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Employers' Digital Practices at Work Survey

First Findings

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Executive summary

There is a growing trend towards deploying novel digital technologies such as machine learning and artificial intelligence powered tools and software. However, there are still significant gaps in our understanding of how employers in the United Kingdom adopt and use them.

This report provides a comprehensive analysis of an original, nationally representative survey of business establishments in the United Kingdom conducted between November 2021 and June 2022. The survey is a key output of the Economic and Social Research Council (ESRC) funded Digital Futures at Work Research Centre (Digit). The report covers: the extent of technology adoption by employers; the reasons for adopting digital technologies; employers' experiences of digital adoption; and the impact of such technologies on the organisation of work, job design, recruitment practices and employee relations.

Key messages

The survey offers both positive and concerning findings. Employer investment in digital technologies appeared to be positively associated with employment growth, future investment and employee involvement practices. However, only a minority of employers were 'digital adopters' with seemingly little appetite for future investment in AI. Employers' investment in skills and training also appeared to be low. If the UK economy is to shift its growth model towards some form of digital transformation, then addressing the emerging divide between digital adopters and non-adopters should be an urgent priority.

Investment in artificial intelligence and machine learning-enabled technologies

- **The use of traditional information and communication technologies was widespread,** with desktop computers, portable devices and smart phones ubiquitous. More than 90 per cent of employers reported that they used desktop computers. In contrast, more novel forms of ICT hardware, such as wearables, were much less common, adopted by around a fifth (22%) of employers.
- **Just over a third of employers had invested in AI-enabled technology in the past five years.** We label these 'digital adopters'. Cloud computing and the internet of things (IoT) were by far the most popular types of new digital technologies (79% and 59% of digital adopters invested in these technologies respectively). Investment in AI-enabled equipment and apps was much less frequent.
- **Digital adopters were more advanced than digital non-adopters in the use of traditional ICT technologies,** especially wearable devices and customer relations software.
- **Digital adoption was uneven. Firm size was significant;** one in two firms with more than 100 employees were digital adopters compared to around one in three among small enterprises (with less than 50 employees).

- **Industrial sector also mattered.** For instance, around two thirds of employers in Public Administration and Information and Communication had invested in digital technologies, while only 22 per cent of those in Accommodation and Food Service Activities and 30 per cent in Education had invested.
- **Improving efficiency, productivity and product and service quality were the main reasons for investment.** Digital technologies were mostly applied in the organisation of production or service delivery, and quality control and monitoring. Non-adopters typically identified their area of business activity, wider business risks and the nature of skills demanded as the key reasons for non-investment.
- **Digital adopters appeared to be very open to future investment.** Six in ten reported that they would invest further in digital technologies in the next two years. In stark contrast, just one in ten digital 'non-adopters' intended to invest in the next couple of years.
- **COVID-19 appears to have accelerated digital investment.** Seven in ten digital adopters cited the pandemic as a driver of increased investment in AI-enabled technology.
- These findings indicate **a tangible risk of a growing digital divide** in the UK economy where a significant proportion of UK employers could be left behind the digital transformation.

Employers' use of data analytics

- **A little less than 40 per cent of employers used data analytics.** Larger firms were more likely to use data analytics. Use of data analytics was more prominent amongst Financial and Insurance employers, Energy Suppliers, and Information and Communication employers.
- **Almost eight in ten organisations using data analytics reported increasing reliance on data in the past five years.** Two thirds of digital adopters

expect this trend to continue. Around half reported that the use of data analytics had increased since the COVID-19 pandemic.
- **Importantly, six in ten data analytics users indicated that employee records and job applications were key data sources.** Sales and performance records, transactions and customer feedback were the most widespread data sources.
- **Data analytics were most commonly used for marketing, finance, the organisation of production and customer relations.** In terms of human resources, over half of analytics users applied data analytics in performance assessment and slightly less than half used data analytics to allocate work and optimise working time. Just over a third of businesses deployed data analytics in recruitment and selection.
- **Cases of semi or fully autonomous algorithmic decision-making were rare.** Between one-fifth and a quarter of employers that used data analytics employed algorithms as decision-making tools in strategic management and human resources.
- **The main reasons for employers not having used data analytics included:** scepticism in the capacity of algorithms to solve real-life business problems; lack of skills; and the lack of a business case for using data analytics.

Staffing and human resource management practices

- **Employers had an overall positive employment outlook.** One in four reported increased staffing levels over the past five years, and one in six expected to grow in the near future. Adoption of digital technology was positively associated with reported increases in employment. There was no association between digital adoption and changes in working hours, past or future.

- **It was rare for employers to have trained all their staff in the previous 12 months.** Only six per cent of employers had put all of their employees through some formal digital skills training, although on-the-job training was reported by nearly a quarter of employers.
- **Digital adopters reported higher incidence of digital skills training.** The widest gap between digital adopters and non-adopters was in relation to informal, on-the-job-training. Around a third of adopters, compared to one fifth of non-adopters, relied on this type of training for the acquisition of digital skills.
- **Digital adopters reported mixed results in relation to employee autonomy and discretion.** Adoption of AI-enabled technology was associated with greater employee control over their working time and higher incidence of teamwork.
- **Digital adopters more frequently used algorithmic control over work organisation (three times more than non-adopters).** However, it should be noted that such an approach was relatively uncommon: just six per cent of digital adopters reported the use of algorithmic control. Digital adopters were more likely to use machines and algorithms to determine the pace of work.
- **Almost every third employer reported the use of customised software apps to monitor working hours and absenteeism.** Such apps were not associated with working time autonomy but showed a positive correlation with machine control over the pace of work and algorithmic control over work organisation.

- **Employee autonomy or control was largely linked to job type.** Employee control over working time was prevalent among managerial and professional occupations. Algorithmic control was more widespread in routine occupations.

Employee voice

- **Digital adopters were more likely to have negotiated or consulted with their employees across all key working practices.** This includes working time, pay, recruitment and selection, and the use of data, including data on employee performance.
- **Employers' decision-making structures were most likely to involve employees in relation to training and skills development.** Employee voice was least apparent around investment decisions related to new technology.

Introduction

Digital technologies are seen as essential for future business success, albeit with the potential to destroy a large number of jobs as human workers are replaced by automation and work processes undertaken by artificial intelligence. However, the consequences for the future workforce will be complex. This is the first nationally representative survey in the UK to provide systematic evidence of how employers perceive these changes.

The survey was conducted against a backdrop of increased interest in the potential impact of new digital technologies on the future of work. Such technologies are often portrayed as transformative, both in terms of their impact on business strategy and the future of work and employment. This report presents the first findings of the Employers' Digital Practices at Work (DPaW) survey. DPaW was funded by the Economic and Social Research Council (ESRC) as part of the core research programme of the Digital Futures at Work Research Centre (Digit). The findings draw from a representative sample of 2001 UK employers.

Existing data are often drawn from leading consultancy firms, based on surveys of their own members, and as a consequence are not representative. Nationally representative survey data in the UK is largely absent, and where it does exist it tends to rely on online consumer panels that do not precisely target key employer respondents.

The DPaW survey fills this evidence gap. Based on careful sampling, the survey offers the most original and authoritative portrait to date of employers' adoption and use of new digital technologies. The survey was designed to explore the different types of new technology utilised by employers. This included traditional information and communication technologies (ICT), data analytics and more advanced forms of artificial intelligence (AI) and machine learning-enabled technologies. Investment in new technology was then set against the context of employers' human resource management practices, with consideration given to patterns of employment, skills and training, work organisation and employee involvement and representation.

The report has seven sections. We begin with methodology, briefly detailing the sample design of the DPaW. The following three sections present the headline findings of employers' use of ICT, advanced digital technologies and data analytics. The report then explores employers' workforce staffing and human resource management practices. The final section presents some key conclusions.

Key findings suggest that levels of investment in advanced digital technologies have been relatively low, but that there is potentially a growing divide between the digital adopters and digital non-adopters. The evidence suggests that digital adopters were more likely to have been associated with employment growth. Digital adopters also reported higher levels of investment in training and skills and employee involvement practices. That said, reported levels of investment in training and skills were generally low even for digital adopters.

The data presented in this first findings report are descriptive and are designed to offer headline insights. A more in-depth treatment of the data will be forthcoming as part of the Digit book series. The dataset will be made available for the wider academic community following this.

Methodology

Sampling design

The sampling frame used for the DPaW survey was drawn from the Dunn and Bradstreet business directory (using the D-U-N-S code as a reference point). Complex sampling design with stratified sampling was employed using the intersection of industry (based on the Standard Industrial Classification) and firm size (organised in bands of organisations with 10-19, 20-49, 50-99, 100-249, and 250+ employees) as the primary sampling unit. The sampling frame covers all regions in England, plus Wales, Scotland and Northern Ireland. The sampling frame is representative of establishments with more than 10 employees, corresponding to more than 260,000 firms that employ over 23.7 million workers across the United Kingdom.

The survey was administered by OMB Research Ltd. and conducted between November 2021 and June 2022 using Computer Assisted Telephone Interviews (CATI). While at the time of data collection the UK economy had largely reopened after the COVID-19 restrictions, the practice of remote working was still widespread. On average, interviews lasted between 25 and 30 minutes. Most respondents were either general managers, managing directors or HR managers within their respective organisations.

The questionnaire was comprised of two main sections. The first section differentiated between different types of digital technologies, from well-established information and communication technologies (ICT), such as desktop computers and portable devices, to different types of software and customised apps, data analytics and various AI-powered digital technologies. In addition to establishing a representative image of the diffusion of these technologies and areas of business activity affected by their application, the rationale for investing or not investing in digital technologies was investigated. The second section included questions on various work practices, including aspects of job autonomy and control, training and skills, involvement in decision-making, pay determination, changes in employment and working hours, remote work and worker representation.

The sample consists of 2001 employers: 1501 responses were collected from the original stratified sampling frame; the remaining 500 responses were from large firms in industries with a higher probability of technology adoption (e.g. financial and insurance services, manufacturing). The latter allowed for a higher response rate from digital adopters and increases the power of inferential statistical analysis. For the presentation of this report, however, all findings are based on the full sample of 2001 employers, with the data weighted by the primary sampling unit. The proportion of 'don't know' responses was low - not exceeding ten per cent for any variable. Such responses were treated as missing data and are excluded from our presentation of key findings.

Sample structure

The survey targeted senior management with areas of responsibility for investment in digital technology and human resource management, including: general managers (34% of respondents), HR managers (14.6%), partners/ directors (13%) and other management roles.

The survey covered all regions in the United Kingdom, including the following regions with the highest share of respondents: the South East (15% of surveyed establishments), London

(nearly 12%); Yorkshire and Humberside (11%); and the South West (10%). Across the devolved administrations, 8 per cent of employers were located in Scotland, 5 per cent in Wales and 3.5 per cent from Northern Ireland.

Firm size was proxied by the number of workers employed: with firms employing less than 50 employees considered 'small'; between 50 and 249 employees considered 'medium'; and more than 250 employees categorised as large. Overall, eight in ten (85%) employers were small. Just over one tenth (13%) were medium-sized, while large businesses accounted for around two per cent of employers. In terms of sector, Wholesale and Retail Trade accounted for more than a quarter of employers (27%), followed by Accommodation and Food and Service Activities (14%), Professional, Scientific and Technical Activities (14%), Manufacturing (13%), and Human Health and Social Work Activities (10%). Sectors with fewer respondents included: Mining and Quarrying (0.01%); Electricity, Gas, Steam and Air Conditioning Supply (0.01%); Water Supply, Sewerage, Waste Management and Remediation Activities (0.5%); Public Administration and Defence; and Compulsory Social Security (0.04%).

The sample reflects the population of UK businesses, dominated by services industries and small and medium-sized enterprises. In terms of ownership status, 1 per cent of businesses were public sector organisations. Third sector organisations (e.g. charities or non-profits) made up 5 per cent of the sample. Most surveyed employers were private limited companies (83%) or public limited companies (6%), with partnerships accounting for nearly 3 per cent of the sample, and 1 per cent were sole traders.

Two thirds (67%) of all employers were a single site, independent business. Among businesses with several sites, more than three quarters (79%) were solely based in the UK. Two thirds (63%) of the sampled employer with several sites were the headquarters of the larger organisation.

More than 63 per cent of respondents employed all their employees on open-ended contracts, and mostly on a full-time basis. On average, around half of the workforce within the sampled organisations were women.

An important part of the sample's demographics was employers' distribution by the largest occupational group (LOG). A fifth (21%) of businesses identified skilled trade occupations as the largest occupational group, followed closely by sales and customer service occupations (20%). Businesses with professional occupations as the LOG accounted for 13 per cent of the sample, while around a tenth of respondents reported process, plant and machine operatives and drivers as the LOGs. The remaining occupational groups represented less than 10 per cent of the sample, including: associate professional and technical occupations (7%); administrative and secretarial occupation (5%); managers, directors and senior officials (5%); and routine occupations (2%).

Reporting conventions

Where differences are presented, these have been tested and are statistically significant at a 5 per cent level, unless otherwise stated.

1. Information and Communication Technology (ICT)

More traditional information and Communication Technologies (ICTs), like desktop computers, portable devices, and smartphones, have gained a strong foothold in UK workplaces. The report begins by presenting an overview of employers' use of these more established ICTs to offer a helpful contextual framework for the following sections that discuss the integration of AI-enabled technology and data analytics.

ICT is increasingly contrasted with novel, Artificial Intelligence enabled (AI-enabled) technologies, machine learning and data analytics that are at the centre of the so-called Fourth Industrial Revolution. Such technologies are assumed to bring about automation and interconnectivity at a scale not previously seen. However, representative quantitative evidence concerning the diffusion of these innovative forms of digital technology is still lacking.

While this lack of rigorous evidence is the key motivation behind the survey, the report begins with an overview of employers' use of more traditional forms of ICT to help provide a contextual background and a useful point of comparison for the subsequent sections covering the adoption of AI-enabled technology and data analytics.

1.1. Use of ICT hardware

Figure 1 shows the proportion of employees within sampled employers that use different types of ICT (including desktop computers, portable devices, smartphones and wearables) in their daily work tasks. The use of desktop computers was ubiquitous, reported by more than 90 per cent of respondents across the UK. For a quarter of employers (25%), almost all or all employees were using desktop computers. In every fifth organisation around half or more than half of employees used desktop computers in their day-to-day work. In four

in ten (44%), fewer than 50 per cent of employees used desktop computers.

The proportion of employees using portable devices, such as laptops and tablets was equally pervasive: 86 per cent of respondents reported that at least some employees used portable devices. For four out of ten employers the share of employees using these types of ICT was less than half. One fifth (21%) responded that almost all or all of their employees were using portable devices, while around one in ten stated that the share was around half or more than half, respectively.

Smartphones with capabilities beyond those of a general mobile phone were used by employees in around three quarters (72%) of employers, while in more than a fifth (23%), almost all or all employees were using smartphones.

