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TECHNICAL REPORT
April 2019

People and machines:
from hype to reality

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Technical report
April 2019

People and Machines: from hype to reality

Contents

Acknowledgements

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Acronyms

3D	three-dimensional
AI	artificial intelligence
CCTV	closed-circuit television
CIPD	Chartered Institute of Personnel and Development
HR	human resources
IER	Warwick Institute for Employment Research
IP	internet protocol
IT	information technology
OECD	Organisation for Economic Co-operation and Development
PR	public relations
R&D	research and development

Executive summary

This report attempts to provide some much lacking evidence on the impact of artificial intelligence (AI) and automation on workers and workplaces. The research reports on a telephone survey of more than 750 business leaders from a range of industries across the UK carried out during July and August 2018. A research report discussing both this survey and case study work on AI and automation can be found at **cipd.co.uk/peopleandmachines**

Investments in AI and new technologies

A third (32%) of business leaders indicated that their organisation had introduced some form of AI-enabled technology during the previous five years:

- 22% had introduced software using AI for cognitive tasks
- 20% had introduced equipment using AI for physical tasks.

Organisations were more likely to have introduced AI-enabled technology if they were:

- in the private sector, as opposed to the public or third sectors
- in the IT and telecommunications industry
- a newer organisation (ten years old or newer).

When comparing adoption rates of the different types of AI-enabled technology:

- Equipment using AI for physical tasks was relatively more common in the manufacturing industry, the transportation and distribution industry, and the IT and telecommunication industry.
- Software using AI for cognitive tasks was relatively more common in the legal industry and financial services industry.

The most commonly cited reasons for introducing AI-enabled technology centred around:

- improving the quality of goods and services
- reducing costs and delivering goods and services more cheaply
- keeping up with competitors and the industry more widely.

In this respect, motivations for introducing AI were not too dissimilar to motivations for introducing other types of new technology.

Impact of AI on jobs within organisations

AI-enabled technologies were most likely to have led to changes in jobs in the production and operations, and IT departments within organisations. These were also the departments that were most commonly involved in the decision to invest in AI and its implementation. AI-enabled technologies were more likely to have led to changes in jobs than were other technologies covered by the survey.

Different types of AI tended to change jobs in different departments. Equipment using AI for physical tasks was more likely to affect jobs in production and operations and IT. Whereas software using AI for cognitive tasks was more likely to affect jobs in the marketing and sales and accounting and finance departments.

The occupational groups that were most affected by the introduction of AI were:

- professional and higher technical staff (28%)
- managers, administrators and intermediate managerial staff (20%)

- semi-skilled and unskilled manual workers (15%)
- clerical and junior managerial workers (13%).

Equipment using AI for physical tasks was relatively more likely to have affected workers in the semi-skilled and unskilled manual workers group, while software using AI for cognitive tasks was relatively more likely to affect workers in the professional and higher technical and clerical and junior managerial occupational groups.

The impact of AI on performance

In terms of productivity gains, nearly all organisations introducing AI in the previous five years reported experiencing at least one of the improvements listed and very few reported experiencing none of the listed improvements.

The most commonly cited improvements were:

- improved quality of goods and/or services (52%)
- reduced costs (37%)
- increased revenue (34%).

Organisations introducing AI were more likely to report these outcomes than those introducing nearly all other types of new technology.

Job destruction and creation

AI's propensity to create and destroy jobs was higher than for any other technology covered by the survey. Two-fifths (43%) of organisations reported job creation as a consequence of the introduction of AI-enabled technology and a similar proportion (40%) reported that jobs had been eliminated as a consequence of the introduction of AI-enabled technology.

While the proportion of organisations reporting job creation and/or job destruction was similar for both types of AI covered (software or equipment), there were some differences in the skills levels of jobs affected:

- Equipment using AI for physical tasks tended to eliminate jobs at the low-skill level and create jobs at a range of levels.
- Software using AI for cognitive tasks tended to eliminate jobs at a range of levels and create jobs at the high-skill level.

The net effect on the number of jobs in the organisation depended on the type of AI that had been introduced:

- Equipment using AI for physical tasks led to a net increase in jobs in 39% of organisations, but a decrease in 21% of organisations.
- Software using AI for cognitive tasks led to a net increase in 31% of organisations, but a decrease in 28% of organisations.

The introduction of AI-enabled technologies tended to have the following self-reported effects on jobs:

- Job tasks tended to stay the same or become only slightly more or less complicated (rather than far more/less complicated).
- Staff needed more skills and knowledge in three-fifths (60%) of organisations introducing AI.
- Jobs became more secure in more than two-fifths (44%) of organisations, but less secure in 18% of organisations introducing AI.

- AI was reported to have led to more control of work hours in 40% of organisations and more control of job tasks in 51% of organisations introducing AI.
- AI was reported to have led to an increase in pay in 41% of organisations introducing AI-enabled technology.

1. Introduction

Background to the study

Technological progress (along with globalisation and demographic change) is one of three 'mega-trends' that has massive potential to transform work.[1] While there is some disagreement as to precisely how many technological revolutions there have been, recent advances in technology have led some to argue that we are at the start of a new digital revolution.[2] Many have called it the Fourth Industrial Revolution, characterised in particular by artificial intelligence (AI) combined with the emergence of big data, the internet of things and ever-increasing computer power. These innovations have the potential to bring an increasing number of tasks, and not just routine tasks, within the range of automation.

While the OECD[3] notes that this new digital technology offers 'unparalleled opportunities' – such as the alleviation of skill shortages, increased productivity, new earnings opportunities and enhanced possibilities for workers as to choose when, where and for whom they work – it is fears for the future of jobs that dominate debate. While concerns about the effect new technology can have on jobs are nothing new,[4] three recent technological developments in particular (AI, digitalisation and platform working) have led many to fear that an ever-increasing proportion of jobs may be at risk of either destruction or serious erosion of job security and quality. For example, it has been estimated that up to 47% of jobs in the US and 35% of jobs in the UK are at high risk of disappearing as a result of automation, including many low- and intermediate-skilled jobs previously thought to be safe from automation.[5] More modest estimates suggest that 14% of jobs in OECD countries are at high risk of automation and an additional 32% face substantial change.[6]

However, despite significant debate on the impact on jobs of AI, there is a lack of empirical evidence. A recent rapid evidence review commissioned by the CIPD looking at the effect of AI on work[7] found that only 40% of papers reviewed contained empirical evidence and more than half were literature reviews, often simply making predictions or based on anecdotes or speculation. Thus, there is a major gap in the evidence base on the effects of AI and automation on jobs. This gap is compounded by a double time-lag: first, much of the technology is new and yet to be implemented, and so its full impacts felt; second, research following the empirics has yet to be undertaken and reported. Practitioners and policy-makers are then left scrambling to understand what the new technologies really mean for jobs. The research reported here aims to help fill this gap in understanding.

Automation and work: the world today

There is a parallel between current debates about potential job destruction from AI and automation and concerns about offshoring and the destruction of jobs raised in the 1990s. In those previous debates, developments in information and communications technology meant that an increasing number of service jobs, and not just back-office work, could be outsourced to low-wage countries, presenting a considerable risk to workers in advanced economies.

However, while there has been considerable debate about the precise number of jobs lost to offshoring, in reality many predictions turned out to be overly pessimistic, as the scope for offshoring in services appears to have been much more limited than previously supposed. Author[8] notes that technological change, and other forms of economic change, may be

important in determining in which occupations, industries and locations jobs may be lost, but the level of demand for goods and services is by far the most important factor in determining overall levels of employment.

Previous experience suggests caution should be exercised when predicting radical change in aggregate employment as a consequence of the introduction of new technology. Despite this, a range of predictions have been made about the potential consequences of AI and robotics. These predictions range from the pessimistic, mass 'technological unemployment', to the optimistic liberation from work and a post-work society.[9]

Somewhere in the middle is the view, in line with theories of skills-biased technological change and routine-biased technological change,[10] that the potential for AI to carry out a wider range of tasks, and not just the low-skill routine tasks, is likely to add to polarisation of the occupational structure and hollowing out of medium-skilled jobs.[11] There has been little evidence of any significant change in this direction to date, and yet such predictions have led policy-makers to seriously consider radical policy responses, such as the introduction of universal basic income or other schemes to ensure that those who are displaced by automation are not left behind and the productivity benefits are shared more widely.

While it is difficult to predict what will happen in the future, predictions of the 'end of work' do seem overly pessimistic. However, there is simply not enough evidence yet to make concrete predictions either way.[12] Above all, it is management decisions at a workplace level that will determine what happens in terms of both the potential productivity gains and the effects on jobs and the organisation of work.

Focus of this study

This research represents an important initial step in addressing the lack of empirical evidence in what is essentially an embryonic field of research. As an embryonic field of research, the terms AI and automation have yet to be clearly defined.[13] The terms tend to be used interchangeably to refer to the application of learning algorithms to create computer programmes capable of automating an increasing range of tasks. AI can be applied to robotic equipment that can be used to carry out physical tasks (for example smart factories or automated vehicles) or can be applied to software applications to carry out cognitive tasks (for example personal digital assistants or telephone chat bots). It is this dual usage that is deployed in the research, which aims to better understand:

1. the extent to which firms are making use of AI-enabled technology
2. motivations for introducing AI
3. the effects of AI-enabled technology on workplace-level performance, jobs and job quality.

Methodology used in this research

The data analysed in this report is generated from a bespoke online survey of business leaders carried out by YouGov during July 2018. The achieved sample consists of 759 respondents with board-level management roles at organisations with ten or more employees.

These leaders were asked questions about their organisations, in particular:

- recent investments in technology that organisations had made in the past five years
- who was involved in decisions about investment in technology (particularly AI-enabled technology) and its implementation
- the impact of recent investments in AI-enabled technology on the business of the organisation and staff

- plans for investments in new technology in the near future (next two years) and the anticipated impacts.

The organisations represented by respondents covered a range of industries in the private, public and third sectors and reflected a broad range of organisation age and sizes. Most (73%) had a turnover of more than £250,000.

See Appendix 1 for more details about the methodology and sample profile.

Structure of this report

The following seven sections detail the findings from the quantitative analysis of the survey data. The sections are structured around the following themes:

- organisations' recent investments in AI and new technology (during the last five years)
- reasons for investing in AI and new technology
- organisations not investing in new technology and reasons for not investing in AI
- who is involved in decisions about investment in new technology and its implementation (with a particular focus on AI-enabled technology)
- who at the organisation is most affected by the introduction of new technology and particularly AI-enabled technology
- the outcomes and effects of new technology on the business of the organisation and workers
- future investments in new technology in the next two years and the anticipated outcomes.

Where possible, data from the analysis is presented visually in the form of charts, with the underlying tables presented in Appendix 3. In cases where charts were not practicable, tables are presented near the relevant text.

A research report discussing both this survey and case study work on AI and automation can be found at **cipd.co.uk/peopleandmachines**

2. Recent investments in new technology

Key points

A third (32%) of business leaders indicated that their organisation had introduced some form of AI-enabled technology during the previous five years:

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Organisations were more likely to have introduced AI-enabled technology if they were:

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When comparing adoption rates of the different types of AI-enabled technology:

- Equipment using AI for physical tasks was relatively more common in the manufacturing industry, the transportation and distribution industry, and the IT and telecommunication industry.
- Software using AI for cognitive tasks was relatively more common in the legal industry and financial services industry.

Equipment using AI for physical tasks was relatively more likely to have been introduced in organisations with a mostly low-skilled workforce.

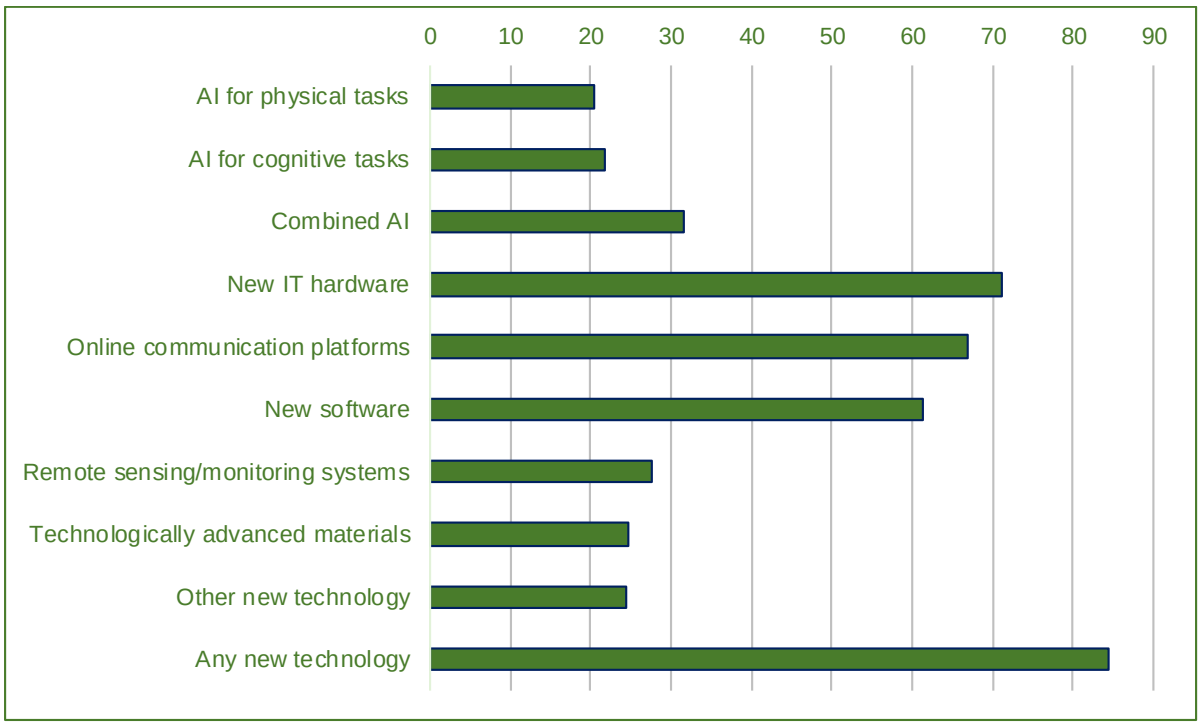
Software using AI for cognitive tasks was relatively more likely to have been introduced in organisations with a mostly high-skilled workforce or where the workforce was mostly young (30 years or under).

Respondents were asked to indicate which of a number of different types of technology their organisation had introduced during the last five years (that is, since July 2013) and were asked to tick all that apply (Figure 1 and Table 30). As might be expected, the most commonly cited technologies were new IT hardware, the use of online communication platforms for work purposes, and the introduction of *new* software (that is, not including maintenance upgrades) (71%, 67% and 61% respectively). More than a quarter (28%) of respondents reported introducing remote sensing or monitoring systems and a quarter (25%) reported introducing technologically advanced materials.

Nearly a third of respondents (32%) indicated that they had introduced some form of AI-enabled technology during the previous five years, with two-thirds of these (22% of all respondents) introducing software using AI for cognitive tasks and two-thirds (20% of all respondents) introducing automated equipment using AI for physical tasks.[14] Thus, around 10% of all respondents had introduced both types of AI-enabled technology.

Specified 'other' types of technology reported included: electric vehicles, fingerprint recognition, interactive whiteboards and display equipment, IP-based telephony to replace mobile phone use, CCTV in vehicles and 3D printers.

Figure 1: Introduction of new technology in the last five years (%)



Base: All respondents (n=759); *Bases exclude item non-response ('Don't know').

The types of technology introduced varied considerably by sector, industry and various other organisational characteristics (Table 1):

- Most types of organisation reported introducing **new IT hardware** or had started using **online networking and communication platforms** for work purposes, although organisations in hospitality and leisure, younger organisations and small organisations were slightly less likely to report introducing this type of technology.
- The extent to which organisations reported introducing **other new software** varied. Older organisations, organisations in the private sector, in IT and telecommunications, the legal industry, transportation and distribution, and financial services were the most likely to have introduced new software. Those organisations least likely to have introduced new software were smaller organisations, those in the public sector, and those in the medical and health services, retail, hospitality and leisure industries.
- **Remote sensing and monitoring systems** were more commonly reported by private sector organisations and by organisations in the transportation and distribution, IT and communications, and construction industries. They were also more common in larger and younger organisations.
- **Advanced or hi-tech materials** were most commonly reported among large and newer organisations, and most commonly introduced by organisations in the IT and telecommunications, construction and manufacturing industries.
- Both types of AI-enabled technology were more commonly reported among private sector organisations, IT and telecommunications organisations and organisations that were newer. However, generally speaking, **automated equipment using AI for physical tasks** was most commonly introduced by organisations in the manufacturing, transportation and distribution, and IT and telecommunications

industries. **Software using AI for cognitive tasks** was more commonly introduced among legal companies and organisations in financial services.

In terms of workforce characteristics (Table 2), the following patterns can be observed:

- Again, **new IT hardware** and **online communication/networking platforms** were commonly cited in the majority of organisations regardless of workforce characteristics, with only a few exceptions. Organisations where the workforce was predominantly female or older were less likely to have introduced the use of communications/networking platforms for work purposes and organisations mostly employing low-skilled workers were relatively less likely to have introduced new IT hardware or the use of communications/networking platforms.
- The introduction of **other new software** was less common among organisations with workforces that were predominantly older, female or low-skilled.
- The introduction of **remote sensing and monitoring systems** was less common than on average in organisations where the workforce was mostly female and was more common in organisations where the workforce was mostly skilled to the intermediate level.
- The introduction of **advanced or hi-tech materials** was less common than on average among organisations where the workforce was mainly female, older or lower-skilled.
- The introduction of **automated equipment using AI to do physical tasks** was relatively more common in organisations where the workforce is mainly low-skilled. The introduction of **software using AI for cognitive tasks** was relatively more common in organisations with a predominantly younger or high-skilled workforce. Adoption of both of these forms of new technology was lowest among organisations that had a mostly female or a mostly older workforce. However, while in organisations with mostly female staff AI adoption tended to include just one type of AI-enabled technology, in organisations with mostly male staff it was more likely to involve both types.

Table 1: Introduction of new technology, by organisation characteristics (%)

	AI for physical and/or cognitive tasks	Equipment using AI for physical tasks	Software using AI for cognitive tasks	New IT hardware	Online comms/networking	Remote sensing /monitoring systems	High-tech materials	Introduced other new software	Other	Base, N (unweighted)
Sector										
Private sector	*31.3*	20.2	21.4	66.6	61.9	26.7	22.5	58.1	14.6	659
Public sector	*25.0*	15.3	15.3	66.5	61.6	19.8	22.6	43.5	12.6	71
Third sector: non-profit, non-government	–	–	–	–	–	–	–	–	–	29
Industry										
Manufacturing	*49.6*	39.9	22.6	72.5	55.3	27.7	29.9	54.0	15	93
Construction	*25.5*	17.0	21.2	77.1	65.4	36.5	30.2	57.0	12.6	48
Retail	*24.1*	22.1	20.4	67.5	50.6	28.4	22.7	46.6	18.7	50
Financial services	*37.4*	19.9	30.3	63.0	65.7	21.4	17.7	63.3	18.8	85
Hospitality and leisure	*25.0*	15.9	17.3	56.6	51.3	19.7	17.8	49.5	2.9	35
Accountancy	–	–	–	–	–	–	–	–	–	23
Legal	*35.2*	9.6	31.6	82.6	65.2	11.8	23.8	69.9	20.7	45
IT & telecommunications	*41.3*	28.4	21.7	62.7	74.9	38.2	32.6	71.5	25.1	64
Media/marketing/advertising/PR & sales	*26.9*	16.4	13.4	62.0	65.4	18.4	21.8	59.6	7.5	34
Medical & health services	*21.8*	14.1	15.6	65.6	61.1	18.3	20.6	44.3	15.7	58
Education	*12.4*	9.3	9.6	60.7	57.9	10.9	17.0	52.2	11.8	42
Transportation & distribution	*29.6*	29.6	16.9	78.4	73.9	39.5	23.9	69.1	14.5	36
Real estate	–	–	–	–	–	–	–	–	–	17
Other	*17.3*	7.7	12.2	60.1	63.1	23.6	10.3	44.4	11.5	129
Company age										
10 years and less	*38.5*	30.1	23.1	57.9	59.9	28.8	26.9	51.2	15.5	134
Over 10 to 20 years	*30.7*	17.0	24.2	71.4	66.0	24.1	22.5	52.9	13.8	132
Over 20 to 35 years	*28.0*	17.3	18.4	63.2	49.7	22.4	20.0	55.1	16.4	145
Over 35 to 100 years	*27.6*	16.2	17.6	67.4	61.2	22.2	20.9	52.5	15.5	166
Over 100 years	*27.0*	15.0	20.1	77.7	77.1	27.4	21.1	66.0	13.2	138
Business size										
10–49	*23.3*	11.7	18.1	59.1	41.7	19.2	18.1	45.9	13.4	164
50–249	*30.5*	20.9	17.1	64.7	57.0	18.7	15.5	56.1	14.9	175
250–999	*31.1*	25.6	16.4	67.5	66.5	27.2	29.1	57.5	13.1	161

Base: All respondents (n=759)

Table 2: Introduction of new technology, by workforce characteristics (%)

	AI for physical and/or cognitive tasks	automated equipment using AI for physical tasks	Software using AI for cognitive tasks	new IT hardware	online comms/networking	Remote sensing or monitoring systems	High-tech materials	Introduced other new software	Other	Base, N (unweighted)
What is the general gender balance of your UK staff?										
Mostly male	*30.0*	19.8	19.4	70.7	62.6	24.8	21.3	58.9	13.3	221
Mostly female	*24.4*	13.8	15.2	63.1	53.7	15.8	17.1	41.8	11.8	144
Fairly balanced	*31.3*	20.2	22.3	68.4	69.0	28.4	24.2	59.8	17.2	374
What is the general age profile of your UK staff?										
Mostly younger (30 or under)	*33.8*	16.6	28.3	67.8	60.3	20.3	19.6	57.5	17.6	103
Mostly mid-career (31-49)	*31.7*	20.8	19.2	69.4	65.1	26.5	20.8	54.5	10.7	328
Mostly older (50 and above)	*20.7*	14.6	13.5	64.8	53.3	25.4	17.7	49.8	18.0	80
A range of ages	*28.2*	18.2	20.4	67.1	65.7	23.5	25.2	57.6	17.8	226
What is the general skills profile of your UK staff?										
Mostly high skilled (university level or higher)	*31.5*	17.3	24.9	69.0	68.5	21.7	23.0	63.5	17.7	284
Mostly intermediate skilled (A-Level, NVQ 3 level, apprenticeships)	*28.3*	17.2	17.0	65.6	61.9	35.8	23.0	55.2	6.7	145
Mostly lower skilled (GCSEs, NVQ level 2, basic skills or lower)	*33.1*	27.3	17.3	52.3	50.4	23.6	16.4	39.2	8.7	98
A range of skills levels	*26.0*	17.9	16.5	75.2	64.0	21.6	21.8	53.1	20.0	213

Base: All respondents (n=759)

3. Reasons for investing in new technology

Key points

The most commonly cited reasons for introducing AI-enabled technology centred around:

- **improving the quality of goods and services**
- **reducing costs and delivering goods and services more cheaply**
- **keeping up with competitors and the industry more widely.**

In this respect, motivations for introducing AI were not too dissimilar to motivations for introducing other types of new technology.

