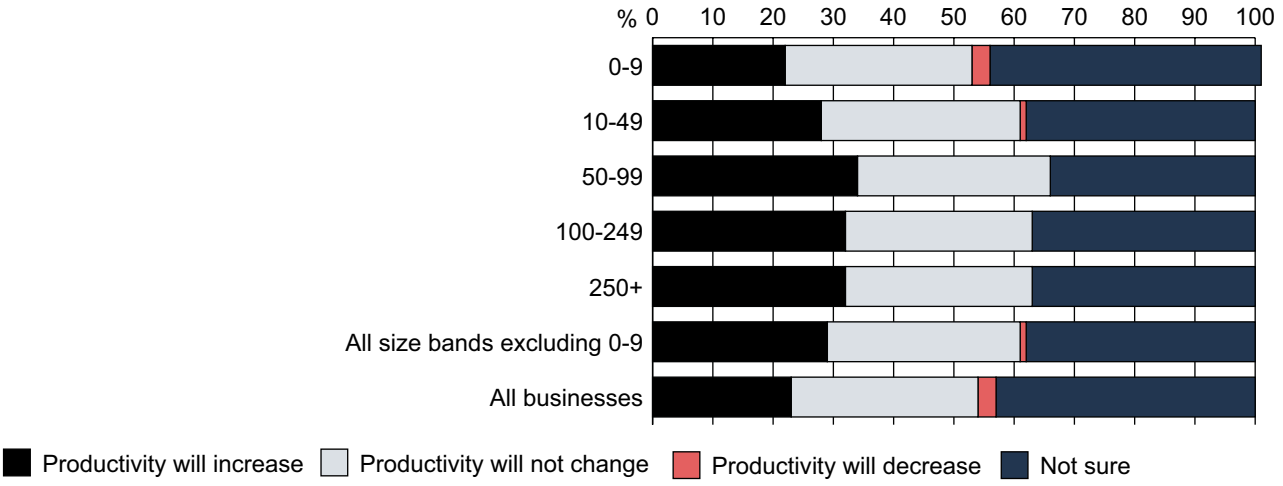
Figure 12. Impact of innovation on productivity over the next 12 months by sector



Source: ONS Business Insights and Conditions Survey data, Wave 38

Notes: Question: 'How do you expect these innovations to affect your business's productivity over the next 12 months?'; As a percentage of businesses not permanently stopped trading who indicated a change, no change or not sure if there was a change in innovation, weighted by count, UK.

Figure 13. Impact of innovation on productivity over the next 12 months by size



Source: ONS Business Insights and Conditions Survey data, Wave 38

Notes: Question: 'How do you expect these innovations to affect your business's productivity over the next 12 months?'; As a percentage of businesses not permanently stopped trading who indicated a change, no change or not sure if there was a change in innovation, weighted by count, UK.

Box 1.2. Assessing the impact of COVID-19 on innovating firms

In 2021 we continued our research into how innovating firms have adjusted their innovation behaviour in response to the COVID-19 crisis. This research involves an ongoing survey tracking firms which have had support from Innovate UK (IUK).

We published a third report based on analysis of a survey completed by 274 IUK award holders conducted in February 2021 - during the third national lockdown in England. Twenty-one in-depth interviews were also undertaken over the same period.

Firms were marginally more optimistic about the outlook than they were in the previous survey conducted in October 2020. However, firms were still experiencing significant challenges constraining their abilities to engage in innovation and complete projects on time, potentially with longer term implications for the innovative capacity of the economy.

Firms said they were experiencing continued disruption through the lockdown, particularly to cash flow, business development and the ability to network with other companies. Cash flow remained critical for about 1:5 companies. This was a slight worsening of the situation from the previous period when around 1:6 companies reported cash flow being critical. Most firms said that they were aiming to reduce costs to cope.

R&D investment patterns varied significantly between firms with some firms rebounding, some in a holding pattern with stable levels of investment and some firms continuing to pull back from investing in R&D and innovation. 62.7 per cent still classified their R&D capacity as “disrupted”, indicating that despite upticks many firms were still not back to normal capacity.

In line with the trends identified in 2020, collaboration between firms and most types of partners had fallen. Around 60 per cent of respondents were collaborating with universities prior to the pandemic, but about 20 per cent of these firms had reduced spend on collaboration by more than 25 per cent.

These findings suggest that in early 2021 the COVID-19 pandemic was continuing to have a significant negative impact on R&D and innovation in these innovating firms. There was also evidence of some new issues also emerging around Brexit impacts, supply chain disruption, workforce and staffing, and employee wellbeing and mental health.

However, R&D remains important to recovery. Despite protracted business disruptions, many firms were continuing to treat R&D as important. Even in this lockdown period, some firms were increasing their R&D activities, although this was totally counterbalanced by other firms stopping or curtailing R&D. Thinking about the longer term over the next year – 45.9 per cent of firms anticipated an increase in R&D spend relative to pre-COVID levels.

The firms surveyed have proved adaptable, and some of the changes they made might be permanent. Some reported increased productivity and had eliminated costs and inefficiencies that were not as evident during normal operations. Around three-quarters of firms said they had changed their business practices over the last three months. Whilst in most cases these changes were regarded as temporary rather than permanent, some firms suggested that part-time remote working might become permanent and had taken steps to reconfigure their offices in anticipation of this.

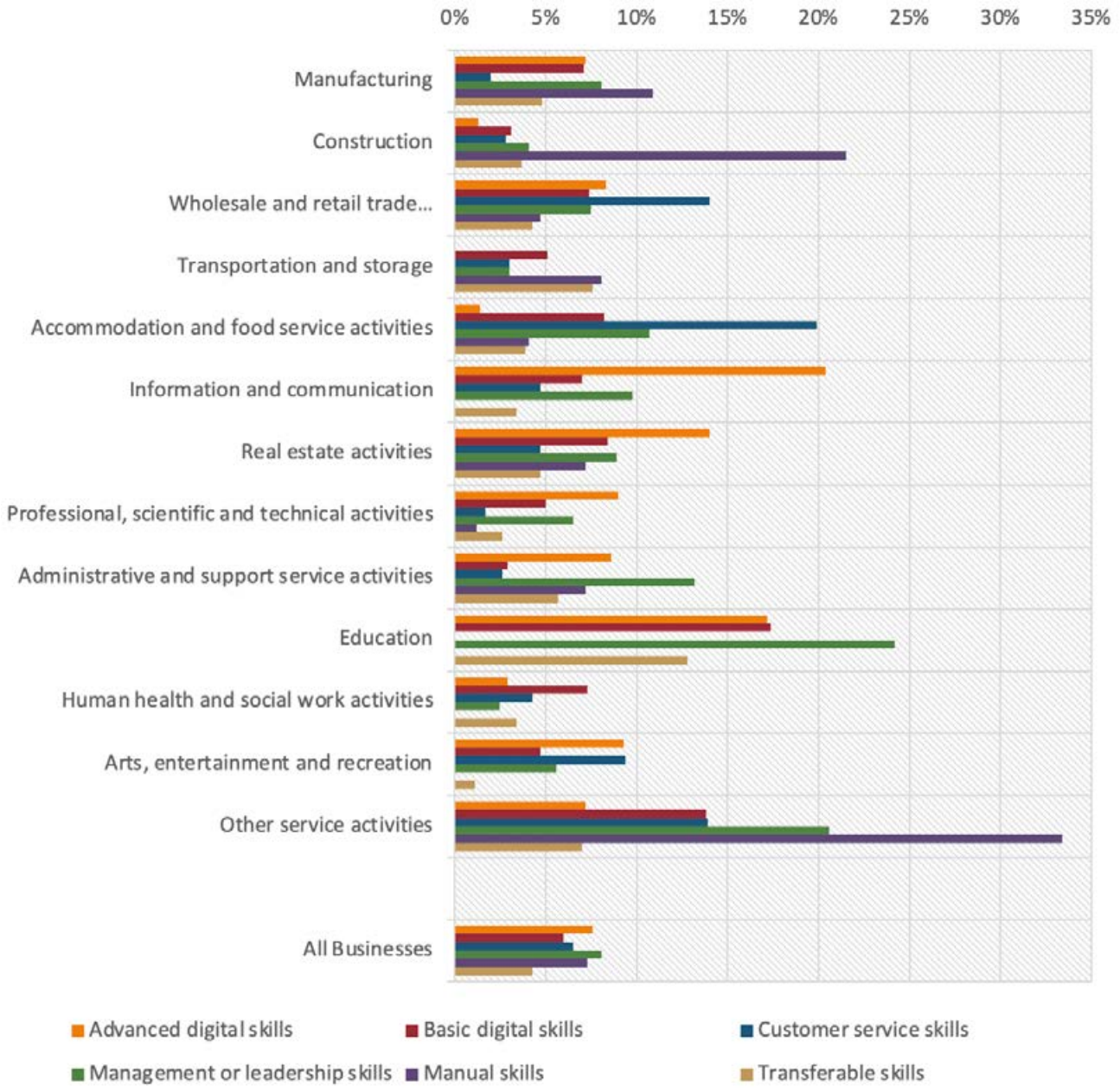
Report link:
https://www.enterpriseresearch.ac.uk/publications/assessing-the-impact-of-covid-19-on-innovate-uk-award-holders/

Workforce skills and training

In Wave 43 of the BICS, businesses were also asked about aspects of their skills and training needs, which gives a useful indication of the situation in terms of workforce and labour market issues. Firms were asked whether their workforce requires additional training and support in the following specific skills: basic and advanced digital skills, customer service, management or leadership skills, manual and transferrable skills. Interestingly, 3 in 4 businesses (75 per cent) reported they had no need for training or extra support to be provided to the workforce in developing the listed skills, despite the context of workplace change and transformation associated with the pandemic.