Wearable devices, sensors, scanners and recording devices were less frequently employed, used by employees only in around a fifth (22%) of UK organisations. Of those, more than half stated that less than 50 per cent of employees used these technologies on a daily basis.

Only 1.5 per cent of employers did not use any of the four types of ICT, while 19 per cent used all of them.

Figure 2 displays the proportion of employers where at least some employees used different types of ICT

Fig 1 **Proportion of employees using different types of ICT (%)**

%

Legend:
- Almost all or all
- More than 50%
- Around 50%
- Less than half
- None

Desktop computers: None 8, Less than half 44, Around 50% 12, More than 50% 10, Almost all or all 25

Portable devices: None 14, Less than half 43, Around 50% 12, More than 50% 11, Almost all or all 21

Smartphones: None 28, Less than half 33, Around 50% 9, More than 50% 8, Almost all or all 23

Wearable devices and mobile sensors, scanners or recording devices: None 78, Less than half 16, Around 50% 3, More than 50% 2, Almost all or all 2

Source: all employers; n=2001

Fig 2 **Proportion of employers where at least some employees use ICT hardware (by size) (%)**

%

Legend:
- Small
- Medium
- Large

Desktop computers: Small 91, Medium 93, Large 98

Portable devices: Small 84, Medium 95, Large 98

Smartphones: Small 70, Medium 85, Large 89

Wearables: Small 20, Medium 33, Large 45

Source: all employers; n=2001
Note: small: 10-49 employees; medium: 50-249 employees; large: > 250 employees
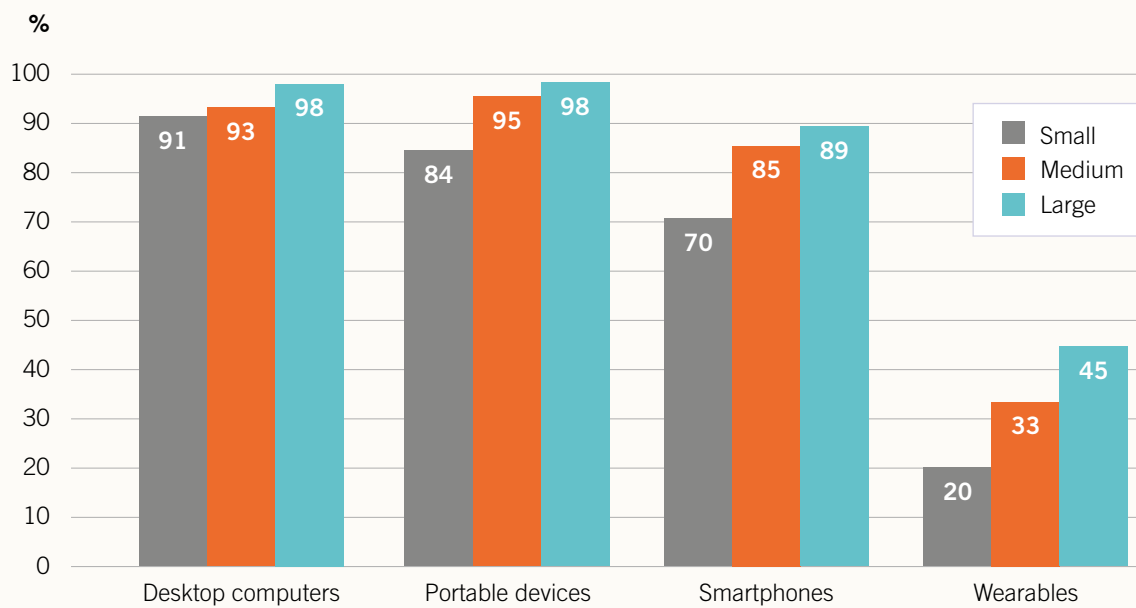
technologies, depending on the size of organisation (small, medium or large). The use of ICT hardware was positively associated with employer size. Notably, a higher proportion of large employers reported that at least some employees were using ICT devices on a daily basis compared to medium and smaller firms. Usage of ICT was most likely for desktop computers and portable devices, but least apparent for the implementation of wearables. Around two in ten small employers reported that at least some employees in their organisation used wearable devices, while this was the case for just under half (45%) of all large firms.

1.2. Use of ICT software

In addition to ICT devices, managers were asked about the use of different ICT-related software. The proportion of employers using four different types of software is illustrated in Figure 3 (right). The most commonly used ICT-related software applications were collaboration software and video conferencing software. Both were used by almost two thirds (63%) of employers. Slightly less than half (41%) used enterprise resource planning software and around a quarter (27%) used software for customer relationships. One sixth (16%) reported using none of the listed ICT-related software, while just over one tenth (12%) used all four types.

Mirroring the picture of ICT-devices above, there is a clear association between the use of ICT software and employer size, as depicted in Figure 4. For each type of software there was a positive association with employer size. Most notably, while close to nine in ten large employers used collaboration software, this was only the case for six in ten small organisations. Customer relationship software was the least used software across all business size categories. Only one quarter (26%) of small employers used this software, compared to just over one third (37%) of larger organisations. Overall, this implies that larger employers were not only more likely to be adopters of ICT technologies, but they were also more likely to use different types of ICT technologies in bundles.

Fig 3   **Employers' use of ICT-related software (%)**

%

Collaboration software	63
Enterprise respource planning software	41
Customer relationship software	27
Video conferencing software	63
None of the above	16
All of the above	12
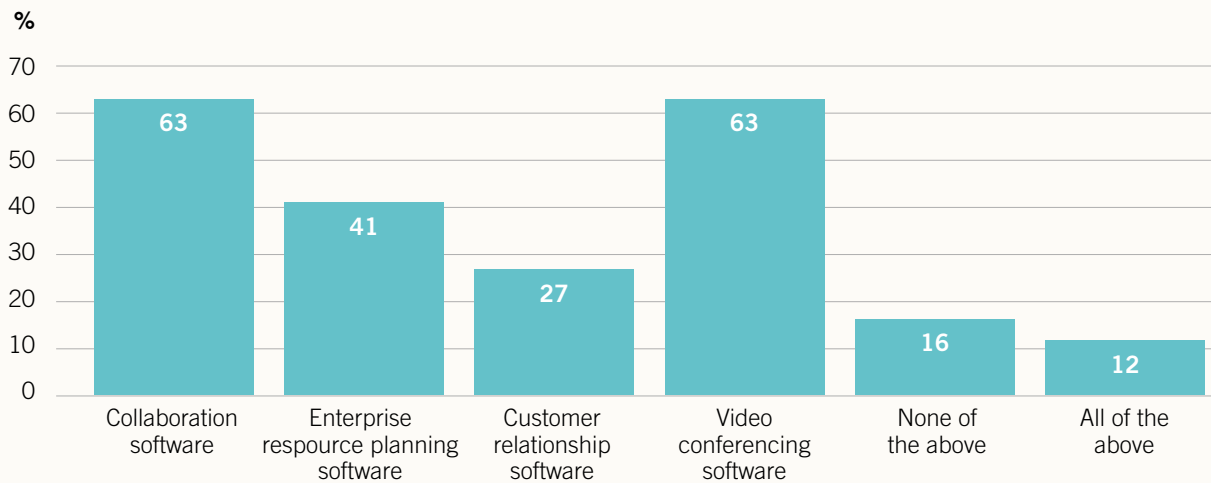
Source: all employers; n=2001

Fig 4   **Use of ICT software by employer size (%)**
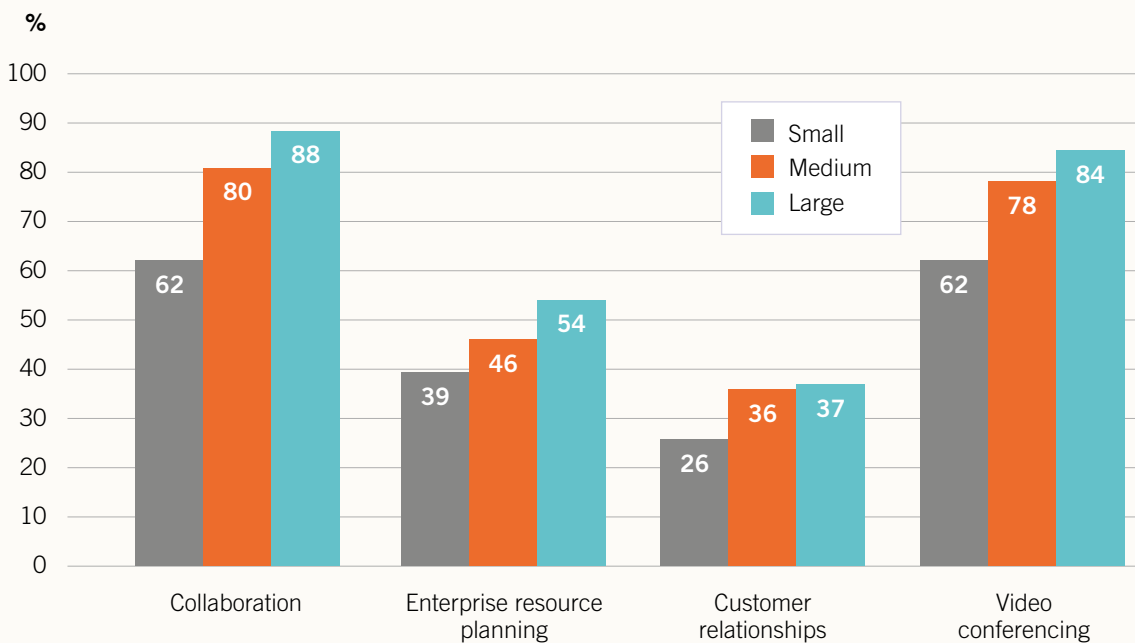
%

	Small	Medium	Large
Collaboration	62	80	88
Enterprise resource planning	39	46	54
Customer relationships	26	36	37
Video conferencing	62	78	84

Source: all employers; n=2001
Note: small: 10-49 employees; medium: 50-249 employees; large: > 250 employees
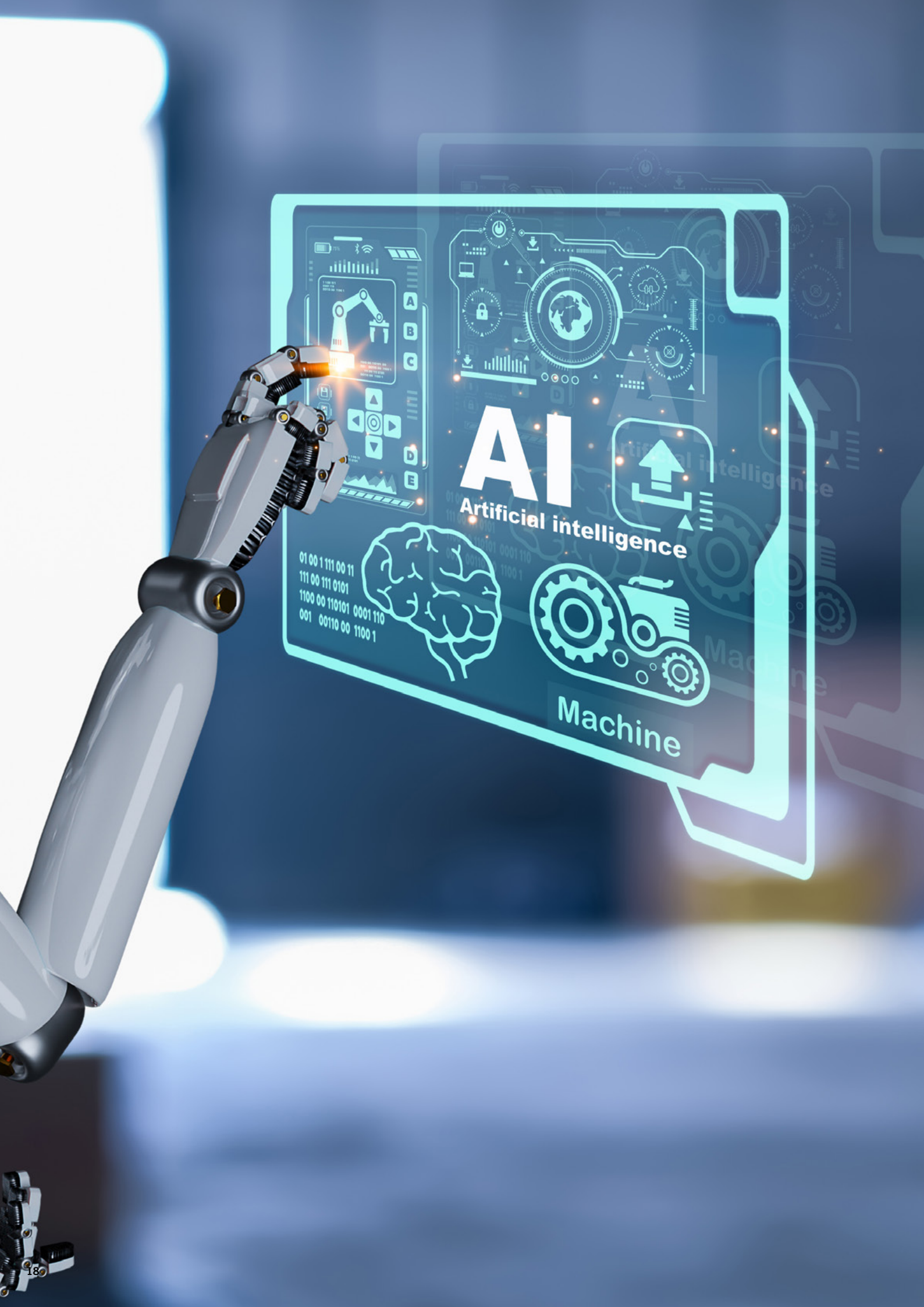
2. Employers' use of new digital technologies

One of the main objectives of the Digital Practices at Work survey was to establish a robust and representative picture of the dispersion of digital technologies across UK employers above and beyond the use of ICT. Findings reported in this section show that new digital technologies have not yet been widely adopted by UK employers and that there is a growing risk of polarisation between digital adopters and non-adopters.

This section focuses on employers' investment in artificial-intelligence and machine learning-enabled technologies that includes both software and equipment; for example, industrial robots, conversational bots and smart assistance, and novel communication technology such as cloud computing. This excludes routine upgrades of existing equipment, ICT and software packages, unless such upgrades were a part of previous investment in AI-enabled technology. Evidence in relation to the business activities affected by technology adoption, the reasons for investing or not investing, and the extent of change in the use of digital technologies are reported in this section.

2.1 Investments in new digital technologies

Respondents were asked, firstly, if they had invested in any of the following AI-enabled digital technologies in the five years prior to the survey referred to here as new digital technologies:

1. AI-enabled equipment including robots, drones, robot process automation, 3-D printing, biometric authentication.
2. AI-enabled applications and algorithms including content creation; natural language processes, image, text, voice recognition software; virtual reality; decision-making, marketing automation software.
3. Worker business support tools powered by AI such as diagnostic tools, visual assistants and chatbots.

