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Assessing and strenghtening human-tech collaboration

TechConnect Industry Landscape Report 2025: Building Human-Tech Skill Complementarity

INDUSTRY LANSCAPE REPORT YEAR 1

Deliverable 1.2

Partners

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Human Tech Index

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Deliverable 1.2

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Abstract	The Industry Landscape Report Year 1 provides a comprehensive landscape analysis, highlighting changes and trends in new technologies, as well as in the Human-Tech Skill Complementarity. This is the first report as part of the longitudinal reports produced consecutively in M6, M18 and M29.
Keywords	Industry landscape; advanced technology usage; ADS skills investment; human-tech skill complementarity.

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DISCLAIMER

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Nature of deliverable:		
Dissemination level		
PU	Public, fully open, e.g. web	X
SEN	Sensitive, limited under the conditions of the Grant Agreement	
Classified R-UE/ EU-R	EU RESTRICTED under the Commission Decision No2015/ 444	
Classified C-UE/ EU-C	EU CONFIDENTIAL under the Commission Decision No2015/ 444	
Classified S-UE/ EU-S	EU SECRET under the Commission Decision No2015/ 444	

* *R: Document, report (excluding the periodic and final reports)*

DEM: Demonstrator, pilot, prototype, plan designs

DEC: Websites, patent filing, press & media actions, videos, etc.

DATA: Data sets, microdata, etc

DMP: Data management plan

ETHICS: Deliverables related to ethics issues.

SECURITY: Deliverables related to security issues

OTHER: Software, technical diagram, algorithms, models, etc.

EXECUTIVE SUMMARY

This Industry Landscape Report Year 1 (D1.2), produced as part of Work Package 1 in the TechConnect project, presents a comprehensive overview of how advanced digital technologies (ADTs) are shaping the nature of work, workforce capabilities, and skill development across sectors. Rooted in the concept of Human–Tech Skill Complementarity, the report highlights the evolving relationship between human and digital skills and the organisational challenges arising from this transformation.

The findings draw on both quantitative and qualitative analysis of the results from an industry survey, participated by both employees and managers. All workers shared their firsthand experiences of using digital technologies at work. Managers additionally reported on workforce digitalisation and upskilling efforts. To ensure broader relevance, the analysis includes a comparison between EU and non-EU respondents, across both employee and managerial perspectives. Additionally, insights are benchmarked against key European studies and policy frameworks to contextualise the findings within the broader digital transformation landscape.

Key findings include:

- The widespread use of ADTs across roles, sectors, and regions. Technologies are applied in diverse and expanding ways, from task automation to decision support and collaboration enhancement.
- The growing recognition of complementarity between human and digital skills. Rather than replacing human input, ADTs are creating new demands for human skills such as problem-solving, creativity and interpersonal skills, reinforcing the need for integrated skill strategies.
- Organisations are encountering significant challenges in managing this shift. Challenges include aligning digital investments with workforce readiness, addressing uneven access to training, and adapting leadership and HR practices to a more digital-ready workplace.

The report concludes with practical recommendations for business leaders, HR professionals, employees, education and training providers, and policymakers. These focus on advancing workforce strategies that integrate human and digital skill development, fostering cross-functional collaboration, strengthening data use and evaluation practices, and promoting inclusive, future-oriented learning ecosystems.

Serving as the empirical foundation of the TechConnect project, this report underpins the practical activities in Work Package 2 (Observational Case Studies) and Work Package 3 (Interventional Pilot Studies). It functions as a diagnostic tool, offering a snapshot of current practices and challenges. In addition, it is a strategic resource to guide organisational decision-making, shape policy interventions, and inform the design of responsive, high-impact education and workforce development initiatives for the accelerated and inclusive digital transformation.

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ABBREVIATIONS

Abbreviation	Full Term
AI	Artificial Intelligence
ADT / ADTs	Advanced Digital Technologies
CTF	Communications Task Force
DoA	Description of Action
EU	European Union
HR	Human Resources
ICT	Information and Communication Technology
IoT	Internet of Things
IT	Information Technology
R&D	Research and Development
RPA	Robotic Process Automation
WP	Work Package

ABOUT TECHCONNECT

TechConnect, a €3 million initiative funded by the European Union, under the Horizon Europe framework with a consortium of 9 partners, Trinity College Dublin (TCD), Mälardalen University (MDU), Technical University of Madrid (UPM), Universiteit Utrecht (UU), BluSpecs, Tallaght University Hospital (TUH), Västerås Hospital (RV), Hospital Ramon y Cajal (FIBIRYCIS) and University Medical Center Utrecht (UMCU).

The TechConnect project aims to deepen the understanding of how ADTs impact human skills by focusing on Human-Tech Skill Complementarity. Through desk research, industry surveys, and case studies in healthcare, TechConnect explores how human skills and technology interact in real-world contexts. The project develops a systemic framework to address the gap between intended and actual technology use, offering practical guidelines for technology procurement, development, and training. By providing tools to enhance human-tech integration, TechConnect ambition is to boost productivity and employment across industries, driving greater alignment between technology and human skills.

1 Introduction

The rapid adoption of ADTs, such as artificial intelligence (AI) and automation is reshaping workplaces and decision-making processes across industries. Addressing a critical challenge, the TechConnect project focuses on enabling efficient and innovative collaboration between humans and digital technologies through skill complementarity and co-evolution.

As organizations integrate more ADTs into their operations, the demand for new skills: both technical and human: continues to evolve. Not only must employees adapt to new tools and systems, but organizations also face the ongoing task of aligning workforce capabilities with technological advancements. This shift brings opportunities for increased productivity, creativity, and job satisfaction, but also poses risks of skill mismatches, job displacement, and unequal access to training.

In this context, understanding the dynamic interplay between human and technological skills is crucial. The concept of Human-Tech Skill Complementarity emphasizes the mutual enhancement and interdependence of human capabilities and digital tools. Rather than viewing technology as a substitute for human labor, the project explores how the right balance of digital and soft skills can drive organizational resilience, competitiveness, and inclusive growth.

TechConnect brings together a multidisciplinary consortium: combining academic researchers, industry partners, and policy experts: to address these challenges. By conducting literature reviews, large-scale industry surveys, and in-depth sectoral case studies, the project seeks to generate evidence-based insights and practical recommendations. These efforts aim to support organizations, policymakers, and education providers in designing effective strategies for digital skills development, workforce transformation, and successful technology adoption.

The purpose of this document is to provide a comprehensive landscape analysis of the evolving relationship between ADTs and human skills, with a particular focus on Human-Tech Skill Complementarity. As part of Work Package 1 (WP1: Conceptual Framework Development and Landscape Analysis) of the TechConnect project, this report aims to:

- Present empirical findings from annual cross-sectoral industry surveys, serving as the foundation for subsequent work packages.
- Identify key trends, drivers, and barriers in technology adoption and skills development.
- Inform stakeholders: including employees, employers, policymakers, and education providers: about current and future skill needs, training practices, and the implications for workforce development and organizational competitiveness.
- Provide evidence-based recommendations to guide policy, practice, and educational program design, supporting human-tech skill complementarity in the digital era.

This document thus serves as both a theoretical cornerstone and a practical resource, underpinning the TechConnect project's broader objectives to strengthen Human-Tech Skill Complementarity and to enhance the quality of employment in the context of digital transformation.

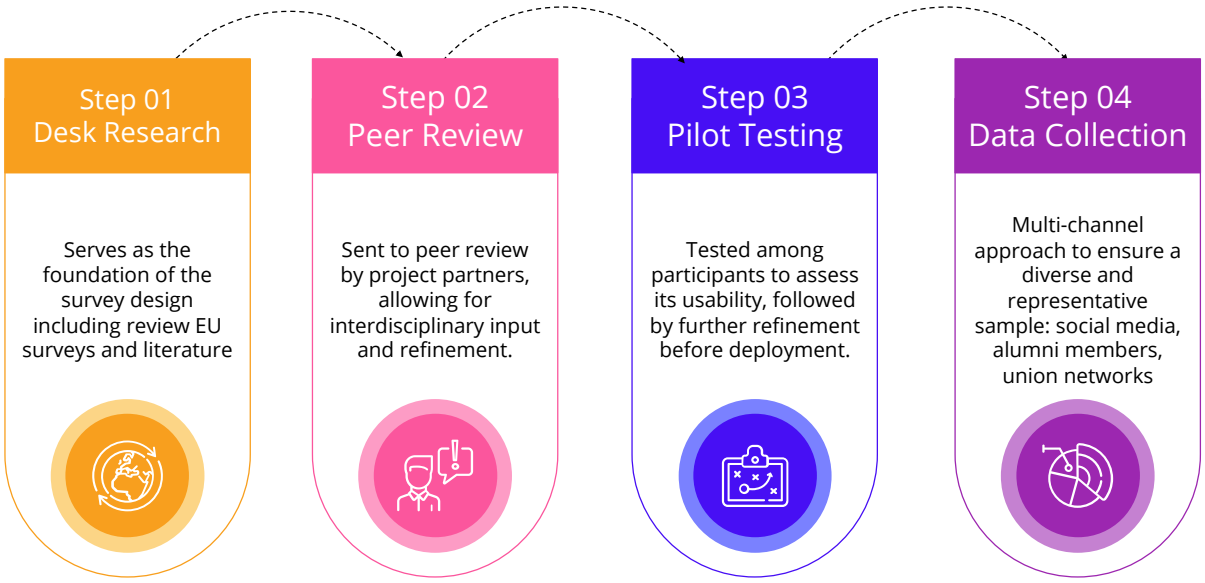
The target audience include:

- Employees and Employers: Drawing on survey and qualitative comments data from both employees and managers, the report identifies key trends in digital upskilling. It helps employees understand their current and future training needs, while supporting employers in developing strategies to strengthen their digital competitiveness.
- Business Leaders and HR Professionals: The report provides practical insights into how ADS initiatives are being implemented across industries. It will assist business and HR leaders in aligning workforce strategies with technological change, making informed investment decisions, and designing more targeted talent development approaches.
- Education and Training Providers: By outlining current skills gaps and workplace needs, the report supports the design and delivery of responsive, future-oriented curricula. Providers can use these insights to tailor programmes that meet the needs of both learners and the evolving labour market.
- Policy Makers: The report highlights systemic drivers and barriers that affect organisational readiness for ADS. It provides a comprehensive evidence base to inform national and EU-level policy decisions, including the design of scalable interventions to accelerate digital skills adoption.
- Funding Agencies: As investors in digital transformation and workforce development, funding agencies will find this report useful in evaluating the impact of current programmes and identifying areas for future investment. The findings can support strategic alignment with EU digital goals and optimise funding for maximum societal benefit.
- General Public: The report increases public awareness of how digital technologies are reshaping work. It underscores the importance of accessible digital education for employability, social inclusion, and economic resilience, offering a clearer view of how organisations and individuals are adapting to this transformation.