When a support or training need *was* identified, there was variation by sector, as figure 14 shows. Thus, over 30 per cent of businesses in other services, over 20 per cent of businesses in construction, and over 10 per cent of businesses in manufacturing reported that staff required extra support and training in manual skills. More than 20 per cent of businesses in information and communication stated that extra support was needed in developing advanced digital skills; and this was the case for 17 per cent of businesses in education, and 14 per cent of businesses in real estate activities. There was a perceived need for support and training in basic digital skills amongst 17 per cent of businesses in

Figure 14. Needs in skills support and training by sector



Source: ONS Business Insights and Conditions Survey data, Wave 43

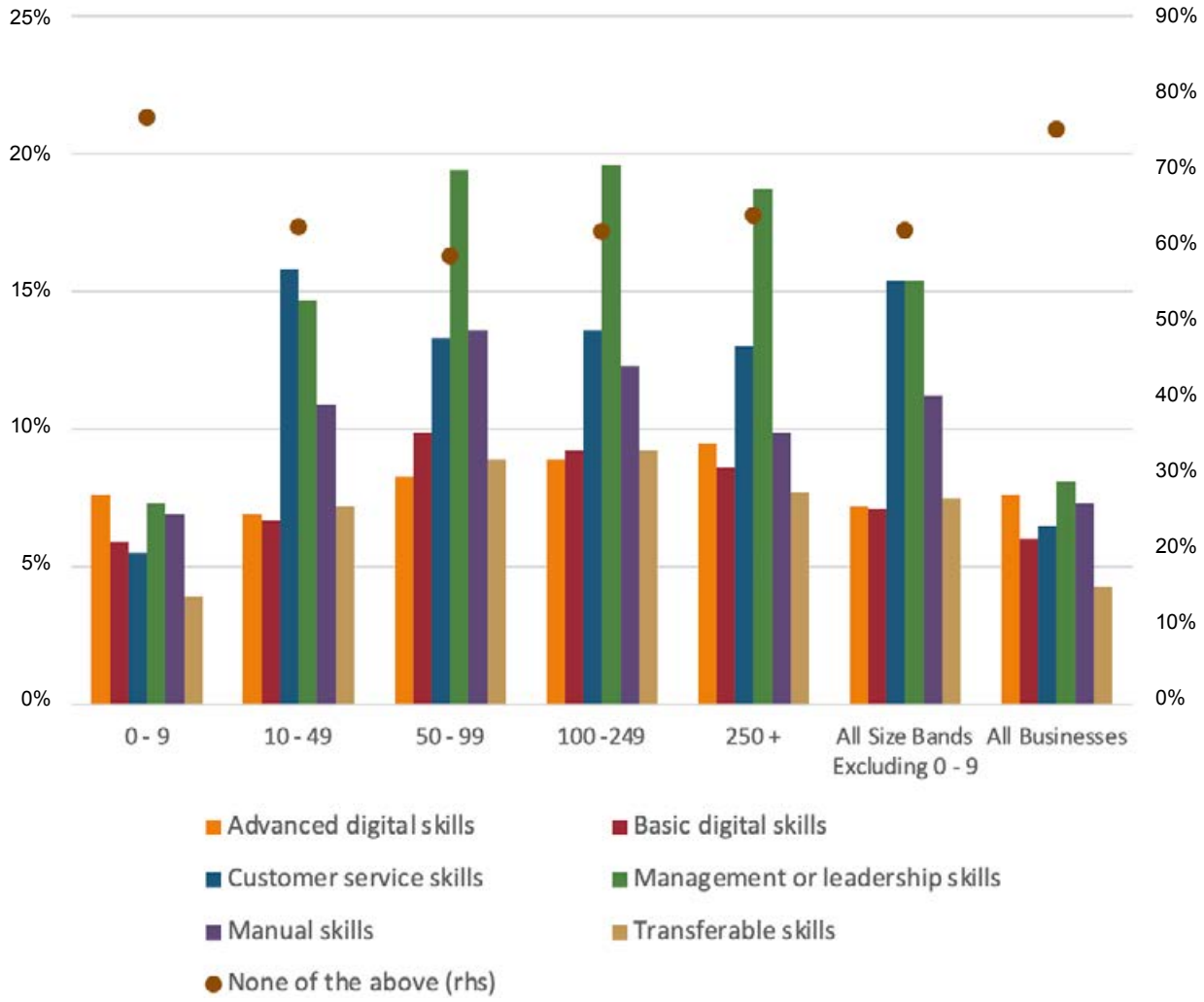
Notes: Question: 'Which, if any, of the following skills does your workforce require extra support or training in?'; as a percentage of businesses not permanently stopped trading, weighted by count, UK.

Water supply, sewerage, waste management and remediation activities sector is excluded because of low counts for confidentiality reasons; idem for 'advanced digital skills' responses for Transportation and storage sectors; 'customer service skills' in education, and 'manual skills' in Information and communication, education, Human health and social work activities, and Arts, entertainment and recreation.

education, and 14 per cent of businesses in other services, compared to less than 1 in 10 businesses in other sectors. Development of customer service skills was seen to require extra support and training in 1 in 5 businesses in the accommodation and food services sector, and in 14 per cent of businesses in wholesale and retail trade sector. Management and leadership skills were stated to need extra support across all sectors but were most frequently cited by businesses in education (24 per cent), other services (21 per cent), administrative and support service activities (13 per cent), and accommodation and food services (11 per cent).

Figure 15 provides a breakdown of skills support needs by business size and shows that the highest proportion of businesses who said that they *do not* require extra support or training for developing skills is observed among micro-businesses (over 75 per cent), compared to small (62 per cent), medium (around 60 per cent), and large businesses (64 per cent). Medium-sized firms were more likely to require extra support for management or leadership skills (just under 20 per cent) than small (15 per cent) and micro (7 per cent) businesses. However, it should be noted, as several commentators have observed, employer reports of skills needs and deficits collected via surveys are fraught with ambiguity, with considerable variation in how managers interpret whether skills gaps or shortages exist, particularly when it comes to assessing managerial level skill deficiencies (Hurrell, 2016).

Figure 15. Needs in skills support and training by size



Source: ONS Business Insights and Conditions Survey data, Wave 43

Notes: Question: 'Which, if any, of the following skills does your workforce require extra support or training in?'; as a percentage of businesses not permanently stopped trading, weighted by count, UK.

Percentage of businesses requiring extra support by type of skills (left-hand scale); proportion of businesses who do not require extra support for any of the mentioned skills (right-hand side scale).

1.2. Trends in entrepreneurship and self-employment

The latest (at the time of writing) Global Entrepreneurship Monitor (GEM)[2] UK survey was undertaken in the last few months of 2020 and showed a sharp fall in the number of individuals in the early stages of setting up a new business compared to the pre-pandemic high in 2019. The Total Entrepreneurial Activity ('TEA') rate explains the percentage of working age adults that were in the early stages of starting or running a business. In 2020, the UK TEA rate was 7.5 per cent, a drop on the previous year but reverting to similar rates seen in 2018. The UK TEA rate is also significantly higher than the rate in Germany (4.8%) and lower than that of the US (15.4%). Following similar levels in 2019, 1 in 4 working age individuals were actively engaged in some type of entrepreneurial activity (figure 16).

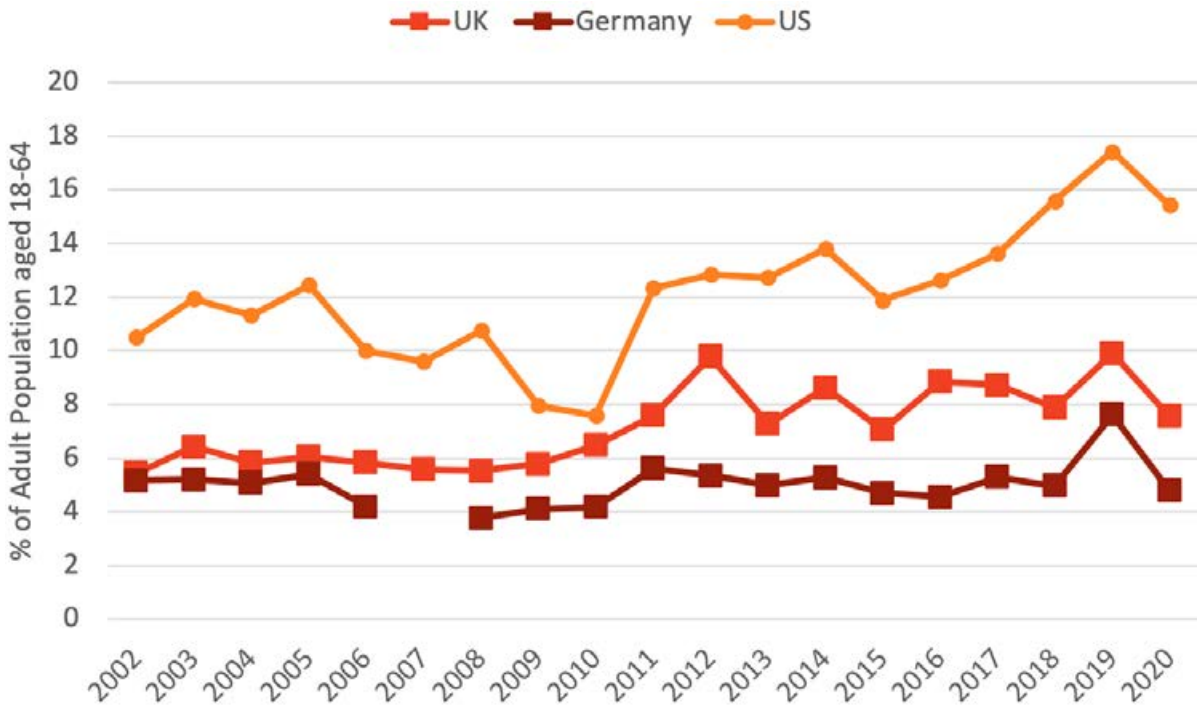
There was a drop in both male and female TEA rates to 9% and 6.1%, respectively in 2020. The male to female TEA ratio of 68 per cent was higher in 2020 than in previous years due to the collapse in male TEA rates, highlighting the resilience of female entrepreneurs during the pandemic. This was also true for nearly all age groups, except for 18–24-year-olds where there was an increase to 9.2 per cent. Immigrant entrepreneurship remained strong in 2020 at 10.8 per cent, which is significantly higher than UK-born lifelong residents with a TEA rate of 6.1 per cent. This follows similar patterns seen in previous years and highlights the resilience of immigrant entrepreneurs.

The fall in the headline TEA rate is hardly surprising, but the analysis has also shown that the entrepreneurial foundations of the economy and society are still strong, and these will be crucial for the recovery after the pandemic and in dealing with the on-going economic fallout from Brexit. Those ethnic-minority communities that have borne the brunt of the pandemic in terms of infection, hospitalisation and sadly deaths demonstrated their resilience by maintaining their previous levels of early-stage entrepreneurial activity (TEA rate) which were significantly higher than for the non-ethnic minority population.

Clearly, the pandemic has had no damaging impact on the level of entrepreneurial activity by immigrants and ethnic-minorities, although it has depressed it for life-long residents and the non-ethnic population. There is undoubtedly an appetite for people to start their own businesses in the next three years, and many report new opportunities because of the pandemic but they are delaying the actual decision to get the business operational.

More broadly, self-employment accounted for 15 per cent of the UK workforce in 2019 pre-pandemic, and

Figure 16. Total early-stage entrepreneurial activity in UK, US and Germany (2002-20)



Source: GEM UK Adult Population Survey (APS) 2002-2020

2 Global and UK Reports are available on www.gemconsortium.org

it is widely acknowledged that this group have been amongst the hardest hit by the economic implications of COVID-19.

The level of self-employment in the UK had risen markedly in the years before the pandemic (particularly amongst women) and this trend has been a key feature of the UK's labour market. Analysis undertaken by Reuschke et al (2021) of data from the UK Labour Force Surveys outlines the key changes in self-employment from April to December 2020 as the pandemic first hit. Across the UK, self-employment fell in each quarter from April 2020, leading to a substantial decrease of almost 14 per cent in the final quarter of 2020 compared to 2019. The impact on the self-employed varied by type of self-employment, with those working for employment agencies, or as subcontractors and freelancers being hardest hit.

Turning to how things developed in 2021, research conducted by the Centre for Economic Performance (CEP) found that 37 per cent of self-employed people were working ten hours or fewer per week in January 2021, up 14 percentage points from August 2020 (Blundell et al, 2021). A further survey by Blackburn et al (2021) conducted in September 2021 reveals that although the self-employed had some improvement in their position over the year, incomes and profits were still below pre-crisis levels. Just below 30 per cent of self-employed people surveyed still reported financial difficulties with essential expenses. Although through 2020 movements out of self-employment were the prevailing trend, inflows into self-employment had started to pick up. Overall, though ONS data shows that self-employment was lower at the end of 2021 than at the end of 2019 – with most of the decline taking place in 2020 (4.7 million in 2019 down to 4.1 million in Q3 2021)[3].