4. Peer-to-peer networks such as blockchain and cryptocurrency.
5. Internet of Things, edge computing (devices connected though sensors or WIFI to store and share data).
6. Cloud computing (running communications remotely over the internet using commercial data centres).

Just over a third (36%) of all employers in the UK had made such investments. This suggests that the overwhelming majority of employers (nearly two thirds) had not invested in novel digital technologies. Based on these findings, we will from here on refer to those employers that had invested in AI-enabled digital technologies as 'digital adopters' and those that had not as 'digital non-adopters' or 'non-adopters'.

Nonetheless, as Figure 5 shows, there was considerable variation in the share of employers that had invested in digital technologies across industry sectors. While around two thirds of employers in Information and Communication and Public Administration (65% and 64% respectively) had invested in digital technologies, only 22 per cent of those in Accommodation and Food Service Activities and 30 per cent in Education had invested. Considering the very limited number of observations for some sectors, caution is needed in interpreting the shares for sectors such as Mining and Quarrying, Electricity, Gas, Steam and Air Condition Supply and Water Supply; Sewerage, Waste Management and Remediation Activities; and Public Administration.

Fig 5   **Investment in new digital technologies by Standard Industrial Classification (%)**

Sector	%
Information and Communication	65
Public Administration and Defence; Compulsory Social Security	64
Electricity, Gas, Steam and Air Conditioning Supply	59
Arts, Entertainment and Recreation	46
Agriculture, Forestry and Fishing	44
Professional, Scientific and Technical Activities	44
Real Estate Activities	43
Manufacturing	42
Mining and Quarrying	41
Administrative and Support Service Activities	40
Water Supply; Sewerage, Waste Management, and Remediation Activities	40
Financial and Insurance Activities	38
Human Health and Social Work Activities	37
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	35
Transportation and Storage	34
Other Service Activities	31
Construction	30
Education	30
Accommodation and Food Service Activities	22

Source: all employers; n=2001

Again, employer size mattered (see Figure 6). Digital adoption was less likely in small organisations compared to large organisations. Around half of all employers with more than 100 employees had invested in digital technologies, compared to less than four in ten employers with fewer than 100 employees.

Figure 7 explores the types of new digital technology employed by the digital adopters. Cloud computing (79%) and the internet of things (IoT)[1] (59%) were by far the most popular types of AI-enabled digital technologies. By contrast, very few employers (7%) were using peer-to-peer (P2P) networks such as blockchain. AI-enabled equipment, applications and algorithms, and worker/business support tools were each used by every fifth employer. This suggests that many types of AI-powered digital technology can still be seen as a niche tool across UK employers.

Only 14 businesses had invested in all six types of digital technologies. These 14 cases could be seen as digital leaders considering the breadth of new digital technologies they use. Three each of the 14 employers were in the Information and Communication sector, Professional, Scientific and Technical Activities and Wholesale and Retail sector, respectively. Three of these cases were located in London and another three in the West Midlands.

Figure 8 displays the proportion of employers that had invested in new digital technologies by ICT hardware usage, comparing employers where almost all or all employees used ICT devices with the rest of the sample. Unsurprisingly, the general use of ICT hardware was associated with investment in AI-enabled technology. The figure suggests a higher proportion of AI-technology adopters among firms where all or almost all employees used various types of ICT devices. Use of wearable devices was the most reliable indicator of investment in digital technology: 71 per cent of businesses where all or almost all employees routinely used wearable devices for work related tasks had invested in AI-enabled technology.

[1] In simple terms, the internet of things (IoT) refers to how devices, objects and applications can increasingly be connected to each other through networks, either through the internet or other forms of connection.

Fig 6 Investment in new digital technologies by employer size (%)

%

10-19	32
20-49	39
50-99	36
100-249	52
250-499	47
510-999	55
1000+	50
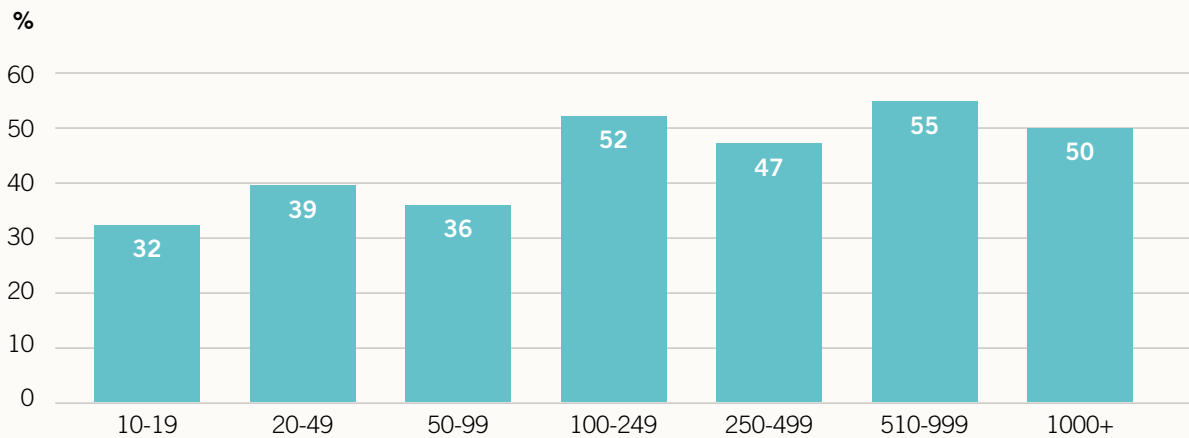
Source: all employers; n=2001

Fig 7 Type of new digital technology investment amongst digital adopters (%)

%

Cloud computing	79
IoT, edge computing	58
Worker and business support tools	22
AI-enabled equipment	21
Other digital technology	20
AI-enabled applications and algorithms	19
P2P networks such as blockchain	7
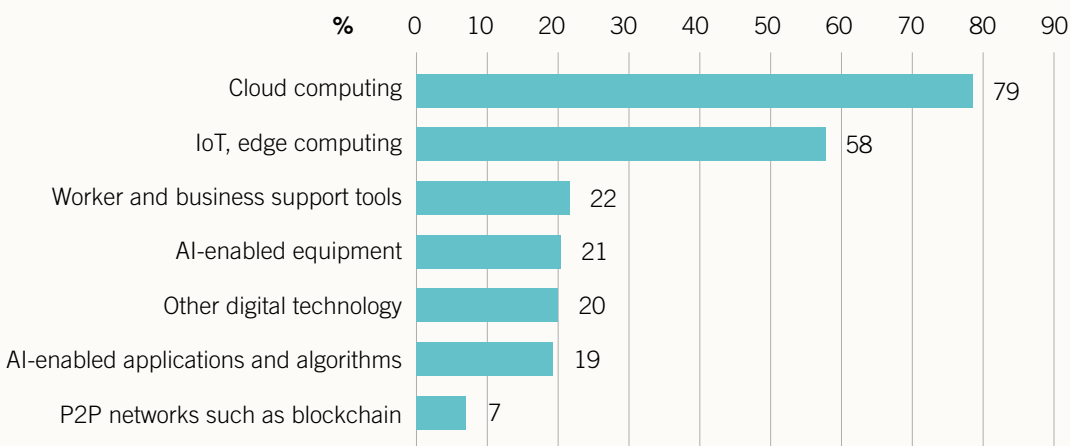
Source: digital adopters; n=790

Fig 8 Investment in new digital technology and use of ICT hardware (%)

%

Wearable devices	Half, some or none	37
	Almost all or all	71
Smartphones	Half, some or none	36
	Almost all or all	44
Portable devices	Half, some or none	34
	Almost all or all	51
Desktop	Half, some or none	34
	Almost all or all	50
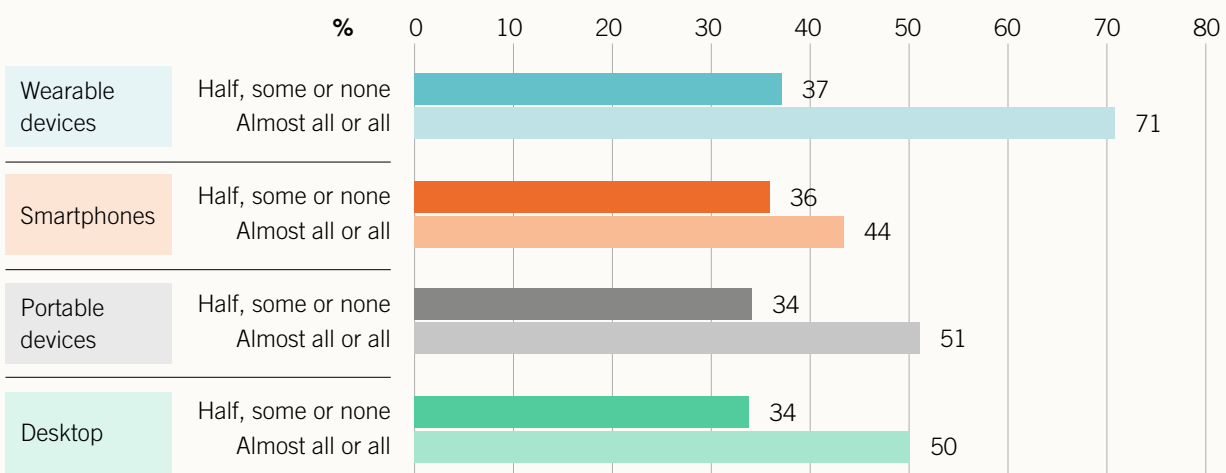
Source: all employers; n=2001

Fig 9   **Investment in new digital technology and use of ICT software (%)**

Category		% values
Video conferencing	No	26
	Yes	45
Customer relations	No	29
	Yes	61
Enterprise planning	No	33
	Yes	45
Collaboration software	No	27
	Yes	44
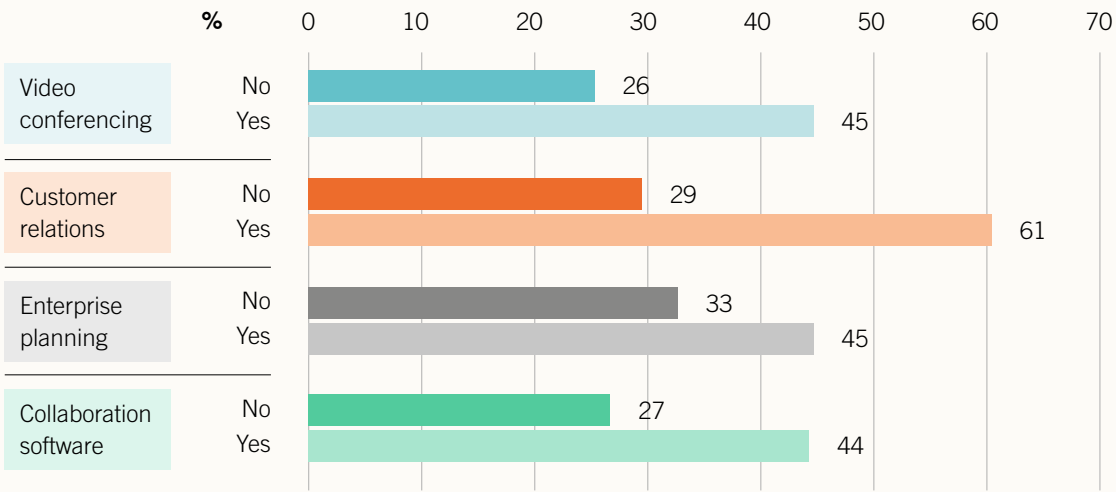
Source: all employers; n=2001

Fig 10   **Changes in the use of new digital technologies (%)**

Legend:
- Decreased
- Stayed the same
- Increased

	Decreased	Stayed the same	Increased
Past 5 years	0.3	11	89
Since the start of Covid 19	2.6	30	68
Planned for next 12-24 months	0.6	37	62
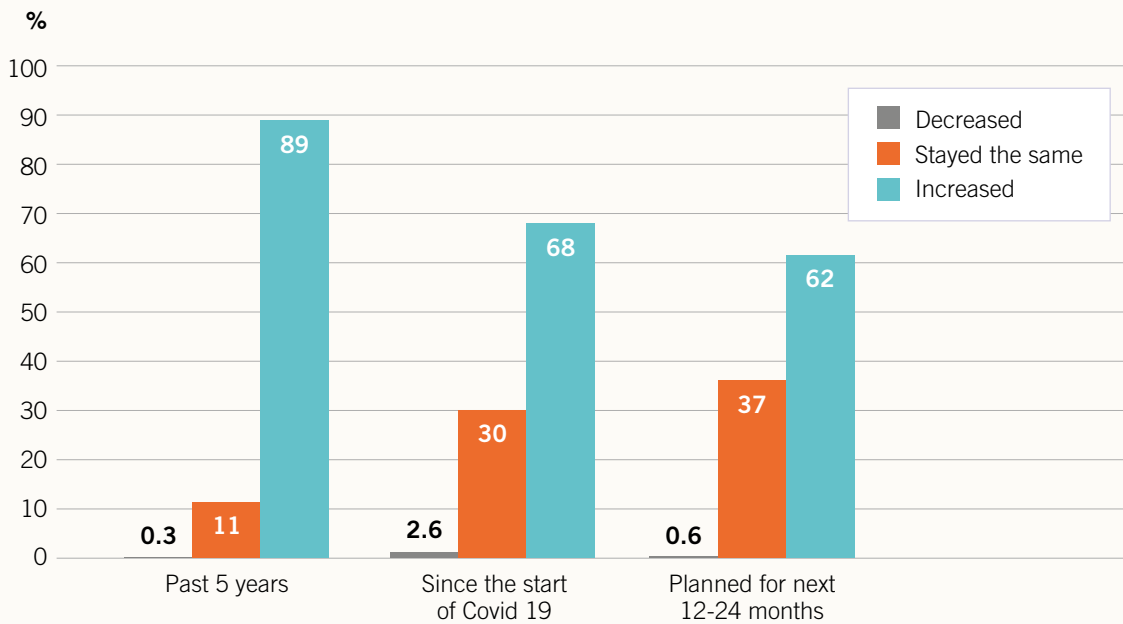
Source: digital adopters; n=790

As with ICT devices, ICT-related software was linked to investment in AI-enabled technology (see Figure 9). Employers that used various types of ICT software were generally more likely to have invested in AI-enabled technology, especially if such software packages were oriented towards customer relations (61% of employers using this type of software also invested in AI-enabled technology).

We also asked employers about changing use of digital technology over the past five years and about future plans for investment. Figure 10 displays the distribution of employers for changes in use: a) in the past 5 years; b) since the start of the COVID-19 pandemic; and c) planned for the next 12-24 months.