2 Methodology

This project involves four stages, i.e. literature review, instruments collection and development, data collection, and analysis as shown in Figure 2.1. They are reported as below.

Figure 2.1 Survey Instrument Development and Data Collection Process



2.1 Literature Review and Desk Research

A comprehensive literature review and desk research formed the foundation of the survey design in this task. The process began with an extensive review of existing academic literature, including the conceptual framework developed in Deliverable D1.1. In addition, the research team systematically examined recent EU-level surveys, such as the OECD AI Survey (Lane et al., 2023), Cedefop's second European Skills and Jobs Survey (Cedefop, 2022), the LEADS ADS Survey and relevant industry reports, such as Deloitte Global Workforce Trends 2024 (Deloitte, 2024). Integrating academic research, EU surveys as well as industry reports, the industry landscape survey captures the emerging trends and best practices in digital technology adoption, workforce skills development, and human–technology complementarity. These sources provided valuable insights into the evolving demands of the digital workplace and informed the design of the survey instrument. It can also help to compare the findings from this research to existing findings to demonstrate the changes and trends. The synthesis of these findings ensures that the report reflects both theoretical advances and real-world developments, laying a robust basis for subsequent empirical analysis.

2.2 Instrument Development

The development of the survey instrument followed a rigorous and collaborative process as shown above to ensure both validity and relevance. Key topics such as the adoption of ADTs, skill needs, training experiences, job satisfaction, and organizational systems: were identified and incorporated into the first draft of the survey. This initial version was then subjected to peer

review by project partners, allowing for interdisciplinary input and refinement. In particular, it was reviewed by academic peers and pilot tested among industry practitioners. Feedback from these stakeholders was used to improve the clarity, face validity, and comprehensiveness of the survey questions. Finally, the instrument underwent pilot testing to assess its usability and to identify any remaining ambiguities or areas for improvement before full deployment. This rigorous development process ensured that the survey effectively captured the key dimensions of Human-Tech Skill Complementarity in the digital workplace.

In the final survey instrument (Annex I), all respondents were asked to fill in the employee survey which covers the topics around ADTs in the workplace and their experience. A question about their role (frontline employee without managerial responsibilities v managers) was asked. When participants indicated that they were managers and had managerial responsibilities, they would be asked to fill in an additional part, so called manager survey, about their organisations' development of employee ADS. The manager survey part provides invaluable insights about the current and future plan in ADS development.

2.3 Data Collection

Data collection for this report was conducted using a multi-channel approach to ensure a diverse and representative sample. Survey invitations were distributed via LinkedIn, leveraging both targeted outreach and reminders to maximize participation rates among relevant professionals. In addition to social media, the research team engaged alumni members from partner institutions, expanding the reach to individuals with varied industry backgrounds and career stages. Furthermore, survey promotion was carried out through a range of industry and academic events, as well as by reaching out to unions and workers' representative bodies, further broadening the pool of respondents and encouraging participation from both employees and managers across sectors. This approach allowed the project to gather comprehensive insights into the experiences, skills needs, and perspectives of the workforce in the context of advanced digital technology adoption.

2.4 Data Analyses

The data was analysed using the Statistical Package for the Social Sciences (SPSS, Version 25). The data was presented using descriptive statistics (frequencies and means). The comments that were provided by respondents were analysed and coded based on the similar themes.

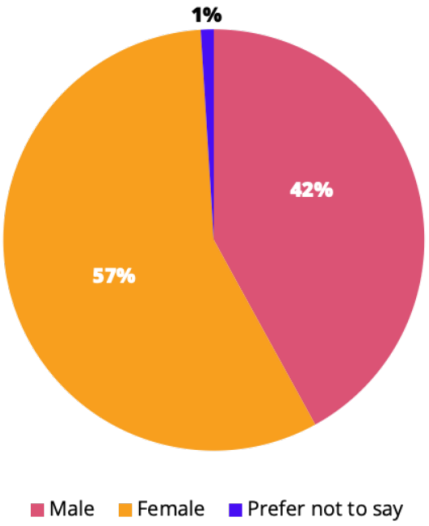
3 Sample Profile

In total, 385 responses were received. After deleting incomplete and invalid responses (20%), a total of 307 usable questionnaires were retained for analysis. The removal of invalid responses ensures the quality of the data in the analysis. The removal of invalid responses ensures the quality of the data in the analysis. Most invalid responses were cases where the questionnaire was submitted without being completed. The proportion was comparable to existing research using random sample via online surveys (e.g. Conway et al., 2016).

Below is a detailed overview of the survey sample's characteristics.

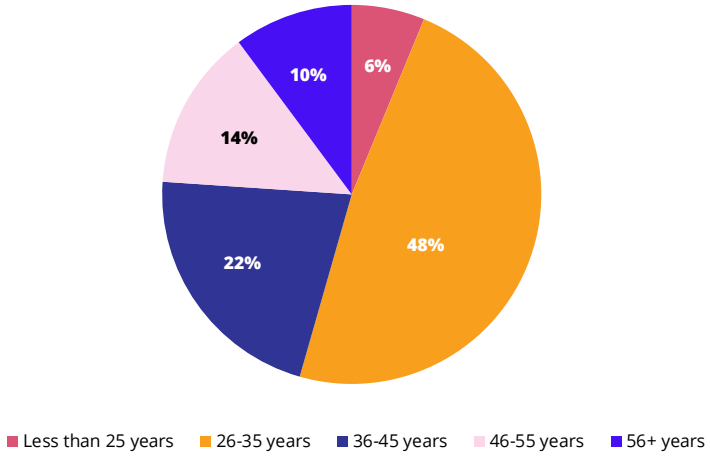
- Gender: Over half (57%) of respondents identified themselves as women, 42% as men, and 1% of respondents were non-binary or preferred not to say, as shown in Figure 3.1.

Figure 3.1 Participant Distribution by Gender



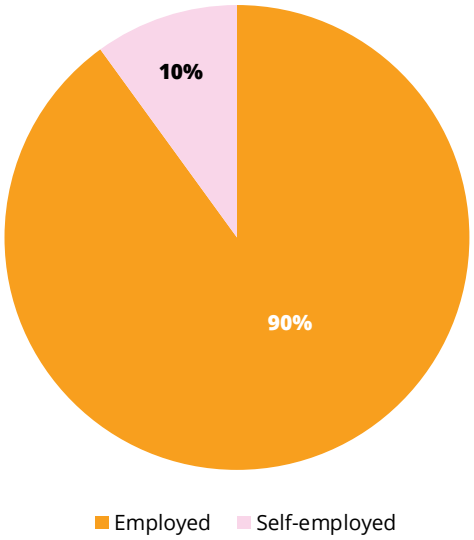
- Age: The average age was 39 years old (SD: 11). Almost half (48%) were aged 26–35, with another 22% in the 36–45 bracket. Younger adults (<25) represented 6%, while people aged 46 and above together account for roughly 24%, as shown in Figure 3.2.

Figure 3.2 Participant Distribution by Age



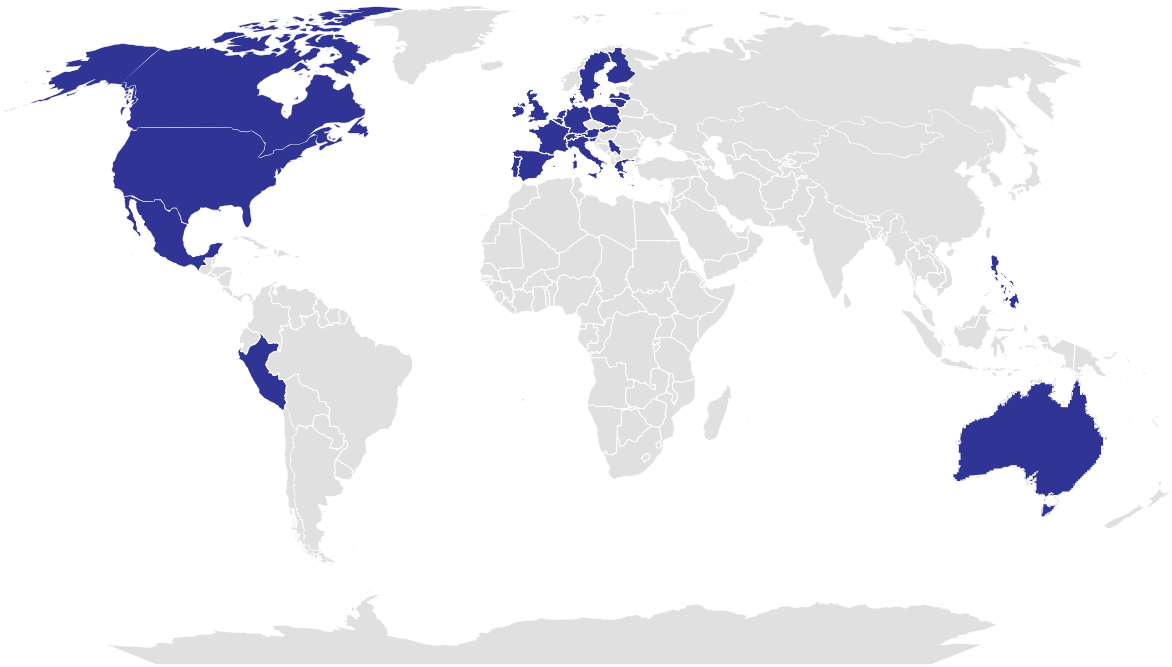
- **Employment status**: Majority (90%) were employees, whereas 10% were self-employed, confirming that standard paid employment dominates the cohort, as shown in Figure 3.3.