Comparing motivations for introducing the two different types of technology covered by the survey:

- **Motivations for introducing software using AI for cognitive tasks were slightly more likely to be about reducing costs, improving quality, providing a new good or service, keeping up with the industry and managing risk.**
- **Motivations for introducing equipment using AI for physical tasks were slightly more likely to be related to improving working conditions or the environment, or about updating existing technology.**

Overall, organisations tended to cite functional reasons for introducing AI-enabled technology, rather than simply adopting an 'innovation' mindset (related to keeping up).

Respondents that reported introducing at least one form of new technology during the last five years were asked to indicate their reasons for deciding to invest in the technology and which was the main reason.

If respondents had introduced some form of AI-enabled technology, they were asked about their reasons for introducing this technology. If they had not introduced AI-enabled technology, they were asked to indicate which of the technologies that they had introduced had 'involved the greatest change in what tasks staff undertake or how work is organised' and were subsequently asked questions about that technology.

In line with other technologies that organisations had introduced, the most commonly cited reasons for introducing AI (Figure 2 and Table 31) were:

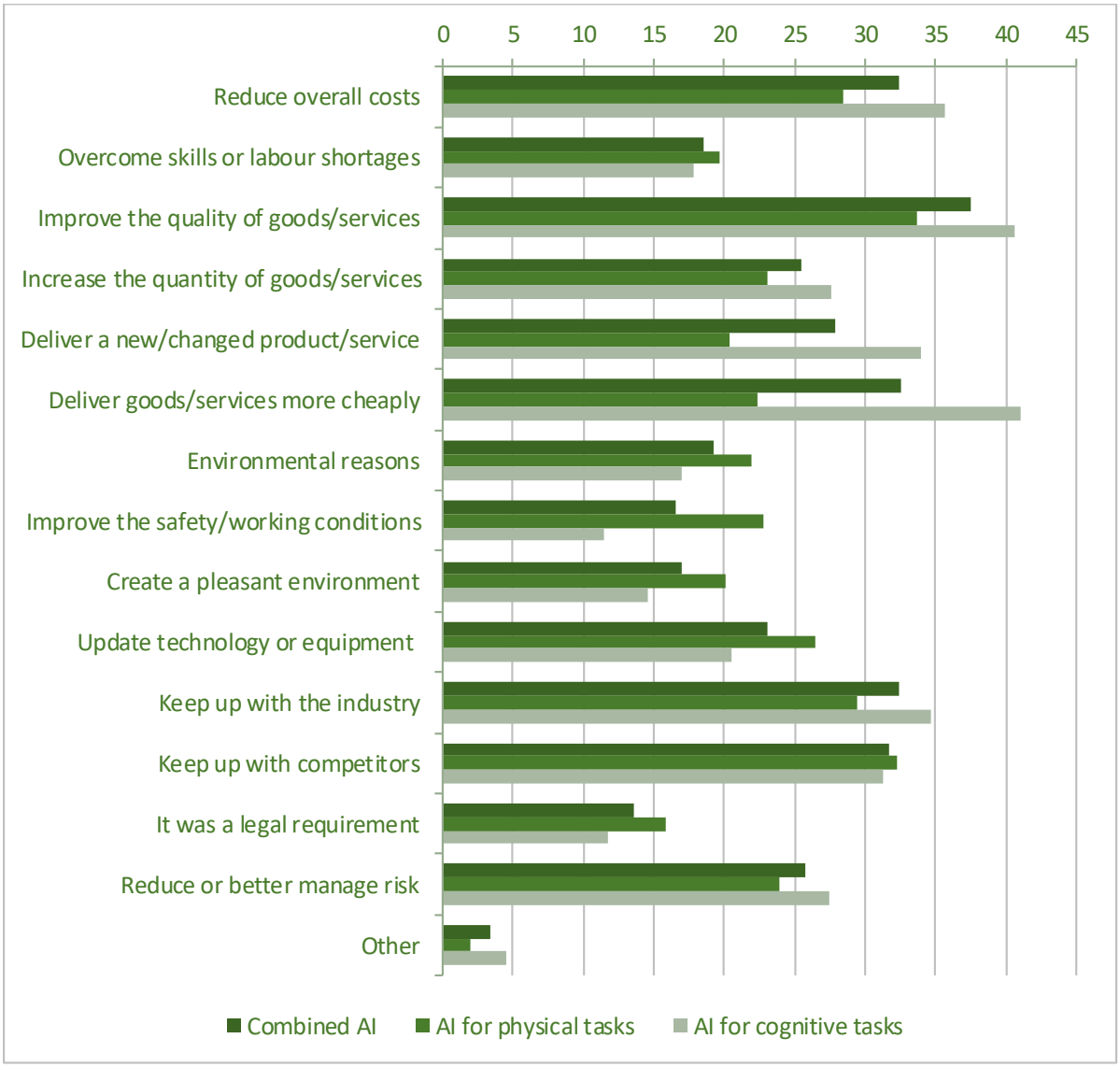
- to improve the quality of goods and services (38%)
- to deliver goods or services more cheaply (33%) or reduce overall costs (32%)
- to keep up with competitors (32%) and developments in the industry more widely (32%).

These reasons for adopting AI were not too dissimilar to the motivations for introducing other technologies. Where motivations for introducing AI differed from other types of technology was in reducing or managing risks (26%), overcoming skills or labour shortages (19%), environmental reasons (19%), and to satisfy legal requirements (14%). All were more commonly given as reasons for introducing AI than for other technologies.

However, there were some differences in terms of the motivations for introducing automated equipment using AI for physical tasks and software using AI for cognitive tasks:

- Those introducing **software using AI for cognitive tasks** were relatively more likely to cite delivering products or services more cheaply, reducing overall costs, improving the quality and the quantity of products/services, and keeping up with competitors and the industry more widely as motivations.
- While those introducing **automated equipment using AI for physical tasks** were relatively more likely to say that improving work conditions for staff, improving the work environment, and updating technology or equipment they had already invested in was a motivation.

Figure 2: All reasons for introducing AI (%)



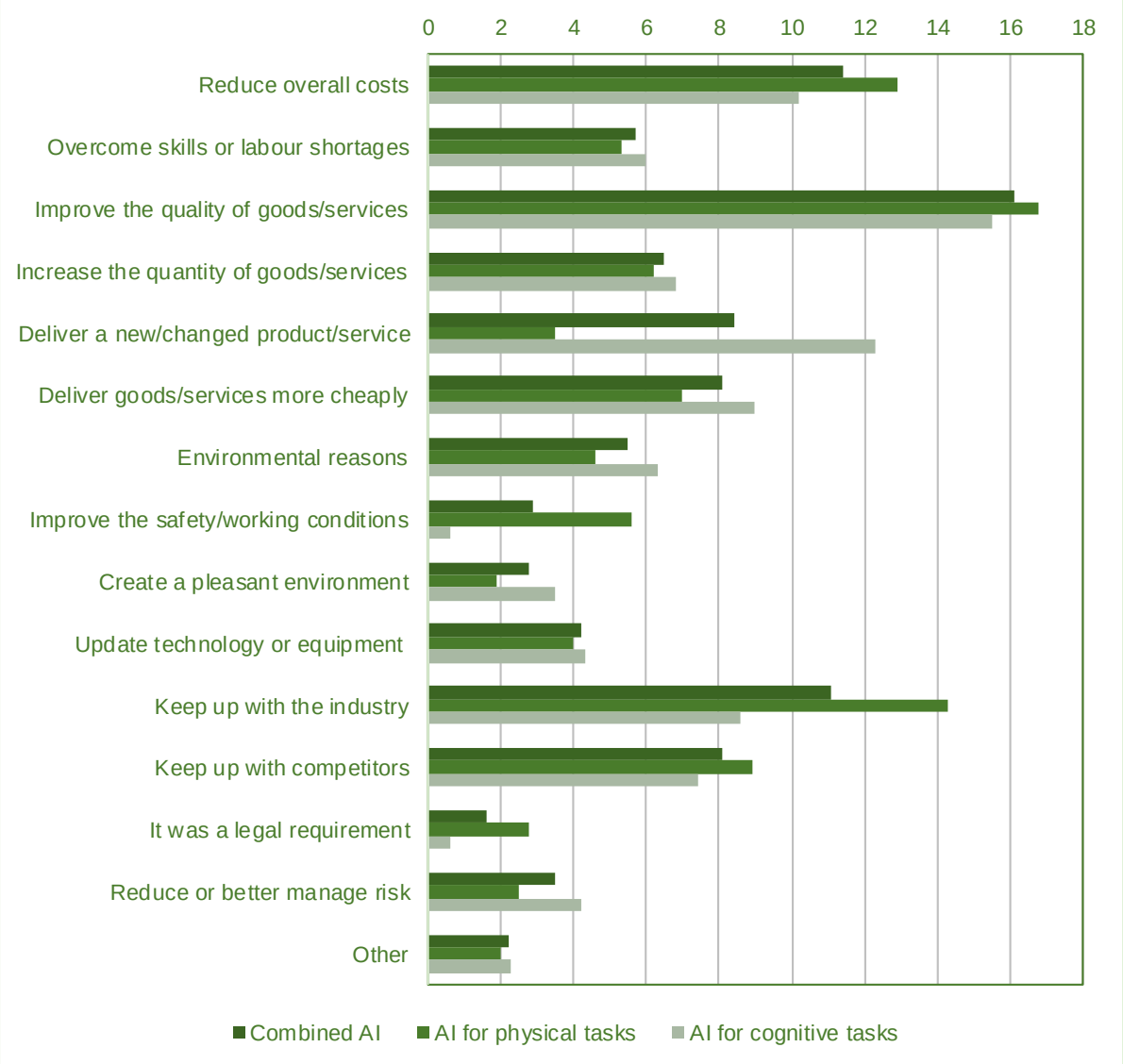
Base: Those introducing AI-enabled technology (n=226)

Reasons cited as the *main* reason for introducing AI (Figure 3 and Table 32) were relatively spread across reasons listed and largely reflected the motivations for technologies introduced by other organisations. However, the most commonly cited main reasons for introducing AI-enabled technology (for physical or cognitive tasks) were:

- to improve quality (16%)
- to reduce overall costs (11%)
- to keep up with developments in the industry (11%).

Those organisations introducing automated equipment using AI for physical tasks were slightly more likely to report these reasons as a main motivation than those introducing software using AI for cognitive tasks. Being able to deliver a new or changed product/service, environmental reasons and to reduce/manage risks were relatively more commonly cited by those organisations introducing software using AI (although these motivations were reported by a relatively small proportion of respondents).

Figure 3: Main reason for introducing the new technology (%)



Base: Those introducing AI-enabled technology (n=226)

Organisations' reasons for investing in AI can be thought of as reflecting three main approaches to AI (see Appendix 2):

- instrumental strategy – citing motivations related to improving quality, reducing costs or improving quantity/quality
- innovation strategy – motivations related to keeping up with competitors or the industry
- non-strategic – reacting to legal requirements or other reasons not covered above.

Table 3 shows the approaches to investment in AI by broad industry:

- The majority (75%) of organisations invested in AI for functional reasons, with this approach the most common across all industries, though especially manufacturing.
- Adopting an innovation strategy was less common by comparison, representing around a fifth of all organisations investing in AI. However, this approach was more common among organisations in IT, telecoms and technology services.

More detailed analysis by industry was not possible because of low base sizes.

Table 3: Main motivation for the introduction of the AI, by industry (%)

	Manufacturing, %	Construction/ Maintenance & repair, %	Retail/hospitality/ Leisure/ transport, %	Professional services, %	IT & telecoms/Technology services, %	Health/Education/Scientific research, %	Other, %	All organisations, %
Instrumental strategy	(81.2)	-	(68.2)	73.8	(65.3)	-	-	74.9
Innovation strategy	(18.8)	-	(23.2)	20.2	(34.7)	-	-	19.2
Non-strategic	(0.0)	-	(2.5)	2.6	(0.0)	-	-	1.6
Other reason	(0.0)	-	(0.0)	1.1	(0.0)	-	-	2.2
Don't know	(0.0)	-	(6.0)	2.4	(0.0)	-	-	2.1
Base, N	45	14	32	79	28	18	10	226

Base: Organisations investing in AI

Organisations' approaches to investment in AI did not differ substantially by size of organisation (Table 4):

- The majority of organisations of all sizes cited functional reasons for introducing AI.
- Very few organisations of any size reported non-strategic or 'other' reasons not listed.
- Business leaders from organisations with 250–999 employees were slightly less likely than on average to cite functional reasons for investing in AI and slightly more likely than on average to cite reasons that reflect an innovation strategy.

Table 4: Main motivation for the introduction of AI, by organisation size (%)

	10-49, %	50-249, %	250-999, %	1000+, %	All organisations, %
Instrumental strategy	(77.0)	78.9	69.9	75.2	74.9
Innovation strategy	(23.0)	15.9	23.1	17.1	19.2
Non-strategic	(0.0)	1.7	5.2	0.0	1.6
Other reason	(0.0)	1.7	0.0	4.5	2.2
Don't know	(0.0)	1.7	1.7	3.2	2.1
Base, N	37	54	54	81	226

Base: Organisations investing in AI

As with size of organisation, the approach to AI adopted by those organisations investing in AI did not vary substantially by the skills profile of the organisation. Regardless of the skills profile of the organisation, the majority cited functional reasons for introducing AI and very few cited non-strategic or 'other' reasons (Table 5). Slight exceptions to this were that:

- Organisations that have mostly high-skilled employees were slightly less likely than on average to cite functional reasons and slightly more likely than on average to cite reasons reflecting an innovation strategy.
- Organisations with staff at a range of skills levels were slightly more likely than on average to cite functional reasons for investing in AI, and notably less likely than on average to cite reasons reflecting an innovation strategy.

Table 5: Main motivation for the introduction of AI, by skill profile (%)

	Mostly high skilled (university level or higher), %	Mostly intermediate skilled (A-Level, NVQ 3 level, apprenticeships), %	Mostly lower skilled (GCSEs, NVQ level 2, basic skills or lower), %	A range of skills levels, %	All organisations, %
Instrumental strategy	67.9	(78.1)	(71.7)	85.4	74.9
Innovation strategy	24.8	(19.7)	(17.1)	11.3	19.2
Non-strategic	1.0	(0.0)	(5.6)	1.7	1.6
Other reason	5.2	(0.0)	(0.0)	0.0	2.2
Don't know	1.0	(2.3)	(5.6)	1.7	2.1
Base, N	91	42	32	60	225

Base: Organisations investing in AI

4. Organisations not investing in AI and reasons for not investing

Key points

Just 15% of organisations reported not introducing any new technology during the previous five years. These organisations were relatively more likely to be:

- in the public or third sector
- in the health or education industries
- small organisations (10–49 employees)
- newer organisations (ten years or newer)
- organisations with a lower turnover (relative to those introducing new technology).

Of the 68% of organisations that had not introduced an AI-enabled technology during the previous five years, the most commonly cited reasons for not introducing such technologies were:

- There was no call for it among clients/customers.
- They were not aware of any technology that would be of use.
- They were happy with the way things were at the organisation.

For those not investing in AI, the main reasons for not investing in AI can be grouped together by the extent to which they reflect strategic or non-strategic approaches. The majority of organisations not investing in AI (56%) can be seen as citing 'non-strategic' reasons for not investing in AI.

There was only slight variation in the approach adopted by organisation size, skills levels or industry.

Overall, 15% of respondents reported not introducing any new technology during the last five years. Organisations not introducing new technology (Table 6):

- were slightly more likely to be in the public or third sector
- were more likely to be in health or education
- tended to be newer organisations
- were more likely to be small organisations
- tended to have a lower turnover than organisations introducing technology.

Table 6: Comparison of organisation characteristics for those introducing and not introducing new technology (%)

		Introduced new technology, %	No new technology, %
What kind of organisation do you work for?	Private	87.4	83.5
	Public	9.0	11.3
	Third sector	3.6	5.2
	Total	100	100
	Base, N (unweighted)	644	115
Organisation industry	Manufacturing/construction	19.3	14.8
	Professional services	24.8	23.5
	Retail/leisure	13.4	13.9
	Logistics	14.9	3.5
	Health/education	12.1	19.1
	Other	15.5	25.2
	Total	100	100
	Base, N (unweighted)	644	115
Organisation age	Up to 5 years	9.5	11.7
	5 to 10 years	9.3	6.8
	10 to 20 years	19	15.5
	20 to 50 years	29.4	32
	50 to 75 years	7.8	10.7
	75+ years	25	23.3
	Total	100	100
	Base, N (unweighted)	612	103
Organisation size	Up to 49 employees	19.9	31.3
	50 to 249 employees	23.9	18.3
	250+ employees	56.2	50.4
	Total	100	100
	Base, N (unweighted)	644	115
Organisation income/revenue	Up to £999,999	16.0	20.0
	£1 million to £9.9 million	25.0	37.3
	£10 million to £99.9 million	24.9	21.3
	£100 million to £999.9 million	17.6	6.7
	£1 billion or more	16.5	14.7
	Total	100	100
	Base, N (unweighted)	551	75

Base: All respondents (n=644)

In terms of workforce characteristics (Table 7), compared with those organisations introducing some form of technology, **those not introducing any new technology** were:

- more likely to have a workforce that was mostly female
- less likely to have a workforce that was mostly mid-career
- less likely to have a workforce that was mostly intermediate-skilled or to have a range of skill levels.

Table 7: Comparison of workforce characteristics for those introducing and not introducing new technology (%)

		Introduced new technology	No new technology
What is the general gender balance of your UK staff?	Mostly male	30.0	24.3
	Mostly female	17.5	27.0
	Fairly balanced	51.2	38.3
	Don't know	1.2	10.4
	Total	100	100
	Base, N (unweighted)	644	115
What is the general age profile of your UK staff?	Mostly younger (30 or under)	13.4	14.8
	Mostly mid-career (31-49)	44.6	35.7
	Mostly older (50 and above)	10.7	9.6
	A range of ages	30.0	28.7
	Don't know	1.4	11.3
	Total	100	100
	Base, N (unweighted)	644	115
What is the general skills profile of your UK staff?	Mostly high skilled (university level or higher)	37.6	36.5
	Mostly intermediate skilled (A-Level, NVQ 3 level, apprenticeships)	19.9	14.8
	Mostly lower skilled (GCSEs, NVQ level 2, basic skills or lower)	12.4	15.7
	A range of skills levels	29.3	20.9
	Don't know	0.8	12.2
	Total	100	100
	Base, N (unweighted)	644	115

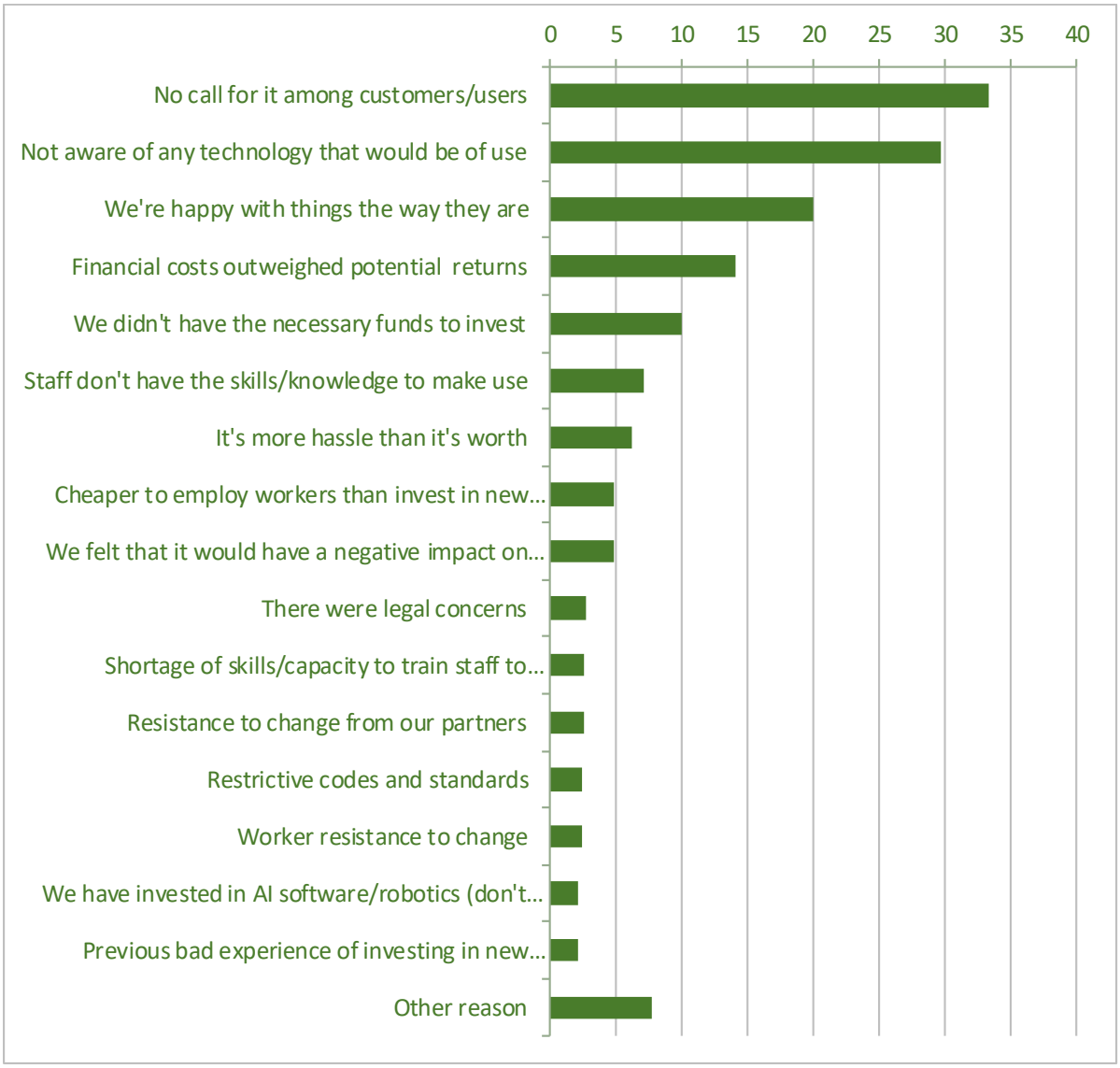
Base: All respondents (n=644)

Of the 68% of **organisations not investing in AI-enabled technology**, the most commonly cited reasons (Figure 4 and Table 33) were:

- that there was no call for it among customers/clients (33%)
- that respondents were not aware of any technology that would be of benefit to their organisation (30%)
- that they were happy with the way things were at the organisation (20%).

Interestingly, that the costs outweighed the returns, a lack of the necessary funds and not having the skills or staff to make use of AI-enabled technology were only reported by relatively few respondents (respectively 14%, 10% and 7%). This finding suggests that the associated costs and skills gaps were not seen as a barrier for the majority of organisations.