Nearly nine in ten (89%) employers reported that the use of digital technologies had increased in the past five years, with less than one per cent (0.3%) reporting it had decreased. The remaining tenth (11%) did not witness any change in the use of new digital technologies. Similarly, two thirds (68%) saw their use increase since the beginning of the COVID-19 pandemic. **This finding gives more substance to the widely spread claim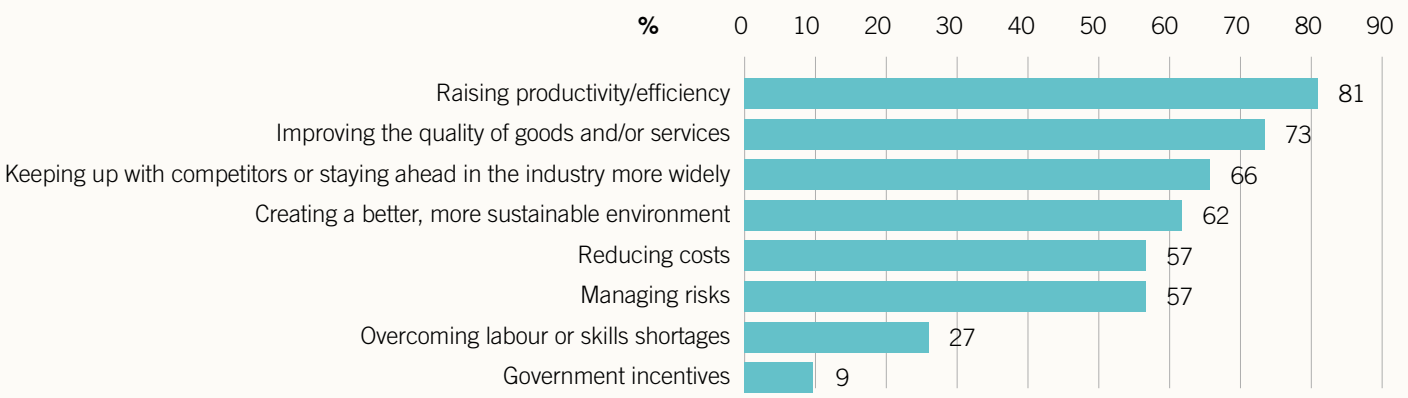 that the pandemic accelerated the use of digital technologies.** Slightly less than two thirds of organisations (62%) also expected to increase their use of new digital technologies in the coming two years, while

around a third anticipated their use to remain the same. Less than 1 per cent of respondents anticipated that the use of digital technologies would decline in the coming 12 to 24 months.

2.2. Reasons for investing in new digital technologies and their impact on business activities

An important consideration when examining the potential associations between digital technologies and work is management's reason for investing (Figure 11). The main reason for investing in new digital technologies was raising efficiency and productivity, reported by more than three quarters (81%) of respondents. Improving product and service quality was also important, reported by nearly three-quarters (73%) of employers. Keeping up with competitors (66%) and creating a better, more sustainable environment (62%) were also common reasons for investing. Using such technologies to help manage risks (57%) and reduce costs (57%) was also reported by a little over half the sample. Digital adoption was infrequently motivated by a need to overcome labour or skills shortages. Less than a quarter (27%) of employers saw this as a driver for investment. Finally, government initiatives and incentives were seen to have had little effect, with less than a tenth (9%) reporting this as a reason for digital adoption.

Fig 11   **Reasons for investing in new digital technologies (%)**

Reason	%
Raising productivity/efficiency	81
Improving the quality of goods and/or services	73
Keeping up with competitors or staying ahead in the industry more widely	66
Creating a better, more sustainable environment	62
Reducing costs	57
Managing risks	57
Overcoming labour or skills shortages	27
Government incentives	9

Source: digital adopters; n=790

Fig 12 Functional activity affected by new digital technologies (%)

Source: digital adopters; n=790

- Not affected at all
- Slightly affected
- Greatly affected
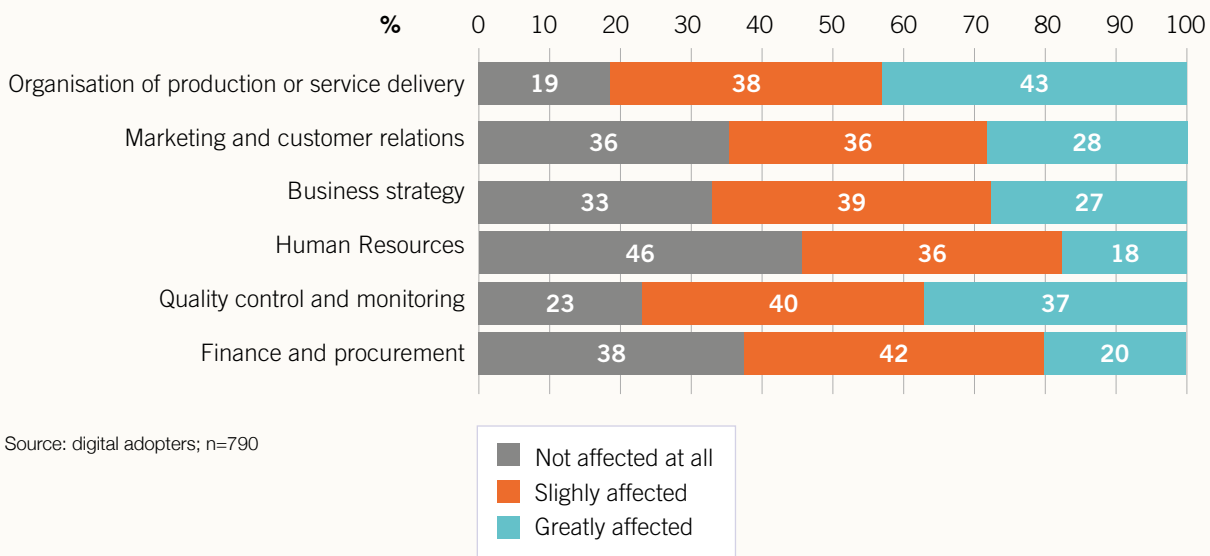
Among those who stated "other" reasons, there were several common themes, including: facilitating remote working; COVID-19; easier employee interaction and communication; information storage and access; improving security; and updating software and equipment.

How do the reasons for investing in new digital technologies translate into their application? This is considered with reference to different business functions. Figure 12 shows the business areas where the adoption of digital technology was most prevalent. The organisation of production or service delivery (81%) and quality control and monitoring (77%) were the most affected activities. This clearly resonates with the cited reasons for digital adoption, which highlighted the centrality of improving product and service delivery and improving productivity and efficiency.

Human resources was the organisational function least likely to have been affected by digital adoption. Although there was evidence of a slight (36%) or great impact (18%), this was less than for other functional activities. Thus, marketing and customer relations, business strategy and finance were more likely to have been impacted by digital adoption.

At this stage, the findings suggest that businesses in the UK had primarily invested in new digital technologies to enhance their performance by

improving products and services and to ensure more efficient operations and quality control.

2.3. Challenges when 'investing' and reasons for 'not investing' in new digital technologies

Half the digital adopters had encountered some challenges when implementing new digital technologies. Respondents were given an opportunity to detail such challenges. **The most frequently identified set of challenges appeared to be related to a lack of skills and the need to train staff in the use of such technologies.** Four in ten respondents reported that there was a lack of skills and a need for more staff training. Around ten per cent stated that poor or unstable internet connection or a lack of fast internet were a problem. A further ten per cent identified staff resistance, behaviour and reluctance in the applications of new technology as a challenge. The costs of implementing, running and training were mentioned by slightly less than five per cent of respondents. Other, less frequently encountered challenges related to technical issues, compatibility issues between different types of technology and software, the process of adapting to the new technology, the overall organisational change process and tailoring the new technology to the particular business needs.

As noted, most employers surveyed had not invested in new digital technologies in the past

five years. Given this, it is important to try to understand why they had not invested. Digital non-adopters were given an (open-ended) opportunity to explain their decision. Of the 520 managers that responded, 300 replied that there was simply no need for these types of new digital technologies. Of those that specified why there was no need, several reasons were repeatedly mentioned.

The first reason relates to the type of work or tasks that are performed. Respondents highlighted human interaction in care work and gastronomy, manual labour such as construction and the production of hand-made or bespoke products as not suited to these new digital technologies.

Second, employer size was a reason. Managers in small organisations often saw no business need for such new, advanced types of technologies. Related to this, the third most common reason for not investing was cost. One tenth reported that cost was an impediment, as investment in new technologies required levels of capital that, small businesses in particular, did not have.

Other reasons, mentioned by at least two respondents, were the COVID-19 pandemic, a lack of skills, higher management decision making, lack of leadership, lack of a technology suited to their business needs and a general aversion to technologies.

While this larger group of employers had not invested in digital technologies in the past five years, this does not mean, of course, that they will not invest in the future. It is therefore worthwhile to understand future investment plans. Intriguingly, few digital non-adopters intended investing in the near future. Just one tenth (10%) reported that they were planning to invest in AI technology in the coming two years. This finding stands in sharp contrast to the future minded intentions of digital adopters, of which almost two-thirds reported that their use of new digital technologies was likely to increase in the near future (see figure 10 above). **This suggests a growing polarisation between digital adopters and non-adopters.**

Other reasons for not investing included the COVID-19 pandemic and a lack of push factors that would motivate employers to invest in new digital technologies in the future. In a follow-up question, respondents were asked about examples of the AI-enabled technologies they were planning to invest in. The top two areas of anticipated change were automation of tasks and processes (23%) and cloud computing (13%).
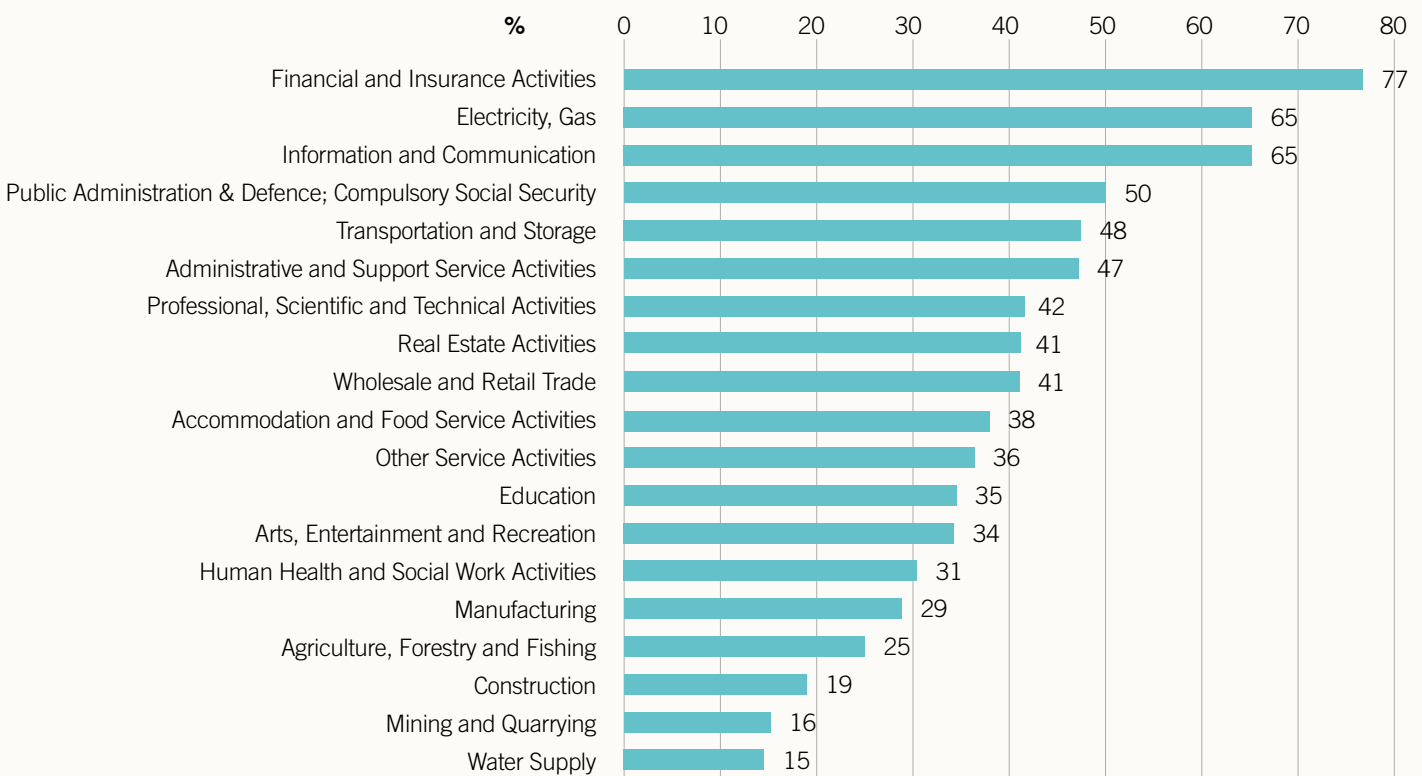
3. Employers' use of data analytics

Data analytics refers to the use of digital tools to analyse data collected by employers themselves or acquired externally. The survey found that just over a third of employers use data analytics, but its use is growing. Where analytics are used, there is very limited evidence of a tendency towards algorithmic decision-making in key areas of strategic management.

3.1. Use of data analytics

Over a third (38%) of employers used data analytics. As with investment in AI-enabled technology, employers' use of data analytics was uneven across different types of businesses. Figure 13 shows that well over half of financial and insurance firms, energy suppliers, and information and communication firms used data analytics. Less than half of all other employers reported the use of data analytics, while in construction, mining and quarrying and water supply organisations, less than 20 per cent utilised data analytics.

| **Fig 13** | **Use of data analytics by Standard Industrial Classification (%)** |

Source: all employers; n=2001

As with investment in AI-enabled technology, larger firms were considerably more likely to use data analytics (see figure 14 below).