Figure 3.3 Participant Distribution by Employment Status



- **World region**: Majority (83%) lived in EU member states; the remaining 17% were located across Asia (e.g. Singapore, Philippines), North America (Canada, the USA), South America (e.g. Peru, Mexico), the Middle East (e.g., Saudi Arabia) and other regions (e.g., Australia), giving the survey international outreach.

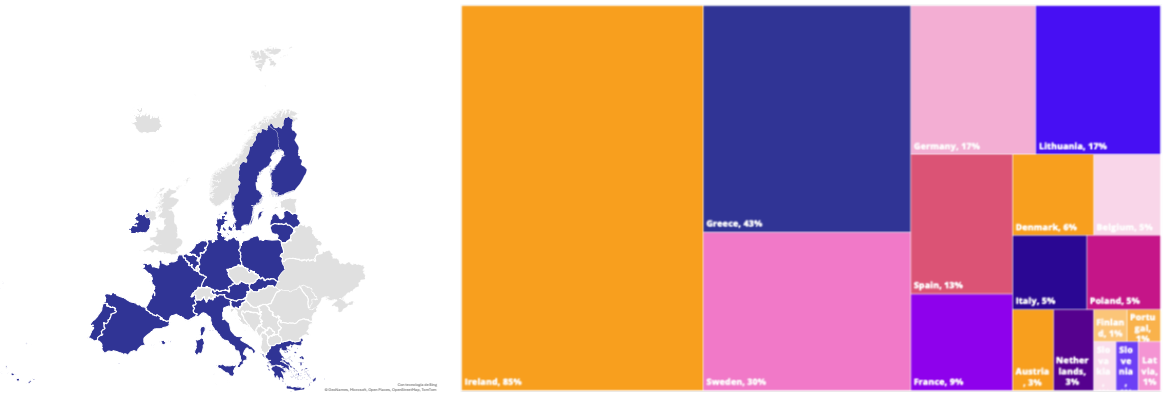
Figure 3.4 Participants' Countries



- **Country of residence (EU subsample)**: Respondents from 18 EU countries along with 16 non-EU countries participated in the survey. In terms of sample distribution, Ireland (30%)

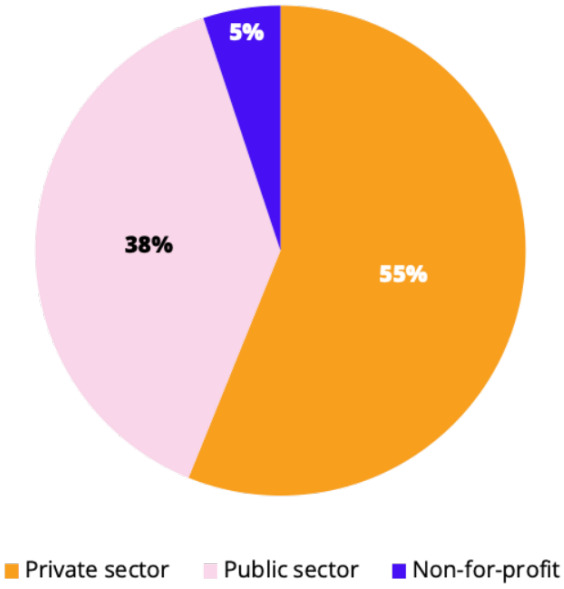
and Greece (17%) top the list, followed by Sweden (12%), Germany and Lithuania (both 7%). Other countries include Austria, Belgium, Denmark, Finland, France, Italy, Latvia, Netherlands, Poland, Portugal, Slovakia, Slovenia, and Spain. Figure 3.5 present information about these countries where participants are located.

Figure 3.5 Participants' Countries in Europe



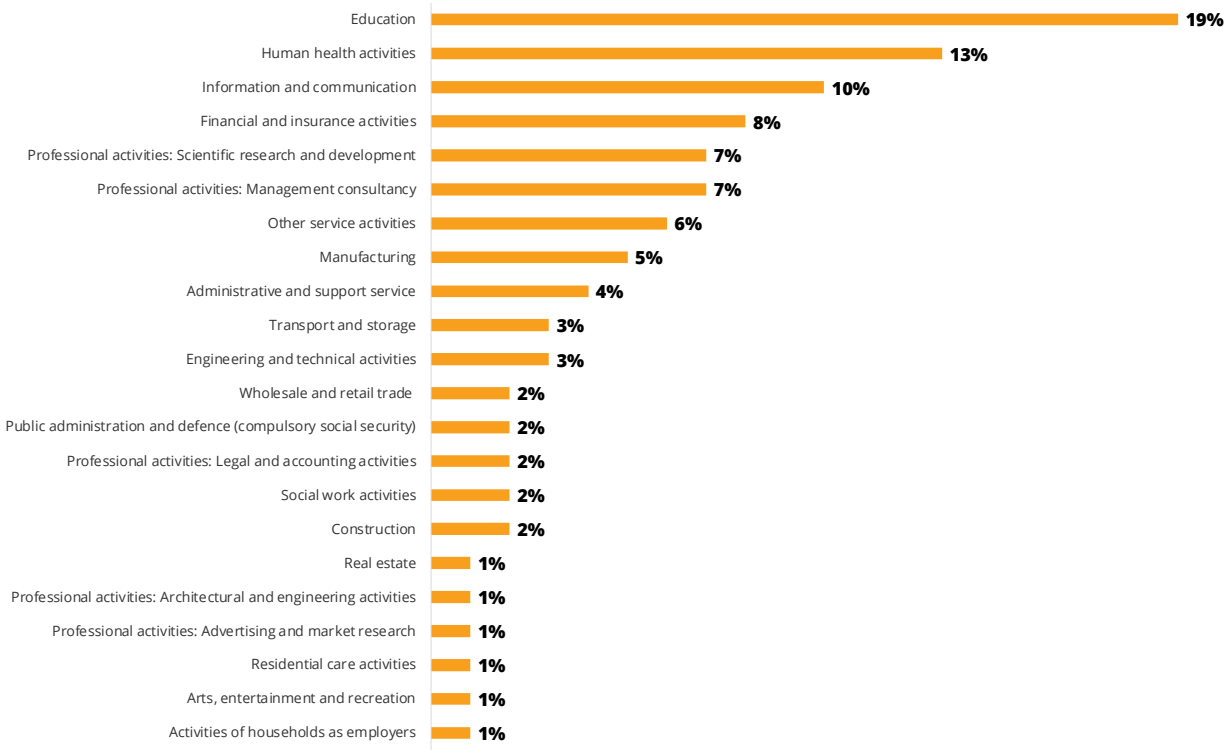
- Sector: Just over half (55%) worked in the private sector, 38% in the public sector and 5% in non-profits, as shown in Figure 3.6.

Figure 3.6 Participant Distribution by Sectors



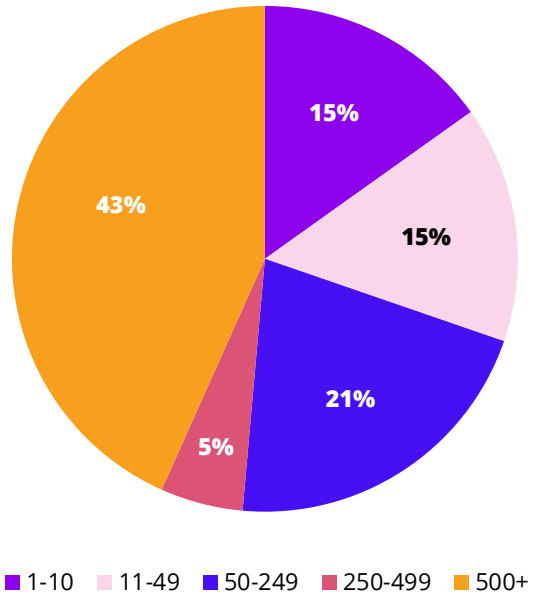
- Industry: Education led at 18%, followed by human health activities (13%) and information & communication technologies (10%). Finance, management consulting and scientific R&D together added another ≈21%, indicating a knowledge-intensive profile, as shown in Figure 3.7.

Figure 3.7 Participant Distribution by Industry



- Firm size: Respondents mainly worked (49%) in large organisations (250+ employees). One fifth worked (21%) in the medium-sized firms (50–249). 15% worked in small firms (11-49) and 15% worked in micro businesses (1–10), as shown in Figure 3.8.