However, the authors conclude that new entrants to self-employment 'appear more precarious and show less resilience to adverse economic conditions than those already in self-employment… Overall, the survey results show an unequal impact of the crisis on the self-employed, with the observed inequalities being connected to their demographics and business sector'.

1.3. Trends in international trade

Finally, we turn now to consider trends in international trade. SMEs trading internationally have encountered unprecedented challenges associated with the COVID-19 pandemic, which has been coupled with the implications of Brexit.

Global trade

With the overall world economy recovering to pre-pandemic level in terms of GDP in 2021 (OECD, 2021), the global trade in goods recovered quickly to surpass the pre-pandemic level in the second

Figure 17. World trade to continue recovering during 2021

Source: UNCTAD calculations based on national statistics.
Note: Quarterly growth is the quarter over quarter growth rate of seasonally adjusted values. Annual growth refers to the last four quarters. Figures for Q1 2021 are preliminary. Q2 onward is a forecast.

3 https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/timeseries/dyzn/lms

quarter (UNCTAD, May 2021;[4] data from Global Trade Update[5]). The value of imports and exports of goods in the third quarter of 2021 reached $5.6 trillion worldwide, setting a new quarterly record (UNCTAD report)[6] – albeit unevenly across countries and sectors. Compared to goods, international trade in services has lagged. According to the UNCTAD forecast, the 2021 will not see it recover to the pre-pandemic level (figure 17).

The strong recovery of international trade in 2021 is largely the result of the strong recovery in demand due to subsiding pandemic restrictions, economic stimulus packages, and increases in commodity prices (UNCTAD report). The sourcing demand was partially driven by changing patterns of consumer spending, while depressed by global supply chains breakdowns.

UK Trade

Following the 2020 recession due to the COVID-19 pandemic and a quick recovery, UK trade started the year 2021 by experiencing a deep depression. The UK shared similar trend of decline in the 2020 recession but with much more severity[7]. The 2021 slump again appears more severe for the UK, as the rest of the world did not witness the significant decline in exports and milder reduction in imports. Trading activities started to recover after March but slowed again in June. The trade challenges in 2021 were the results of pandemic disruption combined with the implementation of the EU-UK Trade and Cooperation Agreement (TCA) and global supply chain disruption[8].

The UK's EU exit had a considerable impact on the UK trade during 2021. There was a substantial reduction in UK trade with EU. Using monthly trade data from ONS, the first 10 months of 2021 saw a reduction of the total UK trade in goods with the EU countries by 17 per cent relative to the same period of 2019. This has been driven by a larger reduction in imports (-20%) than exports (-12%). The same period also saw a depressed trade flow with non-EU countries, but in much less magnitude (-4%), and imports from non-EU countries has in fact grown (4%), suggesting the EU exit played a significant role[9].
This, however, does not reveal the whole picture. Positioning UK trade in the global economy, one can observe an even worse decline of UK trade with other EU countries in comparison with the rest of the world. While other countries not only recovered to pre-pandemic level but exceeded trade with the EU in 2021, the UK struggled to bounce back.

Among different types of goods, the UK export and import of consumer goods to/from the EU has performed particularly poorly, while the UK export of intermediate and capital goods remained stable in the first half of 2021. Footwear and headgear, animal and vegetable oils and fats, textiles and clothing, vegetable products, ceramic and metals sectors have seen a sustained reduction in trade[10].

In 2021, firms faced soaring trade costs due to additional customer formalities, border checks and controls on goods crossing from GB to the EU, and rule of origin restrictions on manufactured and processed goods. The global value chain disruptions and the shortage due to other factors (such as fuel price increases, HGV drivers and other skills, China's power crisis, etc.) also put pressure on exporting firms in the second half of the year. Small and medium sized firms are expected to be negatively impacted by the trade challenges disproportionally more. The Business Insights and Conditions Survey (BICS) reports that 64 per cent of exporters and 75 per cent of importers faced challenges in late October to early November 2021[11].

Headwinds and opportunities

2021 was a year that saw the world turn the tide against the pandemic. However, the supply chain crisis has hampered economic recovery. In the UK, recovery has slowed since June as across the country shortages of goods supplied to production and building sites, and shortages of skills and workers affected firms' ability to operate and trade. Cost pressure was high and persistent, showing an increasing trend over time. The soaring costs of energy, shipping, materials and inflation formed mounting pressure on businesses. In addition, Brexit related factors added challenges to traders – border checks at ports and long delays, and the lack of HGV drivers – all contributed to weak goods exports and imports growth. Traders in the services experienced

4 https://unctad.org/news/global-trades-recovery-covid-19-crisis-hits-record-high
5 https://unctad.org/system/files/official-document/ditcinf2021d2_en.pdf
6 https://unctad.org/webflyer/global-trade-update-november-2021
7 See Du, J. and Shepotylo, O., 2021. UK Trade in the Time of COVID-19: A Review. *World Economy.*
8 More explanations can be found in the written evidence by Du and Shepotylo adopted by the House of Lords European Affairs Committee, 29-10-2021, at https://committees.parliament.uk/work/1508/trade-in-goods/publications/written-evidence/.
9 Reported in the ONS Statistical Bulletin UK trade: October 2021, https://www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/datasets/uktradegoodsandservicespublicationtables.
10 The evidence was provided in Ayele, Larbalestier and Tamberi (2021) at https://blogs.sussex.ac.uk/uktpo/publications/post-brexit-ii-trade-in-goods-and-services/.
11 Reported in the ONS Statistical Bulletin UK trade: October 2021, https://www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/datasets/uktradegoodsandservicespublicationtables.

unprecedented high barriers, and additional customs and administration costs. In some sectors UK qualifications are denied recognition by the EU, and these businesses could no longer trade in the way they did before.

Small businesses have been disproportionally disadvantaged by successive lockdowns and the disruption caused to global supply chains. Small business traders disproportionally relied on the EU as a main market for exporting and had to find ways to adapt to the new challenges following the end of the transition period on 31 December 2020. Many have experienced disruption and additional costs, with a significant number choosing to stop exporting permanently or temporarily[12]. Similar reports about the challenges of international trading can be found within business networks and support organisation with small businesses particularly affected[13].

In 2021, internationally trading businesses had to adapt quickly to the demanding circumstances they found themselves in, with many exploring new ways of engaging in trade, for example with more advanced e-commerce and blockchains. The coronavirus pandemic accelerated this digitalisation shift and showed how innovativeness can help small businesses overcome barriers and reach new markets and customers. Looking forward to 2022 and beyond, as the global trade environment can change quickly it will be important to assess where UK businesses have competitive advantage in terms of products, services and territories. It will also be important to identify specific barriers that deter SMEs from exporting. For many micro and small businesses wishing to export, targeted government support will be important.

12 See UK small businesses experience reflected by Federation of Small Business https://www.fsb.org.uk/resource-report/ready-to-launch.html.

13 For example, FSB's survey at https://www.fsb.org.uk/resource-report/ready-to-launch.html , and CBI's survey at https://cep.lse.ac.uk/pubs/download/cepcovid-19-021.pdf.

2. Enabling the Triple Transition in SMEs

The notion of Industry 4.0 emerged in Germany in 2011, reflecting the critical importance of digitalisation to future competitiveness. More recent policy attention across Europe has focused on the need to move towards lower carbon production, defining what has come to be described as the 'Dual Transition': digitalisation and the net zero transition. For many UK SMEs, however, productivity which is below that of their international competitors also represents a significant challenge and opportunity. Reinvesting in capital equipment, intangibles, skills, and business model innovation for digitalisation and net zero creates the potential for productivity improvement. This defines the 'Triple Transition': digitalisation, moves towards net zero, and productivity upgrading.

In this section we review research undertaken by ERC and its partners over the last year which informs this Triple Transition. Some studies relate to individual transitions. Others provide a link between aspects of the Triple Transition, exploring, for example, the role of digitalisation in supporting moves towards net zero, or the role of green investment in productivity improvement.

The focus throughout this section is on SMEs in the UK. The importance of the Triple Transition in these companies is emphasised both by the realisation that these firms (with less than 249 employees) provide around 60 per cent of private sector employment and create 50 per cent of business-driven emissions[14]. Broad comparisons between SMEs and larger companies also suggest that turnover per employee, an indicator of productivity, is around 15 per cent lower on average than in larger UK firms[15]. The important contribution of SMEs to jobs, innovation, and future sustainability all suggest the need to better understand how these firms are approaching the Triple Transition, and how we can create a business environment which can enable SMEs to make a successful transition.

We start by considering the digital transition. Where are UK small firms in their digital journey? What are the barriers to digital adoption and effective implementation of digital technologies? And, how can we best support firms through their digital transition? While digital adoption decisions are primarily around private returns, helping firms to remain competitive in dynamic market circumstances, moves towards net zero have a different profile of private and social (environmental) benefits. From the point of view of the individual company and its stakeholders, investment in the net zero transition therefore takes on a rather different complexion to investment in digital technologies.

In section 2.2, we turn to consider the drivers of net zero practices in smaller companies, and the evidence on how these practises are influencing business performance. We also consider (briefly) the enabling role of digital technologies in supporting the net zero transition in SMEs.

In Section 2.3 we consider the issue of productivity upgrading in SMEs. Digital investment and investment to support the net zero transition play a potentially significant role here both in supporting higher added value and reducing the resource cost of production and delivery. But what does the evidence suggest about these linkages, and how are they working in different types of SMEs? How are other factors either moderating or enhancing these contributions?

2.1. The digital transition

Digitalisation has the potential to reshape both business models and firms' product and service offerings (Zambon et al. 2019). For SMEs, however, the potential of Industry 4.0 may be limited by resource scarcity, with one recent Delphi study suggesting the potential influence of a lack of expertise and training and a short-term mindset (Moeuf et al. 2019). Survey evidence suggests similar barriers to adoption of Industry 4.0 in SMEs: the lack of advanced technologies in SMEs, lack of financial investment, poor management vision and lack of skilled workers (Huang, Chicoma and Huang 2019). Where digitalisation can be implemented effectively, however, it has the potential to drive radical changes in productivity and business models, even where these are well-established. For example, in a German context, Pahnke and Welter (2019) comment that: 'the Mittelstand is an excellent example of every-day

14 https://www.british-business-bank.co.uk/research/smaller-businesses-and-the-transition-to-net-zero/.

15 https://www.gov.uk/government/statistics/business-population-estimates-2021/business-population-estimates-for-the-uk-and-regions-2021-statistical-release-html, Table A.