Figures 15 and 16 explore the use of data analytics by the extent of ICT hardware and software usage. Similar to findings for AI-enabled technologies, employers' use of ICT devices is a reasonable proxy for use of data analytics. Over half of those employers where all or almost all employees used portable devices also utilised data analytics; while 71 per cent of employers that adopted the use of wearable devices employed data analytics. Likewise, the use of different types of ICT software was associated with the use of data analytics. This was most notable for the use of customer relations software, where more than six in ten employers (61%) that reported using customer relations software also reported that they used data analytics, compared to around three in ten (29%) that did not use such ICT software.
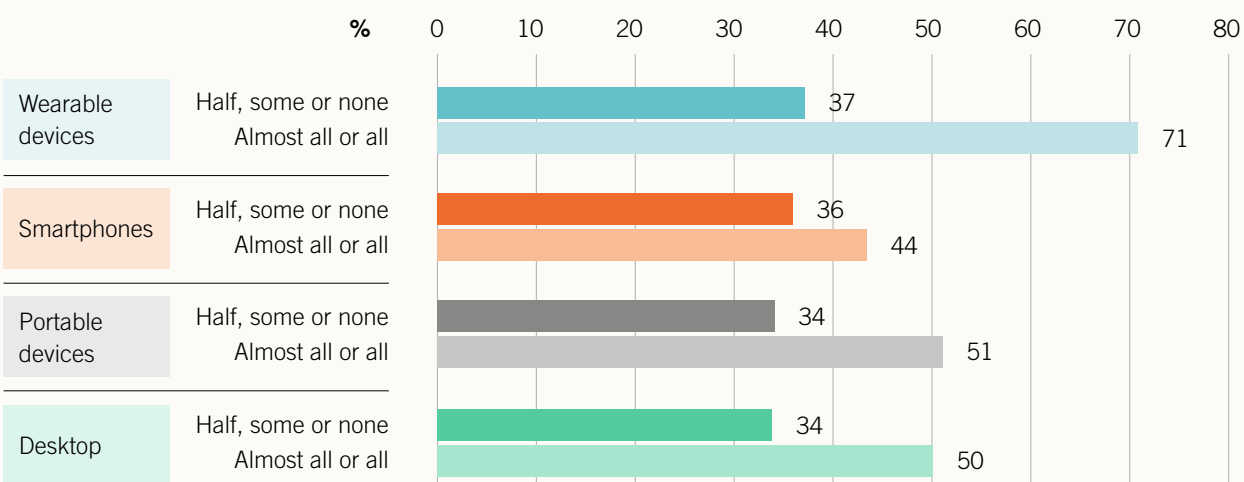
Retrospective questions were employed to understand how employers' use of data analytics had changed over time. The data reported below

Fig 14   Use of data analytics by employer size (%)
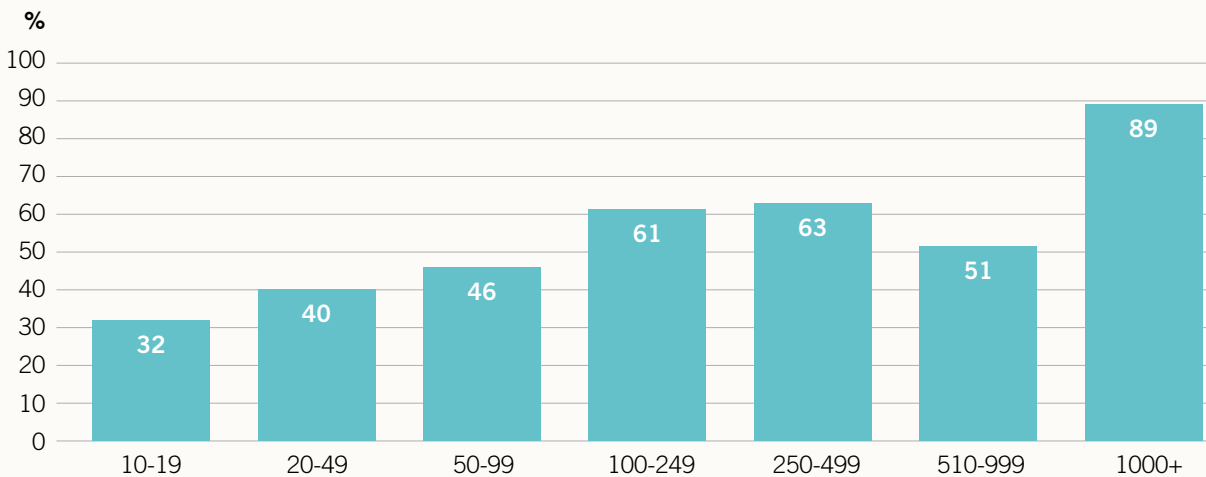
Source: all employers; n=2001

Fig 15   Data analytics and use of ICT hardware (%)

Source: all employers; n=2001

refer to the sub-sample of employers that used data analytics. Figure 17 presents employers' views on changes in the use of data analytics, with reference to changes: a) in the past 5 years; b) since the start of the COVID-19 pandemic; and c) anticipated in the next 12-24 months.

Just over three quarters of employers (78%) indicated that the use of data analytics had increased in the past five years, while slightly less than two thirds (66%) anticipated this trend to continue within the next two years. A considerably smaller proportion of employers reported an increase in the use of data analytics since the beginning of the Covid-19 pandemic (50%), with 45 per cent reporting that the pandemic had made no difference at all in the use of data analytics.

Fig 16   **Data analytics and use of ICT software (%)**
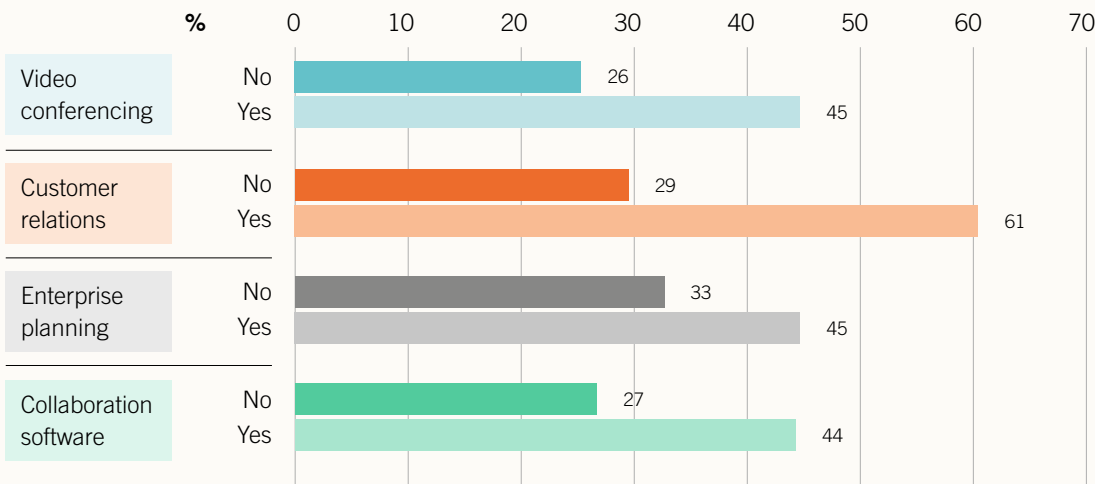
Source: all employers; n=2001

Fig 17   **Changes in the use of data analytics (%)**
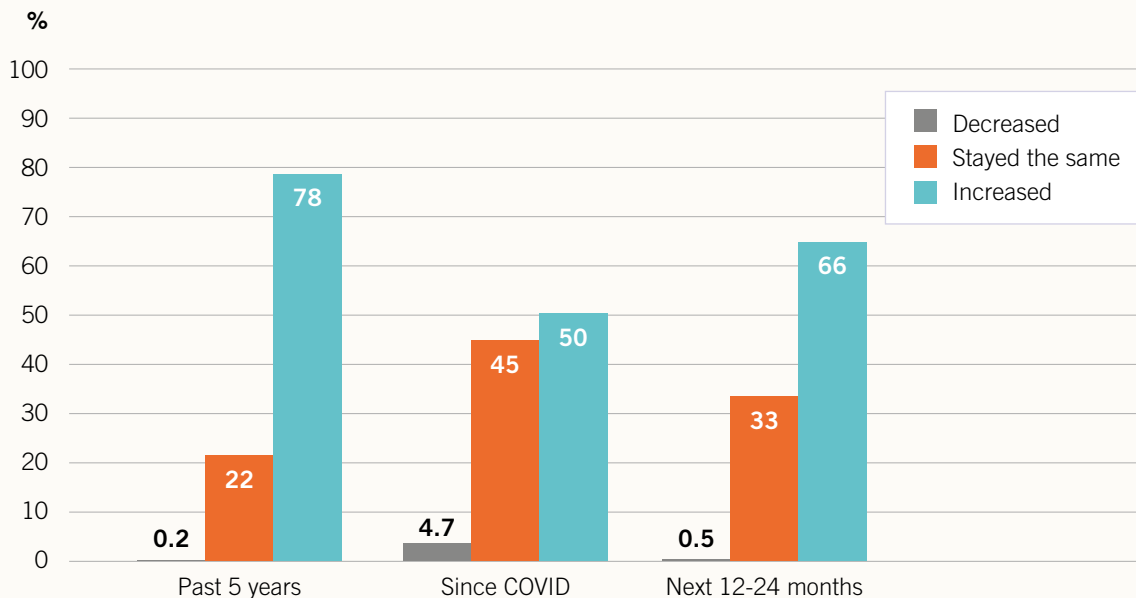
Source: data analytics users; n=860

Fig 18 **Types of data utilised by employers (%)**
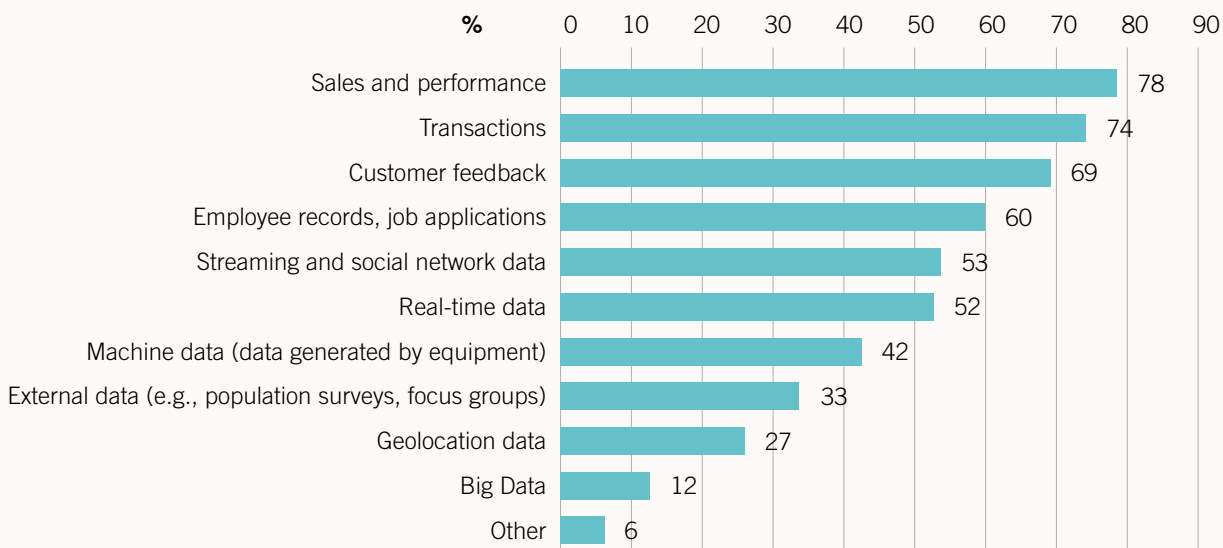
Source: data analytics users; n=860

3.2. Data sources and areas of business affected

Employers utilised data from various sources (Figure 18), with sales and performance, transactions, customer feedback and employee records being the most widely used data sources (between 70 and 80 per cent reported the use of such data sources). Big Data were mentioned by one in ten (12%) employers that reported using data analytics. More than eight in ten employers using data analytics managed it in-house; while about 13 per cent regularly outsourced data analytics services.

Important aspects of data analytics are the extent to which it affects decision-making and in what areas of organisational activity. Turning first to strategic management functions, Figure 19 reports the proportion of employers (focusing on the sub-sample of analytics users) across different strategic functions, from quality control, through marketing and risk assessment to the organisation of production. Finance was the most popular response (67%), followed by marketing (67%) and the organisation of production (59%). Over half of employers reported the use of data analytics in customer relations (58%) and for quality control (54%), with less than half using data analytics in risk assessment (46%) and in procurement (40%).

Employers were further asked as to how they used data analytics in strategic decision-making. A little more than eight in ten employers using analytics deployed it specifically to inform decision-making. Of note, slightly over one fifth of analytics users (22%) reported that data analytics was deployed to create decision-making algorithms (albeit not necessarily autonomous). This points to a nascent tendency towards algorithmic decision-making across the key areas of strategic management.

Figure 20 provides results on the use of data analytics across specific areas of the human resource management (HRM) function. Almost one in two (45%) employers that used data analytics did so to assist with core HRM activities, such as performance assessment (52%), working time optimisation (48%) and the allocation of work (47%). Data analytics was utilised at a slightly lower level (44%) for reward and recognition procedures. While there is increasing interest in the automation of recruitment and selection purposes, only a little over a third of data analytics users (37%) employed data analytics to assist their recruitment and selection processes.

Employers were then asked about the use of analytics in HR decision-making. A quarter of employers using data analytics in HRM applied algorithms as decision-making tools; three quarters used data analytics to inform managers in their decision-making.

3.3. Challenges and reasons for not using data analytics

Around three in ten employers that used data analytics reported that they faced challenges when implementing it. Again, employers were given the opportunity to identify and explain the challenges that they faced. The most common response related to skills and specifically that employers lack the necessary skills when implementing new data analytics capacity. Also frequently mentioned was the fact that implementing data analytics was time consuming and that employers often experienced difficulties accessing reliable data. The pandemic also seemed to have played an important role in deferring investment in data analytics. There were critical voices too, with some managers openly questioning the value of data analytics. As one participant put it:
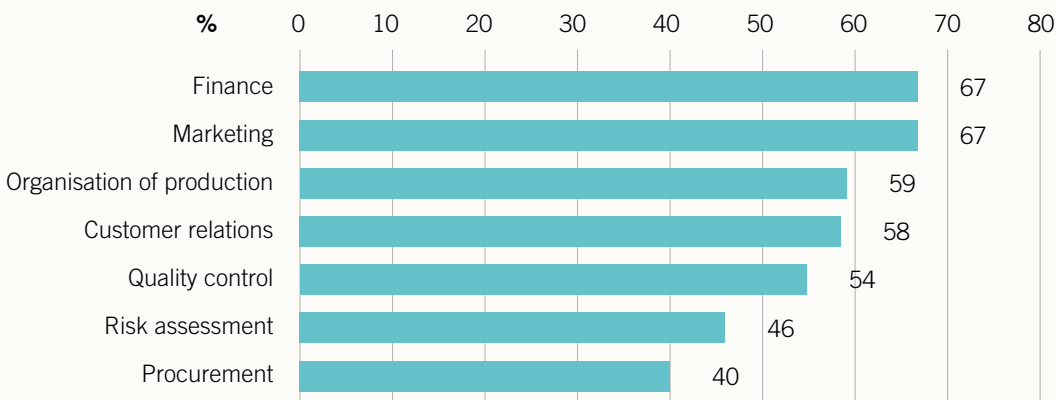
'I feel people make assumptions that the software can do things that it actually cannot. Expectations are too high, and it doesn't deliver'.

Another participant was even more dismissive, suggesting that: *'You cannot do analytics on a human'.*

Responses to the question as to why employers had not used data analytics were mixed. The most common theme related to the lack of need or understanding on the part of managers in terms of potential benefits of data analytics. "*Never needed to" and "What would we need it for?*", were popular answers - albeit some respondents indicated an overall intention to start using data analytics soon. Around 13 per cent of those not using data analytics planned to start using it in the next 12-24 months.

Ultimately, business reasons related to risk and perceived cost-effectiveness were the main reasons for not employing data analytics. As noted, some employers questioned the relevance and utility of data analytics. Others were not keen on changing their existing approach to decision-making that was perceived to have worked so far.