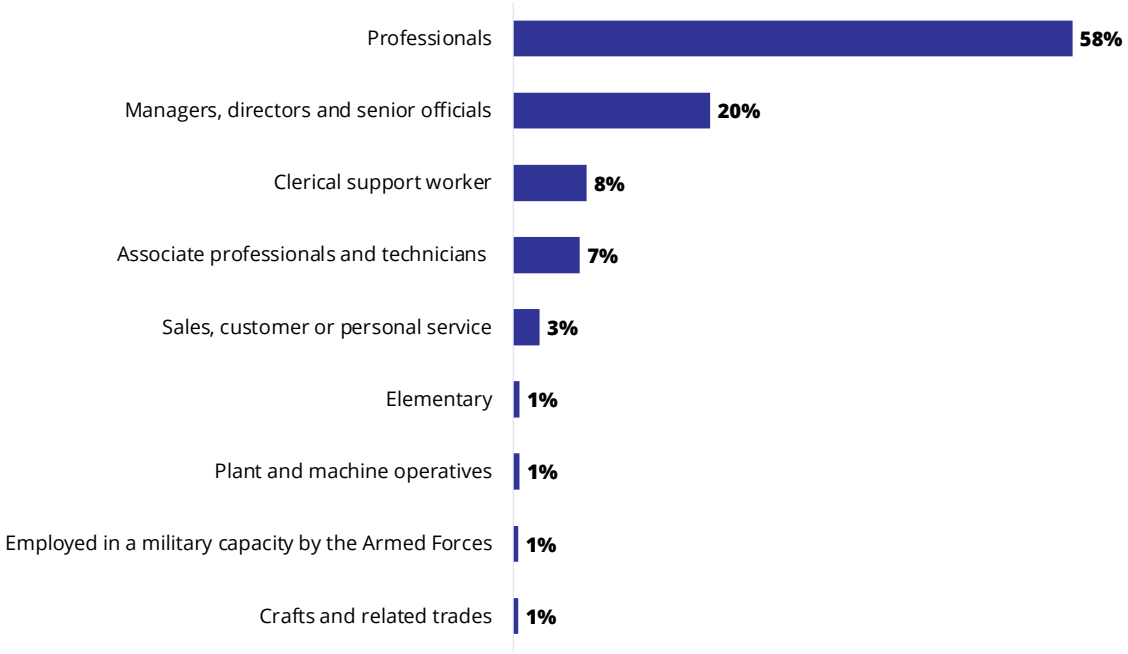
Figure 3.8 Participant Distribution by Firm Size



- Occupational group: "Professionals" dominated at 58%, with managers and senior officials adding another 20%. Associate professionals/technicians (7%), clerical and

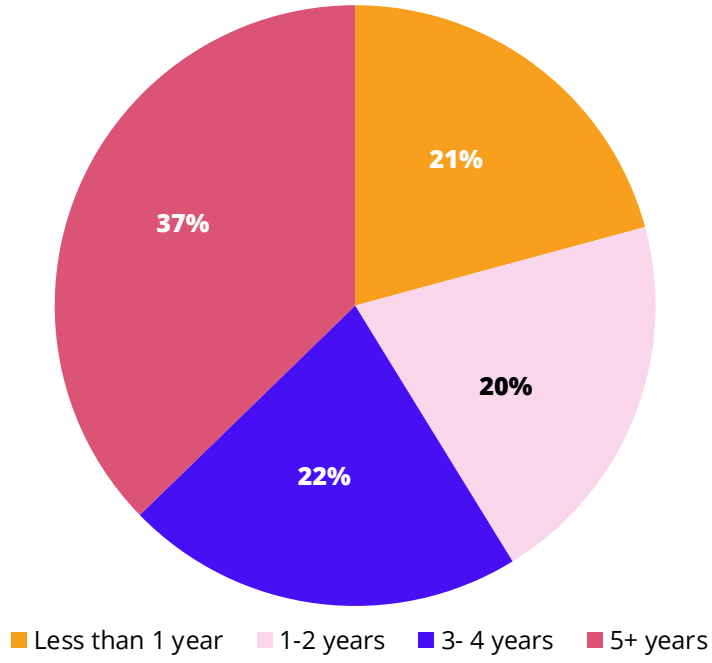
support roles (8%) and other categories filled out a workforce that skews toward high-skill positions, as shown in Figure 3.8 and Table 3.9.

Figure 3.9 Participant Distribution by Occupational Group



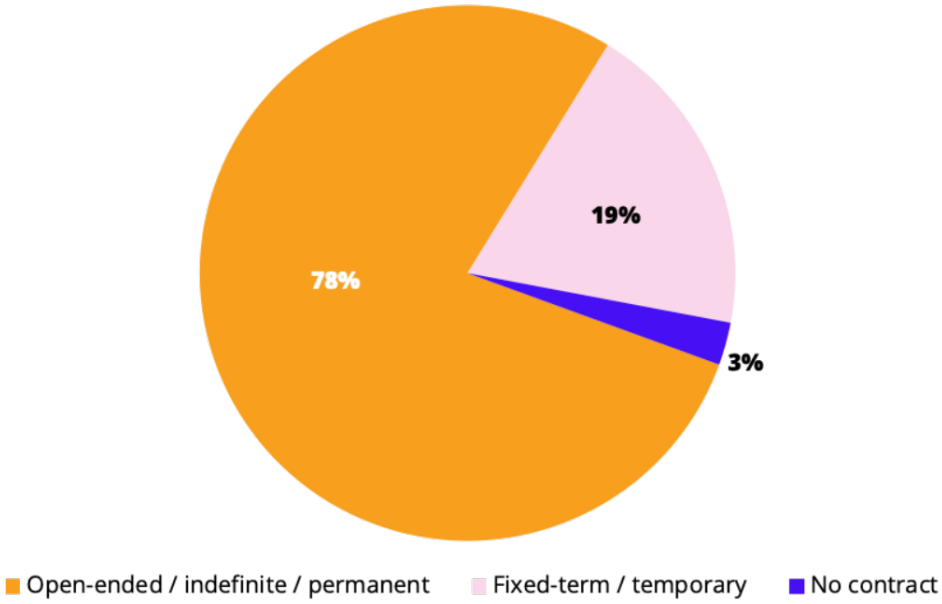
- Length of service: Over one third (37%) had at least five years' tenure in their current organisation. Another 42% have 1-4 years, while almost one in five (21%) were newcomers with less than a year's service, as shown in Figure 3.10.

Figure 3.10 Participant Distribution by Length of Service (Tenure)



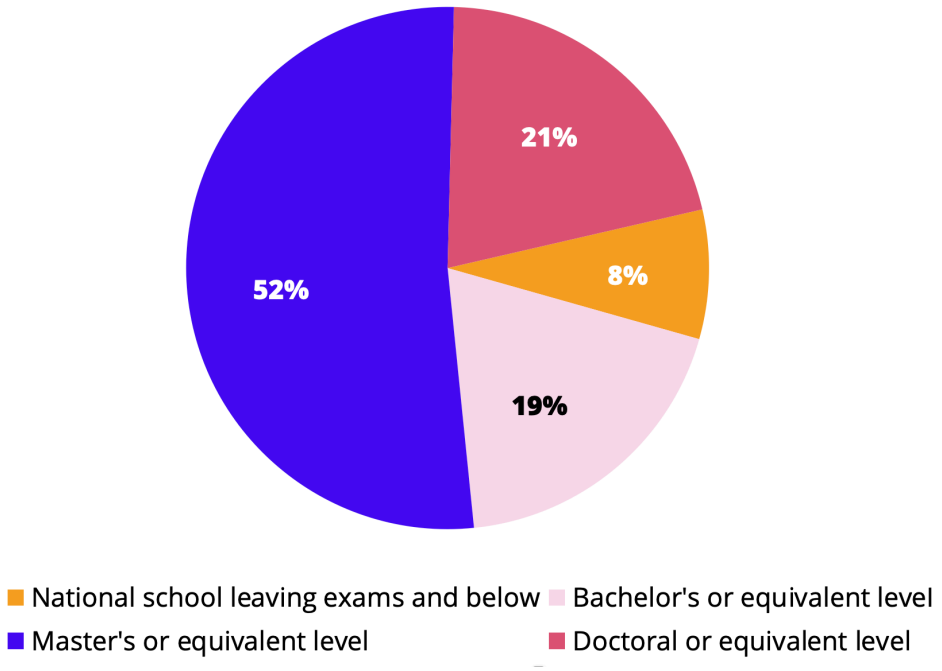
- **Contract type:** Permanent or open-ended contracts were the norm for 78% of participants; fixed-term arrangements cover 19%. A small minority reported working without a contract (3%) or under other atypical forms, as shown in Figure 3.11.

Figure 3.11 Participant Distribution by Contract Type



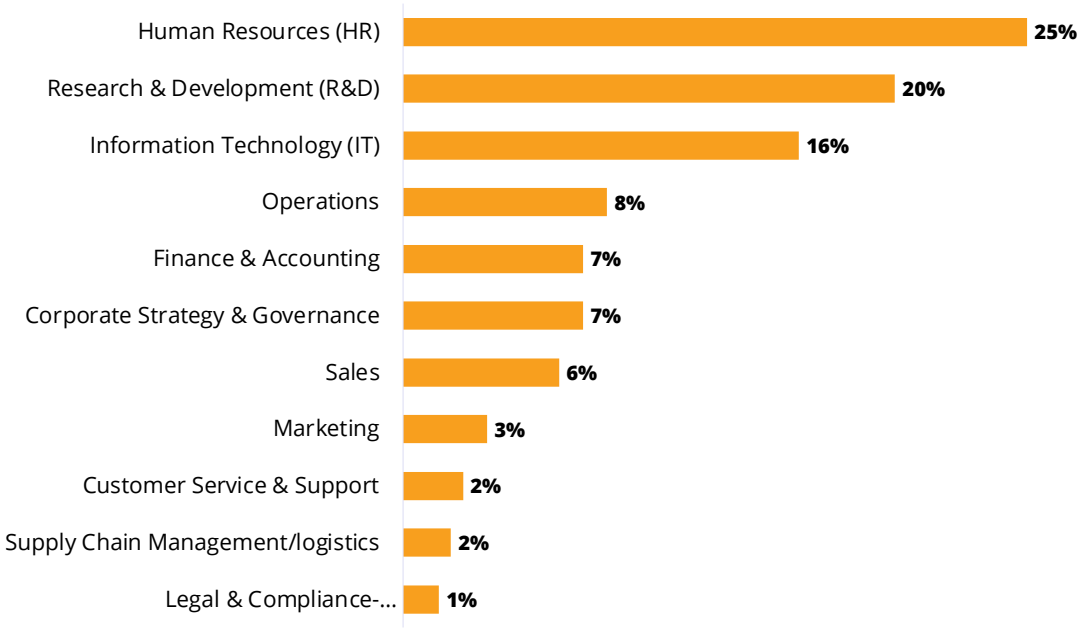
- **Education level**: The sample was highly educated: 52% held a master's degree and 21% a doctorate, meaning two-thirds possess postgraduate qualifications. Bachelor's degrees or equivalent level account for19%. As shown in Figure 3.12.