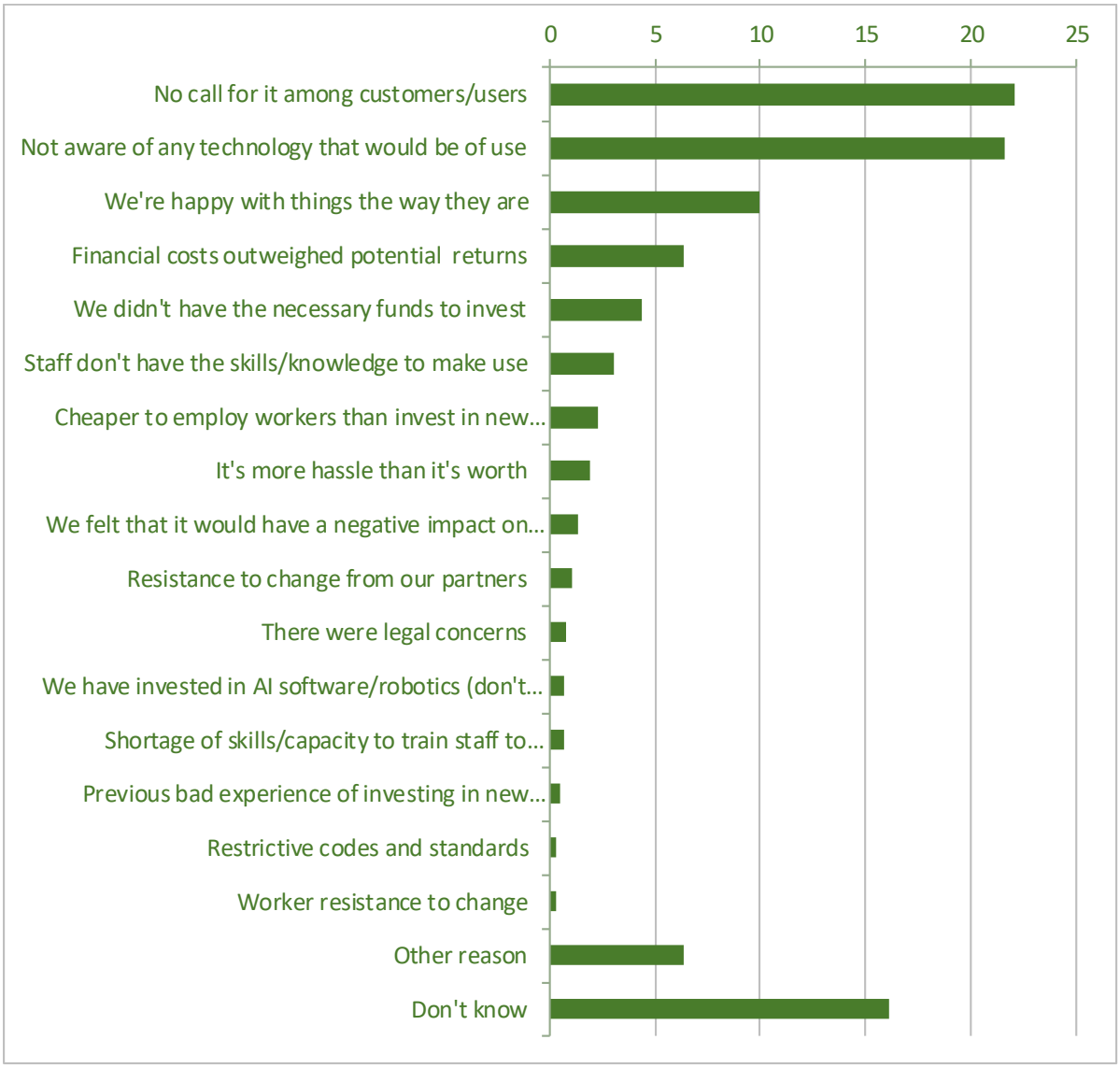
Figure 4: All reasons for not investing in AI (%)



Base: Those not investing in AI (n=533)

When looking at organisations' **main reason for not investing in AI** (Figure 5 and Table 34), a lack of demand from customers and clients (22%) and a lack of knowledge of any AI-enabled technology that might benefit their organisation (22%) were again the most commonly cited reasons. For some organisations, therefore, a lack of knowledge about the potential benefits of AI may be a barrier to adopting such technologies. The fact that only 10% of those organisations not investing in AI indicated that they were 'happy with things the way they are' perhaps suggests that some respondents could be convinced about AI if there was a clear benefit. Again, concerns about the costs, availability of funds and/or necessary skills were not commonly cited as main reasons for not investing in AI.

Figure 5: Main reason for not investing in AI (%)



Base: Those not investing in AI (n=533)

When looking at **all reasons for not investing in AI by industry** (Table 8), the majority of industries reflect the above pattern, although the following exceptions were observed:

- A lack of awareness of any technology that might be of benefit was more commonly cited as a reason by organisations in the legal industry, education, media, marketing and PR, and hospitality and leisure industries.
- A lack of call for it among customers and clients was more commonly cited as a reason for not investing among organisations in IT/telecommunications and education.
- Being happy with the way things are was a significant reason for not investing in AI for manufacturing organisations.

Table 8: Reasons for not investing in AI, by industry (%) (Base: Those not investing in AI; n=533)

All the reasons	Manufacturing	Construction	Retail	Financial services	Hospitality and leisure	Accountancy	Legal	IT & telecoms	Media/marketing/advertising/PR & sales	Medical & health services	Education	Transportation & distribution	Real estate	Other
It's more hassle than it's worth	(4.0)	(2.5)	(2.2)	3.8	(14.1)	–	(6.1)	(4.4)	(7.4)	(4.7)	(0.0)	(3.6)	–	10.1
We're happy with things the way they are	(26.2)	(21.8)	(19.8)	15.4	(21.1)	–	(8.9)	(17.9)	(21.5)	(26.1)	(12.9)	(20.3)	–	19.0
We have invested in AI software and/or robotics before and don't need to update	(0.0)	(0.0)	(10.4)	5.9	(0.0)	–	(0.0)	(5.5)	(7.5)	(0.0)	(0.0)	(3.6)	–	0.0
We are not confident that staff have the right skills or knowledge to make use of it	(9.8)	(2.7)	(10.2)	5.7	(6.7)	–	(10.0)	(11)	(11.3)	(8.6)	(3.2)	(6.6)	–	3.1
Shortage of the skills needed, or our capacity to train staff to implement new technology	(6.0)	(0.0)	(2.7)	1.8	(3.2)	–	(3.40	(0.0)	(0.0)	(5.2)	(3.2)	(3.6)	–	1.7
Previous bad experience of investing in new technologies	(2.0)	(0.0)	(0.0)	1.8	(7.0)	–	(3.1)	(5.5)	(3.9)	(0.0)	(0.0)	(3.3)	–	0.0
We felt that it would have a negative impact on staff	(4.0)	(8.2)	(10.1)	2.0	(0.0)	–	(0.0)	(7.9)	(3.9)	(6.7)	(3.7)	(7.2)	–	5.5
We were not aware of any technology that would be of use to us	(28.7)	(39.0)	(10.1)	29.8	(35.5)	–	(42.5)	(28)	(35.5)	(21.3)	(32.3)	(22.2)	–	35.7
The financial costs outweighed the potential returns	(20.3)	(5.2)	(15.4)	12.6	(13.5)	–	(14.9)	(9.9)	(10.6)	(13.5)	(15.1)	(11)	–	14.6
We didn't have the necessary funds to invest	(17.6)	(10.7)	(15.7)	9.2	(3.2)	–	(10.3)	(16.1)	(7.4)	(10.2)	(12.1)	(6.6)	–	6.4
It is cheaper to employ workers than invest in new machinery or technology	(11.4)	(5.7)	(4.9)	5.6	(7.4)	–	(0.0)	(4.4)	(3.5)	(6.6)	(0.0)	(7.2)	–	3.8
There was no call for it among our customers/users	(27.7)	(36.2)	(31.3)	29.5	(31.4)	–	(37.3)	(44.6)	(34.8)	(29.1)	(45.2)	(14.9)	–	35.3
Resistance to change by businesses with which our business has joint projects	(0.0)	(5.5)	(2.7)	0.0	(0.0)	–	(9.5)	(5.5)	(0.0)	(3.3)	(3.2)	(0.0)	–	2.1
There were legal concerns	(6.1)	(0.0)	(0.0)	5.7	(0.0)	–	(6.1)	(0.0)	(0.0)	(8.6)	(0.0)	(0.0)	–	2.3
Restrictive codes and standards	(0.0)	(0.0)	(0.0)	0.0	(0.0)	–	(6.1)	(0.0)	(3.9)	(13.8)	(0.0)	(0.0)	–	1.5
Worker resistance to change	(2.2)	(2.5)	(0.0)	0.0	(3.9)	–	(6.1)	(5.5)	(6.8)	(0.0)	(3.7)	(6.9)	–	1.5
Other reason	(2.0)	(6.0)	(2.7)	7.6	(7.1)	–	(9.0)	(7.1)	(3.5)	(9.9)	(12.8)	(6.6)	–	11.7
Don't know	(14.7)	(16.9)	(21.3)	23.4	(3.9)	–	(6.8)	(13.2)	(11.2)	(23.7)	(13.7)	(22.2)	–	12.6
Base, N (unweighted)	49	36	38	53	27	16	29	37	25	46	37	25	10	105

Table 9: Main reason for not investing in AI, by industry (%) (Base: Those not investing in AI; n=533)

Main reason (tick one only)	Manufacturing	Construction	Retail	Financial services	Hospitality and leisure	Accountancy	Legal	IT & telecoms	Media / marketing / advertising/ PR & sales	Medical & health services	Education	Transportation & distribution	Real estate	Other
It's more hassle than it's worth	(4.0)	(2.5)	(0.0)	0.0	(0.0)	–	(3.1)	(0.0)	(0.0)	(1.6)	(0.0)	(0.0)	–	3.1
We're happy with things the way they are	(12.1)	(5.2)	(12.6)	7.7	(17.6)	–	(3.1)	(4.9)	(7.4)	(12.3)	(11.3)	(17.1)	–	9.0
Have invested in AI software/robotics before (don't need to update)	(0.0)	(0.0)	(2.7)	4.0	(0.0)	–	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(3.6)	–	0.0
We are not confident that staff have the right skills or knowledge to make use of it	(3.8)	(2.7)	(4.9)	1.8	(0.0)	–	(7.2)	(11.0)	(7.5)	(0.0)	(0.0)	(0.0)	–	0.0
Shortage of the skills needed, or our capacity to train staff to implement new technology	(2.2)	(0.0)	(2.7)	0.0	(0.0)	–	(0.0)	(0.0)	(0.0)	(1.6)	(0.0)	(0.0)	–	0.0
Previous bad experience of investing in new technologies	(2.0)	(0.0)	(0.0)	0.0	(3.5)	–	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(3.3)	–	0.0
We felt that it would have a negative impact on staff	(2.2)	(0.0)	(4.8)	0.0	(0.0)	–	(0.0)	(2.4)	(0.0)	(1.6)	(0.0)	(7.2)	–	0.8
We were not aware of any technology that would be of use to us	(20.7)	(30.6)	(10.1)	22.5	(29.1)	–	(19.9)	(25.6)	(24.6)	(16.7)	(20.9)	(18.5)	–	26.0
The financial costs outweighed the potential returns	(10.2)	(5.2)	(10.4)	5.4	(7.1)	–	(5.6)	(0.0)	(10.6)	(5.0)	(6.3)	(7.7)	–	5.9
We didn't have the necessary funds to invest	(2.0)	(5.7)	(5.1)	3.8	(3.2)	–	(10.3)	(2.7)	(3.9)	(5.0)	(7.4)	(3.0)	–	4.1
It is cheaper to employ workers than invest in new machinery or technology	(6.0)	(0.0)	(2.2)	3.6	(3.5)	–	(0.0)	(0.0)	(3.5)	(3.3)	(0.0)	(3.6)	–	1.6
There was no call for it among our customers/users	(17.9)	(22.3)	(20.8)	20.4	(25)	–	(28.6)	(38)	(17.2)	(14.2)	(24.5)	(7.2)	–	25.4
Resistance to change by businesses with which our business has joint projects	(0.0)	(3.0)	(0.0)	0.0	(0.0)	–	(6.4)	(0.0)	(0.0)	(0.0)	(3.2)	(0.0)	–	0.7
There were legal concerns	(2.2)	(0.0)	(0.0)	0.0	(0.0)	–	(0.0)	(0.0)	(0.0)	(3.4)	(0.0)	(0.0)	–	1.5
Restrictive codes and standards	(0.0)	(0.0)	(0.0)	0.0	(0.0)	–	(0.0)	(0.0)	(3.9)	(1.6)	(0.0)	(0.0)	–	0.0
Worker resistance to change	(0.0)	(0.0)	(0.0)	0.0	(0.0)	–	(0.0)	(0.0)	(6.8)	(0.0)	(0.0)	(0.0)	–	0.0
Other reason	(0.0)	(6.0)	(2.7)	7.6	(7.1)	–	(9.0)	(2.2)	(3.5)	(6.4)	(12.8)	(6.6)	–	9.3
Don't know	(14.7)	(16.9)	21.3)	23.4	(3.9)	–	(6.8)	(13.2)	(11.2)	(27.2)	(13.7)	(22.2)	–	12.6
Base, N (unweighted)	49	36	38	53	27	16	29	37	25	46	37	25	10	105

When looking at **main reasons for not investing in AI** (Table 9):

- A lack of demand among clients/customers was relatively more commonly cited by IT/telecommunications and legal organisations. A lack of awareness of any AI-enabled technologies that would be of benefit was relatively more commonly cited among construction and hospitality and leisure organisations.
- Being happy with the status quo was relatively more commonly given as a reason for not investing in AI in the hospitability and leisure and transport and distribution industries.

As with reasons for investing in AI, main reasons for not investing in AI can be grouped into four broad approaches (see Appendix 2):

- strategic – answers that suggest they had considered the pros and cons of introducing AI but had decided against IT
- semi-strategic – answers that suggest that they had considered introducing AI, but either internal or external barriers prevented them from adopting it
- non-strategic – answers that suggest they had either not fully considered introducing AI or not considered it at all
- other reasons.

Overall, non-strategic approaches were far more common than other approaches, with more than half (56%) of all organisations citing reasons that fit into this category. When looking at approaches of the organisations not investing in AI by broad industry (Table 10):

- Organisations in the manufacturing industry or in retail/hospitality/leisure/transport were relatively more likely to report strategic reasons for not investing in AI.
- Organisations in professional services were relatively more likely than those in other industries to report semi-strategic reasons for not investing in AI.
- Organisations in IT, telecommunications and technology services were the most likely to report non-strategic reasons.
- Organisations in health, education, scientific research and public administration were relatively more likely than other organisations to cite other reasons for not investing in AI.

Table 10: Reasons for not investing in AI, by broad industry (%)

	Manufacturing	Construction/maintenance & repair	Retail/hospitality/Leisure/trans	Professional services	IT & telecoms/Technology services	Health/Education/Scientific	Other	All organisations
Strategic	18.0	(9.2)	15.2	9.9	(4.5)	8.5	(8.4)	10.6
Semi-strategic	10.0	(12.3)	8.7	14.0	(12.1)	9.6	(5.8)	10.7
Non-strategic	57.5	(58.3)	55.3	56.0	(67.4)	52.4	(56.5)	56.2
Other reasons	0.0	(5.3)	5.1	5.8	(4.3)	11.9	(5.1)	6.5
Don't know	14.5	(15.0)	15.7	14.3	(11.7)	17.7	(24.1)	16.1
Base, N	50	41	108	156	42	94	42	533

Base: Organisations not investing in AI

In terms of detailed industries (Table 11):

- Strategic reasons for not investing in AI were relatively more common among organisations in manufacturing, retail, transportation and logistics and media/marketing, advertising and PR.
- Semi-strategic reasons were relatively more common among organisations in the legal industry, media/marketing, advertising and PR, IT and telecoms, and retail.
- Non-strategic reasons for not investing in AI were relatively more common among organisations in hospitality and leisure, IT and telecoms, and accountancy.

Table 11: Reasons for not investing in AI, by detailed industry (%)

	Manufacturing	Construction	Retail	Financial services	Hospitality and le	Accountancy	Legal	IT & telecoms	Media/marketing/ advertising/PR & sales	Medical & health	Education	Transportation &	Real estate	Other
Strategic	18.0	(5.2)	(17.1)	12.2	(9.9)	(5.8)	(5.6)	(2.4)	(13.1)	(9.6)	(6.3)	(20.8)	-	11.7
Semi strategic	10.0	(11.4)	(13.0)	5.2	(3.0)	(8.1)	(24.0)	(13.7)	(20.5)	(11.3)	(10.6)	(6.2)	-	5.6
Non-strategic	57.5	(60.6)	(49.6)	53.4	(76.9)	(66.2)	(54.6)	(68.5)	(49.4)	(45.1)	(56.6)	(43.3)	-	57.3
Other reason	0	(6.0)	(2.3)	7.1	(6.6)	(5.3)	(9.0)	(2.2)	(3.3)	(7.6)	(12.8)	(6.2)	-	9.9
Don't know	14.5	(16.9)	(18.1)	22.1	(3.6)	(14.7)	(6.9)	(13.3)	(13.7)	(26.4)	(13.7)	(23.6)	-	15.6
Base, N	50	36	45	55	29	33	29	37	27	48	37	27	10	70

Base: Organisations not investing in AI

In terms of size (Table 12):

- Non-strategic reasons for not investing in AI were most commonly cited by small and medium-sized organisations (those with 10–49 and 50–249 employees respectively).
- Strategic reasons for not investing in AI were also relatively more likely to be cited among small and medium-sized organisations.
- Organisations with 250–999 employees were more likely than organisations of other sizes to cite semi-strategic reasons for not investing in AI.

Table 12: Reason for not investing in AI, by organisation size (%)

	10-49	50-249	250-999	1000+
Strategic	14.4	11.6	9.5	8.9
Semi-strategic	11.5	7.0	14.5	9.8
Non-strategic	63.6	64.4	52.9	50.2
Other reasons	5.3	10.0	5.7	5.8
Don't know	5.3	7.0	17.4	25.3
Base, N	127	121	107	178

Base: Organisations not investing in AI

In terms of skills profile (Table 13):

- Organisations with workforces that were mostly low-skilled were slightly more likely than other organisations to cite non-strategic reasons for not investing in AI.
- Organisations with workforces that had a mix of skill levels were slightly more likely than other organisations to report strategic reasons for investing in AI.
- Organisations with workforces that were either mostly low-skilled or mostly intermediate-skilled were relatively more likely than other organisations to cite semi-strategic reasons for not investing in AI.

Table 13: Main reason for not investing in AI, by skill profile (%)

	Mostly high skilled (university level or higher)	Mostly intermediate skilled (A-Level, NVQ 3 level, apprenticeships)	Mostly lower skilled (GCSEs, NVQ level 2, basic skills or lower)	A range of skills levels	Don't know	All organisations
Strategic	9.8	11.1	11.0	12.6	-	10.6
Semi-strategic	9.7	15.2	14.5	7.6	-	10.7
Non-strategic	56.7	59.2	61.0	57.6	-	56.2
Other reason	9.1	9.0	1.5	4.2	-	6.5
Don't know	14.7	5.5	11.9	18.0	-	16.1
Base, N	193	103	66	153	18	533

Base: Organisations not investing in AI

5. Who is involved in decisions to introduce AI and its implementation?

Key points

The departments most commonly consulted on the decision to introduce AI-enabled technologies were:

- production and operations
- research and development (R&D)
- IT.

Organisations introducing AI-enabled technology were on the whole more likely than those introducing other types of technology to consult with the departments within the organisation.

The HR department was the least likely department to be involved in the decision to introduce AI-enabled technology.

There was some variation in the proportion of business leaders reporting HR involvement in the decision to invest in AI, depending on organisation size, industry and the organisation's strategic approach. However, these differences should be treated with caution because of low base sizes.

When it comes to the implementation of AI-enabled technologies, the departments most likely to have been involved in the implementation were:

- production and operations
- IT.

There were some differences in terms of who was involved in the implementation depending upon the type of AI that was introduced, with the production and operations department relatively more likely to have been involved in the introduction of equipment using AI for physical tasks and R&D and IT departments relatively more likely to have been involved in the implementation of software using AI for cognitive tasks.

Respondents were asked which departments in their organisation were involved in the decisions both to introduce and implement new technology.

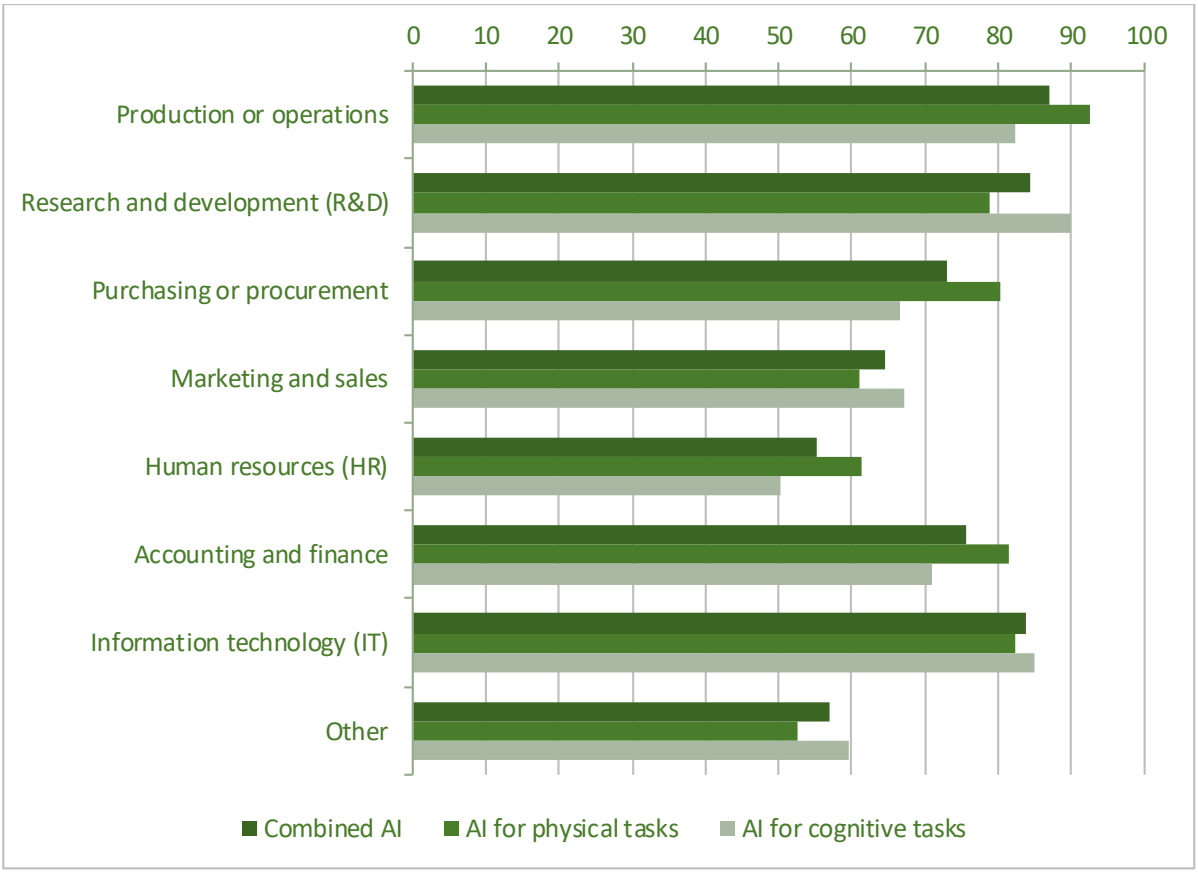
As shown in Figure 6, the departments most commonly consulted in the **decision to introduce AI-enabled technology** were:

- production and operations (87%)
- research and development (84%)
- IT (84%).