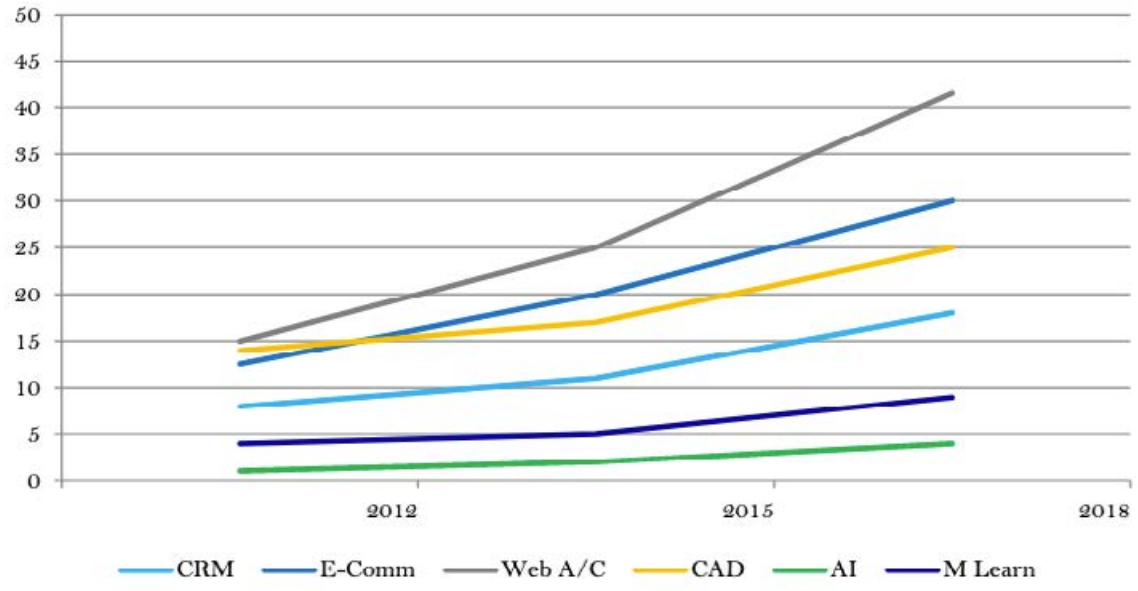
entrepreneurship, demonstrating how entrepreneurship that builds on a sense of responsibility and solidarity can shape an economy and society and contributes to its world standing. What remains to be seen is whether and to what extent the ongoing digitalisation of our economy and society will undermine that typical Mittelstand mindset'.

The COVID-19 pandemic and moves towards home and hybrid working have accelerated digital adoption in many job roles. Even prior to the pandemic, however, the speed of change, and the extent of digital adoption, were increasing sharply. Surveyed in 2018, earlier ERC research suggested that micro-businesses across the UK reported sharply increasing levels of adoption of a range of digital technologies, with a particularly sharp increase in the 2015 to 2018 period (figure 18). Analysis conducted at the time also suggested a strong link between digitalisation and productivity upgrading. When productivity (sales per employee) of micro-businesses when productivity is measured three years after adoption[16]:

- Use of cloud-based computing leads to an increase of 13.5 per cent in sales per employee after three or more years;
- CRM use adds 18.4 per cent to sales per employee over three years;
- E-commerce adds 7.5 per cent to sales per employee over three years;
- Web-based accounting software leads to an increase in sales per employee of 11.8 per cent over three years; and,
- Computer-aided design leads to a 7.1 per cent increase in sales per employee.

Despite this evidence of rapid adoption of digital technologies in the UK, OECD statistics suggest that UK firms have been slower adopters of digital technologies than those in other countries. For example, in the adoption of CRM software – a type of generic application applicable to firms across a wide range of industries – levels of pre-pandemic adoption in the UK remained poor by international standards (figure 19). Levels of adoption of other types of digital application captured in the OECD data (e.g. robotics, EDI) would suggest a rather similar picture. Why is this? One potential explanation is suggested by the Global Innovation Index 2020 (GII) which ranks UK firms 27th internationally on knowledge absorption, well below its overall ranking of 6th on innovation inputs. This relatively low ranking for absorbtive capacity is related to a weakness in research talent working in businesses (ranking 33), intellectual property payments (i.e. licensing), ranking 21st; high-tech imports, ranking 21st; ICT services imports, ranking 31st; and, FDI inflows, ranking 20th[17].

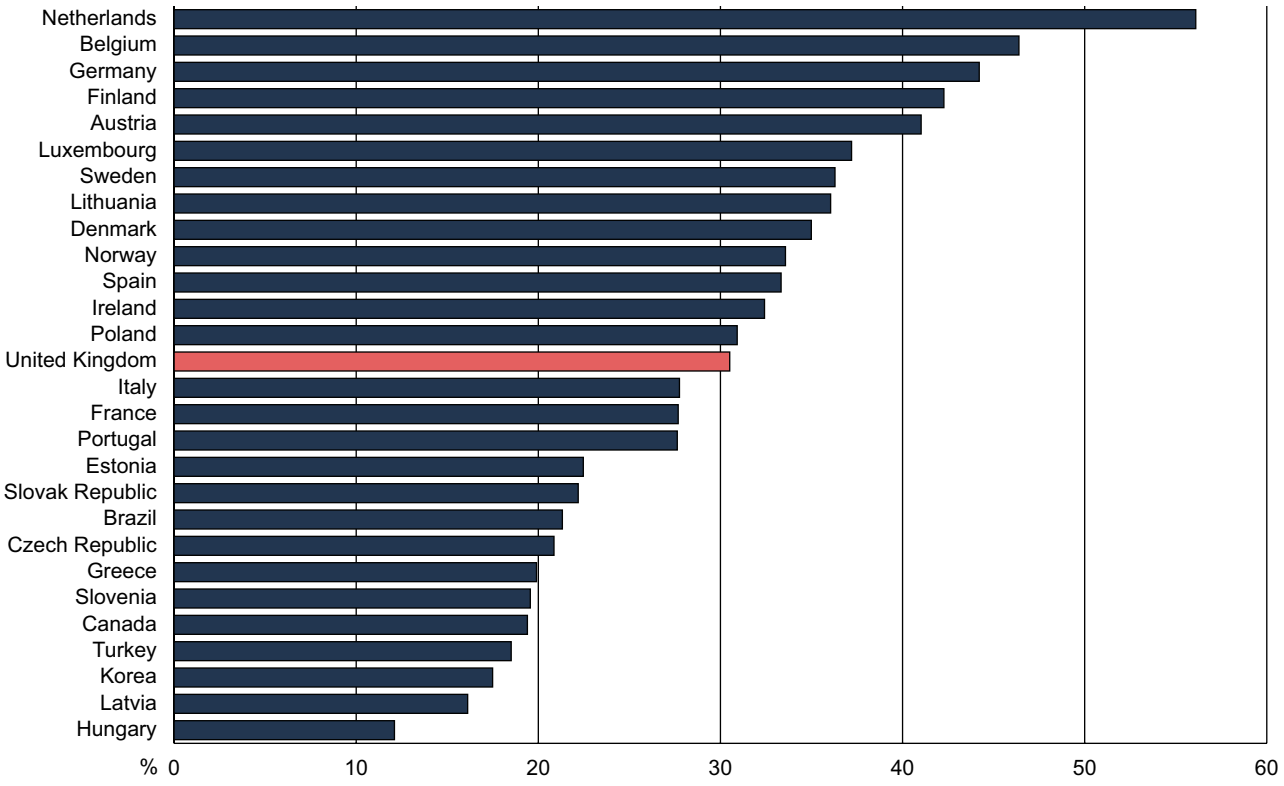
Figure 18. Digital adoption among UK micro-businesses prior to the pandemic



Source: ERC Microbusiness Britain Survey, SSBB report 2018, Figure 5.4

16 Source: ERC State of Small Business Britain 2018, Table 6.1.
17 https://www.globalinnovationindex.org/userfiles/file/reportpdf/GII_2020_Full_body_R_58.pdf, p. 337.

Figure 19. Adoption of Customer Relationship Management (CRM) software: 2019



Source: OECD Statbase

Limitations in SMEs' absorptive capacity are reflected in their level of digital readiness – firms' pre-disposition or propensity to adopt digital technologies. Recent ERC research by Anastasia Ri and Hoang Minh Long (2021) explores this concept and develops a measure of digital readiness which captures both the motivators and inhibitors of digital adoption by SMEs (Box 2.1). Adopting a multi-dimensional approach, the development of this digital readiness index is also useful in suggesting the range of policy measures which may enable broader digital adoption.

Box 2.1. Digital readiness – a predictor of digital adoption

Our conceptualisation of digital technology readiness is not specific to a particular digital technology but rather applicable to a range of different established or emerging advanced technologies and can be applicable to an SME in any sector. It is a dynamic state, a pre-disposition that can be measured at a particular moment in time but can evolve with changes in business goals and organisation as well as in the environment of a firm, rather than a dichotomous state of being 'ready' or 'not ready'. One important implication of this is that digital technology readiness may be influenced by appropriate business support and supportive environment.

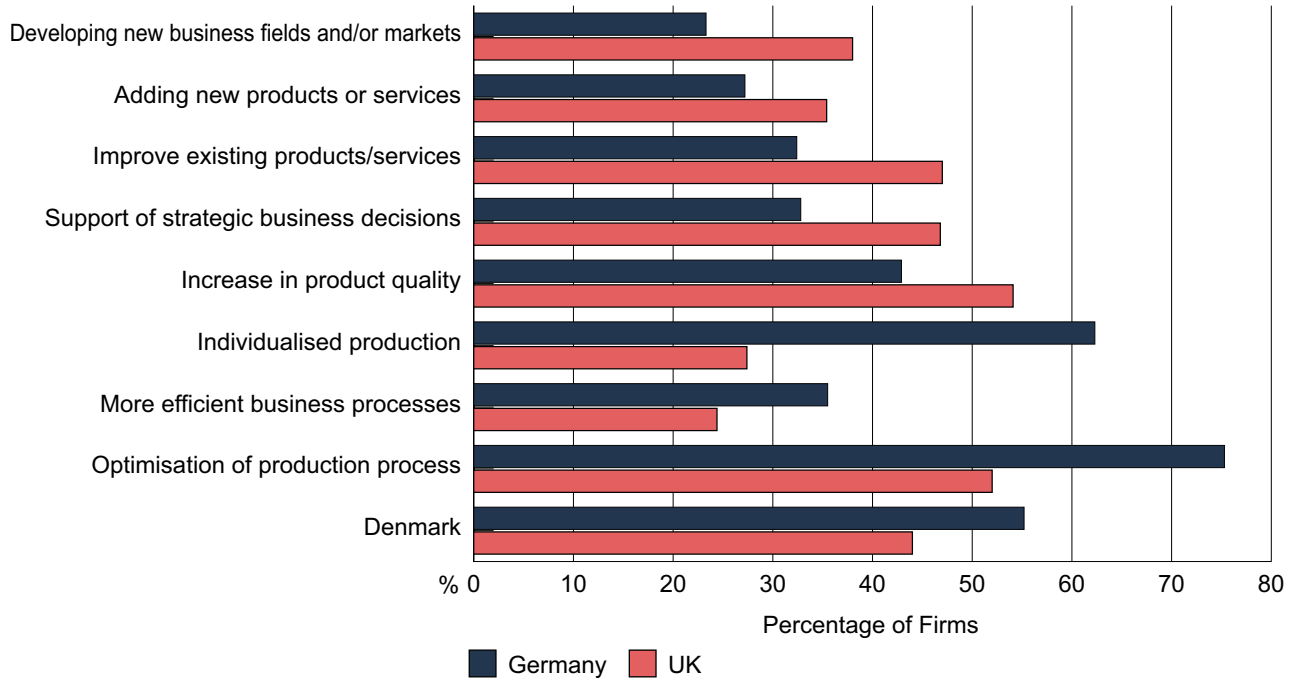
Using the ERC Business Futures Survey 2020, we analysed the relationship between digital readiness, perceived barriers and digital adoption across ten different digital technologies. The results demonstrate a that digital readiness is a good predictor that a small firm would adopt digital technology. Therefore, policy instruments and business support which increases overall awareness of existing digital technologies and showcases their benefits, facilitates networking and information sharing may result in increased digital readiness and, therefore, in increased likelihood of digital adoption.