Figure 3.12 Participant Distribution by Education Level



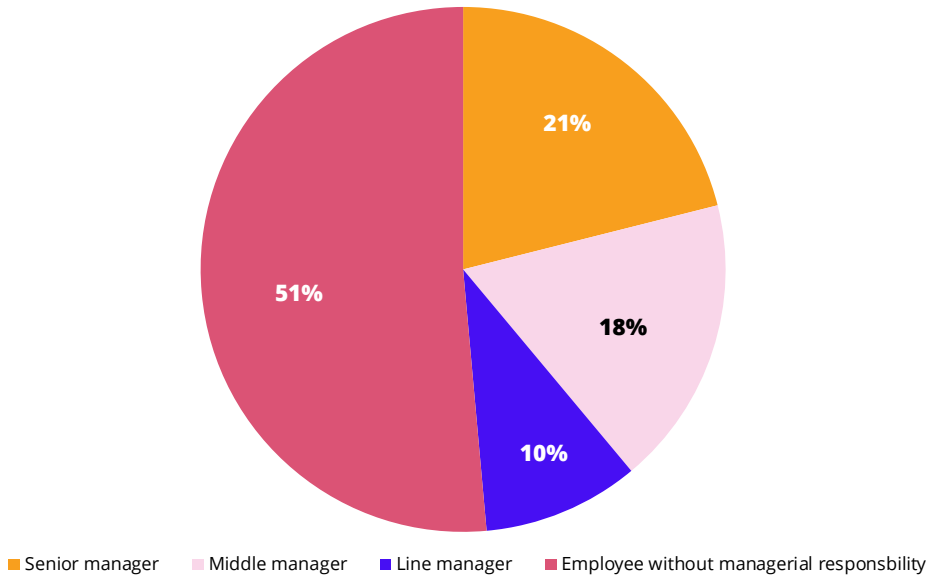
- **Functional area**: Human Resources (25%), R&D (20%) and IT (16%) were the three most common functions. Finance, operations, sales and marketing each counted around 4–10%, as shown in Figure 3.13.

Figure 3.13 Participant Distribution by Functional Area



- **Managerial levels**: Half (51%) held non-managerial positions, while senior managers (21%) and middle managers (18%) together gave the dataset a strong leadership perspective. Line managers added 10%, as shown in Figure 3.14.

Figure 3.14 Participant Distribution by Managerial Levels



4 Survey Findings

4.1 Employee Survey Findings

This section presents key findings from the employee survey, structured around three core themes. First, it examines employees' perspectives on ADTs in the workplace, including the technologies of use, motivations for ADT adoption, perceived impacts of ADTs on employee outcomes, and the barriers that hinder ADT adoption. Then, it explores the concept of human–tech skill complementarity from the employee viewpoint, focusing on reported levels of human skills, digital skills, and employee perceptions of how the two compare in importance. Finally, it assesses reskilling and upskilling activities to support this complementarity, including identified skill needs and access to training and development opportunities. Together, these insights highlight how employees are engaging with technology-driven change and what support they receive in adapting to it.

4.1.1 ADTs in the workplace: Employee's perspective

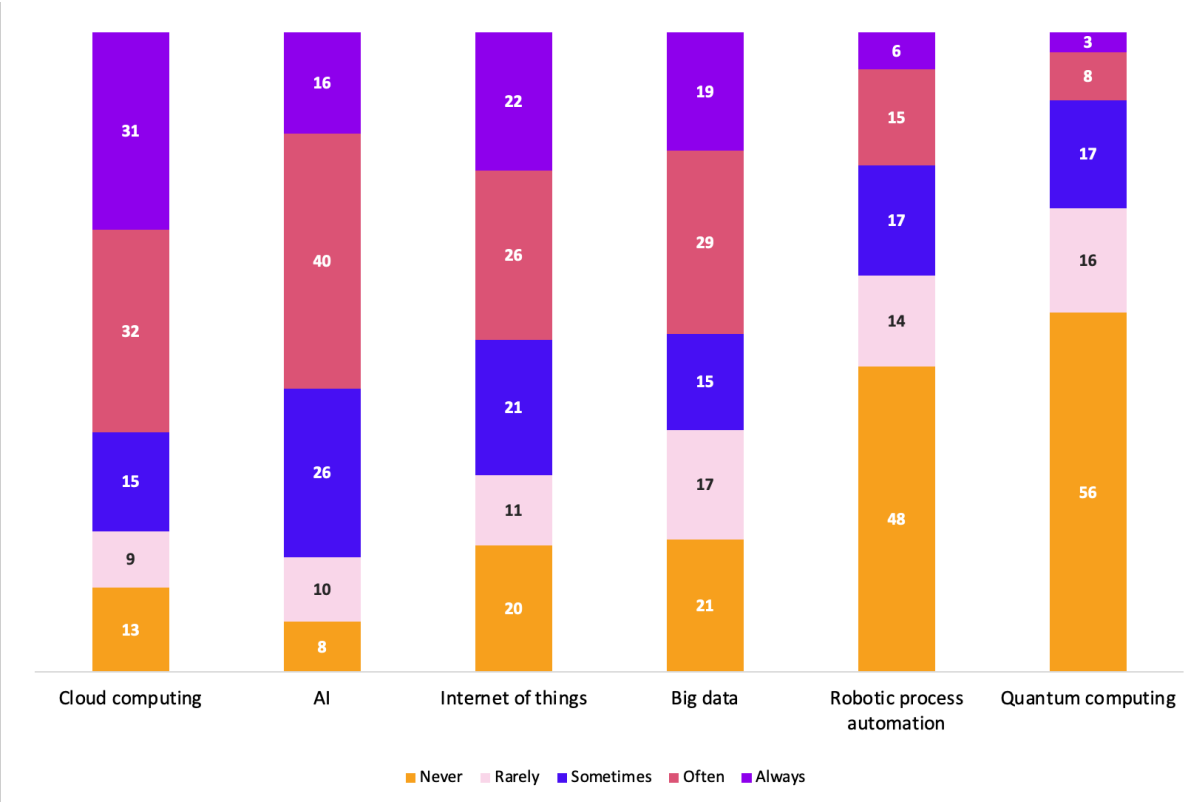
4.1.1.1 Employee ADTs usage

ADT usage means using abstract data types (like stacks, queues, or lists) in a program by calling their standard operations, without worrying about how they work inside (Payton, 2010). Overall, employees' engagement with six ADTs falls into distinct tiers: AI and cloud computing, with over half of employees using them often or always; robotic process automation and quantum computing remain in early stages, with nearly half or more employees rarely or never using them; big data and the Internet of Things (IoT) sit in the middle, with around 40% of employees engaging often or always. The results are shown in Figure 4.1.

- Cloud computing: Cloud services appeared to be deeply embedded in everyday work practices. Nearly two-thirds of employees (63%) reported regular use: 32% often and 31% always. An additional 15% used it occasionally, while just 22% said they rarely or never used cloud technologies.
- Artificial Intelligence (AI): AI tools were also widely adopted. Over half of the workforce (56%) used AI frequently, with 40% using it often and 16% always. Around one-quarter (26%) reported occasional use, while only 18% indicated limited or no exposure to AI.
- Internet of Things (IoT): IoT technologies saw moderate uptake. Almost half of employees (48%) used them regularly: 26% often and 22% always. A further 21% used them occasionally, but nearly one-third (31%) reported infrequent or no use.
- Big data tools: These tools were used by 48% of employees, with 29% reporting frequent use and 19% using them consistently. While 15% reported occasional use, 38% indicated they rarely or never engaged with big data tools.
- Robotic process automation (RPA): Adoption of RPA was comparatively low. Just 21% reported using it regularly: 15% often and 6% always. Seventeen percent used it occasionally, while a combined 62% reported rare or no use, pointing to limited integration in daily workflows.

Quantum computing: Engagement with quantum computing remained minimal. Only 11% of employees used it regularly: 8% often and just 3% always. Another 17% used it sometimes, while the majority (56%) reported no use at all, reflecting its early-stage presence in most workplaces.