Interestingly, HR were the department least likely to be consulted about the decision to invest in AI, although more than half (55%) of organisations with an HR department did consult with this department on the decision.

Organisations were more likely to consult with departments on the decision to invest in AI than just about any other type of new technology (with the exception of consulting with the IT department on new hardware, software or online networking platforms) (Table 35).

Figure 6: Departments involved in decision to invest in AI in organisations (%)



Base: Organisations with each department who introduced AI (n=226)

There were some differences in terms of which departments were consulted about the decision to invest depending on the type of AI-enabled technology introduced:

- For **automated equipment using AI for physical tasks**, organisations were relatively more likely to consult with production and operations, purchasing or procurement, accounts and finance, and HR departments.
- For **software using AI for cognitive tasks**, research and development, IT, and marketing and sales departments were more likely to be consulted.

The likelihood of HR involvement in decisions to invest in AI-enabled technology varied depending upon the size of the organisation, its industry and the type of strategy adopted (Table 14). HR was relatively more likely to be involved in the decision to invest in AI in small organisations (with 10–49 employees), large organisations (250–999 employees) and in organisations in the retail/hospitality/leisure/transport sector. Further, the HR department was slightly more likely to be involved in the decision to invest in AI-enabled technology in organisations citing functional reasons for investing in AI than in organisations adopting an innovation strategy. However, these findings should be treated with caution because of low base sizes.

Table 14: HR involvement in the decision to invest in AI, by size of organisation and broad industry (%)

	HR Involved			
	Yes	**No**	**Total**	**Base, N**
Size of organisation				
10-49	(63.4)	(36.7)	100	37
50-249	53.5	46.5	100	54
250-999	69.9	30.1	100	54
1000+	44.7	55.3	100	81
Broad industry				
Manufacturing	50.4	49.6	100	45
Construction/maintenance & repair	-	-	100	14
Retail/Hospitality/Leisure/Transport	(86.3)	(13.7)	100	32
Professional services	48.4	51.6	100	79
IT & telecoms/Technology services	(53.2)	(46.8)	100	28
Health/Education/Scientific research	-	-	100	18
Other	-	-	100	10
Strategy towards AI				
Instrumental strategy	56.8	43.2	100	173
Innovation strategy	(48.9)	(51.1)	100	41
Non-strategic	-	-	100	3
Other strategy	-	-	100	5

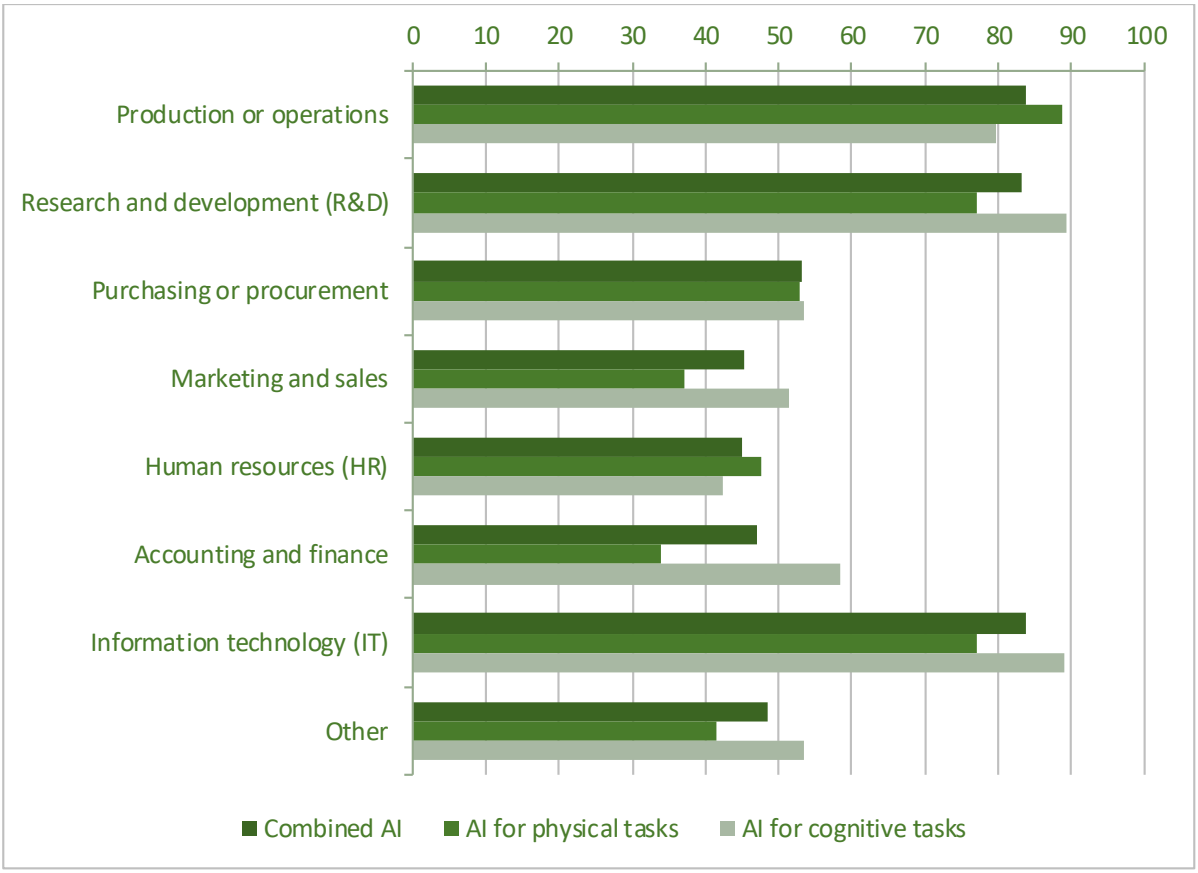
Base: Organisations with an HR department that introduced AI in previous five years

In terms of the implementation of AI and other new technologies (Figure 7 and Table 36), some departments were again much more likely to be involved than others. For example, when it comes to **AI generally**, production/operations (84%), R&D (83%) and IT departments (84%) were much more likely to be consulted. Moreover, organisations introducing AI were much more likely to involve these departments in the implementation of this particular technology than organisations introducing other technologies.

However, when **comparing the different types of AI-enabled technologies** there were some slight differences in terms of which departments were involved in the implementation:

- Production or operations were more likely to be involved in the implementation of **automated equipment using AI for physical tasks**.
- R&D and/or IT departments were more likely to be involved in the implementation of **software using AI for cognitive tasks**.

Figure 7: Departments involved in implementation of AI in organisations (%)



Base: Organisations with each department who introduced AI (n=226)

6. Who has been affected?

Key points

The departments where jobs were most likely to have changed as a consequence of the introduction of AI were:

- production and operations
- IT.

These departments were also reported to be the departments in the organisation that had been *most* affected by changes. It is notable that these were also the departments that were most commonly involved in the decision to invest in AI and its implementation.

AI-enabled technologies were more likely than other technologies to have affected jobs in these departments.

However, different types of AI tended to change jobs in different departments. Equipment using AI for physical tasks was more likely to affect jobs in production and operations and IT. Software using AI for cognitive tasks was more likely to affect jobs in the marketing and sales and accounting and finance departments.

Business leaders reported that the occupational groups that had been most affected by the introduction of AI were:

- professional and higher technical staff (28%)
- managers, administrators and intermediate managerial staff (20%)
- semi-skilled and unskilled manual workers (15%)
- clerical and junior managerial workers (13%).

Equipment using AI for physical tasks was relatively more likely to have affected workers in the semi-skilled and unskilled manual workers group, while software using AI for cognitive tasks was relatively more likely to affect workers in the professional and higher technical and clerical and junior managerial occupational groups.

Two-thirds of respondents said that they had consulted the most affected group in the decision to introduce AI-enabled technology and three-quarters of respondents said that the most affected group had been involved in the implementation of AI.

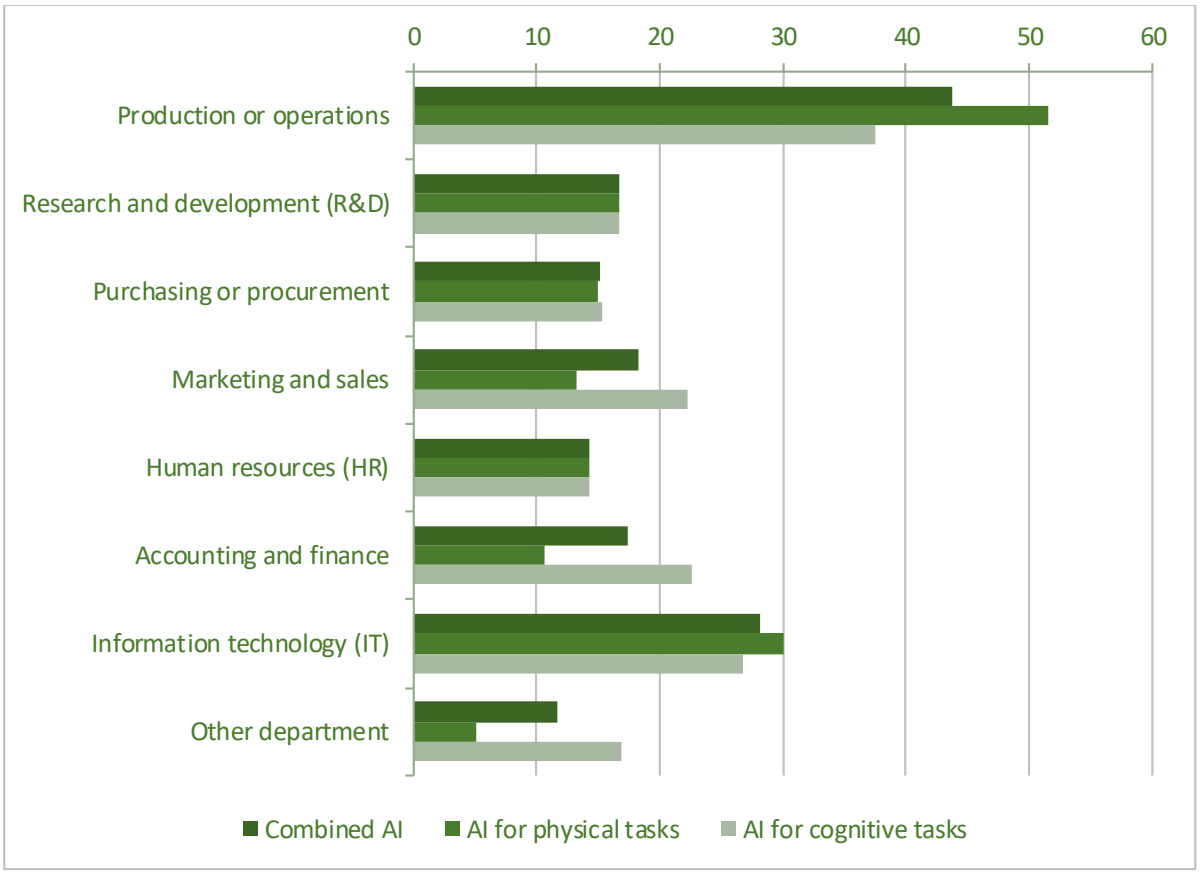
Respondents were asked to indicate the **departments in their organisation in which jobs had changed** as a consequence of introducing the technology, and which department had been most affected.

The departments where jobs were most likely to have changed as a consequence of the introduction of AI (Figure 8) were:

- production or operations (44%)
- information technology (28%).

Jobs in these departments are much more likely to have been changed by the introduction of AI than were reportedly changed by the introduction of other technologies (Table 37), with the exception of new software, which also tended to affect jobs in these departments. When comparing different types of AI-enabled technology, automated **equipment using AI for physical tasks** was more likely to have changed jobs in production/operations and IT than **software involving AI for cognitive tasks**. The reverse was true for marketing and sales and accounting and finance

Figure 8: Have jobs changed as a consequence of the introduction of AI in organisations (%)

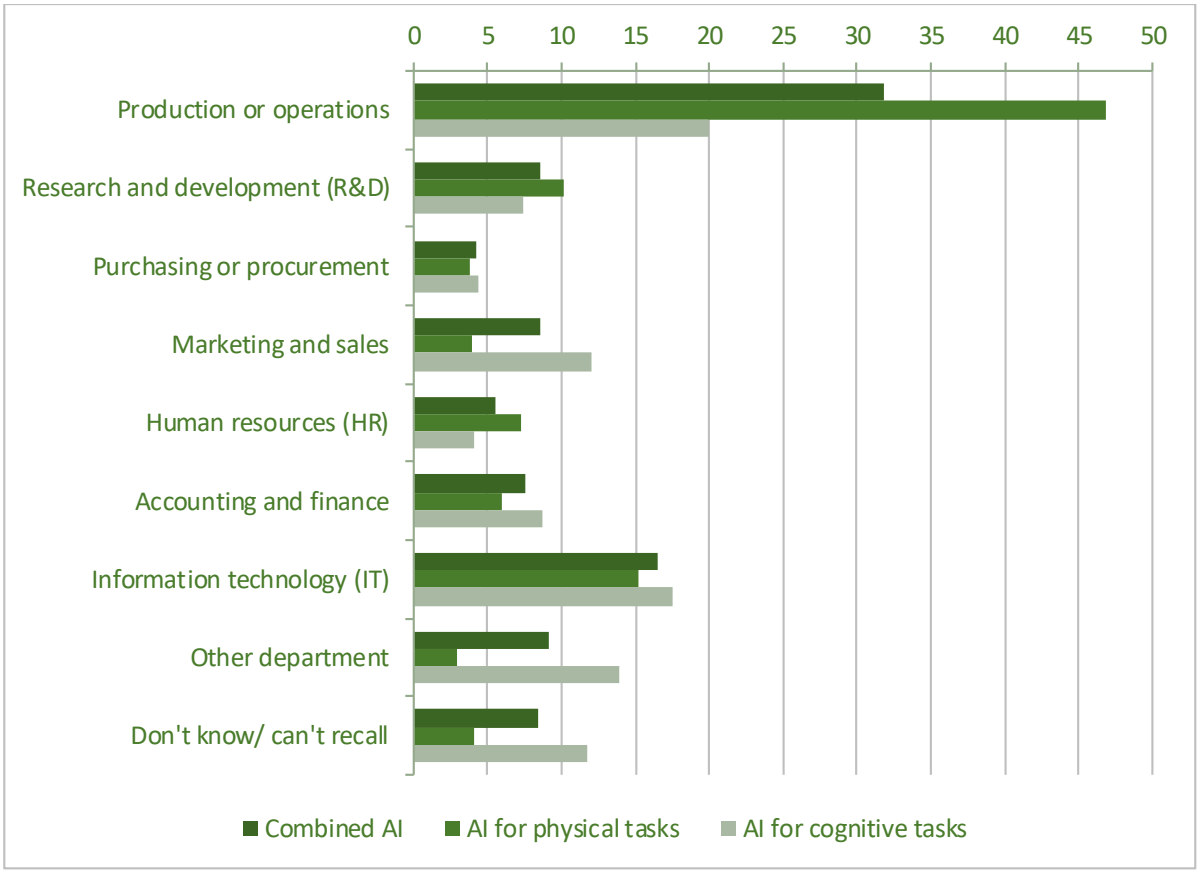


Base: Those introducing AI-enabled technology (n=226)

departments, which were more likely to be affected by software using AI to carry out cognitive tasks.

Production/operations (32%) and IT (17%) were also the two **departments likely to be most affected by the introduction of AI** (Figure 9 and Table 38). However, the production or operations department was much more likely to be reported as the department that had been most affected by changes by organisations which had introduced automated equipment using AI for physical tasks. By contrast, a range of departments were cited as being most affected by changes in organisations introducing software using AI for cognitive tasks.

Figure 9: Departments most affected by the introduction of AI in organisations (%)



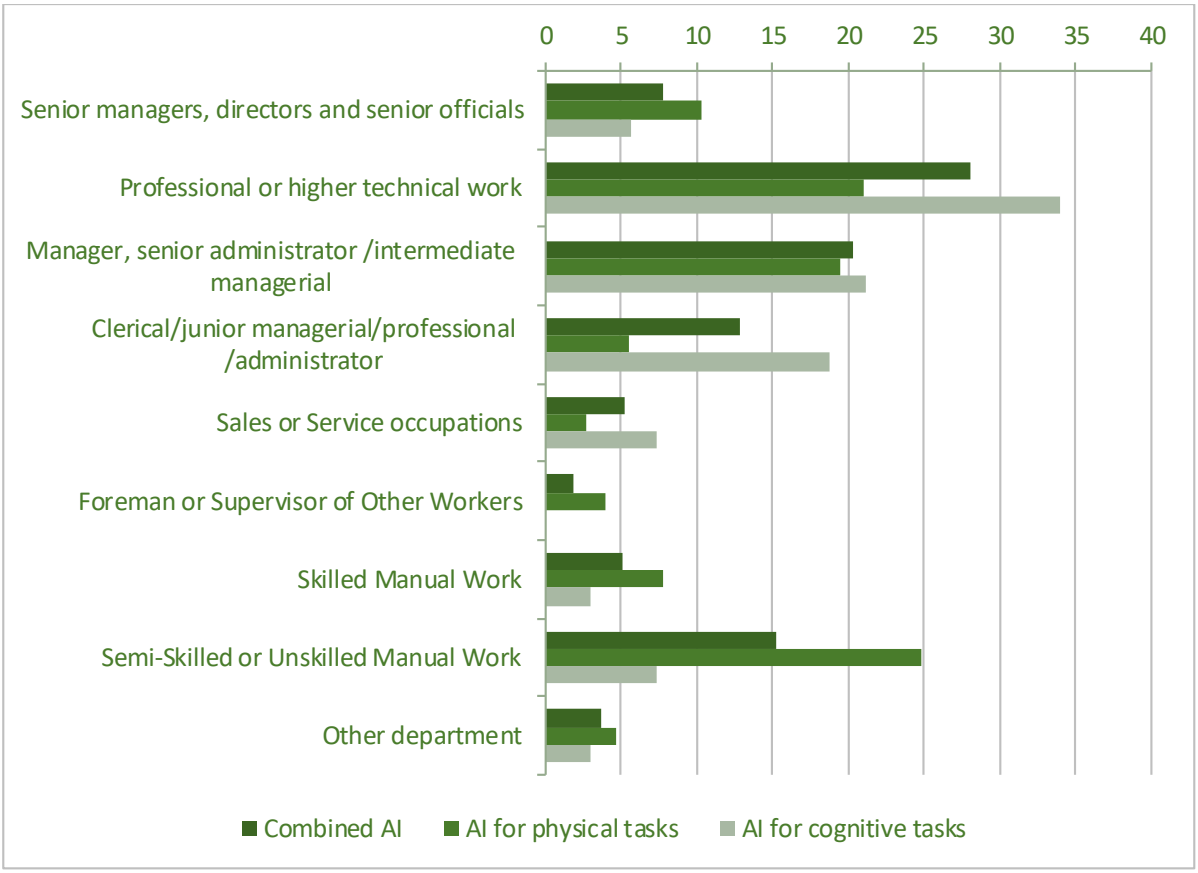
Base: Those reporting changes as a consequence of new technology (n=226)

Respondents were also asked **which occupational groups were most affected** by the introduction of AI. When looking at AI overall (for physical or cognitive tasks) the occupational groups (Figure10 and Table 39) most likely to be affected were:

- professional and higher technical staff (28%)
- managers, administrators and intermediate managerial staff (20%)
- semi-skilled and unskilled manual workers (15%)
- clerical and junior managerial workers (13%).

However, these figures mask some of the variation between organisations that introduced automated equipment using AI for physical tasks and those introducing software using AI for cognitive tasks. Those organisations introducing **AI for cognitive tasks** were more likely to report professional and higher technical workers and clerical and junior managerial staff were most affected. Those organisations introducing automated **equipment using AI for physical tasks** were much more likely to report semi-skilled and unskilled manual workers were most affected and relatively less likely to report professionals were affected.

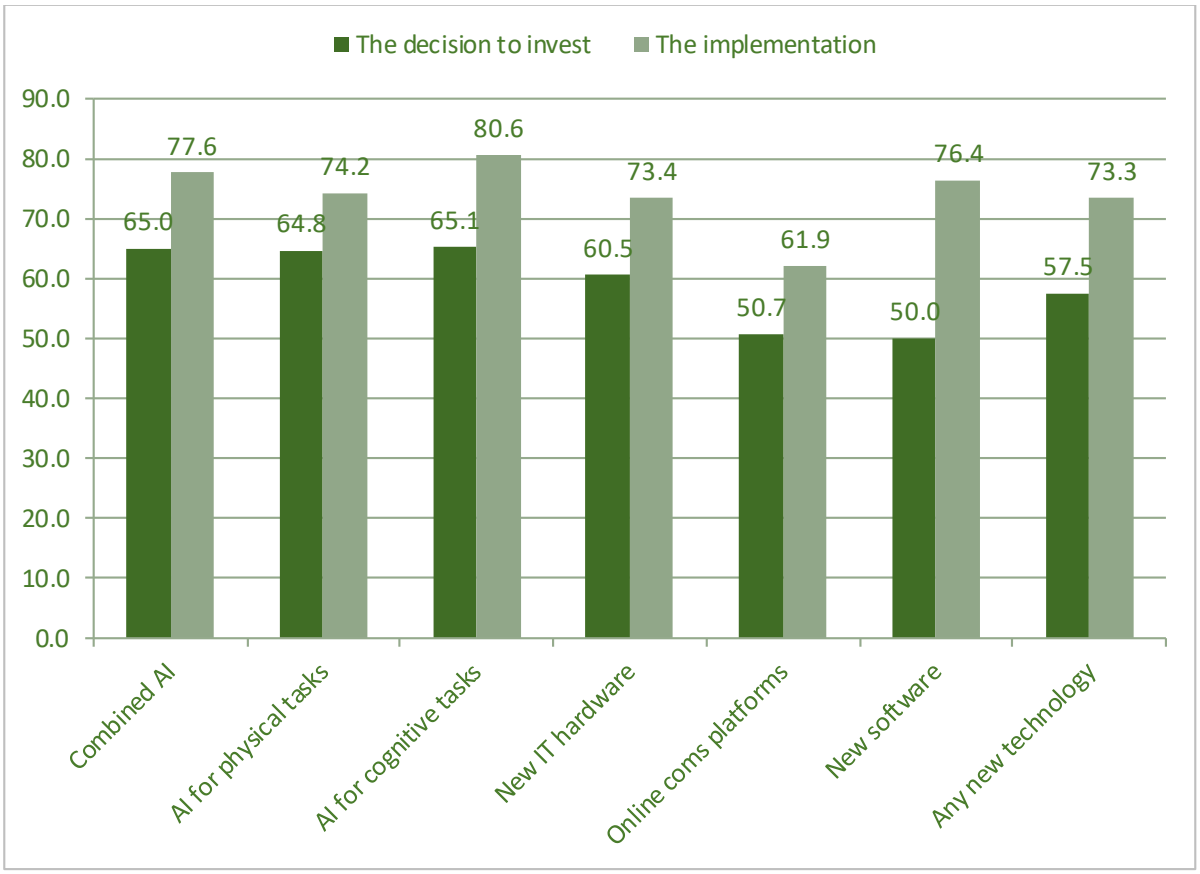
Figure 10: Occupational groups most affected by the introduction of AI in organisations (%)



Base: Those introducing a new technology (n=226)

When asked, in most organisations introducing some form of AI, business leaders reported that the occupational group that was most affected had been involved in the decision to invest in, and implementation of, the technology. Nearly two-thirds (65%) of those organisations reporting introducing some kind of AI-enabled technology reported that the most affected group had been involved in the decision to invest in the technology, and more than three-quarters (78%) of organisations said the most affected group had been involved in its implementation (Figure 11 and Table 40). This was true for both those introducing automated equipment using AI for physical tasks and for those introducing software using AI for cognitive tasks. Organisations introducing AI were slightly more likely to have consulted those most affected than were organisations introducing other new technologies.