Report link: https://www.enterpriseresearch.ac.uk/publications/digital-readiness-digital-adoption-and-digitalisation-of-uk-smes-amidst-the-covid-19-crisis-2/.

Another recent (2021) study undertaken by ERC with Ipsos MORI for the CDEI as part of the AI Barometer also illustrates that the barriers to adoption of data-driven technologies (DDT) can differ at different points in the adoption journey[18]. Based on survey information from around 1,000 UK businesses, this suggested that among non-users of DDT, perceptions of barriers to DDT adoption varied depending on whether a firm did or did not have plans to introduce these technologies in the future. The major barrier for firms that did not have plans to introduce DDT was linked to perceived relative advantage. Firms were significantly more likely to say that they saw limited benefits of using AI in their business (62% of respondents) compared to firms with plans to introduce AI (32%). Among the firms who planned to adopt AI, two in five firms said that lack of funds for purchasing or developing technology were preventing them from doing so (40%). Among current users of DDT, more than 2 in 5 firms using AI and DDT (44%) named lack of funds for purchasing or developing technology, and almost 1 in 4 (24%) cited it as the most constraining barrier. Limited technology capabilities were equally frequently cited (43%). Around 1 in 3 survey respondents mentioned competing investment priorities (37%), low level of digital maturity among customers (34%) and incompatibility with existing equipment (32%). Lack of skills, both internal and external, and an unclear business case for further development was cited by just under 30 per cent of users.

SMEs' motivations for adopting digital technologies may also differ between countries, with potential implications for productivity upgrading. For example, there are marked differences in the importance assigned by German and UK automotive firms for implementing networking and data sharing: German firms place a higher value on role of connectivity for more efficient and flexible production processes, while UK firms are more likely to consider it important for developing new products or markets. The three most important reasons identified by German automotive firms for implementing networking and data sharing are more efficient business processes, achieving greater flexibility and optimising production processes. Each was significantly more important among German firms than among their UK counterparts. UK firms were significantly more likely to have implemented networking and data sharing to develop new business areas (figure 20).

Figure 20. Reasons for implementing networking and data sharing: family-owned and family-controlled automotive SMEs with some data networking: 2019



Source: AI Barometer Business Innovation Survey
Notes: UK respondents were significantly more likely to be implementing data sharing to develop new business areas (t=1.727, ρ=0.087). German firms were significantly more likely to be implementing data sharing to create more efficient business processes (t=2.916, ρ=0.004), for individualised production (t=2.686, ρ=0.086) and achieve greater flexibility (t=4.148, ρ=0.000).

18 See https://www.gov.uk/government/publications/ai-barometer-2021/ai-barometer-part-2-business-innovation-survey-2021-summary.

Another, less well understood, link is the role of the digital transition in supporting moves towards more sustainable business models. An ERC research paper by Effie Kesidou and Anastasia Ri (2021) explores this issue, considering potential complementarities-in-use of digital technologies in UK SMEs (Box 2.2). The evidence here is correlation rather than causality but does suggest a positive link between some digital technologies and moves towards net zero. In other words, a complementarity between the digital and net zero transition.

Box 2.2. Linking the digital and net zero transition

Although recent research has helped us to gain some understanding on how SMEs engage with digital technologies and net zero, one area where knowledge is scarce is how both work together. One major question is to understand whether digital technologies may encourage and facilitate small firms' transition to a more sustainable economy.

Using data from the ERC Business Futures survey (2020) we identify synergies between the use of *CRM* and undertaking of *environmental reports and audits*, *switching to renewable energy,* and introducing *low carbon products and services*. The customer-centred approach enabled by modern digital CRM solutions helps firms to improve their ability to sense customers' needs and to address them proactively. With customers increasingly seeking to adopt a more environmentally friendly lifestyle, firms using CRM systems are more likely to adjust to changing demands quicker and engage with a range of net zero activities. Measuring and showcasing environmental impact, adopting renewable energy and bringing to the market new low carbon products and services become then effective communication and marketing tools, instruments of an effective entrepreneurial strategy helping firms not only to differentiate themselves from the competition and survive during the challenging times, but also to innovate and grow.

We also find a complementarity-in-use between advanced digital technologies - such as augmented and virtual reality and AI and machine learning - and *investment in R&D related to the environment*. Although the intensity of the synergetic effects is relatively low, this result is still very important because it showcases potential benefits and future development of digitally enabled eco-innovation in UK SMEs.

Paper link: https://www.enterpriseresearch.ac.uk/publications/twin-green-and-digital-transitions-joint-adoption-of-net-zero-and-digital-practices-by-uk-smes/

2.2. The net zero transition

While the global importance of the climate crisis is clear, the contribution which small firms can make to achieving net zero, and how this can be done, is less obvious. What changes should smaller firms prioritise? How can they calibrate their carbon footprint and progress towards net zero? Where can SMEs get external help with their net zero journey?

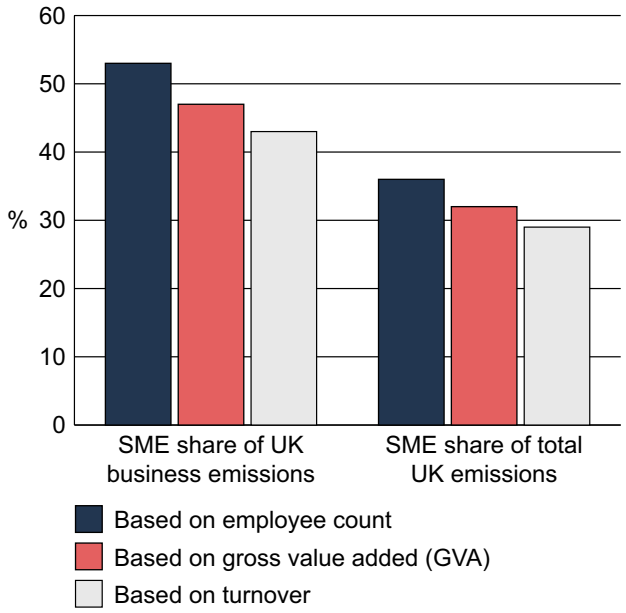
Studies conducted in 2021 by the OECD[19] and the British Business Bank[20] provide some guidance as well as giving us some useful insight into SMEs' attitudes towards the net zero transition. This is particularly significant as prior research has focussed most strongly on the environmental practices of large corporations and new start-ups, mainly because large firms, rather than SMEs, are the prime polluters. Large firms typically operate in carbon intensive industries[21] (ONS, 2019). Additionally, most of the research on SMEs has focused on new start-ups rather than existing SMEs, as start-ups are more likely to generate green product innovations (Hockerts and Wüstenhagen, 2010; Hofmann et al., 2012).

A landmark report published by the British Business Bank (BBB) in 2021 provides both secondary estimates of the contribution of SMEs to greenhouse gas emissions in the UK as well as survey-based insight on the net zero transition in SMEs[22]. Secondary analysis by ONS and BEIS, and included in the BBB report, suggests SMEs' estimated share of UK emissions (Figure 21). Although there is little direct evidence on the emissions from SMEs, estimates can be made based on sectoral emission estimates and the prevalence of smaller companies in each sector. The estimates derived vary somewhat depending on

19 https://www.oecd-ilibrary.org/energy/no-net-zero-without-smes_bab63915-en.
20 https://www.british-business-bank.co.uk/research/smaller-businesses-and-the-transition-to-net-zero/
21 The most GHG intensive industries in the UK are energy supply, agriculture, water supply, mining, transport, and manufacturing (ONS,2019).
22 See https://www.british-business-bank.co.uk/wp-content/uploads/2021/10/J0026_Net_Zero_Report_AW.pdf.

the basis used for the calculation but range from 43-53 per cent of business emissions and 29-36 per cent of all UK emissions. Both suggest the importance of SMEs in the net zero transition.

Figure 21. Estimated SME share of UK greenhouse gas emissions



Source: British Business Bank (2021), Figure 1.2.

So, how are smaller UK firms approaching the net zero transition? The BBB report outlines the results from a survey of around 1200 UK SMEs conducted in Summer 2021. The key findings were as follows:

- Most SMEs are at an early stage in their transition to net zero. Nearly 60 per cent of firms reported reasonable awareness of key net zero concepts, but around half (53%) are not yet ready to prioritise decarbonisation.
- The vast majority of SMEs (94%) have taken at least one physical action to reduce emissions, although they tend to be simpler, such as installing a smart meter, rather than more complex, such as introducing very-low-emissions vehicles.
- More than half (56%) of smaller businesses say they have taken no actions to improve their knowledge and capability.
- Costs were the most significant barrier to adopting net zero practices referenced by respondents (35%), with upfront costs being the most cited component of this at 21%. Feasibility (32%) was almost as frequently mentioned by respondents, with lack of control over actions (e.g. limitations due to tenancy arrangements or supply chain partners) emerging as a key driver of feasibility concerns.
- 11% of UK smaller businesses have already accessed external finance to support net zero actions. Twenty-two per cent say they are prepared to do so in the next five years.

The BBB report highlighted that small firms have varying levels of awareness and different degrees of engagement with the net zero transition, a process often started by taking one concrete step[23]. ERC research started in 2021 has explored the factors which drive the intensity of SMEs' engagement with net zero practices, asking what factors induce SMEs to introduce technological solutions and organisational changes to minimise their environmental impact (Box 2.3). This emphasises the importance of owner-managers personal values and attitudes towards net zero, as well as the importance of customer pressure.

Box 2.3. What drives the intensity of SMEs' engagement with net zero?

Based on an analysis of the ERC Business Futures Survey (2020) which covered over 1,000 UK SMEs, we examined the factors which encouraged firms to adopt net zero practices.

Interestingly, the results show that the intensity of the engagement of SMEs with the net zero transition is strongly driven by the individual attitudes of business owner-mangers towards the environment. This finding is consistent with other evidence which suggests that in the case of small firms, the beliefs, values and personal goals of entrepreneur have an important influence on business goals.

Customers' demand for more environmentally-friendly products and services complement these individual motivations in driving the intensity of net zero engagement of small firms. Other external and regulatory drivers, although important at the first step, do not appear to be significant in encouraging firms to engage more strongly with net zero practices.

Another perspective on this approach is to consider this in terms of how intrinsic (i.e. personal), extrinsic (i.e. firm), and external (i.e. market or regulatory) factors influence different aspects of SMEs' environmental orientation (Box 2.4). This suggests that personal motivations may be important in driving relatively low-cost organisational changes, but it is external drivers – related to market or regulatory changes – which prove more important in driving more costly technological interventions.

23 https://oecdcogito.blog/2021/11/02/what-can-smes-do-to-accelerate-their-journey-to-net-zero/

Box 2.4. Different motivations behind different net zero practices?
In follow-on research we used the ERC Business Futures survey 2020 data to explore the intrinsic, organisational and external motivations driving environmental practices of UK SMEs.

This analysis found important differences in what drives different environmental practices.

Thus, individual (intrinsic) pro-environment motivations of the business owner-manager drive the adoption of organisational practices (e.g. environmental reports and audits, market research on low carbon and environmental training) and switching to renewable energy. This suggests that pro-environmental attitudes drive relatively low cost and easy to implement practices, while more costly and potentially more disruptive technological solutions are mainly driven by other factors. These factors often relate to organisational and commercial considerations, such as cost reduction and improving image and reputation.