Figure 4.1 Employee ADTs Usage



4.1.1.2 Employee motivation for using ADTs

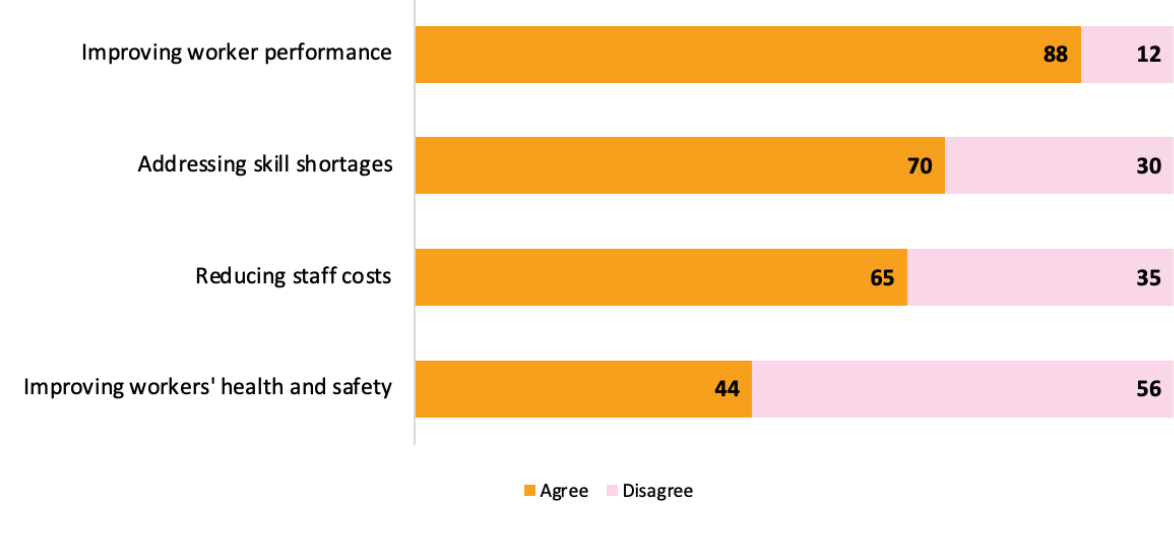
Respondents rated four potential motivations for adopting ADTs. Overall, improving worker performance and addressing skill shortages were the strongest drivers, whereas improvements in health and safety garnered the least support. The results are shown in Figure 4.2. Detailed findings are as follows:

- **Improving worker performance:** This emerged as the most widely acknowledged motivation for adopting ADTs. A striking 88% of respondents agreed, highlighting performance enhancement as a near-universal benefit. Only 12% disagreed, indicating minimal resistance to this rationale.
- **Addressing skill shortages:** ADTs were also seen as a response to workforce capability gaps. Seventy percent of employees agreed: 50% moderately and 20% strongly: that technology played a role in addressing skills shortages. However, nearly 30% remained unconvinced, suggesting that not all employees viewed technology as an adequate substitute for human skills.
- **Reducing staff costs:** Cost efficiency was another frequent motivation, with 65% agreeing that ADTs helped lower staffing expenses: 40% agreed and 25% strongly agreed. Still, 35%

expressed doubt, including 3% who strongly disagreed, pointing to uncertainty about the return on investment in automation and digital tools.

- Improving workers' health and safety: This was the least supported driver. Fewer than half (44%) agreed that health and safety concerns motivated ADT adoption: 34% agreed and 10% strongly agreed. A majority (56%) disagreed or strongly disagreed, suggesting that wellbeing was not a leading factor in technology decisions.

Figure 4.2 Employee Motivation for Using ADTs



4.1.1.3 Impact of ADTs on employees' outcomes

This survey asked respondents about the impact of ADTs in three aspects:

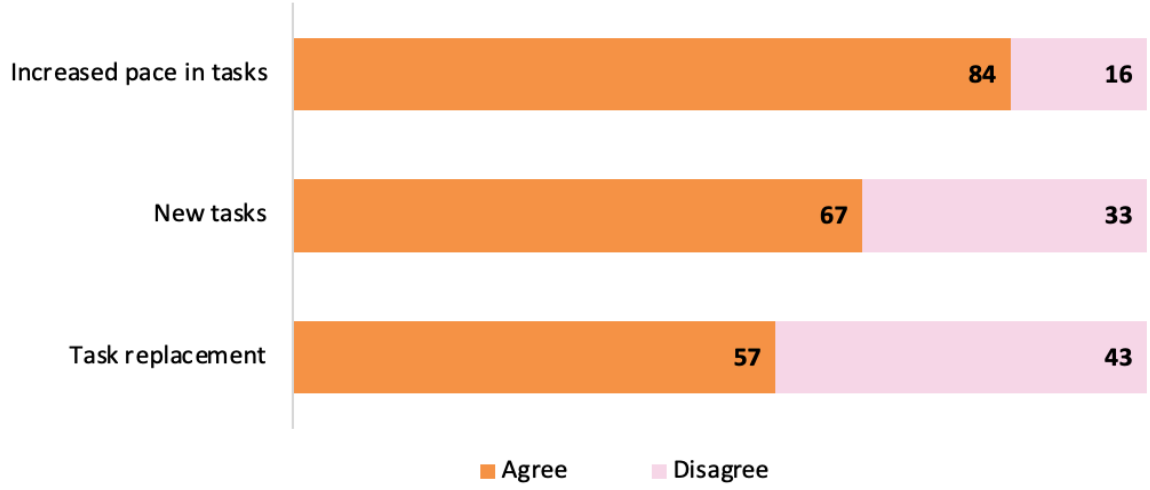
- The impact of ADTs on tasks (from 1 strongly disagree to 4 strongly agree)
- The impact of ADTs on jobs (from 1 not at all to 4 great extent)
- The impact of ADTs on employee outcomes (Positive/Negative/No Impact)

4.1.1.3.1 ADTs and tasks

Respondents were asked how ADTs have altered the nature and pace of their work by indicating their agreement with three statements. The results are shown in Figure 4.3.

- Increased pace in tasks: The majority of respondents (84%) reported that ADTs had increased the speed at which they performed some tasks. Of these, 28% strongly agreed and 56% agreed. Only 16% disagreed to any extent, with 15% disagreeing and 1% strongly disagreeing.
- New tasks: Two-thirds (67%) indicated that they had taken on new or different tasks as a result of ADT adoption: 9% strongly agreed and 58% agreed. In contrast, 33% disagreed, with 30% moderately and 3% strongly disagreeing.
- Task replacement: More than half (57%) reported no longer performing certain tasks they had previously done: 6% strongly agreed and 51% agreed. Meanwhile, 43% disagreed, including 39% who disagreed and 4% who strongly disagreed.

Figure 4.3 Employee ADT Adoption and Changes in Tasks

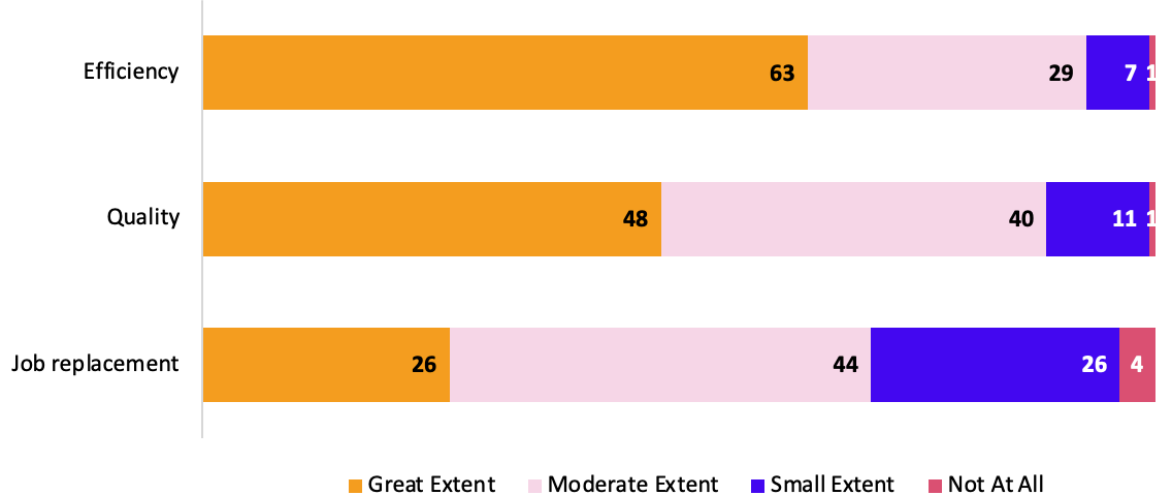


4.1.1.3.2 ADTs and jobs

Respondents were asked to what extent ADTs affected their jobs in terms of performing part or all of their main job (job replacement), speeding up their work (efficiency), and improving work quality (quality). The results are shown in Figure 4.4.

- Efficiency: A large majority (92%) of respondents reported that ADTs had improved the speed of their work: 63% to a great extent and 29% to a moderate extent. Only 8% reported minimal impact, with 7% indicating a small extent and 1% not at all.
- Quality: Similarly, 88% of respondents believed that ADTs had enhanced the quality of their work: 48% to a great extent and 40% to a moderate extent. Just 12% saw limited or no improvement, with 11% reporting a small extent and 1% not at all.
- Job replacement: Over two-thirds (70%) agreed that ADTs could or would perform part or all of their main job tasks: 26% to a great extent and 44% to a moderate extent. A quarter (26%) saw this happening only to a small extent, while 4% saw no potential for replacement.