Fig 19 **Use of data analytics across strategic business functions (%, Yes)**

Function	%
Finance	67
Marketing	67
Organisation of production	59
Customer relations	58
Quality control	54
Risk assessment	46
Procurement	40

Source: data analytics users; n=860

Fig 20 **Use of data analytics in human resource management (%, Yes)**

Function	%
Performance assessment	52
Optimising working time	48
Allocation of work	47
Reward and recognition	44
Recruitment and selection	37
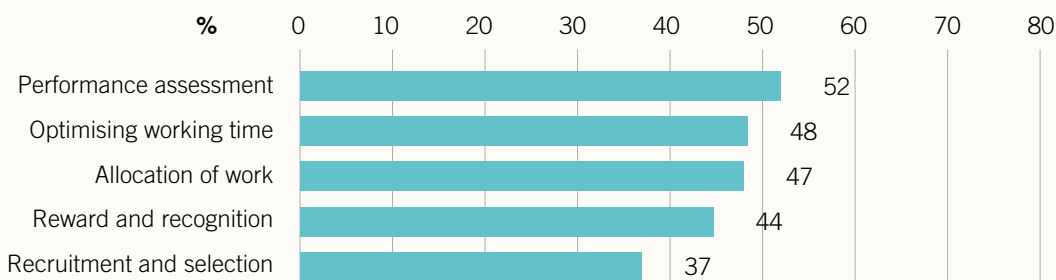
Source: data analytics users; n=860

4. Workforce staffing and human resource management practices

This section examines in more detail the human resource management practices of employers and presents some initial associations between digital investments, workforce staffing and work autonomy. The survey found limited evidence of systematic employer investment in digital skills training, despite reported difficulties in recruitment and retention.

4.1. Digital technology and employment

Employers generally presented a positive portrait in terms of changes in employment in the largest occupational group (LOG, the largest group of workes in an organisation based on the type of work they perform), both in terms of the recent past and their expectations for the future. This is shown in Table 1. Four in ten employers (40%) reported that employment had increased in the LOG in the five-year period prior to the survey. Employment had decreased in a little under a quarter of cases (23%).

The findings revealed a similar pattern in terms of projected change in employment in the LOG over the next five years. Just under six in ten (59%) employers reported that they anticipated a likely increase in employment amongst the LOG in the next five years, while just over a third (37%) anticipated no change. Very few employers anticipated that employment would decrease over the next few years. This is a somewhat surprising finding given predicted economic conditions in the coming years, but may be reflective of a more sanguine sentiment amongst employers at the time of the survey. The findings with regard to working hours appeared to be less significant. A large majority of employers reported no change in terms of working hours for the LOG, both in the previous five years and looking to the future. Less than one in five (17%) employers reported

that working hours had increased during the previous five years, while just over one tenth (11%) reported that working hours had decreased. For the vast majority of employers (72%), working hours had stayed the same. A similar pattern was evident for how working hours may change over the next five years. Around eight in ten (80%) employers predicted that working hours would remain the same.

The focus on the five years prior to the survey obscures, of course, the potential impact of the Covid-19 pandemic on employers. Employers were thus asked about the impact of the pandemic on their business, and whether this had been negative, positive or had no discernible consequence. The impact of Covid-19 was most demonstrable with regard to reported changes in employment; reported changes to working hours were more subtle.

A negative experience of Covid-19 was associated with a more pessimistic outlook. Among employers negatively affected by the pandemic, around a third (37%) reported a decrease in the number of employees in the past five years compared to 13 per cent and 11 per cent among those not affected or positively affected by Covid-19 respectively. To put these figures in context, less than half (47%) of employers reported a negative impact of Covid-19 on their organisation, compared to a quarter reporting a positive effect. Looking to

Table 1 **Actual and predicted changes to employment and working hours on LOG (%)**

	Previous five years		Next five years	
	Employment	Hours	Employment	Hours
Increase	40	17	59	13
No Change	37	72	37	80
Decrease	23	11	4	7

Source: all employers; n=2001

the future, there were less evident differences in terms of predicted changes to employment given employers' experiences during Covid-19 – anticipated increases in employment were nearly identical regardless of negative or positive experiences of Covid-19, with just over 60 per cent of employers anticipating an increase in staffing levels in the next five years.

There was no significant variation in the impact of the pandemic on employers' use of digital technologies: 44 per cent of digital adopters reported a negative effect of Covid-19 compared to 48 per cent of digital non-adopters. Similarly, half (50%) of the data analytics' users were negatively impacted by the pandemic as opposed to 45 per cent among non-users.

To summarise, where employers reported their experiences of Covid-19 had been positive in terms of business context, they were more likely to report positive changes in employment. Conversely, where the impact of Covid-19 had been negative, the reported change to employment was also likely to be more negative.

Fig 21 **Investment in new digital technology and employment outlook (%, increase(d) employment)**

%
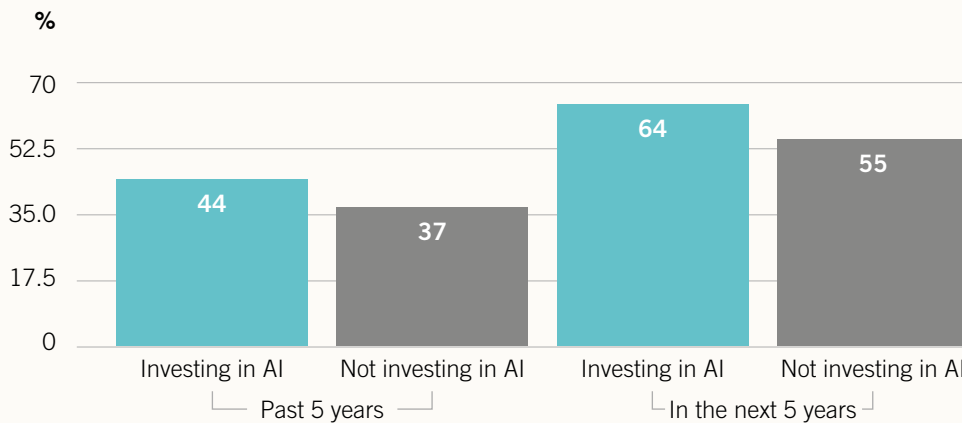
Source: Digital adopters, n=790; Non-adopters, n=1153

Fig 22 **Use of data analytics and employment outlook (%, increase(d) employment)**
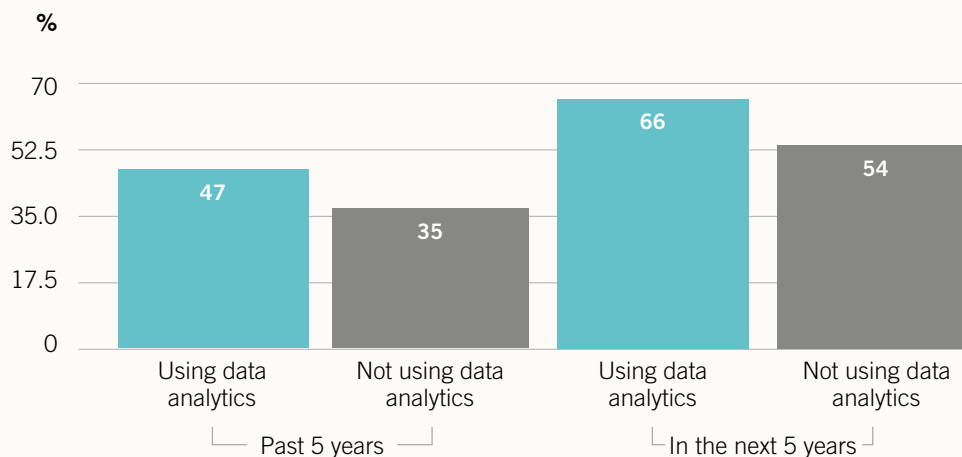
%

Source: using data analytics, n=860; not using data analytics, n=1013

There was some association between whether employers had invested in digital technology in the previous five years and their reports of changes in employment amongst the LOG. This is shown in Figure 21. **Just over four in ten digital adopters (44%) reported having increased employment amongst the LOG in the previous five years, compared to a little over a third (37%) of digital non-adopters.**

Turning to the future, slightly less than two thirds (64%) of digital adopters anticipated employment in their LOG would increase in the next five years, compared to just over half (55%) of digital non-adopters. Similarly, close to half (47%) of employers using data analytics

reported an increase in staffing levels in the previous five years compared to one in three (35%) among those not using data analytics. The same pattern is reflected in employers' assessment of future employment (see Figure 22).

In summary, then, when asked about historical changes in employment amongst their LOG, employers were generally positive and appeared particularly sanguine about the potential for employment growth over the next five years. This pattern was more pronounced in organisations that were less affected by the Covid-19 pandemic and among those that had invested more in digital technologies.

4.2. Digital technology, training and skills

This section considers training and skills issues, with consideration of the type of training investments made by employers, their anticipated skills needs and the difficulties they faced in terms of recruiting and retaining staff with appropriate skills. Table 2 details the proportion of employees within organisations that had received digital skills training in the 12 months prior to the survey, depending on whether the training was received through some formal means of instruction, such as classes, or on-the-job training.

It was rare for employers to have trained all of their staff in the previous 12 months. The proportion of employers that had put all of their employees through some formal digital skills training was slightly above seven per cent. On-the-job training for all employees was more extensively reported by nearly a quarter of employers (24%). A little less than half (47%) of employers had undertaken on-the-job training of some employees, while one in three (35%)

employers had some of their employees formally trained. **The most common response for nearly six tenths of employers (58%) was that none of their employees had received formal digital skills training in the past 12 months.**

There were no notable differences in reported levels of digital skills training by whether employers were private, public or third sector organisations. There were, however, differences in the level of training by specific industrial sector. The formal training of all employees in digital skills in the past 12 months was most likely in public administration, electricity, information and communications, and financial and insurance activities.

Digital skills training – both formal and on-the-job – was associated with investment in digital technology. For example, as displayed in Figure 23, ten per cent of digital adopters reported that all of their employees had received formal digital training sessions in the past 12 months compared to just four per cent of digital non-adopters.

Table 2 **Proportion of employees receiving digital skills training in past 12 months (%)**

	Formal training	On-the-job
All employees	7	24
Some	35	47
None at all	58	28

Source: all employers; n=2001

Fig 23 **All employees receiving digital skills training by investment in new digital technologies (%)**
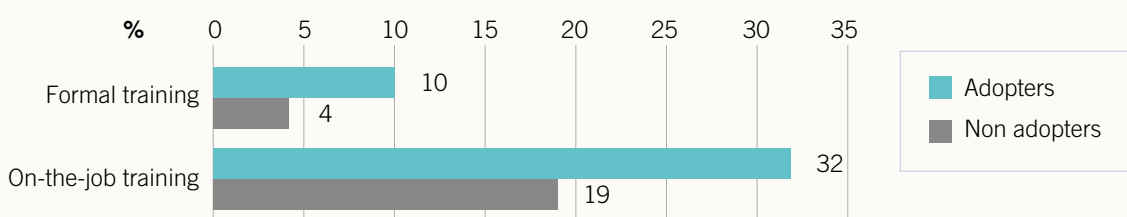
Source: Digital adopters, n=790; Non-adopters, n=1153

Table 3   **Skills requiring investment in the next 12-24 months (%)**

	Basic IT skills	Advanced IT skills	Data analytics
Lot of investment	6	5	4
Some investment	56	28	32
No investment	38	67	66

Source: all employers; n=2001

The gap between digital adopters and non-adopters was considerably wider in relation to informal, on-the-job training: every third digital adopter reported on-the-job training for all employees in the LOG compared to every fifth non-adopter.

An important issue in the contemporary economy, and one that employers highlighted as a key challenge in section 1, is the extent to which employers have employees with the requisite skills to facilitate the adoption of new digital technologies. This is explored in Table 3, which looks at investments in specific types of skills – basic IT skills, advanced IT skills and data analytic skills - which employers consider will be needed in the next couple of years. The most notable finding is the relatively low levels of anticipated investment that employers reported will be required in the next 12-24 months. **Less than ten per cent of employers reported that they will need to make a lot of investment in digital skills in the coming years.**
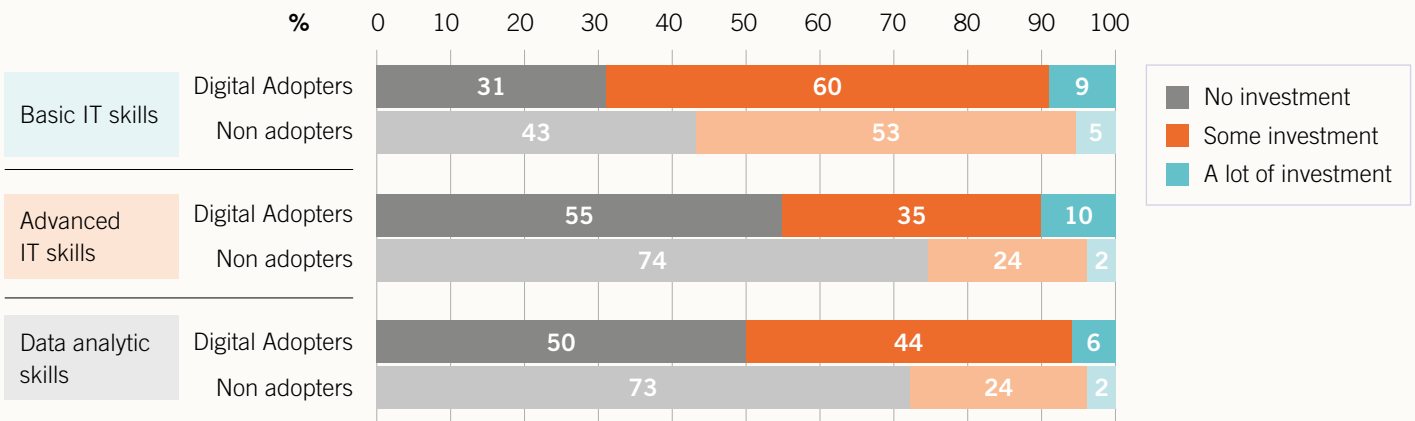
Where employers reported that skills investments were needed, they were most likely to respond that some, rather than a lot, of investment was required. Investment in basic IT skills was the most commonly identified area of need, cited by more than half (56%) of employers, followed by data analytics skills by slightly less than a third of employers (32%). Around three in ten employers (28%) reported that some investment was needed in advanced IT skills.

Sectorally, anticipated levels of investment were highest in the information and communications sector. Of those employers in the information and communications sector, nearly a quarter reported that there was a need for a lot of investment in advanced skills; just over ten per cent noted that a lot of investment was needed in data analytics.

Investment in digital technologies was associated with the need for digital upskilling (see figure 24 below). Although, again, the proportions for "a lot of investment" were rather low for each type of digital skill, digital adopters were significantly more likely to respond that at least some investment in digital skills will be required – for example, six per cent of digital adopters believed there was a need for data analytics skills compared to 2 per cent of non-adopters.