Figure 11: Was the group most affected involved in the decision and implementation of new technology? (%)



Base: Those introducing a new technology (n=644)

7. What are the outcomes and how are employees affected?

The introduction of AI was found to have a range of outcomes, both in terms of the delivery of goods and services and for workers.

Effects on production

Key points

In terms of productivity gains, nearly all organisations introducing AI in the previous five years reported experiencing at least one of the improvements listed and very few reported experiencing none of the listed improvements.

The most commonly cited improvements were:

- improved quality of goods and/or services (52%)
- reduced costs (37%)
- increased revenue (34%).

Organisations introducing AI were more likely to report these outcomes than those introducing nearly all other types of new technology.

There was some variation in reported improvements by industry, size and skills levels, but in all cases the most commonly reported improvement was increased quality of goods and services, and this was true of organisations of any size or industry.

Reported improvements varied slightly more by skills levels than they did by organisation size or industry, with the main difference being that organisations with a mostly low-skilled workforce were more likely than other organisations to indicate that they had experienced a reduction in costs (although this finding should be treated with caution because of low base sizes).

Organisations introducing new technologies were asked to indicate from a list which of a number of improvements in performance they had experienced as a consequence of introducing that technology.[15] Any number of improvements could be selected from the list.

As shown in Section 3, reasons for investing in AI largely centred around improving quality of goods and services and reducing costs. As Table 15 shows, reported outcomes of introducing AI were in line with these aims, with the most commonly cited outcomes being:

- improved quality of goods and/or services (52%)
- reduced costs (37%)
- increased revenue (34%).

Organisations introducing AI were more likely to report these outcomes than those introducing nearly all other types of new technology. These organisations were also more likely to cite increased quantity of goods/services and/or introducing a new good or service and were much less likely to say that they had experienced none of the above improvements. Organisations that had introduced automated equipment using AI for physical tasks were relatively more likely to report

improved quality of goods and/or services, whereas those introducing AI for cognitive tasks were relatively more likely to report reduced costs.

Table 15: Outcomes of new technology introduced, by type of technology (%)

Improvements	AI for physical and/or cognitive tasks	automated equipment using AI for physical tasks	Software using AI for cognitive tasks	new IT hardware	online communication	new software	Any new technology
Improved quality of goods and/or services	51.9	56.5	48.1	42.6	46.6	48.7	47.6
Increased quantity of goods and/or services	30.4	33.9	27.5	19.6	13.3	26.5	23.5
Introduced a new good and/or service	29.4	28.2	30.3	20.2	10.8	16.2	20.6
Reduced costs	37.4	32.4	41.5	36.3	27.7	25.9	32.6
Increased revenue	34.0	32.7	35.0	16.0	11.1	15.5	21.4
None of the above	4.1	1.7	6.1	17.4	12.8	19.3	11.7
Base, N (unweighted)	226	101	125	137	115	126	644

Base: Those introducing a new technology (n=644)

Performance improvements as a consequence of the introduction of AI varied slightly by industry, size and skills mix of the organisation, although improved quality of goods and services was the most commonly reported improvement regardless of industry, size or skills profile.

Table 16 shows the proportion reporting the listed improvements by broad industry.[16] While the numbers should be treated with some caution because of low base sizes, the table shows the following:

- The vast majority of organisations in any industry reported at least one improvement as a consequence of AI, with very few reporting no improvements.
- A range of benefits to the introduction of AI were reported, and while improved quality was the most commonly reported outcome in nearly all industries (being reported by around half or more organisations), there was some variation between industries.
- Organisations in IT/telecoms and technology services were the most likely to report improved quality as an outcome but slightly less likely to report reduced cost as an outcome of the introduction of AI (although 30% still cited improved quality as an outcome).
- Improved quality, quantity and reduced costs were the most commonly reported outcomes reported by manufacturing organisations, although they were slightly less likely than organisations in other industries to cite increased revenue as an outcome.
- Reduced cost, improved quality and increased revenue were the most commonly cited outcomes in the retail/hospitality/leisure and transport industry grouping.
- Improved quality, reduced cost and increased revenue were the most commonly reported outcomes cited by professional services organisations, although relatively fewer organisations in this grouping reported these outcomes than in other industries. Organisations in this industry grouping were also relatively more likely to indicate that AI had not resulted in any of the above improvements.

Table 16: Benefits of implementing AI, by broad industries (%)

	Manufacturing	Construction/ maintenance & repair	Retail/Hospitality/ Leisure/Transport	Professional services	IT & telecoms/ Technology services	Health/Education/ Scientific research	Other
Improved quality	53.9	-	(51.6)	49.3	(57.4)	-	-
Increased quantity	43.2	-	(27.8)	26.8	(26.1)	-	-
New good/service	30.8	-	(31.9)	25.4	(27.4)	-	-
Reduced cost	38.0	-	(53.6)	34.4	(30.3)	-	-
Increased revenue	29.4	-	(44.0)	33.8	(37.4)	-	-
None of the above	2.2	-	(0.0)	8.5	(0.0)	-	-
Base, N	45	14	32	79	28	18	10

Base: Organisations introducing AI

When looking at reported improvements for organisations of different sizes (Table 17), the following can be seen:

- The most commonly reported improvement was improved quality of goods and/or services, with more than half of organisations of any size indicating that quality had improved as a consequence of AI.
- The pattern of reported improvements was broadly similar across organisations of different sizes, with around a quarter to a third reporting each improvement.
- There were slight variations: first, that organisations with 250–999 employees were slightly more likely to report increased revenue; and, second, that small organisations (10–49 employees) were slightly less likely to indicate that quantity of goods had improved or that costs had reduced.
- Very few organisations of any size reported that they had seen none of the improvements listed.

Table 17: Benefits of implementing AI, by organisation size (%)

	10-49	50-249	250-999	1000+
Improved quality of goods and/or services	(50.3)	52.5	54.5	50.6
Increased quantity of goods and/or services	(24.8)	40.3	31.4	26.9
Introduced a new good and/or service	(34.7)	28.1	33.1	25.8
Reduced costs	(32.4)	40.5	38.3	37.2
Increased revenue	(30.1)	36.6	44.0	28.0
None of the above	(2.5)	3.5	3.5	5.4
Base, N	37	54	54	81

Base: Organisations introducing AI

In terms of the skills profile within organisations (Table 18):

- Those organisations with mostly low-skilled staff were relatively less likely to indicate that quality had improved, but were more likely to indicate that quantity had increased and costs had been reduced.
- Those organisations with mostly high-skilled employees were, compared with organisations with mostly low-skilled employees, more likely to indicate that quality had improved and that revenue had increased, but were relatively less likely to indicate that costs had reduced.
- For organisations with mostly intermediate-skilled staff, improved quality and reduced costs were the most commonly cited improvements. However, these organisations were less likely than organisations with mostly high-skilled staff or low-skilled staff to indicate that quantity had increased or that revenue had increased.
- Organisations with employees with a range of skill levels were the most likely group to indicate that quality had improved (62%), but were also relatively likely to cite improvements across the board.

Table 18: Benefits of implementing AI, by skill profile of the organisation (%)

	Mostly high-skilled	Mostly intermediate-skilled	Mostly low-skill	Range of skills levels
Improved quality	52.5	(53.3)	(31.8)	61.6
Increased quantity	28.3	(20.8)	(37.2)	37.5
New good/service	29.8	(27.4)	(28.4)	31.2
Reduced cost	31.5	(41.6)	(49.5)	38.0
Increased revenue	42.6	(21.1)	(29.7)	32.2
None of the above	5.1	(2.0)	(2.5)	5.0
Base, N	91	42	32	60

Base: Organisations introducing AI

Job creation and destruction

Key points

Two-fifths (43%) of organisations reported job creation as a consequence of the introduction of AI-enabled technology. The proportion of organisations reporting job creation was higher for AI than for any other type of technology covered by the survey.

However, a similar proportion (40%) reported that jobs had been eliminated as a consequence of the introduction of AI-enabled technology. Again, this proportion was higher than for any other technology listed.

While the proportion of organisations reporting job creation and/or job destruction was similar for both types of AI covered (software or equipment), there were some differences in the skills levels of jobs affected.

Equipment using AI for physical tasks tended to eliminate jobs at the low-skill level and create jobs at a range of levels.

Software using AI for cognitive tasks tended to eliminate jobs at a range of levels and create jobs at the high-skill level.

Interestingly, HR involvement in the decision to introduce AI and its implementation tended to coincide with job creation and job destruction, and the same was true of trade union involvement. It is possible that HR or the trade union tended to be consulted in cases where significant change was expected.

Job creation was no more likely in organisations citing skills gaps and labour shortages as a motivation for investing in AI. Job destruction, however, was more likely in these organisations than in other organisations, although this finding should be treated with caution because of low base sizes.

More than two-fifths (43%) of organisations that introduced some form of AI reported that the technology had created jobs at the organisation – more than for any other form of new technology reported (Table 19). Similar proportions of organisations reported job creation as a result of introducing equipment using AI for physical tasks as for software using AI for cognitive tasks. However, whereas the jobs created following the introduction of automated **equipment using AI for physical tasks** tended to be across a range of skill levels, the jobs created as a consequence of **software using AI for cognitive tasks** were more likely to be highly skilled.

Nevertheless, while some jobs appear to have been created by the introduction of AI, a similar proportion of respondents reported that some jobs were eliminated or replaced by AI. Overall, two-fifths (40%) of organisations introducing some type of AI reported that jobs had been eliminated or replaced by it. Again, the level of job elimination was notably higher than for any other type of new technology reported, suggesting that AI has capacity for both job creation and job destruction. Interestingly, while automated **equipment using AI for physical tasks** tended to replace or eliminate low-skilled jobs (and to some extent high-skilled jobs), **software using AI for cognitive tasks** tended to replace jobs at any skill level.

Table 19: Job creation and elimination due to the introduction of new technology (%)

	AI for physical and/or cognitive tasks	Automated equipment using AI for physical tasks	Software using AI for cognitive tasks	New IT hardware	Online communication platforms	New software	Any new technology
Has the introduction of the technology created any jobs in your organisation?							
Yes	43.0	44.3	41.9	12.2	7.3	17.5	23.4
No	44.1	46.4	42.2	76.8	76.4	76.2	64.6
Don't know	13.0	9.3	15.9	11.0	16.2	6.3	12.0
Base, N (unweighted)	226	101	125	137	115	126	644
What skill level were these new jobs created?*							
Mostly high-skilled	38.9	(27.9)	48.5	–	–	–	35.4
Mostly intermediate-skilled	23.9	(24.2)	23.7	–	–	–	30.0
Mostly lower-skilled	9.8	(11.6)	8.3	–	–	–	8.9
A range of skills levels	27.4	(36.4)	19.5	–	–	–	24.5
Don't know	0.0	(0.0)	0.0	–	–	–	1.3
Base, N (unweighted)	98	45	53	18	8	22	155
Has the introduction of the technology eliminated or replaced jobs?							
Yes	39.9	42.9	37.4	14.9	6.7	10.3	21.1
No	48.1	49.6	46.8	75.4	79.3	82.5	67.5
Don't know	12.0	7.5	15.7	9.7	13.9	7.2	11.4
Base, N (unweighted)	226	101	125	137	115	126	644
What skill level were the jobs eliminated/replaced?*							
Mostly high-skilled	29.0	(27.0)	(30.9)	–	–	–	22.0
Mostly intermediate-skilled	17.3	(9.7)	(24.5)	–	–	–	18.5
Mostly lower-skilled	44.2	(51.3)	(37.5)	–	–	–	44.7
A range of skills levels	9.5	(12.0)	(7.2)	–	–	–	14.2
Don't know	0.0	(0.0)	(0.0)	–	–	–	0.7
Total	100	100	100	–	–	–	100
Base, N (unweighted)	95	46	49	19	7	12	140

Base: Those introducing a new technology (n=644); *Those reporting job creation/destruction

In organisations where HR was involved in either the decision to invest in AI or its implementation, **job creation** was more likely than it was in organisations where HR was not involved in either the decision or the implementation (50% vs 37% – Table 20). Furthermore, in organisations where HR was involved, job creation tended to be at the high-skill level or at a range of levels (40% and 31% respectively), whereas in organisations where HR was not involved, AI-enabled job creation was either at the high- or medium-skill level (47% and 36%). When comparing the stage at which HR was involved, job creation was more likely if HR was involved in implementation rather than investment decisions (59% vs 50% respectively).

Table 20: Job creation and elimination due to the introduction AI, by HR involvement (%)

	HR involvement in decision to invest or implementation of AI					
	Involved in decision	NOT involved in the decision	Involved in the implementation	NOT involved in the implementation	HR involved in decision or implementation	NOT involved in decision or in implementation
Has the introduction of the technology created any jobs in your organisation?						
Yes	50.3	37.6	59.3	34.5	50.3	36.9
No	40.6	50.7	32.5	56.3	40.2	51.6
Don't know	9.1	11.8	8.2	9.2	9.4	11.5
Base, N (unweighted)	93	70	78	91	101	63
What skill level were these new jobs created?*						
Mostly high-skilled	(37.0)	(52.3)	(41.4)	(38.4)	40.1	–
Mostly intermediate-skilled	(22.9)	(32.1)	(20.8)	(36.3)	21.1	–
Mostly lower-skilled	(8.0)	(5.9)	(8.1)	(5.0)	7.4	–
A range of skills levels	(32.1)	(9.7)	(29.7)	(20.3)	31.3	–
Base, N (unweighted)	46	26	46	31	50	23
Has the introduction of the technology eliminated or replaced jobs?*						
Yes	59.0	21.9	60.1	25.9	57.4	21.1
No	33.9	69.1	32.7	67.3	33.0	74.8
Don't know	7.1	9.0	7.3	6.8	9.6	4.1
Base, N (unweighted)	93	70	78	91	101	63
What skill level were the jobs eliminated/replaced?*						
Mostly high-skilled	33.4	–	(36.7)	(12.1)	31.7	–
Mostly intermediate-skilled	15.3	–	(17.8)	(24.4)	16.3	–
Mostly lower-skilled	42.9	–	(37.4)	(53.6)	43.9	–
A range of skills levels	8.5	–	(8.1)	(10.0)	8.1	–
Total	100	100	100	100	100	100
Base, N (unweighted)	56	16	48	25	59	14

Base: Those introducing a new technology (n=226); *Those reporting job creation/destruction

Interestingly, while job creation was more likely in organisations where HR was involved in the introduction of AI than organisations where HR was not involved, **job destruction** was also more likely. More than half (57%) of organisations where HR was involved in either the decision to invest in AI or its implementation experienced job destruction compared with just 21% where there was no HR involvement. However, in contrast to job creation, the stage of HR involvement made little difference to the chances of job destruction occurring.

Table 21: Job creation and elimination due to the introduction of AI, by whether union was consulted (%)

	Trade union involvement in introduction of AI			
	Consulted on both the decision to introduce and the implementation	**Consulted on the decision to introduce only**	**Consulted on the implementation only**	**No – trade union representatives were not consulted**
Has the introduction of the technology created any jobs in your organisation?				
Yes	62.6	(35.5)	(46.8)	37.2
No	33.3	(48.2)	(44.6)	52.8
Don't know	4.1	(16.4)	(8.6)	10.0
Base, N (unweighted)	44	32	36	50
What skill level were these new jobs created?*				
Mostly high-skilled	(32.7)	–	–	–
Mostly intermediate-skilled	(21.1)	–	–	–
Mostly lower-skilled	(12.7)	–	–	–
A range of skills levels	(33.6)	–	–	–
Base, N (unweighted)	27	18	12	19
Has the introduction of the technology eliminated or replaced jobs?*				
Yes	(58.9)	(43.7)	(45.3)	44.4
No	(36.8)	(40.3)	(46.5)	38.0
Don't know	(4.3)	(16.1)	(8.2)	17.6
Base, N (unweighted)	44	32	36	50
What skill level were the jobs eliminated/replaced?*				
Mostly high-skilled	(45.4)	–	–	–
Mostly intermediate-skilled	(17.1)	–	–	–
Mostly lower-skilled	(24.5)	–	–	–
A range of skills levels	(13.1)	–	–	–
Base, N (unweighted)	28	15	17	23

Base: Those introducing a new technology (n=226); *Those reporting job creation/destruction

Similarly, trade union involvement seemed to coincide with both job creation and job destruction (Table 21). In organisations where unions were involved in implementation only, or implementation *and* the decision to invest, **job creation** was more likely than if unions were only involved in the decision to invest or not consulted at all (47% and 63% vs 35% and 37% respectively). At the same time, **job destruction** was more likely in organisations where unions were involved in the decision *and* implementation of AI (59%) than if the union were *only* involved in the decision to invest in AI or only involved in its implementation or were not involved at all (44%, 45% and 44% respectively).

These findings are perhaps counterintuitive: it might be expected that union involvement would ameliorate job destruction. Yet that does not appear to be the case here. However, in order to understand the above findings properly would require being able to discern the direction of causality in the relationship, rather than just identifying a correlation. Unfortunately, the bivariate analysis presented here cannot discern the direction of the relationship between HR or union involvement and outcomes. It may be the case that the HR department and/or union representatives were only involved in discussions about the introduction or implementation of AI in cases where restructuring as a consequence of AI was already anticipated. Likewise, it could be the case that the HR department and/or union representatives were only consulted in discussions about implementation and job design in cases where job creation was an expected outcome of AI. Whatever the true direction of the relationship is, the findings suggest a more complex picture than might otherwise be assumed.

As noted in Section 3, around a fifth (19%) of organisations introducing AI indicated that overcoming skills or labour shortages was at least one of the motivations for introducing AI. On the one hand, it might be surmised that using AI to this end might lead to job destruction, as jobs are replaced by robots. On the other hand, where AI is used to address skills gaps or bottlenecks in production, this use could lead to increased productivity and ultimately job creation.

Table 22 shows the extent to which organisations introducing AI to address skills gaps or labour shortages (or citing other reasons only) reported job creation and job destruction respectively. The figures suggest that:

- Job creation as a consequence of the introduction of AI was no more likely in organisations citing skills gaps as a reason for introducing AI than in organisations that did not cite skills gaps as a reason.
- However, job destruction as a consequence of AI was more likely in organisations citing skills gaps as a reason for investing in AI.

Analysis of the skills levels at which jobs destruction or creation occurred was not possible because of low base sizes.

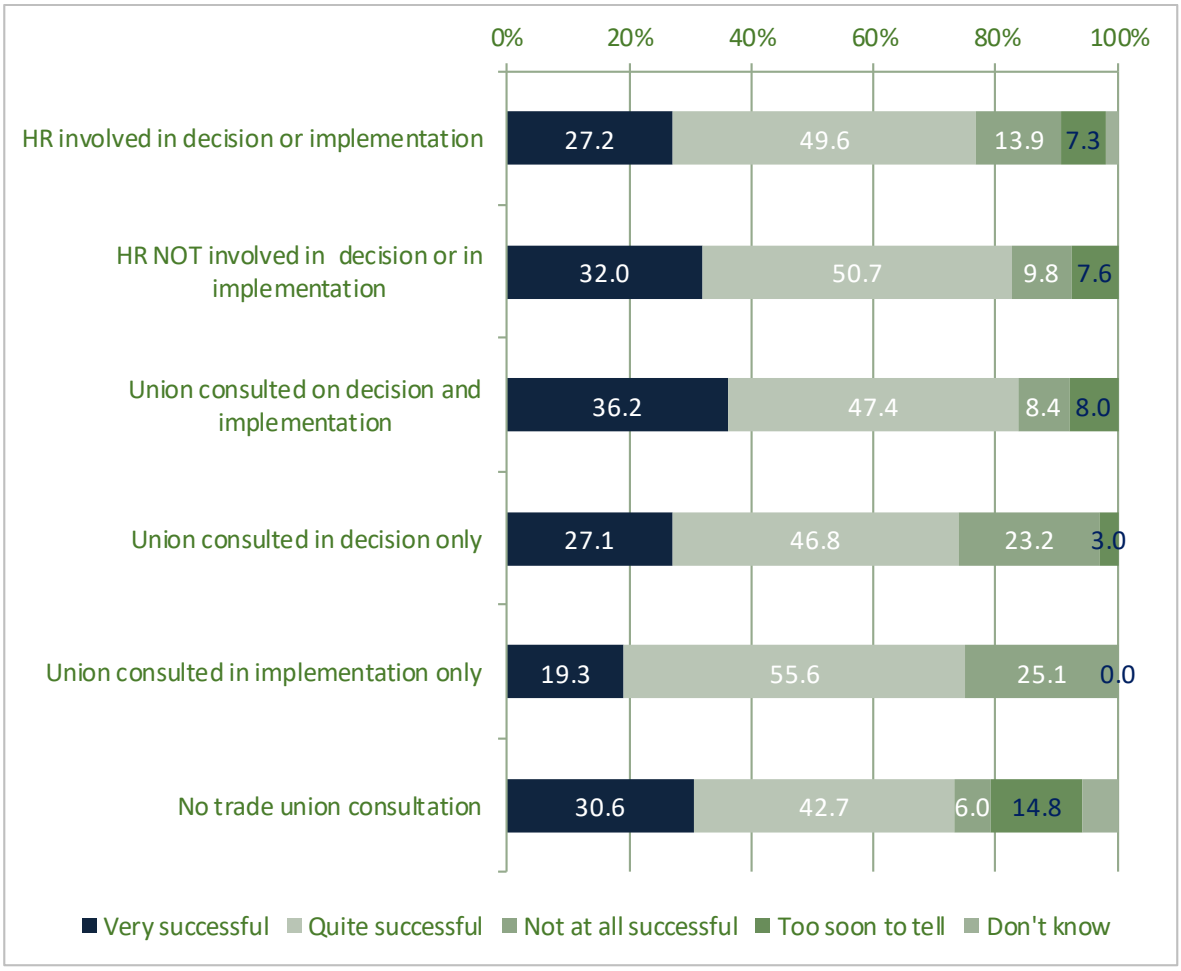
In terms of the perceived success of the introduction of AI, HR or union involvement appeared to have little impact on whether the introduction was regarded as successful (Figure 12 and Table 41).