Figure 4.4 Employee ADT Adoption and Changes in Jobs

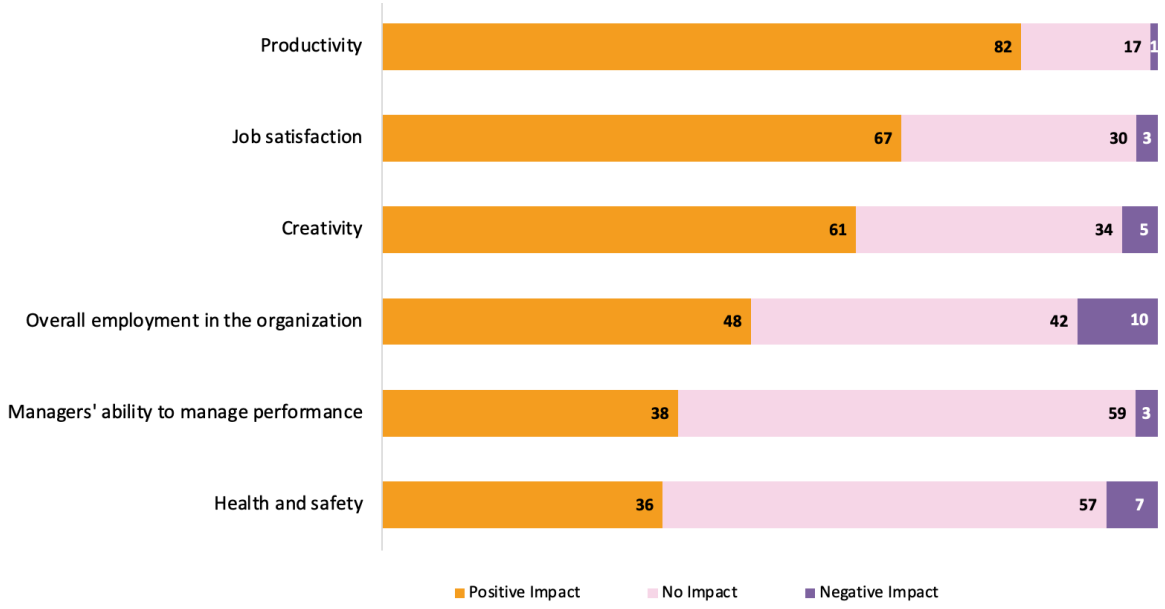


4.1.1.3.3 ADTs and employee outcomes

In relation the direct impact of ADTs in the workplace, respondents' perceptions of how ADTs affect various aspects of their daily work are overwhelmingly positive for productivity, job satisfaction and creativity, but considerably more mixed for health & safety, managerial oversight, and overall employment. The results are shown in Figure 4.5.

- **Productivity:** The majority of respondents (82%) reported that ADTs had a positive impact on their productivity. Seventeen percent saw no change, while only 1% perceived a negative effect.
- **Job satisfaction:** Two-thirds (67%) agreed that ADTs improved their job satisfaction. In contrast, 30% noticed no difference, and 3% reported a decline in satisfaction.
- **Creativity:** Sixty-one percent felt that ADTs enhanced their creative capabilities. Meanwhile, 34% observed no change, and 5% experienced a negative impact.
- **Overall employment in the organisation:** Just under half (48%) believed ADTs had a positive effect on employment levels. Forty-two percent saw no impact, while 10% perceived a negative effect on job security.
- **Managers' ability to manage performance:** Only 38% thought ADTs had improved their managers' ability to oversee performance. Most respondents (59%) noticed no change, and 3% viewed the impact as negative.
- **Health and safety:** A minority (36%) felt that ADTs positively affected their health and safety. A majority (57%) reported no noticeable impact, and 7% experienced a negative effect.

Figure 4.5 Employee ADT Adoption and Changes in Outcomes

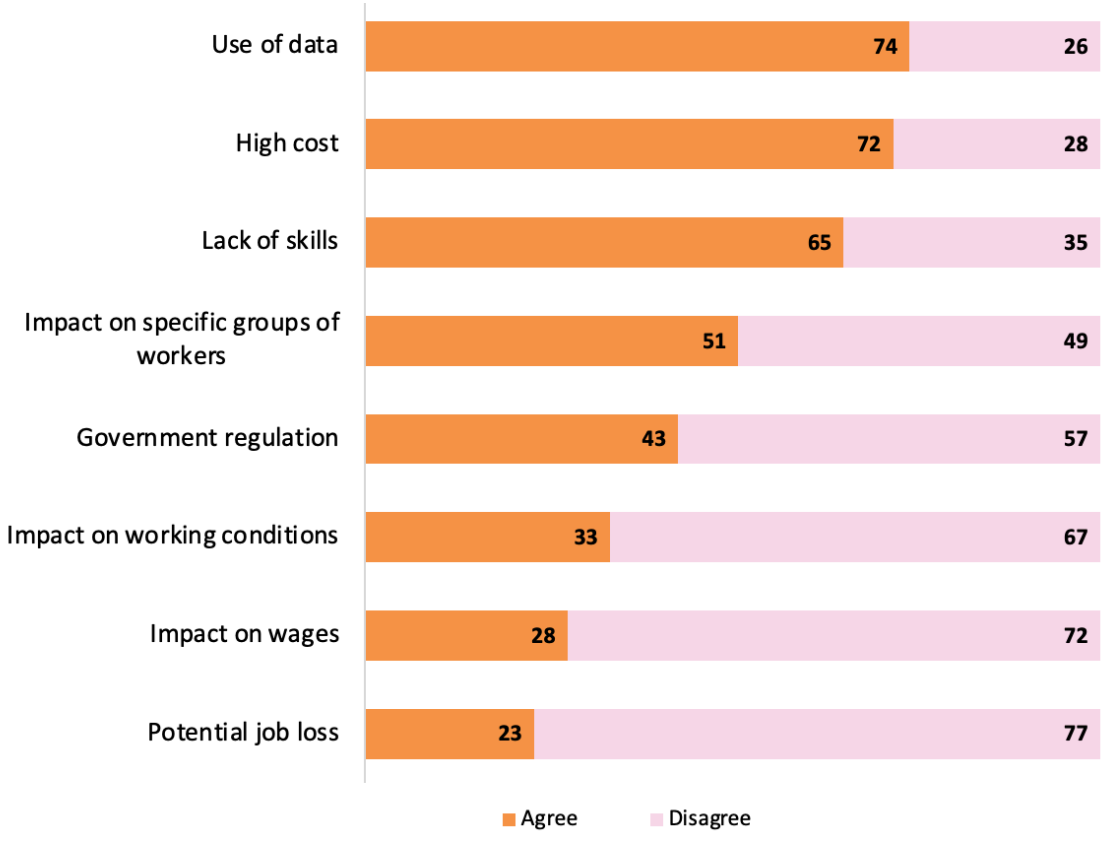


4.1.1.4 Barriers for adopting ADTs

Respondents' perceptions of barriers to adopting ADTs vary considerably. High cost and skill shortages emerge as the most widely cited obstacles, whereas concerns such as potential job loss and regulatory constraints receive more mixed support. The results are shown in Figure 4.6.

- Use of data: Data-related concerns emerged as the top barrier, with nearly three-quarters of employees (74%) identifying the use of data as a major obstacle to adopting ADTs. Half agreed and another 24% strongly agreed, signalling widespread discomfort or uncertainty around how data is collected, managed, or applied. Only 26% disagreed.
- High cost: The financial burden of adopting ADTs was the second most frequently mentioned barrier. A total of 72% of employees expressed concern with 46% agreeing and 26% strongly agreeing, highlighting the tension between long-term benefits and short-term costs. Only 28% disagreed.
- Lack of skills: Skills shortages were flagged by 65% of employees, with 48% agreeing and 17% strongly agreeing. This underlines a clear perception that organisations are not yet equipped with the digital competencies needed to fully leverage these technologies.
- Impact on specific groups of workers: Just over half (51%) agreed that ADTs could adversely affect certain categories of workers. However, nearly as many (49%) disagreed, suggesting a split in perception based on occupational exposure or role security.
- Government regulation: While 43% saw regulation as a barrier, mainly due to compliance complexity or uncertainty, 57% did not share this view, indicating that regulatory frameworks are not yet universally seen as restrictive.
- Impact on working conditions: Only 33% believed that working conditions would worsen as a result of ADT adoption. A clear majority (67%) disagreed, suggesting that most employees do not associate digital technologies with deteriorating job quality.

Figure 4.6 Perceived Barriers to Adopting ADTs



- Impact on wages: Concerns about wages were relatively low. Just 28% thought ADTs might affect earnings, while a strong majority (72%) dismissed this concern, possibly reflecting confidence in job stability or evolving compensation models.
- Potential job loss: Fear of job displacement due to ADTs was the least reported barrier. Only 23% expressed concern, while 77% disagreed: indicating a broadly optimistic or resilient outlook among employees regarding technology's impact on employment.

4.1.2 Human-tech skill complementarity: Employee's perspective

Human-tech skill complementarity refers to the synergistic relationship between employees and technology within an organization. It describes the dynamic interplay, collaboration, and integration between employees (skills, knowledge and abilities) and technological tools, systems. High human-tech complementarity means that employees leverage technology, and technology empowers employees to be more productive, creative, and effective (see D1.1). This concept emphasizes that neither human talent nor technology alone can maximize value: optimal outcomes arise when both complement each other (Guo et al., 2023).