Customer demand for low carbon products and services comes out as one of the most important drivers of environmentally friendly behaviour across all organisational and technological practices except for air pollution monitoring and filtering.

Among other external factors, we find evidence that government grants and subsidies drive changes in production and distribution processes, but we do not find any statistically significant effect on other practices. Although further investigation is needed, this may be partly explained by lack of awareness by SMEs of available schemes and by burdens of the grant application process.

A central observation from the BBB, OECD and ERC studies is that firms' engagement with the net zero transition can be thought about in terms of the implementation – and the intensity of implementation – of net zero practices. Such practices may be organisational or technological, and adoption may be driven by intrinsic or external pressures and can be enabled by effective external advice and support.

If the UK is to achieve its net zero ambitions, the country's SMEs will need to make significant changes in business models and practices over the next decade. As with the digital transition, the journey towards net zero is likely to be long one for many SMEs, and they will have varying support needs at different stages in the process. In an ERC SOTA Review published this year (Blundel and Hampton, 2021a) assert that the increasing ambition from SMEs for action on environmental issues has 'exposed significant gaps in empirical evidence, which need to be filled in order to design and implement more effective SME-specific policy', and that the sheer scale of the net zero challenge demands new approaches. Another ERC SOTA Review published this year (Rebmann and Folmer, 2021) argued that SMEs can take inspiration from the variety of different ways that social enterprises alter their business models to improve their sustainability, particularly the challenges involved in balancing environmental as well as economic goals, gaining legitimacy and measuring impact.

Future analyses may also need to consider the potential for a firm level 'net zero readiness' metric or index[24]. In addition, as the BBB study illustrates, existing measures of SME emissions – particularly at firm level – are almost non-existent in any consistent way, a critical gap in SME statistics which makes progress towards net zero difficult to assess.

2.3. The productivity transition

In the UK, aggregate productivity has fallen behind comparator countries, and is currently around a fifth lower than Germany, France, and the US (BEIS, 2021). And, as noted earlier, productivity in SMEs is significantly lower than that in larger firms. Much of the policy discussion around the productivity puzzle in the UK centres on the 'long tail' of low performing firms, or the 'laggards', consisting mainly of SMEs. Not only is this long tail less productive, but it also achieves slower productivity growth than the group of high performing 'frontier' firms. This contributes to the productivity puzzle by reducing average productivity growth across the economy. It also emphasises the importance of achieving a productivity transition in the UK's SMEs. ERC research undertaken in 2020 explored what determines productivity growth 'behind the frontier' based on an analysis of accounts data and in-depth interviews with SMEs which were

24 KPMG have recently published a national Net Zero Readiness Index. See https://home.kpmg/xx/en/home/insights/2021/09/net-zero-readiness-index.html.

achieving high productivity growth. This analysis suggested little link between productivity growth and a range of observable characteristics – investment, ownership etc. – while the interviews suggested a strong link between productivity growth and aspects of management and leadership (Box 2.5).

In particular, the in-depth interviews with leaders of high productivity, high growth SMEs revealed that, irrespective of sectors, these SMEs were implementing effective leadership and management practices particularly in terms of people management, they were innovative and, reflecting the digital transition, they used data-driven operational management practices. Other ERC research has also considered each of these drivers of productivity upgrading.

Box 2.5. What drives productivity growth behind the frontier?

This paper explored the drivers of productivity growth in SMEs using a combination of accounting data and in-depth interviews. Examining accounting data for firms in twelve 4-digit SIC codes covering both manufacturing and services firms identified only weak links between firms' observable characteristics and subsequent productivity growth. Contrary to previous findings which show that the most productive firms in the economy- frontier firms - grow faster than other firms, we find no consistent relationship between firms' initial productivity level and subsequent productivity growth for SMEs who typically operate 'behind the frontier'. This finding is robust across twelve manufacturing and service sectors.

This focuses attention on unobservable organisational factors which we explore through interviews with a sample of high performing SMEs. Our qualitative analysis suggests several factors which characterise high performing SMEs: inspirational leadership, people management, data-driven operational management processes, strategic investments, and product, market and tactical innovation.

Paper link: https://www.enterpriseresearch.ac.uk/publications/what-drives-productivity-growth-behind-the-frontier-a-mixed-methods-investigation-into-uk-smes-research-paper-no-89/

There is clear evidence that operational management practices are linked to productivity and that SMEs lag larger firms in their implementation of management practices[25]. Earlier ERC research also highlighted the links between human resource management practices and SME performance (Hayton 2015, Peng et al. 2019).

The COVID-19 pandemic has brought other human resource management issues to the fore, particularly issues around the mental health and wellbeing (MH&W) of employees and the potential impacts of poor MH&W on productivity. Prior research points to a huge annual productivity cost to UK firms of workplace mental health issues of between £42bn and £45bn pre-pandemic, attributable to sickness absence, presenteeism and staff turnover (Deloitte, 2020). ERC research undertaken during 2021 suggested that many employers seem to be unaware of the extent and costs of poor MH&W on productivity and are not adopting positive MH&W practices (Box 2.6). A great deal of evidence suggests that one legacy of the COVID-19 pandemic will be a substantial increase in mental health issues, in existing and new sufferers. Addressing these issues will therefore be important to ensure that employees are able to play a part in enabling firms' productivity transition.

25 https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/managementpracticesingreatbritain/2016to2020#management-practices-by-firm-size-industry-and-region

Box 2.6. Exploring mental health and wellbeing practices during COVID-19

A second wave of the ERC's Workplace Mental Health & Wellbeing survey carried out in early 2021 sought to explore Midlands employers' experiences of workplace mental health issues during the COVID-19 pandemic. This followed an earlier wave of data collection pre-COVID-19 in early 2020. The 2021 survey found a complex picture when it came to mental health-related sickness absence. Although fewer firms reported mental health related absence compared to the previous year, those reporting it said that it accounted for a greater proportion of their sickness absence. Long-term mental health related absence was up, but repeated absence was down. Changed patterns of working during the COVID-19 crisis have undoubtedly influenced these findings. Although more than 50 per cent of firms in our study offered initiatives and activities aimed at supporting employee mental health and wellbeing, still only 27.2 percent of firms had a mental health plan, only 42.5 per cent had a senior level mental health lead and

only a quarter of firms had a mental health budget. These metrics were largely unchanged year-on-year. However, a third of firms reported having offered new initiatives in response to the COVID-19 crisis, and we identified several firm-level factors that are significantly associated with the adoption of mental health practices, ranging from firm size to employee diversity, the adoption of technology to aid performance, and the recording of reasons for mental health absence.

Paper link: https://www.enterpriseresearch.ac.uk/publications/workplace-mental-health-and-wellbeing-in-midlands-firms-before-and-during-the-covid-19-pandemic/

Another key driver of growth behind the frontier is innovation – the introduction of new or improved products or services. Innovation is vital for increased productivity, and indeed, slowing productivity over recent decades has been attributed to the slowing rate of UK innovation (Fernald, 2015).

R&D spending in the UK has been constantly below the OECD average during the 1990-2018 period, with transformative research also slowing (BEIS, 2021). There are well-established arguments, however, suggesting that firms tend to under-invest in R&D and innovation, a situation which may have been made worse by the impact of the pandemic. ERC research in 2021 considered the impacts of public support, through innovation of different types to firm productivity and growth. The results highlight the dynamics of the relationship between different types of innovation and firm performance and the importance of a medium to long-term perspective in evaluating the value of innovation-support schemes (Box 2.7).

Box 2.7. Pathways to productivity, pathways to growth

Innovation can take several forms relating to firms' products or services, business processes, operating routines and organisational structures, and each might be expected to have differential impacts on different dimensions of firm performance. In this study, we examine how different types of innovation affect firms' productivity (sales per employee) growth, sales growth and employment growth. Furthermore, public support for private innovation is often justified by firms' inability to estimate and appropriate the full rents from innovation due to the market failures linked to asymmetric information which exist. As an extension to our study, we consider whether the source of firms' R&D finance matters.

Results suggest that two years after innovation is measured product or service innovation has a significant positive relationship to employment growth and a significant negative effect on efficiency growth. However, process innovation raises both efficiency growth and sales growth and organisational innovation has a positive efficiency growth effect due to a negative employment effect. Over the longer term significant positive and negative growth effects are not sustained and some sign patterns change.

Paper link: https://www.enterpriseresearch.ac.uk/publications/pathways-to-efficiency-pathways-to-growth-evidence-from-the-uk-innovation-survey-research-paper-no-83/

The differential effects of each type of innovation on growth and efficiency inevitably reflect the diverse nature of the innovation itself and the strategic and market requirements for achieving either scale or operational efficiency. In strategic terms, this suggests the importance for firms of having a clear view of what they are trying to achieve through their innovation investments: in the short term, firms prioritising jobs growth should focus on product innovation; those seeking efficiency improvement should focus on organisational or process change. Firms also need to be aware that before generating longer-term performance benefits, innovation can cause short term disruption effects leading to a fall in both growth and efficiency.

Innovation also provides a key theme linking each element of the Triple Transition with digital technologies playing a key role in shaping innovation processes and outcomes and greener technologies providing the impetus for much new product and service development. Trade-offs may also be possible here, however, where innovation or investment priorities focus on producing more sustainable rather than higher productivity outcomes. These potential trade-offs may be more pressing in SMEs which are more resource constrained than larger firms.

A key question here is can a small firm contribute to the net zero agenda without compromising its performance? A recent ERC study explored these themes and considered whether the adoption of net zero practices created a trade-off with growth[26]. Using data from the ERC Business Futures survey 2020, the study provides early evidence that a small business can take environmentally friendly actions and grow at the same time. This creates a win-win situation where business objectives are compatible with environmental goals. Specifically, the data shows that SMEs that introduced *changes in production or distribution processes* to make them more efficient, invested in *R&D on environmental matters*, switched to *renewable energy* or introduced *pollution filtering* were more likely to grow. More easily implemented and less costly organisational changes such as undertaking *environmental reports and audits* and conducting *low carbon market research* were also found to be positively related to employment growth.

One explanation, confirmed by the evidence, is that increasingly environmentally aware consumers are demanding low carbon products and services. If business is up to the challenge of meeting this new demand - it will thrive. Customer demand emerges as one of the most potent driving forces encouraging businesses to adopt net zero practices along with the positive attitude towards the environment of business owners and managers. With a new breed of entrepreneurs starting out with green models and technologies, established entrepreneurs cannot afford to stand still. The challenge for established small businesses is to transform this threat into an opportunity.

2.4. Policy, place and the Triple Transition

The UK is marked by significant spatial disparities in productivity and wellbeing, the focus of policies related to 'Levelling Up'. Indeed, the UK today has amongst the highest interregional productivity disparities of any industrialised economy (McCann 2016, 2020).

ERC analysis has explored these local disparities focusing on productivity distributions within 38 Local Enterprise Partnership (LEP) areas in England and NUTS 2 level areas in Northern Ireland, Wales and Scotland. The results suggest that firm-level productivity distributions tend to be very similar in shape across areas. The implication is that productivity disparities are due primarily to the position of the distribution rather than the shape of the productivity distribution. In other words, areas such as London are more productive than the rest of the UK across the whole distribution of firms – the whole productivity distribution is shifted to the right.