Table 22: Jobs created and destroyed as a consequence of AI, by whether addressing skills gaps was a motivation (%)

	Cited addressing skills gaps as a motivation	Did not cite skills gaps as a motivation	All orgs
Job creation			
Jobs created	(43.8)	42.8	43.0
Jobs not created	(49.4)	42.9	44.0
Don't know	(6.8)	14.4	13.0
Total	100	100	100
Job destruction			
Jobs destroyed	(54.5)	36.5	39.9
Jobs not destroyed	(36.8)	50.7	48.1
Don't know	(8.7)	12.8	12.0
Total	100	100	100
Base, N	44	182	226

Base: Organisations introducing AI

Figure 12: How successful has the introduction of AI been, by HR and union involvement (%)



Base: Those introducing AI-enabled technology (n=101)

How jobs were affected by the introduction of AI

Key points

The introduction of AI-enabled technologies tended to have the following self-reported effects on jobs:

- Job tasks tended to stay the same or become only slightly more or less complicated (rather than far more/less complicated).
- Staff needed more skills and knowledge in three-fifths (61%) of organisations introducing AI.
- Jobs became more secure in more than two-fifths (44%) of organisations, but less secure in 18% of organisations introducing AI.
- AI was reported to have led to more control of work hours in 40% of organisations and more control of job tasks in 51% of organisations introducing AI.
- AI was reported to have led to an increase in pay in 41% of organisations introducing AI-enabled technology.

The NET effect on the number of jobs in the organisation depended on the type of AI that had been introduced:

- Equipment using AI for physical tasks led to a net increase in jobs in 39% of organisations, but a decrease in 21% of organisations.
- Software using AI for cognitive tasks led to a net increase in 31% of organisations but a decrease in 28% of organisations.

There was no real evidence to suggest that organisations investing in AI were any more or less likely than those introducing other technologies to engage workforce planning or invest in training.

In order to evaluate the effects the introduction of AI could have on jobs and job quality, respondents were asked how the jobs of staff most affected by the introduction of technology had changed. Responses to these questions can be seen in Table 23. Overall, AI was reported to have had the following effects on jobs:

- Nearly two-fifths of organisations introducing AI reported no change in the number of staff in the group most affected. AI appears to have had a greater effect on the number of staff than reported for other technologies in one direction or another.
- Automated equipment using AI for physical tasks was reported to have increased the number of staff in 39% of organisations (compared with just 31% for software using AI). The introduction of AI for cognitive tasks led to a decrease in the number of staff in 28% of organisations (compared with just 21% for automated equipment using AI).

Overall, in terms of job quality, AI was reported to have had the following effects on both work and employment:

- Job tasks were either reported to have become slightly more or slightly less complicated or to have stayed the same.
- Staff were reported to need more skills and knowledge by more than half (60%) of organisations introducing AI.

- Just over half (51%) of organisations introducing AI said staff had slightly or far more control over their job tasks, more than for any other technology reported.
- AI was reported to have led to more control over working hours in two-fifths (40%) of organisations introducing AI (other technologies had a smaller impact).
- While half (49%) of organisations introducing AI reported no change to pay for staff most affected, pay increases were reported in 41% of organisations introducing AI.
- Jobs were reported to have become more secure in 44% of organisations introducing AI, but less secure in 18% of organisations. Software using AI for cognitive tasks appears to be slightly more likely to lead to less security than automated equipment using AI for physical tasks.

In comparison with the other technologies reported in the survey, AI also tended to be:

- more likely than other technologies to make jobs more complicated
- more likely to require upskilling
- more likely to increase staff control of work hours and work tasks
- more likely to lead to an increase in pay
- more likely to make jobs more secure (although not so much in the case of software using AI for cognitive tasks).

Thus, while the effect of AI on the number of staff in the affected groups can be either positive or negative, it appears to have had a positive effect on job quality, generally speaking, for those remaining: increasing job complexity, skill requirements and workers' control, as well as increasing pay and job security.

Table 23: Effect of new technology on those most affected, by type of technology (%)

For the group most affected by the technology introduced…	AI for physical and/or cognitive tasks	Automated equipment for using AI for physical tasks	Software using AI for cognitive tasks	New IT hardware	Online communication platforms	New software	Any new technology
Their job tasks have become:							
Far more complicated	9.6	10.9	8.6	3.5	1.5	1.6	4.8
Slightly more complicated	29.6	30.6	28.7	27.1	26.0	33.3	29.2
No change	29.8	31.3	28.6	25.4	39.7	26.0	31.5
Slightly less complicated	20.5	19.7	21.2	32.1	18.7	30.7	23.9
Far less complicated	7.5	5.6	8.9	9.4	5.1	5.9	6.7
Don't know	3.0	1.9	3.8	2.5	9.0	2.4	4.0
Total	100	100	100	100	100	100	100
Staff need:							
Far more skill and knowledge	15.9	16.2	15.7	7.3	4.4	7.9	9.6
Slightly more skill and knowledge	44.9	47.5	42.8	53.2	41.7	46.4	45.8
No change	25.9	24.6	27	34.2	42.9	38.1	35.2
Slightly less skill and knowledge	9.5	8.0	10.7	2.3	1.9	3.8	4.9

Far less skill and knowledge	1.2	1.8	0.8	0.5	0.0	0.7	0.7
Don't know	2.5	1.9	3.1	2.4	9.1	3.1	3.9
Total	100	100	100	100	100	100	100
Jobs have become:							
Far more secure	13.2	15.2	11.5	6.7	4.3	5.3	8.3
Slightly more secure	30.5	35.3	26.6	22.2	13.8	14.3	21.6
No change	36.4	36.9	35.9	55.7	67.8	65.1	53.8
Slightly less secure	13.3	6.7	18.7	10.4	3.5	10.7	9.8
Far less secure	4.5	3.9	5.0	2.6	0.7	1.5	2.5
Don't know	2.1	1.9	2.3	2.3	9.8	3.1	3.9
Total	100	100	100	100	100	100	100
They have more/less control of their working hours:							
Far more control	11.3	11.9	10.8	6.5	5.8	5.9	7.9
Slightly more control	29.2	30.6	28	15.3	24.8	12.9	21.5
No change	47.5	46.5	48.3	69.6	54.6	76.8	60.6
Slightly less control	7.1	7.2	7.0	2.4	4.4	1.3	4.3
Far less control	2.0	1.9	2.0	1.7	0.6	0.7	1.3
Don't know	3.0	1.9	3.8	4.5	9.8	2.4	4.5
Total	100	100	100	100	100	100	100
They have more/less control of what tasks they do:							
Far more control	14.7	18.1	12	13.1	5.7	14	12.2
Slightly more control	35.8	32.6	38.3	29.2	35.7	31	32.9
No change	33.5	37.8	30.1	44.9	38.8	37.4	38.7
Slightly less control	8.5	7.0	9.8	8.5	9.3	13.7	9.6
Far less control	3.7	1.7	5.2	1.8	0.0	0.8	1.8
Don't know	3.8	2.8	4.6	2.5	10.6	3.1	4.8
Total	100	100	100	100	100	100	100
Number of staff in this group has:							
Increased a lot	7.6	7.7	7.5	5.2	1.3	3.3	4.9
Increased slightly	27.2	31.7	23.6	10.8	14	21.5	19.4
No change	38.0	37.6	38.3	66.0	67.7	65.4	56.4
Decreased slightly	20.2	16.6	23.2	13.6	7.1	6	13
Decreased a lot	4.8	4.5	5.1	1.2	0.7	2.3	2.5
Don't know	2.1	1.9	2.3	3.1	9.1	1.6	3.9
Total	100	100	100	100	100	100	100
Pay for staff in this group has:							
Increased a lot	9.5	10.8	8.5	3.2	0.6	0.8	4.6
Increased slightly	31.3	31.0	31.6	19.5	12.1	19.7	22.2
No change	49.4	51.9	47.4	71.8	76.4	71.7	64.4
Decreased slightly	2.0	0.9	2.9	1.9	1.9	4.5	2.3
Decreased a lot	3.1	2.6	3.6	1.7	0.0	0.0	1.4
Don't know	4.6	2.8	6.0	2.0	9.0	3.2	5.0
Total	100	100	100	100	100	100	100
Base, N (unweighted)	226	101	125	137	115	126	644

Base: Those introducing a new technology (n=644)

Business leaders who reported having introduced some form of new technology during the previous five years were asked whether the introduction of the technology had resulted in more or less training for staff. Table 24 shows that while nearly all technologies reported generally led to either more training or more training for some and less for others, there was relatively little variation between different technologies. In particular:

- Organisations introducing AI were no more likely to indicate that it had resulted in more training than organisations reporting other technologies, and in fact the introduction of AI was slightly less likely to result in more training than the introduction of new software or new IT hardware.
- Organisations introducing AI were slightly more likely than those introducing other technologies to indicate that it had resulted in either less training or no change.

Table 24: Whether the introduction of technology resulted in more or less training, by type of technology introduced (%)

Has the introduction of [the technology] resulted in…	AI for physical and/or cognitive tasks	automated equipment using AI for physical tasks	Software using AI for cognitive tasks	new IT hardware	online communication platforms	remote sensing or monitoring systems	technologically advanced materials	new software	new technology	Total
More training	32.8	32.7	32.9	42.7	30.5	-	-	47.4	-	38.0
Less training	14.2	15.8	12.8	2.5	2.9	-	-	3.8	-	6.6
A mixture of more and less training	36.2	36.4	36.1	30.0	35.9	-	-	23.4	-	32.7
No change	11.6	11.2	11.9	21.6	20.7	-	-	23.0	-	17.5
Don't know	5.2	3.9	6.3	3.3	10.0	-	-	2.3	-	5.2
Total	100	100	100	100	100	100	100	100	100	100
Base, N	226	101	125	137	115	17	16	126	7	644

Base: Organisations introducing some form of technology

Apart from investments in technology, business leaders were asked to indicate whether they had engaged in a range of other organisational changes during the previous five years. A number of these organisational changes involved making numerical changes to the composition of the workforce, which could be interpreted as reflecting a level of workforce planning.[17]

The majority of organisations indicated that they had engaged in some level of workforce planning, but there was no real evidence to suggest that those introducing AI were any more likely to engage in workforce planning than organisations introducing other types of technology (Table 25).

Table 25: Whether those introducing AI had engaged in workforce planning activities (%)

	Introduced AI (physical or cognitive), %	Invested in any other technology, %
Workforce planning	78.2	81.0
No workforce planning	21.8	20.1
Total	100	100
Base, N	226	418

Base: Organisations introducing some form of technology

8. Future investments in technology

Key points

Just over half (52%) of respondents reported that they had no planned technological investments in the next two years or did not know.

Overall, one in five reported that they were planning to invest in some form of AI-enabled technology:

- 14% of organisations planned to introduce software using AI for cognitive tasks.
- 9% of organisations planned to introduce equipment using AI for physical tasks.

Reasons given for planning to invest in AI reflected those cited by organisations who had made recent investments in AI, namely:

- to improve quality of goods and services
- to improve quantity of goods and services
- to keep up with competitors
- to deliver goods/services more cheaply or reduce costs.

The departments most likely to be consulted in the decision to invest in AI were IT, production and operations, accounting and finance, and purchasing and procurement.

The departments most likely to be involved in the planned implementation of AI were IT, production and operations, and research and development.

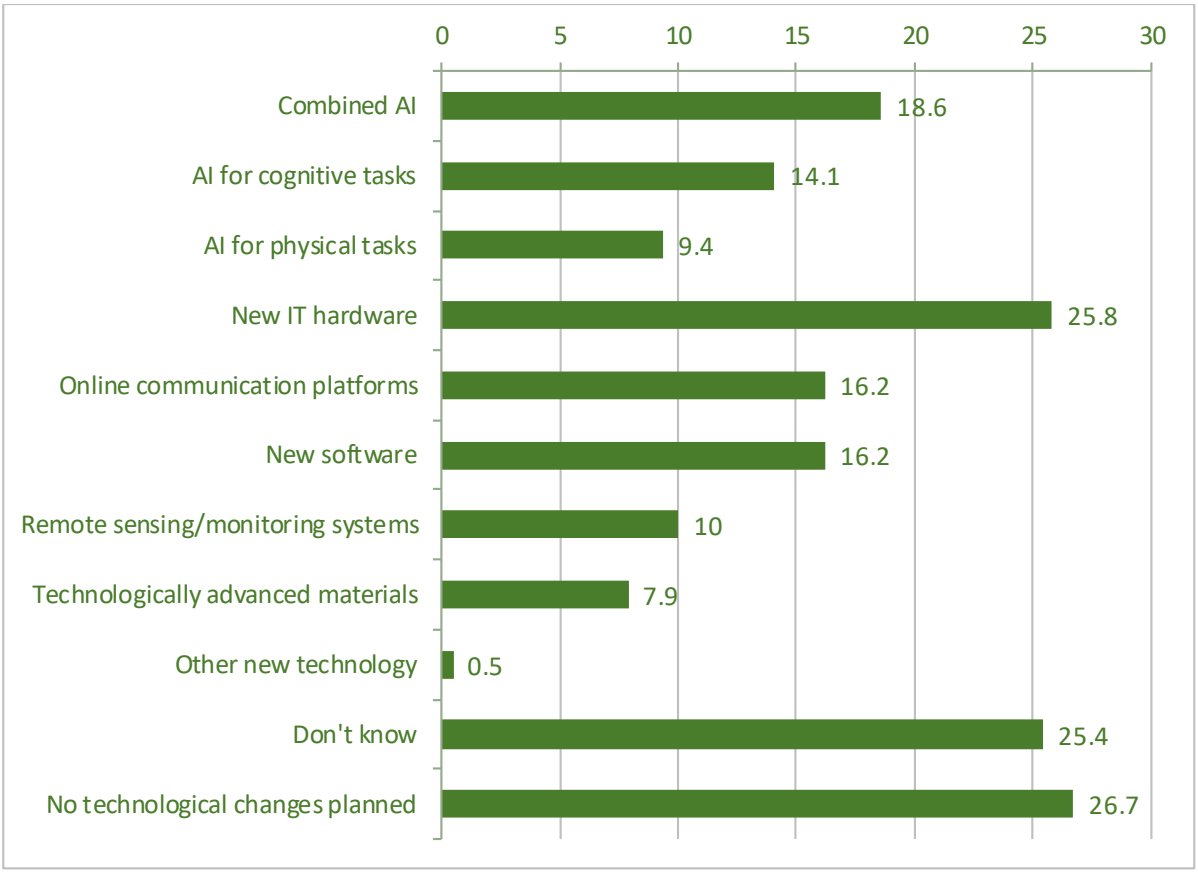
Respondents were asked whether they were planning to invest in any new technologies in the next two years and, if so, which technologies.

Compared with the questions about previous investments in new technology, considerably more respondents (52% in total) either said that they did not know whether they would invest in new technologies over the next two years or reported that they were not planning to invest in any new technologies (Figure 13 and Table 42). The technologies that were most commonly planned were:

- new IT hardware (26%)
- online communication platforms for work purposes (16%)
- new software (16%)
- software using AI for cognitive tasks (14%).

Overall, one in five (19%) of organisations reported that they were planning to invest in some form of AI over the next two years (equipment using AI for physical tasks and/or software using AI for cognitive tasks).

Figure 13: Future planned investments in the next two years (%)

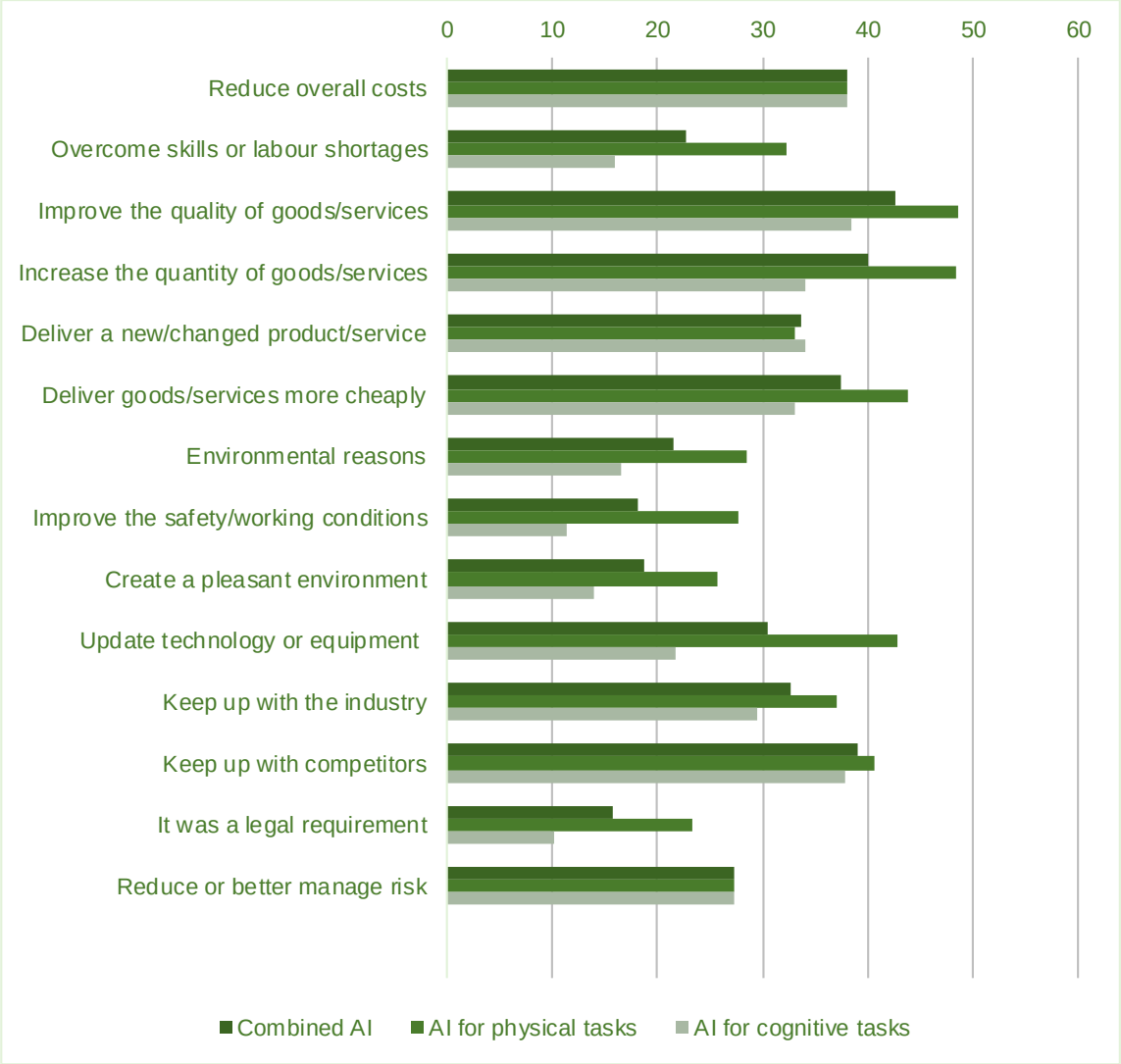


Base: All respondents (n=759)

The most commonly cited reasons for planning to invest in AI (Figure 14 and Table 43) were:

- to improve quality of goods and services (43%)
- to increase the quantity of goods and services (40%)
- to keep up with competitors (39%)
- to produce goods or services more cheaply (38%)
- to reduce costs more generally (38%).

Figure 14: All motivations for the future investment in AI (%)



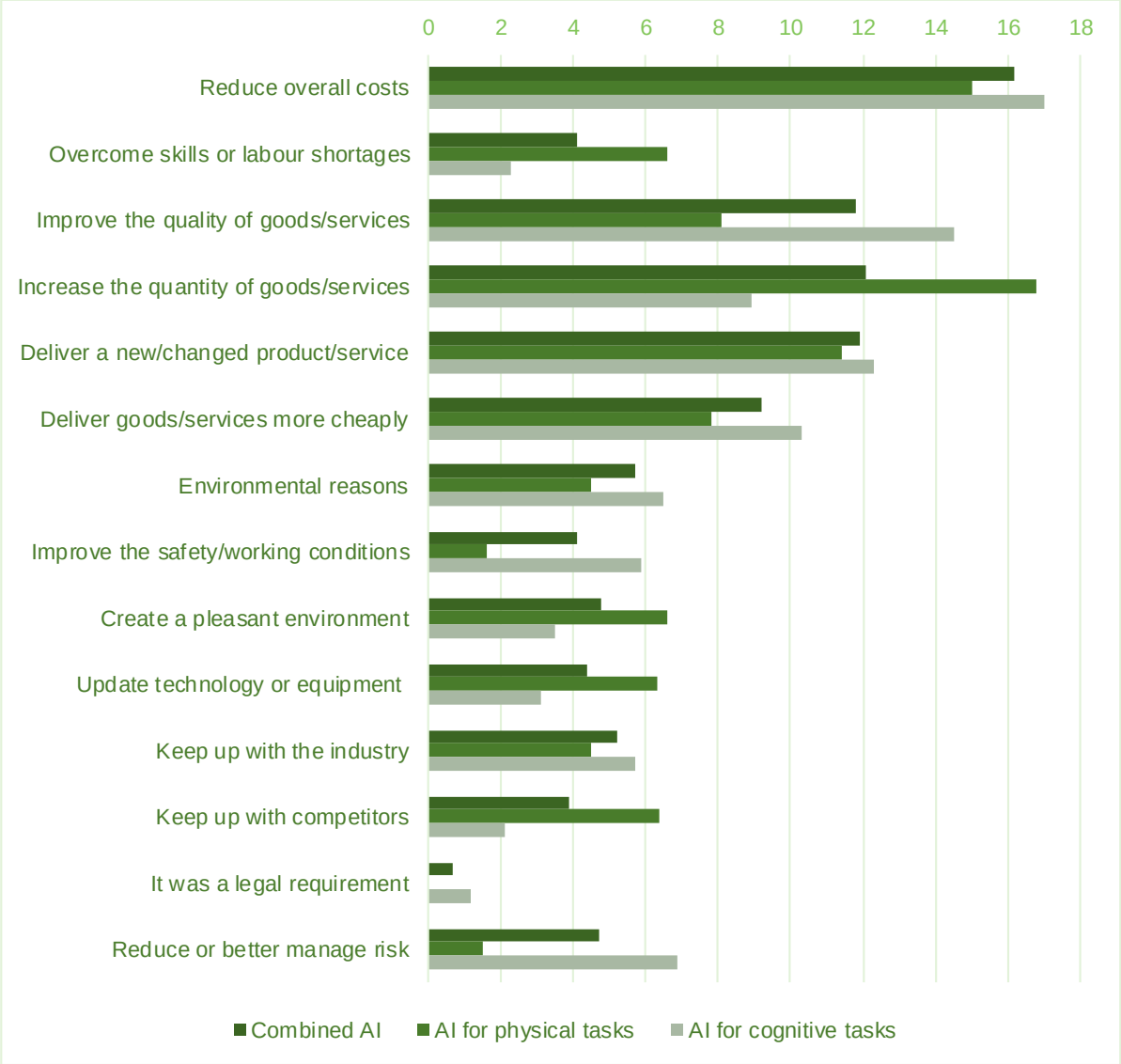
Base: Those planning on investing in AI-enabled technology (n=141)

The main motivation (Figure 15 and Table 44) for investing in AI over the next two years varied from organisation to organisation, but the most commonly reported main reasons were:

- to reduce overall costs (16%)
- to increase the quantity of goods or services (12%)
- to improve the quality of goods or services (12%)
- to be able to provide a new good or service (12%).