Given the relatively low perceived need for a lot of investment in digital skills in the near future, it may well be that employers could either recruit relatively un-problematically on the external labour market or else already had all the skills they required amongst their existing workforce. Figure 25 considers this with reference to the extent to which employers experienced difficulties in the recruitment and retention of employees with required skills. Generally, employers did experience some difficulties in finding employees with the required skills: more than three quarters found recruiting the required skills either fairly or very difficult. A third (34%) of employers claimed they found it very difficult to find employees with the required skills as opposed to only seven per cent who found it very difficult to retain employees.

Fig 24

Fig 24 **Skills requiring investment and investment in new digital technologies (%)**

		No investment	Some investment	A lot of investment
Basic IT skills	Digital Adopters	31	60	9
	Non adopters	43	53	5
Advanced IT skills	Digital Adopters	55	35	10
	Non adopters	74	24	2
Data analytic skills	Digital Adopters	50	44	6
	Non adopters	73	24	2

Source: Digital adopters, n=790; Non-adopters, n=1153

Fig 25 **Difficulties in recruitment and retention (%)**

	Not at all difficult	Not very difficult	Fairly difficult	Very difficult
Find employee with required skills	8	15	43	34
Retain employees	33	38	22	7
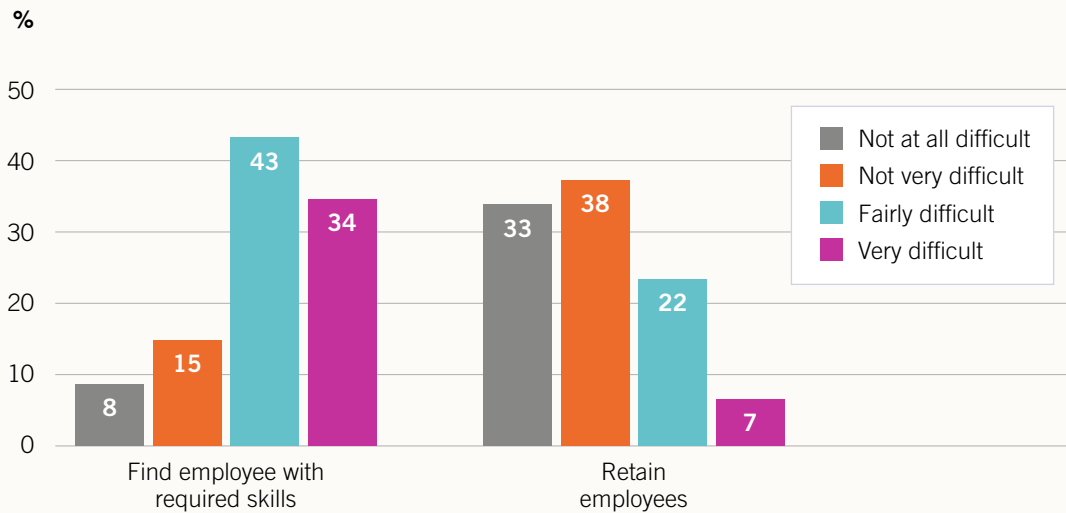
Source: all employers; n=2001

Table 4

Table 4   Proportion of employees receiving digital skills training in past 12 months (%)

	Ability to find employees with required skills		Ability to retain employees	
	Digital non-adopters	**Digital adopters**	**Digital non-adopters**	**Digital adopters**
Fairly difficult	43	44	21	24
Very difficult	34	34	7	7

Source: Digital adopters, n=790; Non-adopters, n= 1153

As Table 4 shows, there was no association between employers' investment in new digital technologies and their perceived difficulties in the recruitment and retention of staff with the required skills. There were no significant associations by industrial sector, with the exception of retention difficulties amongst employers in the accommodation and food services and the arts, entertainment and recreation sectors.

## 4.3. Digital technology and work organisation

In this section, we present descriptive findings concerning the extent of employee autonomy over working time and tasks, and whether this was associated with the adoption of digital technology.

Nearly four in ten employers (39%) reported that employees in the LOG control their own working time, while just over 60 per cent noted that employees control the work organisation process. This was in all likelihood down to the fact that nearly three quarters (75%) of employers reported that the work in the LOG was organised in teams. A much smaller share of employers (13%) indicated that the pace of work in the LOG was controlled by machines; a further four per cent reported algorithmic control over work organisation.

Figure 26 shows that employee autonomy over working time was associated with the occupational structure of the LOG. Managerial and professional occupations were almost twice as likely to exercise control over working time, and less likely to experience algorithmic controls over work organisation. Although the share of algorithmic control was small, its incidence was twice as high among trades, routine and other occupations relative to managerial and professional occupations.

Fig 26   Employee autonomy by largest occupational group (%, Yes)
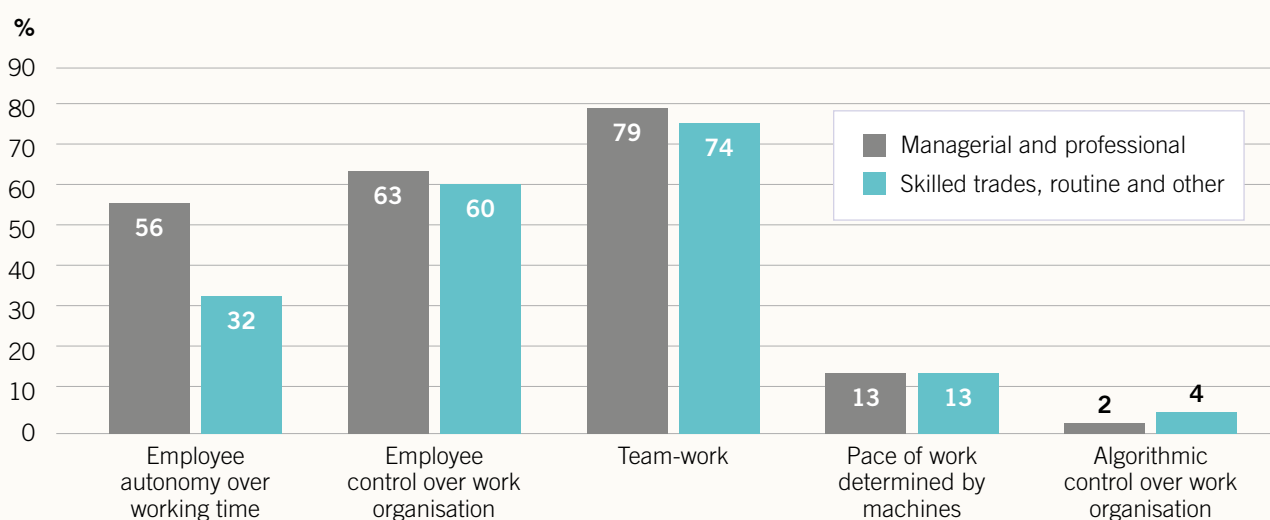
Source: all employers; n=2001

Fig 27 Employee autonomy by investment in new digital technologies (%, Yes)
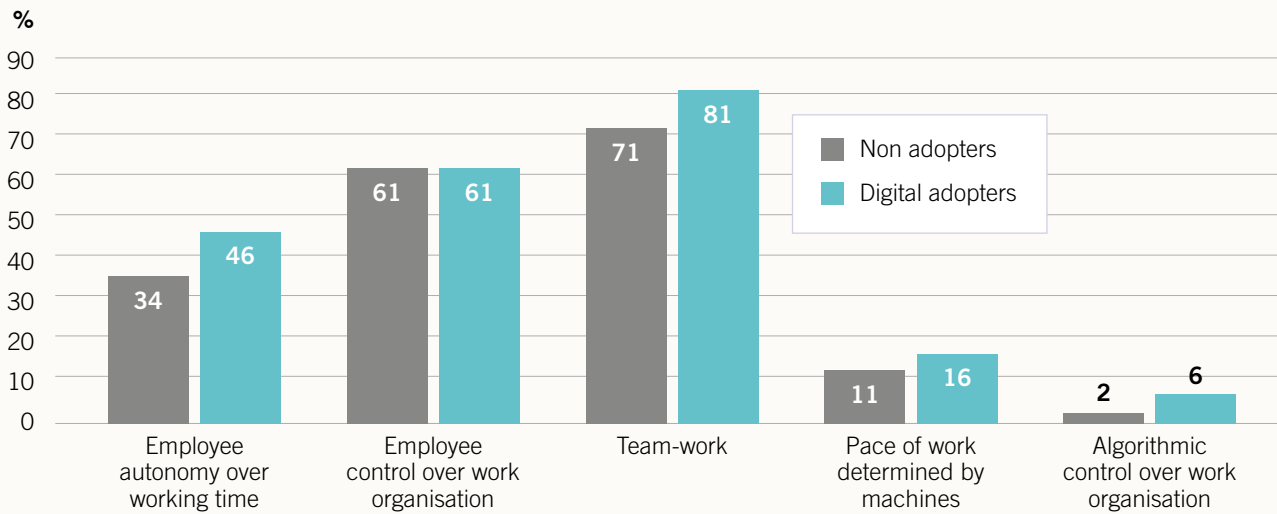
Source: Digital adopters, n=790; Non-adopters, n=1153

Investments in new digital technology appears to have some association with employee autonomy (see Figure 27). Digital adopters reported higher levels of team work and employee control over working time. While there was no clear association with employee control over work organisation, digital adopters were more likely to report that the pace of work was determined by machines, with a higher likelihood of algorithmic control. The latter, while relevant for a very small proportion of employers in our sample, was nearly three times higher among digital adopters.

Every third employer reported the use of customised software apps to monitor working hours and absenteeism. However, this only marginally impinged on employee autonomy over working time and work organisation and teamwork (Figure 28). Nevertheless, the use of customised apps was associated with machine control over the pace of work and algorithmic control of work organisation. For instance, the incidence of algorithmic control over work organisation was three times higher among employers using customised apps.

Fig 28 Employee autonomy by use of customised apps for monitoring working hours and absenteeism (%, Yes)
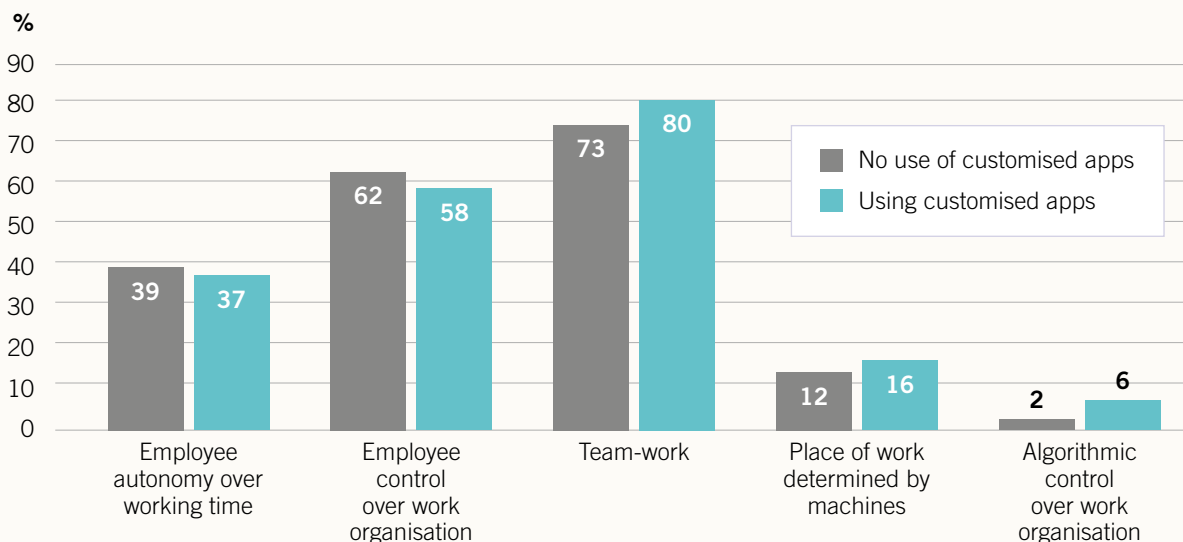
Source: all employers; n=2001

5. Employee involvement and representation

A key challenge for employers investing in new digital technologies is effective implementation. One way in which employers can attempt to achieve successful implementation is to actively involve employees in decision-making processes around investment and implementation decisions. In other words, structures of voice and representation may be important. However, half of employers report that employees are not currently consulted about investment in new technology.

Collective representation was considered in terms of whether employers recognised a trade union or some other type of employee representatives. In total, less than one in ten (7%) employers recognised trade unions and around one in ten (11%) recognised non-union employee representatives. Such representation was not mutually exclusive. Nearly half (47%) of all union-recognised employers also recognised non-union employee representatives.

Table 5 considers collective representation within employers that invested in new digital technologies and those that did not. With 7 per cent and 8 per cent, respectively, there was no significant difference in trade union recognition between digital adopters and digital non-adopters. The extent of recognised, non-union employee representatives was slightly more pronounced but also statistically non-significant.

Table 5 **Levels of employee representation by investment in new digital technologies (%)**

	Recognised trade union (%)	Recognised employee representatives (non-union) (%)
Digital adopters	8	13
Digital non-adopters	7	10

Source: Digital adopters, n=790; Non-adopters, n=1153

Fig 29   **Employee involvement in decision-making (%)**

%

Legend:
- Not involved
- Informed
- Consulted/negotiated

Category	Not involved	Informed	Consulted/negotiated
Pay	26	39	35
Training and skills development	13	32	55
Investment in technology	51	23	26
Working time	23	30	48
Use of data	44	30	26
Recruitment and selection	39	30	31
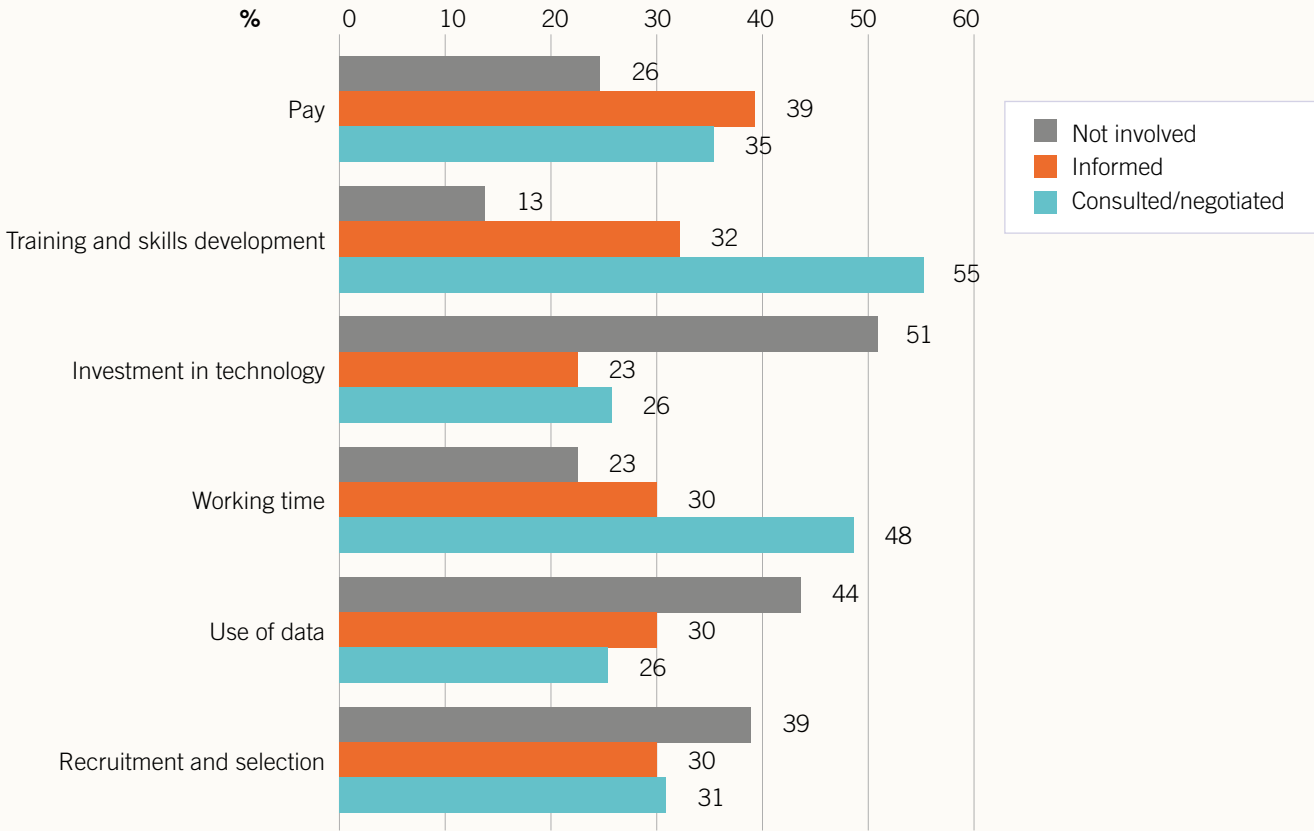
Source: all employers; n=2001