Significant regional disparities also exist in carbon emissions. UK government statistics show that the UK's economically weaker regions exhibit the highest per capita carbon emissions (BEIS 2021). Reflecting their industrial mix, Wales, Northern Ireland, Yorkshire & Humber, and the East Midlands top the regional emissions league table. Wales currently has per capita emissions which are 137 percentage points higher than London and 72 percentage points higher than the South East, while those for Northern Ireland are 128 percentage points higher than London and 66 percentage points higher than the South East.

These disparities in productivity and emissions emphasise the spatial dimension of the Triple Transition, and the much greater level of adaptation that is needed in less prosperous areas of the UK. COVID-19 is likely to have exacerbated these differences too, as remote working practices have been more readily and easily adopted in the UK's more prosperous regions (OECD, 2020). Experience also suggests that the UK's less prosperous regions

26 See https://www.enterpriseresearch.ac.uk/publications/drivers-and-performance-outcomes-of-net-zero-practices-evidence-from-uk-smes/.

are less resilient – recover more slowly – to economic shocks than our more prosperous areas (Roper, 2020).

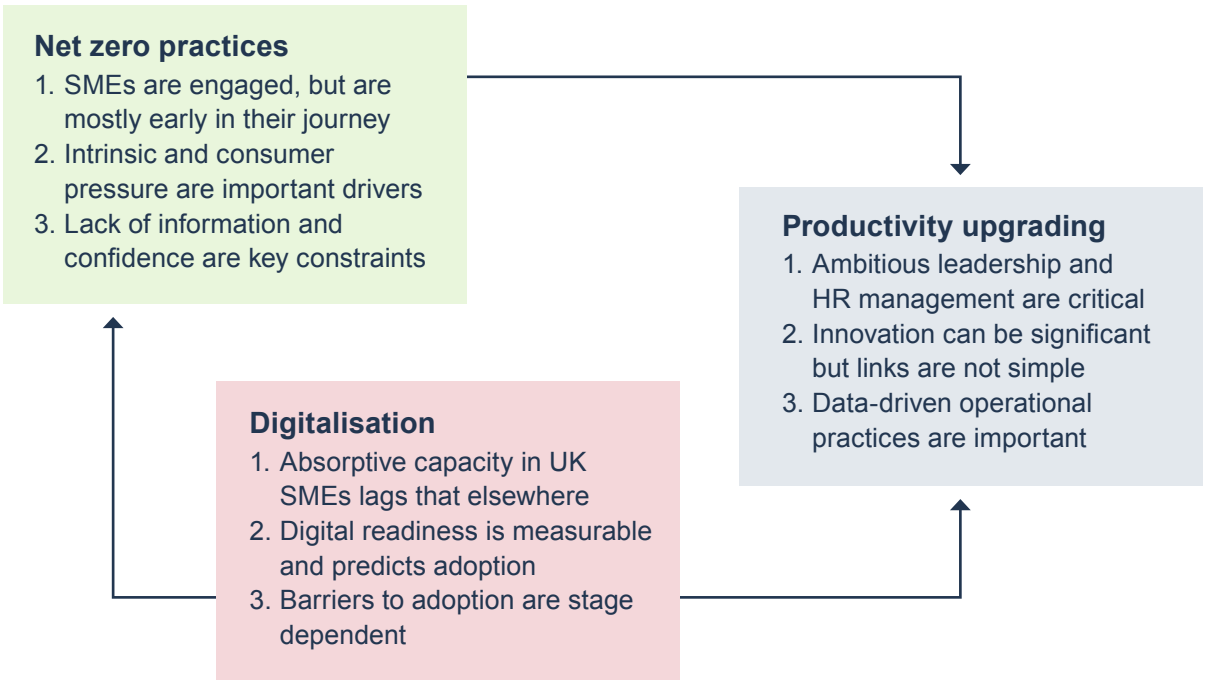
Other ERC research in 2021 has also suggested spatial differences in firms' approach to aspects of the Triple Transition, and the implications for resilience during the pandemic, as including research published by NICRE on rural-urban differences (and summarised earlier in Box 1.2). This work highlights significant differences between rural and urban firms when it comes to both the net zero and digitalisation aspects of the Triple Transition. Rural firms were more likely than urban firms to approach environmental issues positively, were more engaged with, and invested in, environmental practices, and were ahead when it comes to integrating environmental priorities into their business models. This suggests that firm location (e.g., urban or rural context) matters when it comes to the adoption of net zero practices. Policies that acknowledge this difference may allow rural firms to continue to lead the way on the adoption of net zero practices. However, rural firms are less likely to have a digital strategy, are more likely to feel that they lack the capabilities to introduce new technologies. They are also less likely to say that they keep up with the latest technologies than urban firms. Broadband capacity remains a major obstacle to digital adoption for some rural firms, a significant blockage on their Triple Transition path.

Social enterprises are increasingly playing a role in providing innovative solutions to local challenges and have the potential to address regional inequalities. The ERC published a set of SOTA Reviews this year in partnership with The Women's Organisation, which explored various aspects of social enterprise, including their contribution to the levelling up agenda. In his review Hazenburg (2021) argues that social enterprises 'have already had a significant impact on skills development and employment in the UK, and that this impact could be even greater given the right policy and funding environments'. And in another review Robinson (2021) argues that if a broader interpretation of economic development is taken that focuses on the creation of sustainable and inclusive economies 'social enterprises have the potential to enrich local economies and make a significant contribution to the left-behind regions, reducing regional inequality and thus have the potential to be a key driver of levelling-up'.

2.5. Policy to support the Triple Transition in SMEs

Recent research by ERC and others suggests a range of insights which can inform policy thinking in relation to the Triple Transition (Figure 22). Critical to this is also the increasing evidence of the role of digitalisation in supporting the net zero transition and the role of both the net zero and digital transition in supporting productivity upgrading.

Figure 22. Understanding the Triple Transition



While policies to promote leading-edge innovation are well established in the UK, policies to promote *digital* innovation are largely recent introductions - e.g., Made Smarter, Be the Business – and remain either localised or small-scale interventions. Help2Grow Digital announced in the 2021 budget is a more recent addition to this limited suite of policy interventions. Berlingieri et al. (2020) suggest the potential for a more comprehensive range of policy supports for digital diffusion comprising a combination of demand side and supply side measures (Figure 23). In this context, demand side measures focus on the adopters themselves, and here relevant interventions could include aspects of R&D support, data access and ICT infrastructure to support improvements in absorptive capacity along with measures designed to raise awareness of new technologies and help firms better understand their potential returns. On the supply-side, measures focus on the quality of the technologies on offer and their relevance to potential adopters. Both have the potential to accelerate digital adoption in UK SMEs enabling both the net zero and productivity transition.

Figure 23. Policies to support technology and knowledge diffusion

	Objectives	Instruments
Demand-side	Raising awareness about new technologies, their use and benefits	• Awareness raising schemes • Collaboration and networks • Labour mobility • Trade and GVC participation
	Developing firms' absorptive and investment capacity	• Education System • Training policies (especially for low-skilled) • Financial support • R&D support • ICT infrastructures • Data access
	Favouring positive return to adoption and reducing risks and uncertainties	• Competition policies • Entrepreneurship policies • Insolvency regimes • Normalisation and standardisation procedures • Addressing market failures (network effects, technological lock-in)
Supply-side	Fostering production and sharing of knowledge	• Public research • Science-industry linkages • Collaboration • Open innovation • Comprehesnihve strategies for the development of GPTs
	Enabling experimentation and bringing innovations to the market	• R&D support • Entrepreneurship policies • Financial support • IP system • ICT infrastructures • Data access • Test beds for regulatory sandboxes • Open innovation

Source: Berlingieri et al 2020, Table 6

Policy supports for the net zero transition – particularly policy supports relevant to SMEs – are less well developed internationally. However, OECD (2021) provides a useful overview of potential policy instruments which have or could be used to support the net zero transition in SMEs (Figure 24). Measures in the 'information-based instruments' category are likely to be of value at the initial stages of firms' net zero journey. This is likely to involve organisational changes rather than the more expensive technological net zero practices. Regulatory and financial incentives are likely to be more relevant to sustaining progress towards net zero and helping firms to finance the necessary investment. Both may of course also have implications for productivity upgrading.

Figure 24. Net zero policy instruments

Category of policy instruments	Specific policy levers
Regulatory tools	• Simplification of regulatory requirements for SMEs • Regulatory incentives for environmental managements system use • Sector-specific strategies for compliance assurance
Information-based instruments	• Advice to individual SMEs • Dissemination of information on compliance and good-practices • Eco-labels and recognition awards
Economic incenties and financial instruments	• Grants • Tax incentives and low interest rate loans • Green public procurement • Green investment funds • Green bonds • Green commercial mortgage backed securities

Box 2.8. COVID19, business support and SME productivity in the UK

ERC research examined how the government's COVID-19 emergency public support measures–– furlough funding and loan guarantees during the pandemic- have influenced firms' future investment intentions and employee wellbeing. Both provide an early indication of potential effects on future productivity. We use survey data from the SME Finance Monitor for 2020Q3 and 2020Q4 and the Health and Wellbeing Survey 2021, together covering around 12,000 firms. We estimate probit models, instrumenting for different combinations of policy instruments (furlough/loan, loan only, furlough only). Overall, we find widespread positive short-term impacts of the government support schemes on investment planning and smaller impacts on employee wellbeing. For example, firms which received a combination of Furlough and loans are 17.2 percentage points more likely to plan investments in capital equipment than firms with no pandemic support. The same group of firms are 9.2 percentage points more likely to report mental health absences and 9.9 percentage points less likely to report sickness absences. While it is still too early to draw firm conclusions about the impact of these programmes on productivity, our findings suggest they are contributing to more positive investment intentions and wellbeing, potentially sustaining or growing productivity and aiding recovery.

Paper link: https://www.enterpriseresearch.ac.uk/publications/covid-19-business-support-and-sme-productivity-in-the-uk/

In their ERC SOTA Review published this year, Blundel and Hampton argue that the pandemic has prompted a new discourse to emerge relating to resilience and survival, business purpose and values. The post COVID-19 recovery presents a unique opportunity to capitalise on this in the design and delivery of future net zero policy interventions.

The need for productivity upgrading in SMEs has been recognised in several recent policy measures designed to enhance leadership and management skills, such as the Small Business Leadership Programme and the Help to Grow: Management programme. Indeed, another piece of ERC research that utilised a Randomised Controlled Trail approach - the gold standard for evaluating the impact of government interventions - has found that similar management and leadership training programs (Business Boost) can be successful in changing the behaviour and attitudes of SME leaders in ways that can improve productivity.

The evidence also suggests that other COVID-19 support programmes introduced at the start of the pandemic: the furlough scheme and government backed loans (Coronavirus Business Interruption Loan Scheme (CBILS) and Bounce Back Loans (BBLs) may also impact positively on firm level productivity. A recent ERC study – conducted with support from the Productivity Institute[27] - explored how these schemes influenced firms' investment intentions and employee wellbeing. Both measures are well-established lead indicators for future productivity. Our findings show widespread positive impacts of the furlough scheme and government backed loans on both investment intentions and wellbeing, with some sectoral variation (Box 2.8). The implication is that the Government's emergency COVID-19 support programmes are working in ways that can sustain or grow productivity. This provides some good news for policymakers and for recipient businesses and their employees about potential impacts on productivity and subsequent recovery.

27 https://www.productivity.ac.uk/

3. Looking forward

In this report we have used insights from ERC research to highlight a range of ways in which the COVID-19 pandemic has continued to affect SMEs in the UK, and on the implications for what we call the Triple Transition. In this final section of the report, we look forward to some of the ERC research we have planned in 2022.