Comparing motivations for the two types of AI covered in the survey, increasing the quantity of goods and services was more commonly reported as a main motivation by organisations planning to introduce **equipment using AI for physical tasks** (17% vs 9%). Improving the quality of goods and services was more commonly reported as a main motivation for those planning to introduce **software using AI for cognitive tasks** (15% vs 8%).

Figure 15: Organisations' *main* motivation for the future investment on new technologies (%)



Base: Those planning on investing in new technology (n=141)

The departments most likely to be consulted in decisions to invest in AI over the next two years (Table 26) were:

- IT (87%)
- production or operations (86%)
- accounting and finance (76%)
- purchasing and procurement (73%).

As with previous investments in AI, **HR departments were less likely to have been consulted about the planned investment** in AI (59%). When comparing the two types of AI covered by the survey, production and operations, purchasing and procurement, and accounting and finance departments were more likely to have been involved in investment decisions in organisations planning to introduce equipment using AI for physical tasks.

Table 26: Departments involved in the decision to invest in planned new technologies (%)

	AI for physical and/or cognitive tasks	Automated equipment using AI for physical tasks	Software using AI for cognitive tasks	New IT hardware	Online communication platforms	New software	Base, N (with dept)
Production or operations	85.9	93.6	80.2	74.6	(62.3)	68.7	504
Research and development (R&D)	84.1	85.0	83.0	65.9	(47.2)	59.9	321
Purchasing or procurement	72.6	84.2	62.7	77.1	(68.5)	71.4	499
Marketing and sales	58.3	64.3	54.8	41.7	(50.1)	58.8	581
Human resources (HR)	58.7	61.4	57.1	49.6	(39.8)	44.3	570
Accounting and finance	76.3	87.7	68.1	69.9	(64.6)	65.8	640
Information technology (IT)	86.7	83.6	88.6	89.4	(88.8)	82.3	574
Other	45.6	49.6	43.0	52.9	(32.2)	23.2	382
Base, N (unweighted)	141	60	81	60	44	57	

Base: Those planning on investing in new technology (n=640)

Departments most likely to be involved in the planned implementation of AI (Table 27) were:

- IT (89%)
- production or operations (84%)
- research and development (73%).

The HR department was the department that was least likely to be involved in the planned implementation of AI, particularly in organisations planning to introduce software using AI for cognitive tasks.

Table 27: Departments that will be involved in the implementation of new technologies in the future (%)

	AI for physical and/or cognitive tasks	equipment using AI for physical tasks	Software using AI for cognitive tasks	new IT hardware	online communication platforms	new software	Base, N (with dept)
Production or operations	84.1	97.9	74.4	80.1	(56.9)	75.3	504
Research and development (R&D)	72.5	77.7	66.6	59.4	(58.1)	24.2	321
Purchasing or procurement	57.7	66.8	50.4	53.7	(44.8)	36	499
Marketing and sales	49.2	52.4	47.3	44.7	(54.3)	46.7	581
Human resources (HR)	45.8	57.9	38.5	45.0	(36.4)	42.9	570
Accounting and finance	52.8	54.6	51.5	58.1	(34.0)	55.3	640
Information technology (IT)	89.0	84.8	91.6	91.7	(87.4)	91.3	574
Other	50.6	58.6	45.8	66.4	(37.3)	22.9	382
Base, N	141	60	81	60	44	57	

Base: Those planning on investing in new technology (n=640)

9. Summary of findings and discussion

Key points

On the verge of a new digital revolution, there is significant debate about its effects on jobs, with debates dominated by concerns about job loss.[18] However, evaluation of any impacts is hampered by a lack of empirical evidence.[19] In relation to this debate, the new empirical evidence from the CIPD survey of business leaders about their own organisations reveals as number of important key points:

1. A significant number of organisations from a range of industries are starting to adopt technologies involving AI, although mainly in the private sector.
2. This introduction can be driven by functional as well as innovation strategies; that is, AI is introduced to improve operations, not just maintain competitiveness.
3. Not introducing AI is often a response to a lack of business need or lack of awareness.
4. The anticipated organisational improvements, whether functional or innovative, tend to be realised.
5. In analysing the impact of this AI on jobs, it is useful to disentangle AI for cognitive tasks and AI for physical tasks.
6. The effect of AI on jobs is varied and nuanced:
    - While AI does lead to some job destruction, job creation is just as likely.
    - AI has more impact on job creation and loss than other technologies.
    - The skill levels of the jobs created or destroyed depends to some extent on the type of AI introduced and its aims.
    - The occupations affected by the introduction of AI are not always those at either end of the occupational hierarchy.
    - For those occupations affected, there is some evidence of job quality improvements.
7. Based on these empirical findings, while there will be disruption for some workers, there are some grounds for cautious optimism about the future of work with AI.
8. While the outcomes are varied and nuanced, jobs are impacted by AI. Nevertheless, HR departments are not central to the decision-making on either the introduction or implementation of AI.

Summary of main findings

Nearly a third (32%) of business leaders reported that their organisation had invested in some form of AI-enabled technology in the past five years. The introduction of AI was less common than some other forms of technology investments, such as new IT hardware or the use of online communication platforms for work purposes, but was as common as the introduction of remote sensing and monitoring systems or the introduction of technologically advanced materials.

The introduction of AI-enabled technologies was more prevalent in private sector organisations, particularly organisations in the IT and telecommunications industry. Equipment using AI for physical tasks was relatively more common in the manufacturing and transportation and distribution industries and in organisations that had a primarily low-skilled workforce. Software

using AI for cognitive tasks was more prevalent in the legal industry and financial services and in organisations with a workforce that was mostly younger and highly skilled.

As with most technologies, the most commonly cited reasons for investing in AI-enabled technologies were related to improving the quality of goods and services, cutting costs and delivering goods and services more cheaply, and keeping up with competitors and the industry more widely. However, motivations for introducing software using AI for cognitive tasks were relatively more likely to relate to reducing costs, improving the quantity and quality of goods or services and keeping up with the industry or competitors, while environmental reasons and improving working conditions were more likely to be reported by those introducing AI for physical tasks.

For organisations not investing in AI, the most commonly cited reasons were a lack of call for it among customers/clients, a lack of awareness of any benefits of introducing AI, and a sense of being happy with things the way they are at the organisation.

When looking at AI-enabled technology as a whole, production and operations, R&D and IT were the departments most likely to be consulted in both the decision to invest in and implement this technology. However, the departments involved in decisions about investment and the implementation of AI varied to some degree depending upon which type of AI-enabled technology was being introduced. The production and operations and accounting and finance departments were relatively more likely to be consulted in organisations introducing equipment using AI for physical tasks. R&D, IT and marketing and sales departments were more likely to be consulted in organisations introducing software using AI for cognitive tasks.

The HR department was the department least likely to be involved in either the decision to invest or implement AI-enabled technologies, although the HR department was slightly more likely to be consulted in organisations introducing equipment using AI for physical tasks.

The departments where jobs were most likely to have changed as a result of the introduction of AI-enabled technology were production and operations and IT, and these departments were also reported to be the *most* affected departments. Staff in the production and operations department were more likely to be affected in organisations introducing equipment using AI for physical tasks, whereas staff in marketing and sales and accounting and finance were relatively more likely to be affected in organisations introducing software using AI to carry out cognitive tasks. It is noticeable that while R&D departments were highly likely to be involved in the decision to invest in AI-enabled technology and its implementation, they were highly unlikely to experience job changes as a consequence.

The introduction of AI-enabled technology appears to affect occupations at a number of different levels. However, there were some differences in terms of which occupations and types of workers were most affected depending upon the type of AI-enabled technology introduced. Professional and higher technical occupations and clerical or junior managerial occupations were more likely to be the most affected groups in organisations introducing software using AI for cognitive tasks. Semi-skilled and unskilled manual work occupations were more likely to be the most affected groups in organisations introducing equipment using AI for physical tasks.

Tying in with motivations for introducing AI, the most commonly reported organisational outcomes of the introduction of AI-enabled technology were improved quality of goods or services, reduced costs and increased revenue.

More than two-fifths of organisations introducing AI-enabled technology reported that jobs had been created as a consequence. The proportion reporting job creation was higher than for any other technology covered by the survey. However, job destruction was also more likely in organisations introducing AI-enabled technology than in organisations introducing other technologies. Again, around two-fifths of organisations introducing AI reported job destruction. In organisations introducing software using AI for cognitive tasks, job creation tended to be at a high-

skilled level, while job destruction could eliminate jobs at a range of levels. In organisations introducing equipment using AI for physical tasks, job creation tended to occur at a range of skill levels, whereas job destruction tended to eliminate mostly low-skilled jobs.

The effect that HR and/or union involvement has on the impact that the introduction of AI-enabled technology has on job creation and destruction is complex. While HR involvement in either the decision to invest in AI or its implementation tended to coincide with job creation, job destruction was also more likely in organisations where HR were involved. Likewise, union consultation also coincided with both job creation and job destruction. It is not clear whether job creation and/or destruction was a consequence of the involvement of these groups or, perhaps more likely, that these groups were consulted in cases where job creation or destruction was an anticipated outcome of the introduction of AI-enabled technology.

In terms of the effects of introducing AI-enabled technology on tasks, changes in overall number of staff and job quality (for example pay, job security and control over tasks and hours), the following effects were reported:

- The number of staff was more likely to have increased or stayed the same than to have decreased.
- Staff tended to need more skills and knowledge.
- Staff had more control over job tasks and work hours.
- Pay was reported to have remained the same (49%) or increased (41%) in the vast majority of organisations introducing AI.
- Jobs were reported to be more secure in many organisations (44%), but were less secure in a sizeable minority (18%).

Software using AI for cognitive tasks was relatively more likely to have led to a decrease in job security and the number of staff, while equipment using AI for physical tasks was relatively more likely to have led to an increase in the number of staff.

Plans for investment in AI-enabled technology over the next two years were relatively more muted than reported recent investments, although there was a relatively high level of 'don't know' responses to this question. Where the introduction of AI-enabled technology was planned, motivations revolved around increasing the quality and quantity of goods and services, keeping up with competitors and reducing costs.

Need for further research

The research presented in this report represents a first step to plugging the empirical gaps in current understanding about the impact of AI on jobs identified by Hislop et al.[20] The value of this initial survey should therefore not be under-stated. Its findings will add significantly to debate in the UK and internationally on AI and the future of work. However, the use of AI by organisations is still fairly embryonic, particularly in the public and voluntary sectors.

As this use expands and matures, there will be a need to evaluate the sustained rather than the initial impacts of AI on jobs. First, we would suggest that such research continues, however, to focus on the impact on not just the quantity of jobs but also the quality of jobs, distinguishing between types of organisations, their industries and sectors, and workforce compositions. Making the CIPD survey periodic would be one way of achieving the necessary data longitudinally, perhaps repeating it every three to five years to allow for sufficient empirical change to have occurred. Second, while generating UK data is important, we would suggest it is not sufficient if understanding is to be made comprehensive and encompass possible country effects. If definitional problems[21] can be overcome, there would be scope for extending the CIPD survey, or at least some version of it, internationally. Of course such research would require international partners. However, its data would be of significant interest to inter-governmental organisations

such as the OECD and those which have programmes of work focused on AI, automation and the future of work. Third, the value of that data would be further enhanced if there were matched surveys of both management and employee respondents or, in the case of the latter, employee representative respondents. This data might hold validity issues through data triangulation. Fourth, while survey data is needed, it could be usefully complemented by qualitative research, interview-based most obviously. In the case of the CIPD, the survey data in this report reveals that HR departments are not central to decision-making around the introduction and implementation of AI. Qualitative research might be able to dig deeper into this issue and provide insights as to why this situation exists. In other words, a mixed research approach would offer opportunity for even better understanding of the inputs into, processes surrounding and outcomes of AI and jobs within organisations.

With these suggestions, future research should be more regular, more extensive in scope and data collection, and explore more comprehensively some of the issues raised by this initial, though still important, survey.

Appendix 1: Methodology and sample profile

The data analysed in this report was generated by a new and bespoke online survey of business leaders carried out by YouGov during July 2018.

The survey was developed by the team at Warwick Institute for Employment Research and the CIPD, working with YouGov. The questionnaire focused on the following areas:

- recent investments in technology that organisations had made in the past five years
- who was involved in decisions about investment in technology (particularly AI-enabled technology) and its implementation
- the impact of recent investments in AI-enabled technology on the business of the organisation and staff
- plans for investments in new technology in the near future (next two years) and the anticipated impacts.

The sample was randomly selected from a panel of more than 850,000 British adults in the UK, which has been compiled by YouGov during the last ten years.[22] A sub-sample of eligible panellists was randomly selected by the contact database based on survey availability and whether they meet the eligibility criteria. Only those selected are able to complete the survey and they can only respond once. The invite text did not include information about the topic of the survey to try to eliminate bias.

The eligible population for the survey was business leaders (that is, those in board-level management) at organisations with ten or more employees. The questionnaire was piloted with a sample of eligible respondents. The survey achieved a response of 759 respondents.

Data are weighted based on business size (that is, number of employees) and sector (that is, private, public) to be representative of the target population using data from official ONS estimates.[23]

Sample profile

The sample profile, after weighting, can be seen in Table 28. In terms of organisations' characteristics:

- Three-quarters (75%) of respondents were from private sector organisations, 18% were from public sector organisations and 7% worked for third sector organisations.
- Respondents were from a wide range of industries. The largest, in terms of numbers of respondents, were manufacturing (11%), financial services (10%), medical and health services (10%), and education (8%).
- The organisations represented had a range of ages, but 60% were over 20 years old.
- The majority (62%) of respondents worked for large organisations; 38% were from small to medium-sized organisations (SMEs). Micro organisations, consisting of nine people or fewer, were not included in the target population for the survey.
- The majority of organisations (73%) had turnover of more than £250,000. Only 8% had a turnover of less than £250,000. A fifth of respondents (20%) declined to report their company turnover.

Table 28: Sample profile – organisation characteristics

	%	N (weighted)	N (unweighted)
Sector			
Private sector – profit-seeking (for example public limited company, partnership)	75.0	569.3	659
Public sector – government-owned or funded (for example civil service, local government)	18.0	136.6	71
Third sector – non-profit, non-governmental (for example charity, social enterprise)	7.0	53.1	29
Industry			
Manufacturing	11.0	83.6	93
Construction	5.5	41.4	48
Retail	6.0	45.8	50
Financial services	9.8	74.7	85
Hospitality and leisure	4.2	31.8	35
Accountancy	3.0	22.5	23
Legal	5.5	42.1	45
IT & telecommunications	7.8	59	64
Media/marketing/advertising/PR & sales	4.3	32.7	34
Medical & health services	9.5	71.8	58
Education	8.1	61.2	42
Transportation & distribution	4.8	36.3	36
Real estate	2.3	17.3	17
Other	18.3	138.7	129
Company age			
10 years and less	16.3	123.6	134
11 to 20 years	15.5	117.6	132
21 to 35 years	17.6	133.5	145
36 to 100 years	22.7	172.6	166
101 years or more	19.8	150.6	138
DK/prefer not to say	8.1	61.1	44
Business size (employee numbers)			
10–49	19.0	144.2	164
50–249	19.0	144.2	175
250–999	22.4	170.3	161
1,000 or more	39.6	300.3	259
Organisation's income/revenue (£)			
Below 250,000	7.6	57.4	57
250,000–1.9 million	11.8	89.8	93
2–9.9 million	13.8	104.5	119
10–99.9 million	19.6	148.5	153
100–999.9 million	14.6	111.2	102
1 billion or more	13.5	102.3	102
DK/prefer not to say	19.1	145.3	133

Base: All respondents (n=759)

In terms of workforce characteristics (Table 29):

- Nearly half (48%) of organisations had a 'fairly balanced' workforce in terms of gender.[24] Just over a quarter (27%) reported having mostly male employees and just over a fifth (21%) reported having a predominantly female workforce.
- In terms of age, 43% reported having a workforce mainly made up of mid-career workers (aged 31–49), 12% had a mainly young workforce, 11% employed mostly older workers and 30% employed workers that were a range of ages.

- In terms of skill levels, the majority of organisations represented were either mostly high-skilled (that is, university level or higher – 38%) or employed workers at a range of skill levels (28%). Nearly a fifth (19%) employed mostly intermediate-skilled workers (equivalent to A Levels) and just 12% employed mostly low-skilled workers (GCSE level or below).
- In terms of technology usage, in the majority of organisations at least half of employees regularly used computers (81%) and/or used handheld devices such as tablets or smartphones (60%). However, use of AI-enabled technologies was not as prevalent. In the majority of organisations (61%), less than a quarter of employees use robotic or automated equipment to complete physical tasks. Likewise, the majority of organisations (54%) reported that less than a quarter of employees use software or equipment using AI.[25]

Table 29: Sample profile – characteristics of workforce

	%	N (weighted)	N (unweighted)
What is the general gender balance of your UK staff?			
Mostly male	27.2	206.5	221
Mostly female	21.2	160.7	144
Fairly balanced	48.4	367.5	374
Don't know	3.2	24.4	20
What is the general age profile of your UK staff?			
Mostly younger (30 or under)	12.3	93.3	103
Mostly mid-career (31–49)	42.7	324	328
Mostly older (50 and above)	11.4	86.4	80
A range of ages	30.3	230.1	226
Don't know	3.3	25.1	22
What is the general skills profile of your UK staff?			
Mostly high-skilled (university level or higher)	37.8	286.6	284
Mostly intermediate-skilled (A Level, NVQ level 3, apprenticeships)	19.0	144.6	145
Mostly lower-skilled (GCSEs, NVQ level 2, basic skills or lower)	12.0	91.1	98
A range of skills levels	28.3	214.6	213
Don't know	2.9	22.1	19
Approximately what proportion of your UK staff regularly work with…			
…computers (for example desktops, laptops)			
More than three-quarters	57.1	433.7	430
More than half, up to three-quarters	12.1	91.6	90
About half	11.7	89	90
More than a quarter, up to half	6.6	50.4	51
A quarter or fewer	8.6	65.1	72
Don't know	3.8	29.2	26
…handheld devices (for example tablets, smartphones)			
More than three-quarters	27.8	210.7	219
More than half, up to three-quarters	13.6	103.5	107
About half	17.8	135.2	129
More than a quarter, up to half	10.1	76.4	78
A quarter or fewer	24.4	185.3	185

Don't know	6.3	47.9	41
…robotic/automated equipment (that is, to complete a physical task)			
More than three-quarters	4.2	31.7	34
More than half, up to three-quarters	5.7	43.2	44
About half	5.4	41.1	44
More than a quarter, up to half	4.5	34.5	33
A quarter or fewer	60.8	461.8	470
Don't know	19.3	146.8	134
…software/equipment that uses artificial intelligence (AI) (that is, which is able to learn from data, reasoning or self-correction)			
More than three-quarters	6.9	52.1	55
More than half, up to three-quarters	6.1	46.5	48
About half	8.0	60.8	61
More than a quarter, up to half	5.1	38.9	39
A quarter or fewer	54.3	412.2	421
Don't know	19.6	148.5	135

Base: All respondents (n=759)

Appendix 2: Categorising motivations for investing or not investing in AI

In order to understand organisational strategies towards AI, organisations were grouped together depending upon their responses to two main questions in the survey. If respondents indicated that they had invested in AI (equipment using AI for physical tasks or software using AI for cognitive tasks), they were asked what their motivations were for introducing the technology; if respondents indicated that they had not introduced an AI-enabled technology, they were asked to indicate their reasons for not investing in AI.

Approaches to investing in AI

Business leaders who reported that they had introduced AI during the previous five years were asked to indicate from a list what their motivations were for introducing the technology and which of these were their *main* reasons. Approaches towards AI were classified as either an 'instrumental strategy' (that is, organisations invested in AI to address a specific issue or problem), 'innovation strategy' (that is, organisations invested in AI in order to keep up with developments elsewhere), or as 'non-strategic' (that is, where they had to introduce AI in order to respond to a legal requirement).

Approaches to AI were based on organisations' main reason for investing in AI, as follows:

Instrumental strategy
'To reduce overall costs'
'To overcome skills or labour shortages (for example difficulty recruiting and retaining people into low-skilled jobs)'
'To improve the quality of the goods or services we deliver'
'To increase the quantity of the goods or services we deliver'
'To be able to deliver a new or changed product or service'
'So that we can deliver goods or services more cheaply'
'For environmental reasons (for example to reduce waste or prevent pollution and global warming)'
'To improve the safety or working conditions of staff'
'To make the workplace a more pleasant environment'
'To update technology or equipment that we had invested in previously'
'To reduce or better manage risk'
Innovation strategy
'To keep up to date with developments in the industry'
'To keep up with our main competitors'
Non-strategic
'It was a legal requirement (for example to respond to health and safety or data protection regulations)'
'Other (please specify)'

Approaches to not investing in AI

Business leaders who did not report investing in AI during the previous five years were asked to indicate from a list what the reasons were for not investing in AI and were asked to indicate which was the main reason.