Fig 30   **Employee involvement in decision-making by digital investment (%)**

%

Legend:
- Digital non-adopters
- Digital adopters

Category	Digital non-adopters	Digital adopters
Pay	31	42
Training and skills development	53	60
Investment in technology	21	34
Working time	46	52
Use of data	23	33
Recruitment and selection	28	37
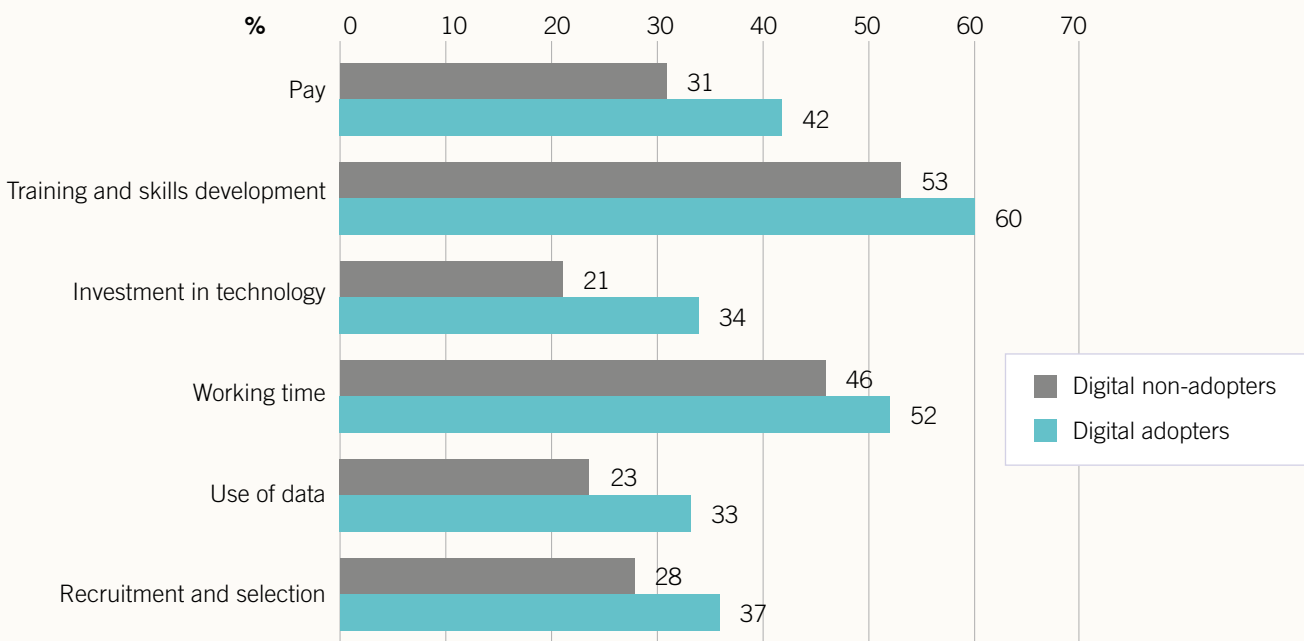
Source: Digital adopters, n=790; Non-adopters, n=1153

The extent of collective representation tells us little, of course, about how involved employees are in different decision-making processes within companies. This is explored in more detail in Figure 29. Employers were asked to specify how involved employees were in decision-making related to a range of working practices (such as training, pay, working time etc). This included whether such practices were negotiated/consulted, whether employees were informed or whether there was no employee involvement at all.

Employers were most likely to involve employees in their decisions relate to training and skills development. Human capital-related decisions were negotiated or consulted in just over half (55%) of all cases. There was no involvement of employees in employers' decisions pertaining to training and skills in only 13 per cent of cases.

The area of decision-making where employees were least likely to be involved was around investment decisions related to new technology. Half of employers (51%) reported that employees were not involved in decisions related to investment in technology: employees were informed of such decisions in a quarter (23%) of cases and a similar proportion (26%) were consulted or negotiated.

Looking across the other factors, employee involvement was ranked from higher to lower in order of: working time, pay, recruitment and selection and the use of data, including data on employee performance. It should be noted that while employers reported that they negotiated or consulted on pay in a third of cases (35%) the prevalence of formal structures for collective bargaining was low – just over one per cent of employers reported that pay was determined by structures of collective bargaining. The predominant means of pay determination, for around 62 per cent of employers, was by

management decision, either at the workplace or at a higher organisation level.

Figure 30 explores these findings further to ascertain the extent to which digital adopters could be considered high involvement employers. The data are reported for those cases where employers reported negotiation and consultation in decision-making as this is considered to be the highest level of employee involvement. The findings, which are all statistically significant, show that digital adopters were more likely to have negotiated or consulted with their employees across all six working practices compared to the digital non-adopters.

The difference in employee involvement around investments in new technology was particularly pronounced. Nearly a third (34%) of digital adopters reported that they had either negotiated or consulted with their employees around decisions pertaining to investment in new technology compared to just a fifth (21%) of their non-adopter counterparts. Levels of negotiation and consultation with employees was, as noted above, highest for decisions related to training and development, but there was nearly a seven percentage point difference between those employers that had invested in digital technology and those that had not (60% to 53%). Overall, these findings suggest that digital adopters were more likely to be high-involvement employers.

Concluding remarks

First findings from the Employers' Digital Practices at Work (DPaW) survey offers new and authoritative evidence on current levels of digital adoption and polarisation in the United Kingdom, and the potential implications for employers' human resource management practices.

Notable findings include:

- Overall, employers' investment in new digital technologies and data analytics remains rather low. The majority of employers surveyed had not adopted new digital technologies or data analytics in the five years prior to the survey. The extent of adoption varied, however, by firm size and industrial sector.

- There was some evidence, certainly amongst those that had adopted new digital technologies, to support claims that Covid-19 had accelerated digital investment.

- Digital adopters were positive about further investment in new technologies in the coming years, while non-digital adopters were not. This suggests a growing divide between those businesses that are investing in new digital technologies and those that are not. This is a potential concern for policy makers.

- There was little evidence that digital adoption leads to job destruction. The evidence suggests the opposite. Digital adopters were more likely to have increased their employment in the five-year period prior to the survey. They were also positive about employment growth in the immediate future.

- Key human resource management practices were more positively associated with digital adopters compared to digital non-adopters.

Levels of training and employee involvement in key decision-making processes, for example, were higher amongst digital adopters.

- However, investment, and planned investment, in digital skills training seemed low.

- A large proportion of employers reported difficulty in recruiting those with required digital skills. A lack of skills and the need to train staff in the use of new digital technologies were the main challenges identified by employers in their digital implementation strategies.

- Levels of employee involvement were least well developed for decisions related to investment in new technology and data usage.

It is important to note that our findings offer insight into the experiences of employers only. They present very much a managerial perspective. The experiences and perspectives of employees with regard to new digital technologies may very well be different. This is something for further research. This caveat notwithstanding, decisions around whether employers invest in new digital technologies and the course that implementation takes is the main responsibility of organisations' management.

In this context, the DPaW survey offers a new and authoritative evidence base for the policy community that can help shape the public conversation around future economic growth

and the development of digital working practices. The survey has generated some striking findings. Employer investment in digital technologies and digital skills upgrading are seen as priority concerns for policy makers. The findings suggest some potential benefits for digital adoption. Those employers that had invested in digital technologies were more positive about future investment and innovation and were associated with growth in employment, both in the past and the near future. There is also some evidence to suggest that digital adopters are more likely to be high-involvement employers.

However, there are also some notable challenges. Only a minority of employers reported investment in digital technologies in the past five years. There was also no evidence to suggest that those that had not invested would do so in the foreseeable future. **The policy challenge, then, is how to address a potentially growing digital divide between adopters and non-adopters.** There also appears to be an emerging skills problem. While digital adopters identified recruitment and training in digital skills as key challenges around the implementation of new technologies, only a small proportion of employers were planning significant investment in digital skills upgrading over the next few years. Low employer investment in both digital technologies and new digital skills suggests, therefore, that much remains to be done if the UK economy is to realise the potential benefits of digital transformation.
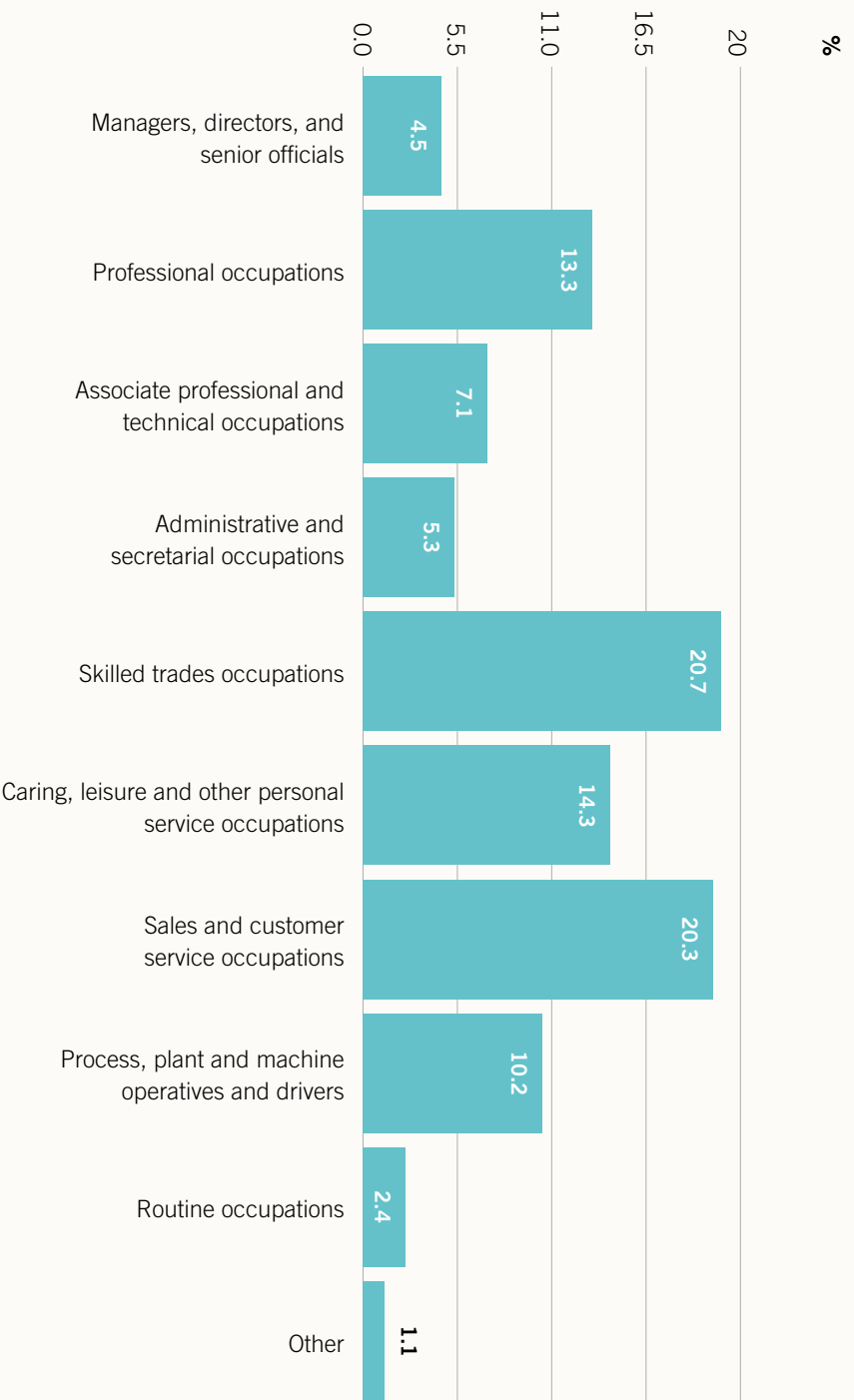
Annex

Table A1 **Distribution of businesses by industry**

Industry code	Share (%)
A - Agriculture, Forestry and Fishing	0.1
B - Mining and Quarrying	0.01
C - Manufacturing	13.0
D - Electricity, Gas, Steam and Air Conditioning Supply	0.01
E - Water Supply; Sewerage, Waste Management and Remediation Activities	0.05
F - Construction	5.9%
G - Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	26.9
H - Transportation and Storage	1.5
I - Accommodation and Food Service Activities	13.9
J - Information and Communication	2.2
K - Financial and Insurance Activities	0.4
L - Real Estate Activities	0.4
M - Professional, Scientific and Technical Activities	13.9
N - Administrative and Support Service Activities	8.3
O - Public Administration and Defence; Compulsory Social Security	0.04
P - Education	2.1
Q - Human Health and Social Work Activities	9.7
R - Arts, Entertainment and Recreation	0.5
S - Other Service Activities	1.2

Fig A1

Distribution of businesses by largest occupational group

%

Occupational group	Value
Managers, directors, and senior officials	4.5
Professional occupations	13.3
Associate professional and technical occupations	7.1
Administrative and secretarial occupations	5.3
Skilled trades occupations	20.7
Caring, leisure and other personal service occupations	14.3
Sales and customer service occupations	20.3
Process, plant and machine operatives and drivers	10.2
Routine occupations	2.4
Other	1.1

Axis values: 0.0 5.5 11.0 16.5 20