As we begin 2022, the challenges of the pandemic are still hitting many businesses in key sectors of the economy through increased absenteeism, and another perfect storm is brewing with the late payment issue impacting around a third of small businesses according to recent survey by the Federation of Small Business[28]. This is exacerbated by rising costs, and for those firms exporting, sales are constrained by full Brexit customs checks starting to bite.

The concept of the Triple Transition will be valuable for researchers and policymakers going forward in the development of national and local enterprise policy in the UK and internationally, contributing to rebuilding strength and resilience following the shock associated with the COVID-19 pandemic. It will remain a unifying focus for our research programme in 2022.

Previous research has shown that new and young firms are responsible for most of the job creation and innovation in a country and ultimately drive growth and prosperity. Entrepreneurship has also been proposed as a key route thorough which societies can combat sustainability challenges such as climate change and inequalities. Our research programme builds on these observations, while recognising that sustainable entrepreneurs tend to face greater challenges and perceive greater financial, administrative and information-based barriers to starting their ventures than regular entrepreneurs. Policy measures designed to support SMEs' moves towards net zero face similar complexity.

Where there are gaps in the existing data available on SMEs an important strand of ERC activity relates to conducting **new business surveys**. Much of the analysis reported in earlier sections of this report was based on our 2020 Business Futures Survey, the Survey of Mental Health and Productivity (2020 and 2021) and the NICRE State of Rural Enterprise Survey. During 2022 we plan further analysis of these surveys but also to repeat both the Business Futures and Mental Health and Productivity Survey. The 2022 Business Futures survey (2022q1) will provide more in-depth information on SMEs' net zero transition as well as focusing on SMEs' engagement with wider social and community. This reflects the focus of the SDGs and the wider role of small firms in supporting social and community coherence. The 2022 Mental Health and Productivity Survey (2022q1) will reflect the continuing impact of the COVID-19 pandemic on workforce wellbeing but also explore the impact of hybrid and homeworking on wellbeing and productivity.

The **net zero transition** will form a key focus of much ERC research during 2022. The Business Futures survey 2022 and related analysis will be part of this activity, but we also plan projects around the support eco-system for SMEs and how this can help SMEs overcome the informational and resource barriers to net zero. How effectively are public and private aspects of the business eco-system supporting the net zero transition in SMEs? How does this vary between localities, sectors and types of SME? How are SMEs planning to finance future low carbon investment? Other planned projects focus on the implementation of net zero practices within SMEs and the impact on growth, productivity and exporting. Our initial analysis suggests some complementarity, but this is a theme we plan explore further through 2022.

Productivity upgrading is also a key theme of our work in partnership with the ESRC funded Productivity Institute (TPI). Here, we are looking at the (potentially mutually reinforcing) relationships between novel innovation, exporting and productivity, and later in 2022 plan to link this to public funding for R&D and innovation. Other work in partnership with the TPI will explore the productivity implications of post-Brexit adjustments to import and export behaviour in SMEs. More broadly the theme of **trade and internationalisation of SMEs** will form a major focus of ERC research in 2022 and beyond with a focus initially on the impact of COVID-19 and future work on the impact of non-tariff barriers.

Another major theme for ERC through 2022 will be **spatial disparities in SME innovation, productivity and growth**. One aspect of this will be through ERC's partnership with researchers from Newcastle and

28 https://www.fsb.org.uk/resources-page/400-000-small-firms-threatened-by-late-payment-as-costs-surge-new-study-finds.html

Gloucester Universities and the Royal Agricultural University in the National Innovation Centre for Rural Enterprise (NICRE). NICRE projects in 2022 will focus on rural infrastructure and resilience, rural innovation and entrepreneurship and the dynamics of job creation and destruction in rural areas of the UK. Rural firms' financial responses to the COVID-19 pandemic will also be considered early in 2022.

Other ERC research will aim to support the effective implementation of **future support for R&D and innovation**. Related projects in 2022 will focus on IP use and innovation in smaller firms, the geography of IP use (and what determines it) and different aspects of supporting deep-tech commercialisation. Other projects – some in partnership with the Innovation Caucus[29] – will also consider the continuing impact of the COVID-19 pandemic on innovation and the business growth and productivity impacts of aspects of the UK's innovation support regime. These will involve both econometric analysis and longer-term follow-up of publicly supported projects based on a research approach known as 'follow the thing'.

We welcome any thoughts or comments you may have on our planned research topics and would be very happy to discuss any of projects with you in more detail.

29 https://innovationcaucus.co.uk/

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Annexes

All publications are available at https://www.enterpriseresearch.ac.uk/our-work/publications/

Annex 1. List of research papers and policy papers 2021

No.96 Digital readiness, Digital adoption and Digitalisation of UK SMEs Amidst the Covid-19 crisis
Anastasia Ri and Hoang Minh Luong, July 2021

No.95 Drivers and Performance Outcomes of Net Zero practices: Evidence from UK SMEs
Effie Kesidou and Anastasia Ri, June 2021

No.94 COVID-19, business support and SME productivity in the UK
Halima Jibril, Stephen Roper and Mark Hart, June 2021

No.93 Interactive adaption in 'mid-chain' firms: How are supply chains enabling digital and net zero transitions?
Halima Jibril, Stephen Roper, Maria Wishart and Carol Stanfield, May 2021

No.92 Exploring the micro-geography of innovation in England: Population density, accessibility and innovation revisited
Stephen Roper, March 2021

No.91'Taking back control': Developing Protected Food Names post-Brexit: What can we learn from GI use internationally?
Stephen Roper and Akunna Oledinma, February 2021

No.90 Understanding the role of IP protection in UK firms' growth, productivity and innovation 1998-2016: Patents, trademarks and registered designs reconsidered
Joanne Turner and Stephen Roper, January 2021

Annex 2. List of research reports 2021

Workplace Mental Health In Midlands Firms 2021: Baseline Report
Maria Wishart, Stephen Roper, Jane Bourke and Vicki Belt, September 2021

Benchmarking Local Innovation: The Innovation Geography of England 2016 -18
Stephen Roper and Karen Bonner, July 2021

Equality, diversity and inclusion in UK Foundation Industries- Summary Findings: Age and Gender
ERC, June 2021

The impact of Covid-19 pandemic on Northern Ireland SMEs: Evidence and comparison with the rest of the UK
Hoang Minh Luong, Lee Hopley and Nola Hewitt-Dundas, March 2021

Assessing the impact of Covid-19 on Innovate UK award holders Survey and case study evidence Wave 3–February 2021
Stephen Roper, Tim Vorley and Jen Nelles, March 2021

Innovation Readiness in UK Foundation Industries An ERC report for UKRI
Lee Hopley, Ian Drummond and Temitope Akinremi, February 2021

Assessing the impact of Covid-19 on Innovate UK award holders Survey and case-study evidence Wave 2 –October/November 2020
Stephen Roper, Tim Vorley and Jen Nelles, 2021

Annex 3. List of insight papers 2021

Twin Green and Digital Transitions: Joint adoption of net zero and digital practices by UK SMEs
Effie Kesidou and Anastasia Ri, October 2021

Assessing innovation spillovers from the public science system
Bettina Becker, Stephen Roper and Enrico Vanino, October 2021

Learning from the best: National innovation systems
Stephen Roper, September 2021

Eco-innovation and Green Start-ups: An Evidence Review
Richard Blundel and Sam Hampton, September 2021

The UK's business R&D workforce: skills, sector trends and future challenges
Vicki Belt, Anastasia Ri and Temitope Akinremi, September 2021

Workplace mental health and wellbeing in Midlands firms before and during the COVID-19 pandemic
Maria Wishart, Stephen Roper and Vicki Belt, June 2021

The impact of the COVID-19 pandemic on UK SMES and their response
Lee Hopley, February 2021

Annex 4. SOTA reviews 2021

No.53 Social enterprise and environmental sustainability
Emma Folmer and Anna Rebmann, October 2021

No.52 What can Social Enterprises contribute to the 'levelling up' agenda?
Catherine Robinson, September 2021

No.51 How Can SMEs Contribute to Net Zero?: An Evidence Review
Richard Blundel and Sam Hampton, July 2021

No.50 The role of social enterprise in developing skills and creating employment opportunities in the UK
Richard Hazenberg, April 2021

No.49 Building a creative work force: What is the current evidence on individual predictors of creative performance?
Tamara L. Friedrich, March 2021

No.48 Leading for Creativity and Innovation: A Review of the Current Evidence
Tamara L. Friedrich, March 2021

No.47 Diversity in R&D and Innovation
Lorna Treanor, February 2021

Annex 5. Blogs 2021

Pushing productivity to the top of a firm's agenda
Kevin Mole, December 2021

Income Protection for Micro-entrepreneurs Under COVID-19: Serving Neoliberal Interests or Small Traders?
Julia Rouse, November 2021

Building an inclusive human resource community: Insights from an action research study of ethnic minority microbusinesses
Monder Ram and Imelda McCarthy, November 2021

Are employers doing enough to support mental health in the workplace?
Maria Wishart, November 2021

What can SMEs do to accelerate their journey to Net Zero?
Mark Hart, Anastasia Ri and Effie Kesidou, November 2021

How Can SMEs Contribute to Net Zero?
Sam Hampton, July 2021

Helping firms along the right road?
Stephen Roper, June 2021

Is Declining Dynamism to blame for our Productivity woes?
Sam Dumitriu, April 2021

The end of the beginning, or the beginning of the end for UK trade?
Jun Du and George Feiger, March 2021

Innovating places
Stephen Roper, March 2021

Innovate short, innovate long
Stephen Roper, January 2021

Annex 6. Podcasts 2021

Episode 5: SMEs and Net Zero
ERC Director Professor Stephen Roper is joined by Dr Anastasia Ri, Research Fellow at the ERC; Jonathan Withey, Head of Business Development and Planet Mark; and Catherine Westoby, Senior Policy Adviser, Public Behaviour Change on Net Zero at the Department for Business, Energy and Industrial Strategy to discuss SMEs and the Net Zero challenge.

Episode 4: SMEs, COVID-19 and mental health
Vicki Belt is joined by Dr Maria Wishart, Research Fellow at the ERC; Dr Carla Toro, Associate Professor Behavioural and Wellbeing Sciences at the University of Warwick; Sean Russell, Co-Investigator of the Mental Health and Productivity Pilot, Coventry University; and Tara Sankar, HR and mental health lead at Tamworth-based SME, Crystal Specialist Finance.

Episode 3: Supporting innovative start-ups
Vicki Belt is joined by Stephen Roper, Director of the ERC, Jane Galsworthy, Managing Director of Oxford Innovation Services and Alex Toft, Head of Minerva Business Angels to discuss how to support innovative start-up businesses.

Episode 2: Local Growth and Levelling Up
Exploring Enterprise are Colin Bell, Business and Sector Growth Director, North East LEP, and Richard Jeffery, National Director of *Growth Company Business* **to** discuss local growth and 'levelling up', sharing their perspectives on what it means and the main challenges in achieving it in North East England and Manchester.

Episode 1: How have SMEs fared during the pandemic?
Lee Hopley is joined by Professor Stephen Roper, Director of the ERC, and Professor Mark Hart and Dr Vicki Belt, Deputy Directors at the ERC discussing the ERC's research into small and medium-sized enterprises, and particularly about what they have found out about how businesses have fared over the past year during the COVID-19 pandemic.

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