Organisations' approaches were classified as either 'strategic', 'semi-strategic' or 'non-strategic' based on their main reason for not investing in AI, as follows:

Strategic reasons
'We have invested in AI software and/or robotics before and don't need to update it'
'We felt that it would have a negative impact on staff'
'The financial costs outweighed the potential returns'
'It is cheaper to employ workers than invest in new machinery or technology'
Semi-strategic reasons
'We are not confident that staff have the right skills or knowledge to make use of it'
'Shortage of the skills needed, or our capacity to train staff to implement new technology'
'We didn't have the necessary funds to invest'
'Resistance to change by businesses with which our business has joint projects'
'There were legal concerns'
'Restrictive codes and standards'
'Worker resistance to change'
Non-strategic reasons
'It's more hassle than it's worth'
'We're happy with things the way they are'
'Previous bad experience of investing in new technologies'
'We were not aware of any technology that would be of use to us'
'There was no call for it among our customers/users'

Appendix 3: Additional tables

Table 30: Introduction of new technology in the last five years

Over the past five years (i.e. since July 2013), has your organisation introduced ---	Introduced, %	Base, N (weighted)*
AI for Physical and/or cognitive tasks (combined)	31.7	690
- automated equipment using AI for physical tasks	*20.3*	683
- software using AI for cognitive tasks	*21.8*	684
new IT hardware	71.2	710
online communication platforms	66.8	711
remote sensing or monitoring systems	27.5	670
technologically advanced materials	24.6	661
new software	61.2	686
Other new technology	24.5	463
Any new technology	84.4	759

Base: All respondents (n=759); *Bases exclude item non-response ('Don't know')

Table 31: All reasons for introducing the new technology (%)

	AI for physical and/or cognitive tasks	Automated equipment using AI for physical tasks	Software using AI for cognitive tasks	New IT hardware	Online communication platforms	New software
All the motivations for investing on different technologies (multiple response)						
To reduce overall costs	*32.4*	28.5	35.6	32.3	20.7	32.4
To overcome skills or labour shortages	*18.6*	19.6	17.8	1.8	5.8	4.5
To improve the quality of the goods or services we deliver	*37.5*	33.7	40.6	39.5	32.7	52.8
To increase the quantity of the goods or services we deliver	*25.5*	23.0	27.6	22.8	14.0	25.5
To be able to deliver a new or changed product or service	*27.9*	20.4	34.0	25.3	23.2	33.1
So that we can deliver goods or services more cheaply	*32.6*	22.3	41.1	18.7	13.1	24.5
For environmental reasons	*19.2*	22.0	17.0	5.2	10.7	5.5
To improve the safety or working conditions of staff	*16.5*	22.8	11.4	8.5	6.3	4.5
To make the workplace a more pleasant environment	*17.0*	20.1	14.5	13.5	21.1	11.3
To update technology or equipment that we had invested in previously	*23.1*	26.4	20.5	49.7	22.0	39.9
To keep up to date with developments in the industry	*32.4*	29.5	34.7	24.6	27.3	42.7
To keep up with our main competitors	*31.7*	32.2	31.3	18.8	22.2	24.9
It was a legal requirement (for example health and safety or data protection)	*13.6*	15.8	11.7	3.9	5.9	11.4
To reduce or better manage risk	*25.8*	23.9	27.5	16.6	13.3	19.5
Other	*3.4*	2.0	4.5	4.4	6.7	6.8
Base, N (unweighted)	*226*	101	125	137	115	126

Base: Those introducing a new technology (n=644)

Table 32: Main reason for introducing the new technology (%)

	AI for physical and /or cognitive tasks	Automated equipment using AI for physical tasks	Software using AI for cognitive tasks	New IT hardware	Online communication	New software
Main motivation (tick one only)						
To reduce overall costs	*11.4*	12.9	10.2	11.7	9.9	8.4
To overcome skills or labour shortages	*5.7*	5.3	6.0	0.0	2.2	0.0
To improve the quality of the goods or services we deliver	*16.1*	16.8	15.5	21.5	17.5	26.7
To increase the quantity of the goods or services we deliver	*6.5*	6.2	6.8	3.0	2.1	5.2
To be able to deliver a new or changed product or service	*8.4*	3.5	12.3	7.0	10.3	10.0
So that we can deliver goods or services more cheaply	*8.1*	7.0	9.0	2.3	2.2	3.8
For environmental reasons	*5.5*	4.6	6.3	0.0	2.9	0.0
To improve the safety or working conditions of staff	*2.9*	5.6	0.6	0.7	2.7	0.7
To make the workplace a more pleasant environment	*2.8*	1.9	3.5	3.1	7.9	0.0
To update technology or equipment that we had invested in previously	*4.2*	4.0	4.3	28.3	7.7	14.7
To keep up to date with developments in the industry	*11.1*	14.3	8.6	4.7	9.5	10.6
To keep up with our main competitors	*8.1*	8.9	7.4	4.8	6.3	1.5
It was a legal requirement (for example health and safety or data protection)	*1.6*	2.8	0.6	0.0	2.2	2.2
To reduce or better manage risk	*3.5*	2.5	4.2	2.0	3.4	6.3
Other	*2.2*	2.0	2.3	3.2	2.9	6.0
Don't know	*2.0*	1.7	2.3	7.9	10.3	4.0
Total	*100*	100	100	100	100	100
Base, N (unweighted)	*226*	101	125	137	115	126

Base: Those introducing a new technology (n=644)

Table 33: All reasons for not investing in AI

All reasons (multiple response)	%
There was no call for it among our customers/users	33.4
We were not aware of any technology that would be of use to us	29.7
We're happy with things the way they are	20.0
The financial costs outweighed the potential returns	14.1
We didn't have the necessary funds to invest	10.0
We are not confident that staff have the right skills or knowledge to make use o	7.1
It's more hassle than it's worth	6.2
It is cheaper to employ workers than invest in new machinery or technology	4.9
We felt that it would have a negative impact on staff	4.8
There were legal concerns	2.8
Shortage of the skills needed, or our capacity to train staff to implement new t	2.6
Resistance to change by businesses with which your business has joint projects	2.6
Restrictive codes and standards	2.4
Worker resistance to change	2.4
We have invested in AI software and/or robotics before and don't need to update	2.2
Previous bad experience of investing in new technologies	2.1
Other reason	7.8
Base, N	533

Base: Those not investing in AI (n=533)

Table 34: Main reason for not investing in AI

Main reason (tick one only)	%
There was no call for it among our customers/users	22.1
We were not aware of any technology that would be of use to us	21.6
We're happy with things the way they are	10.0
The financial costs outweighed the potential returns	6.4
We didn't have the necessary funds to invest	4.4
We are not confident that staff have the right skills or knowledge to make use o	3.0
It is cheaper to employ workers than invest in new machinery or technology	2.3
It's more hassle than it's worth	1.9
We felt that it would have a negative impact on staff	1.3
Resistance to change by businesses with which your business has joint projects	1.1
There were legal concerns	0.8
We have invested in AI software and/or robotics before and don't need to update	0.7
Shortage of the skills needed, or our capacity to train staff to implement new t	0.7
Previous bad experience of investing in new technologies	0.5
Restrictive codes and standards	0.3
Worker resistance to change	0.3
Other reason	6.4
Don't know	16.1
Base, N	533

Base: Those not investing in AI (n=533)

Table 35: Departments involved in decision to invest, by type of technology (%)

	AI for physical and/or cognitive tasks	Automated equipment using AI for physical tasks	Software using AI for cognitive tasks	New IT hardware	Online communication platforms	New software	Base, N (with department)
Production or operations	87.0	92.4	82.3	71.0	56.2	79.9	395
Research and development (R&D)	84.4	78.7	89.8	(60.0)	(61.2)	(52.2)	248
Purchasing or procurement	73.0	80.3	66.5	74.5	55.8	65.0	394
Marketing and sales	64.5	61.0	67.1	49.1	51.6	60.2	446
Human resources (HR)	55.2	61.3	50.1	47.2	55.0	46.1	417
Accounting and finance	75.6	81.5	70.9	77.6	66.7	75.2	502
Information technology (IT)	83.8	82.4	85.0	89.8	91.4	90.0	473
Other	57.0	(52.7)	59.7	(33.1)	(38.8)	34.8	248
Base, N	226	101	125	137	115	126	502

Base: Organisations with each department who introduced technology (n=502, bases vary for each cell)
Note for Table 35 and 36: Remote sensing, technologically advanced materials and 'other' new technology are excluded from the table because of low base sizes

Table 36: Departments involved in implementation, by type of technology (%)

	AI for physical and/or cognitive tasks	Automated equipment using AI for physical tasks	Software using AI for cognitive tasks	New IT hardware	Online communication platforms	New software	Base, N (with department)
Production or operations	83.9	88.7	79.6	59.0	50.4	81.9	399
Research and development (R&D)	83.2	77.0	89.2	(37.6)	(46.9)	(54.5)	252
Purchasing or procurement	53.1	52.8	53.5	43.9	29.0	40.9	388
Marketing and sales	45.3	37.2	51.4	39.9	49.7	49.4	457
Human resources (HR)	44.9	47.6	42.5	38.9	42.0	49.6	429
Accounting and finance	47.1	33.8	58.3	49.1	36.3	53.2	490
Information technology (IT)	83.8	77.2	89.0	91.3	93.9	93.0	472
Other	48.6	(41.6)	53.5	(40.7)	(36.6)	36.9	266
Base, N	226	101	125	137	115	126	490

Base: Organisations with each department who introduced technology (n=490, bases vary for each cell)

Table 37: Have jobs changed as a consequence of the introduction of new technology, by type of technology introduced (%)

Have jobs in any of the following departments changed as a consequence of…? (% reporting job changes)	AI for physical and/or cognitive tasks	Automated equipment using AI for physical tasks	Software using AI for cognitive tasks	New IT hardware	Online communication platforms	New software	Any new technology	Base, N (with dept)
Production or operations	43.7	51.6	37.5	27.3	21.6	43.6	35.6	504
Research and development (R&D)	16.7	16.7	16.7	2.3	6.0	5.3	9.3	321
Purchasing or procurement	15.1	14.9	15.3	14.5	3.0	14.7	12.0	499
Marketing and sales	18.3	13.2	22.3	16.9	24.7	23.5	19.5	581
Human resources (HR)	14.3	14.3	14.2	12.5	14.3	14.2	13.3	570
Accounting and finance	17.3	10.7	22.6	22.2	14.0	24.8	18.4	640
Information technology (IT)	28.2	30.0	26.8	25.5	22.4	28.8	26.6	574
Other department	11.7	5.1	16.9	6.2	9.2	6.9	9.1	382
Base, N (unweighted)	226	101	125	137	115	126	644	

Base: Those introducing a new technology (n=644)

Table 38: Departments *most* affected by the introduction of new technology, by type of technology introduced (%)

Which of the following departments have been <u>most</u> affected by the introduction of…? (% reporting job changes)	AI for physical and /or cognitive tasks	equipment using AI for physical tasks	Software using AI for cognitive tasks	new IT hardware	online communication platforms	new software	Any new technology	Base, N (with dept)
Production or operations	31.8	46.9	20	24.9	18.7	31.8	28.7	504
Research and development (R&D)	8.6	10.1	7.4	1.2	3.0	3.7	4.5	321
Purchasing or procurement	4.2	3.8	4.4	5.0	1.4	3.9	3.5	499
Marketing and sales	8.5	3.9	12.1	10.6	20.8	13.9	12.2	581
Human resources (HR)	5.5	7.2	4.1	4.8	2.3	3.2	4.0	570
Accounting and finance	7.5	5.9	8.7	13.1	4.6	13.2	8.8	640
Information technology (IT)	16.5	15.2	17.5	15.6	8.9	11.4	14	574
Other department	9.1	2.9	13.9	9.1	13.1	6.7	9.6	382
Don't know/can't recall	8.4	4.1	11.7	15.8	27.1	12.2	14.9	504
Total	100	100	100	100	100	100	100	
Base, N (unweighted)	226	101	125	137	115	126	644	

Base: Those reporting changes as a consequence of new technology (n=644)

Table 39: Occupational groups most affected by the introduction of new technology, by type of technology introduced (%)

Which of the following *groups* have been most affected by the introduction of…? (% reporting job changes)	**AI for physical and /or cognitive tasks**	**Automated equipment using AI for physical tasks**	**Software using AI for cognitive tasks**	**New IT hardware**	**Online communication platforms**	**New software**	***Any new technology***
Senior managers, directors and senior officials	7.7	10.3	5.7	14.0	13.7	5.1	9.7
Professional or higher technical work – requiring at least degree-level qualification	28.1	21.0	33.9	22.0	18.9	28.2	24.8
Manager or senior administrator/intermediate managerial (for example finance/personnel manager, senior local government officer)	20.3	19.4	21.1	17.6	24.4	18.5	20.0
Clerical/junior managerial/professional /administrator (for example office worker, student doctor, clerk, secretary)	12.8	5.5	18.7	14.9	16.3	25.8	16.2
Sales or service occupations (for example commercial traveller, shop assistant, nursery nurse, care assistant, paramedic)	5.2	2.7	7.4	11.4	10.8	7.8	8.2
Foreman or supervisor of other workers (for example building site foreman, supervisor of cleaning workers)	1.8	3.9	0.0	1.1	0.6	0.7	1.9
Skilled manual work (for example plumber, electrician, fitter)	5.1	7.8	2.9	1.9	2.8	3.8	3.9
Semi-skilled or unskilled manual work (for example machine operator, waitress, labourer, driver, call centre worker)	15.2	24.8	7.4	8.5	3.4	4.6	9.0
Other department	3.7	4.7	3.0	8.7	9.1	5.4	6.3
Total	100	100	100	100	100	100	100
Base, N (unweighted)	226	101	125	137	115	126	644

Base: Those introducing a new technology (n=644)

Table 40: Was the group most affected involved in the decision and implementation of new technology? (%)

Were staff from the group most affected involved in…?	AI for physical and/or cognitive tasks	Automated equipment using AI for physical tasks	Software using AI for cognitive tasks	New IT hardware	Online communication platforms	New software	Any new technology
The decision to invest	65.0	64.8	65.1	60.5	50.7	50.0	57.5
The implementation	77.6	74.2	80.6	73.4	61.9	76.4	73.3
Base, N (unweighted)	226	101	125	137	115	126	644

Base: Those introducing a new technology (n=644)

Table 41: How successful has the introduction of AI been, by HR and union involvement (%)

	HR involvement		Union involvement			
	HR involved in decision or implementation	HR NOT involved in decision or in implementation	Union consulted on decision and implementation	Union consulted on decision only	Union consulted on implementation only	No trade union consultation
How successful would you say the introduction of AI has been?						
Very successful	27.2	32.0	(36.2)	(27.1)	(19.3)	30.6
Quite successful	49.6	50.7	(47.4)	(46.8)	(55.6)	42.7
Not at all successful	13.9	9.8	(8.4)	(23.2)	(25.1)	6.0
Too soon to tell	7.3	7.6	(8.0)	(3.0)	(0.0)	14.8
Don't know	2.0	0.0	(0.0)	(0.0)	(0.0)	6.0
Base, N (unweighted)	101	63	44	32	36	50

Base: Those introducing AI-enabled technology (n=101); *Those reporting job creation/destruction

Table 42: Future planned investments in the next two years

Type of new technology (tick all that apply)	%
Automated software or equipment for physical and/or cognitive tasks	18.6
- Introduce AI, robotic or automated software to undertake a cognitive or non-physical task	*14.1*
- Introduce AI, robotic or automated equipment to undertake a physical task	*9.4*
Introduce new IT hardware (e.g. computers, hand-held devices), not including maintenance upgrades	25.8
Introduce online communication/networking platforms for work purposes (e.g. instant messaging, video conferencing, social networking)	16.2
Introduce remote sensing or monitoring systems (e.g. smart detection systems, GPS)	10.0
Introduce high-performance or technologically advanced materials	7.9
Introduce other new software, not including maintenance upgrades	16.2
Other	0.5
Don't know	25.4
No technological changes are planned in the next 2 years	26.7
Base, N (unweighted)	759

Base: All respondents (n=759)

Table 43: All the motivations for future investment on new technologies (%) (Base: Those planning on investing in new technology; n=363)

All motivations (tick all that apply)	AI for physical and/or cognitive tasks	Automated equipment using AI for physical	Software using AI for cognitive tasks	New IT hardware	Online communication platforms	Remote sensing or monitoring	Technologically advanced	New software	New technology	Any new technology
To reduce overall costs	38.0	38.1	38	16.6	(24.4)	–	–	27.2	–	29.8
To overcome skills or labour shortages (for example difficulty recruiting and retaining staff)	22.7	32.3	15.9	5.5	(7.8)	–	–	8.7	–	13.1
To improve the quality of the goods or services we deliver	42.7	48.7	38.5	32.7	(35.4)	–	–	42.2	–	37.1
To increase the quantity of the goods or services we deliver	40.0	48.4	34.1	21.4	(13.4)	–	–	34.2	–	28.7
To be able to deliver a new or changed product or service	33.6	33.1	34	26.2	(21.9)	–	–	32	–	30
So that we can deliver goods or services more cheaply	37.5	43.9	33	17.7	(23.6)	–	–	17.1	–	24.8
For environmental reasons (for example to reduce waste or prevent pollution and global warming	21.6	28.6	16.6	10.9	(23.1)	–	–	7.3	–	18.3
To improve the safety or working conditions of staff	18.1	27.7	11.4	5.7	(27.1)	–	–	7.3	–	14.9
To make the workplace a more pleasant environment	18.8	25.7	14	14.2	(35.5)	–	–	10	–	17.1
To update technology or equipment that we had invested in previously	30.5	42.8	21.8	31.3	(26.2)	–	–	44.7	–	29.1
To keep up to date with developments in the industry	32.6	37	29.5	21.2	(27.5)	–	–	39.6	–	30.4
To keep up with our main competitors	39	40.7	37.8	20.2	(16.5)	–	–	24.2	–	27.5
It was a legal requirement (for example to respond to health and safety or data protection)	15.7	23.4	10.2	3	(6.0)	–	–	6	–	9.9
To reduce or better manage risk	27.4	27.3	27.4	14.6	(15.4)	–	–	27.2	–	22.3
Other	0	0	0	1.5	(6.7)	–	–	1.4	–	2.8
Base, N (unweighted)	141	60	81	60	44	29	29	57	3	363

Table 44: Organisations' main motivation for the future investment in new technologies (%)

Main motivations (tick one only)	AI for physical and/or cognitive tasks	Automated equipment using AI for physical tasks	Software using AI for cognitive tasks	New IT hardware	Online networking / communication platforms	New software	Any new technology
To reduce overall costs	16.2	15.0	17.0	8.8	(1.9)	6.8	11.3
To overcome skills or labour shortages (for example difficulty recruiting and retaining staff)	4.1	6.6	2.3	3.0	(1.9)	3.2	3.0
To improve the quality of the goods or services we deliver	11.8	8.1	14.5	15.3	(23.8)	18.4	13.4
To increase the quantity of the goods or services we deliver	12.1	16.8	8.9	8.9	(5.6)	9.9	10.1
To be able to deliver a new or changed product or service	11.9	11.4	12.3	14.7	(4.1)	5.5	10.0
So that we can deliver goods or services more cheaply	9.2	7.8	10.3	7.5	(3.9)	6.1	6.9
For environmental reasons (for example to reduce waste or prevent pollution and global warming)	5.7	4.5	6.5	1.5	(6.5)	0.0	4.6
To improve the safety or working conditions of staff	4.1	1.6	5.9	1.3	(8.3)	3.2	3.8
To make the workplace a more pleasant environment	4.8	6.6	3.5	1.3	(8.3)	0.0	4.0
To update technology or equipment that we had invested in previously	4.4	6.3	3.1	17.0	(13.0)	11.2	8.1
To keep up to date with developments in the industry	5.2	4.5	5.7	8.9	(7.8)	17.0	8.7
To keep up with our main competitors	3.9	6.4	2.1	2.7	(2.1)	7.5	5.1
It was a legal requirement (for example to respond to health and safety or data protection)	0.7	0.0	1.2	0.0	(0.0)	2.9	0.7
To reduce or better manage risk	4.7	1.5	6.9	6.1	(6.0)	7.2	6.0
Base, N (unweighted)	141	60	81	60	44	57	363

Base: Those planning on investing in new technology (n=363)

Notes

[1] OECD. (2017) *Future of work and skills*. Paper presented at the 2nd meeting of the G20 Employment Working Group.

[2] Eurofound. (2018) *Automation, digitalisation and platforms: implications for work and employment*. Luxembourg: Publications Office of the European Union.

[3] OECD (2017).
OECD. (2018a) *Online work in OECD countries*. Policy Brief on the Future of Work. Paris: OECD.
OECD. (2018b) *Putting faces on the jobs at risk of automation*. Policy Brief on the Future of Work. Paris: OECD.

4 See, for example, Jenkins, C. and Sherman, B. (1979) *The collapse of work*. London: Eyre Methuen.

5 Frey, C.B. and Osborne, M.A. (2013) *The future of employment: how susceptible are jobs to computerisation*. Oxford Martin Programme on the Impacts of Future Technology Working Paper. Oxford Martin Programme on Technology and Employment, University of Oxford.

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[6] OECD (2018b).

[7] Hislop, D., Coombs, C., Taneva, S. and Barnard, S. (2017) *Impact of artificial intelligence, robotics and automation technologies on work*. London: Chartered Institute of Personnel and Development.

[8] Autor, D.H. (2015) Why are there still so many jobs? The history and future of workplace automation. *Journal of Economic Perspectives*. Vol 29, No 3. pp3–30.

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Levy, F. and Murnane, R.J. (2013) *Dancing with robots: human skills for computerized work*. NEXT Report.

[11] OECD (2018b); Frey and Osbourne (2013); Deloitte (2014).

[12] Hislop et al (2017).

[13] See, Davies, R. (2015) *Industry 4.0: digitalisation for productivity and growth*. Briefing. European Parliamentary Research Service. Available at: www.Projects/JRC%20FoW/EPRS_2015%20industrie%204%200%20.pdf

[14] The precise wording of these categories was 'Introduced AI, robotic or automated equipment to undertake a physical task', and 'Introduced AI, robotic or automated software to undertake a cognitive/non-physical task'. The combined variable was derived by assigning a value of 'introduced' if respondents indicated they had introduced either, or both, of these two types of technology.

[15] Respondents introducing some form of AI were asked about the performance improvements of the AI. Those organisations not introducing AI but introducing other technologies were asked which of these technologies had led to the most change in the organisation and were then asked about the performance improvements related to that technology.

[16] Low base sizes meant that it was necessary to group industries together. Industries were grouped together that involved broadly similar activities and where investment levels in AI were comparable. Industries were grouped together as follows: (1) manufacturing; (2) construction with maintenance and repair; (3) hospitality and leisure with transportation and retail; (4) 'professional services' includes financial services, accountancy, legal, media/marketing/advertising/PR and sales, real estate, and engineering, design, or architecture; (5) technology services were included with IT and telecoms; (6) health, education,

'scientific research', and public administration were grouped together; and (7) 'other specific' refers to industries that could not be easily combined with any of the above groupings.

[17] Organisations were assumed to have engaged in 'workforce planning' if they indicated that they had made any of the following organisational changes during the previous five years: 'reduced the number of staff', 'increased the number of staff', 'increased the use of self-employed contractors, or agency or temporary staff', 'reduced the use of self-employed contractors, or agency or temporary staff'.

[18] Eurofound (2018); Frey and Osbourne (2013); Deloitte (2014); OECD (2018b).

[19] Hislop et al (2017).

[20] Ibid.

[21] See Davies (2015).

[22] The panel is compiled using a variety of recruitment methods, including: advertising and partnerships with range of websites, member-get-member scheme, topical or interest-based 'open' surveys, registration through the YouGov panel portal (for those who find out through word of mouth, reading about it in the media, and so on). Details about the panel and how it is compiled can be found on the YouGov website: https://yougov.co.uk/about/panel-methodology/

[23] www.gov.uk/government/statistics/business-population-estimates-2017

[24] The response categories were 'mostly male', 'mostly female', or 'fairly balanced'.

[25] The precise wordings used in the survey were 'Approximately what proportion of your UK staff regularly work with…', 'Robotic/automated equipment (that is, to complete a physical task)' and 'Software/equipment that uses artificial intelligence (AI) (that is, which is able to learn from data, reasoning or self-correction)'.

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