4.1.2.1 Employee human skills

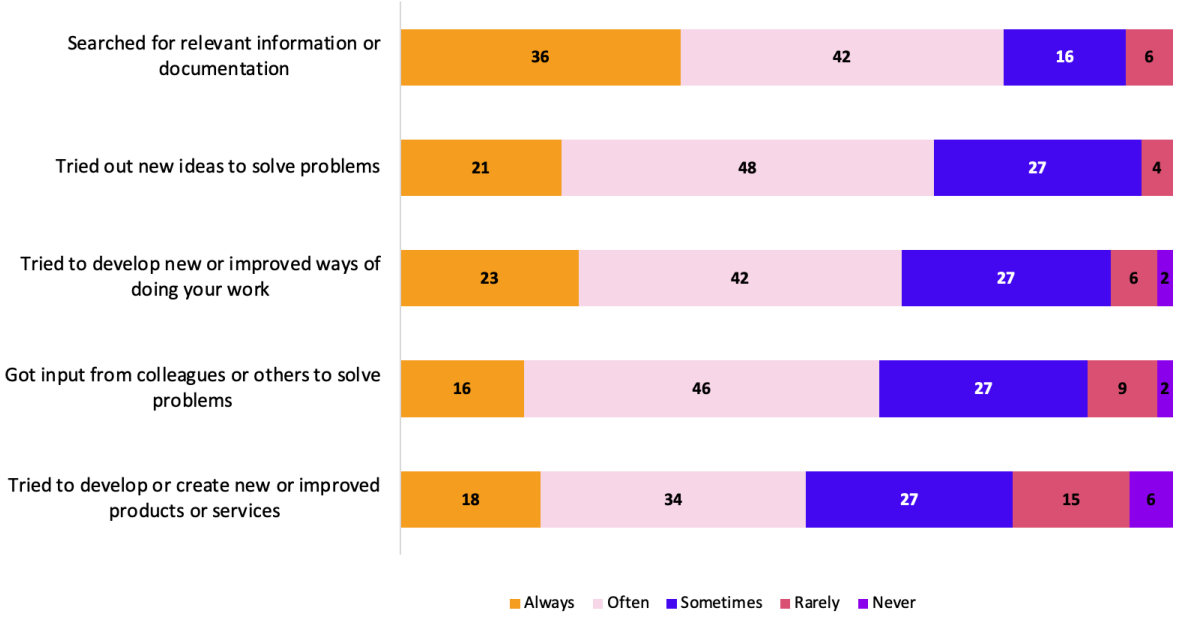
4.1.2.1.1 Problem-solving and creativity skills

Problem-solving and creativity skill refers to an individual's ability to effectively identify, analyze, and resolve complex or novel problems by generating original and practical solutions. This skill set encompasses logical reasoning, critical thinking, flexibility, and the capacity to apply innovative approaches when confronted with challenges. Problem-solving and creativity are recognized as essential 21st-century competencies for academic, professional, and everyday success (Mumford et al., 2017). Employees self-reported how frequently they engage in various problem-solving and creative behaviors. Across all five activities, a clear majority perform them at least sometimes, with "often" and "always" accounting for well over half of responses in most cases (see Figure 4.7).

- Searched for relevant information or documentation: A large majority (78%) engaged in problem-solving through information retrieval, with 36% always and 42% often searching for resources such as books or online materials. Another 16% did so occasionally, while only 6% rarely did, and none reported never doing so.
- Tried out new ideas to solve problems: Most employees (69%) took an experimental approach to challenges: 21% always and 48% often tried new ideas. Another 27% did so occasionally, with very few reporting rare (4%) or no engagement (0%).
- Developed new or improved ways of working: Creative improvements to workflows were common: 23% always and 42% often sought better ways of doing their work. Another 27% did this sometimes, while only a small minority rarely (6%) or never (2%) did so.
- Sought input from colleagues: Collaboration (66%) played a key role in problem-solving, with 16% always and 46% often seeking help from others. Every one in five (27%) did so occasionally, while fewer engaged rarely (9%) or not at all (2%).
- Created or improved products or services: Innovative contributions were somewhat less common. Eighteen percent always and 34% often tried to develop or enhance products

or services, while 27% did so occasionally. However, 15% rarely and 6% never engaged in this type of activity.

Figure 4.7 Human Skills: Self-Rated Problem-Solving and Creativity Skills



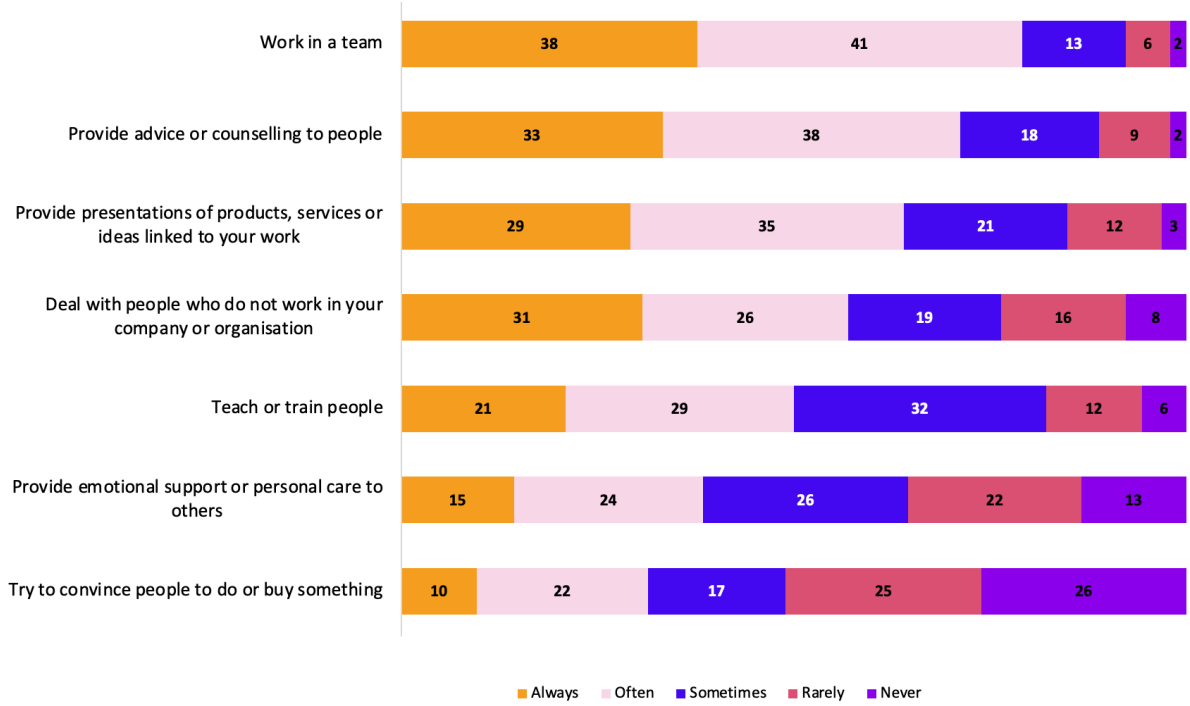
4.1.2.1.2 Interpersonal skills

Interpersonal job-skill refers to the abilities that enable individuals to interact effectively and harmoniously with others in the workplace. These skills include communication, teamwork, conflict resolution, empathy, active listening, and relationship-building. Strong interpersonal job-skills are essential for collaborating with colleagues, managing workplace dynamics, and contributing positively to organizational goals (Robles, 2012). Respondents rated how frequently they perform a range of interpersonal tasks at work. Overall, team-based activities and customer interactions are very common, while persuasive and support-oriented tasks occur less often. The results are shown in Figure 4.8.

- Worked in a team: Teamwork was highly prevalent, with 38% always and 41% often collaborating with others to achieve shared objectives. Only small proportion (13%) did so sometimes, while only a small minority rarely (6%) or never (2%) worked in teams.
- Provided advice or counselling: This was also common, with 33% always and 38% often offering guidance or support to others. Eighteen percent did so occasionally, while 9% rarely and 2% never took on this role.
- Presented products, services, or ideas: Over half of respondents (64%) reported doing this regularly: 29% always and 35% often. Twenty-one percent did so occasionally, while 12% rarely and 3% never engaged in presentations.
- Interacted with external stakeholders: Engaging with people outside their organisation, such as clients or customers, was fairly common: 31% always and 26% often. Nineteen percent did so sometimes, while 16% rarely and 8% never had such interactions.

- **Taught or trained others:** Twenty-one percent always and 29% often took part in teaching or training. Nearly a third (32%) did this occasionally, while 12% rarely and 6% never engaged in these activities.
- **Provided emotional support or personal care:** This was less frequent: only 15% always and 24% often offered such support. Twenty-six percent did so occasionally, while 22% rarely and 13% never provided it.
- **Tried to convince others to do or buy something:** This was the least common activity. Only 10% always and 22% often attempted persuasion in a sales or influence context. Seventeen percent did so sometimes, while nearly half reported doing so rarely (25%) or never (26%).

Figure 4.8 Human Skills: Self-Rated Interpersonal Job Skills



4.1.2.2 Employee digital skills

4.1.2.2.1 Employee experience with ADT adoption in the workplace

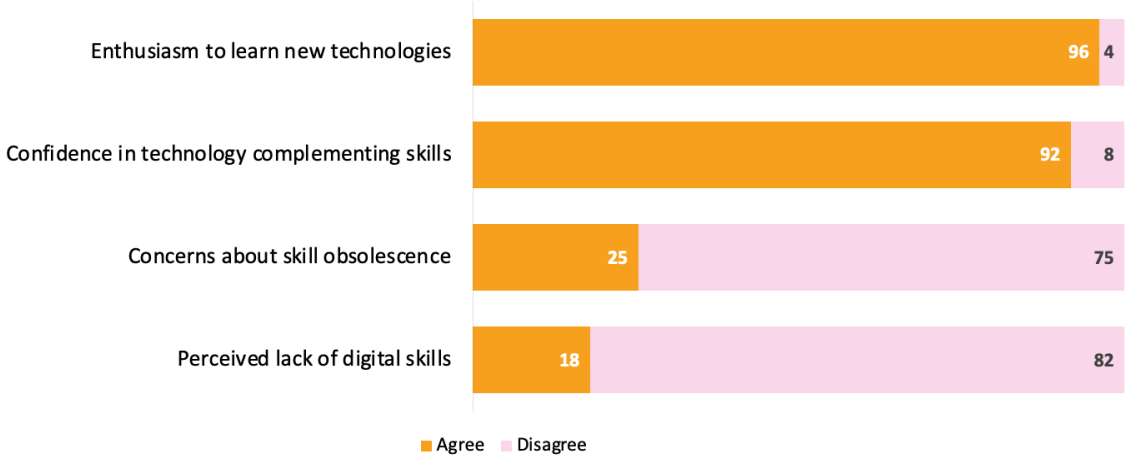
Employees were asked to indicate their agreement with four statements measuring how ADTs complement their skills. Overall, respondents express strong enthusiasm and confidence that ADTs enhance their capabilities, and only a minority believe these technologies devalue their skills or that they lack the necessary skills to work with them. The results are shown in Figure 4.10.

- **Enthusiasm to learn new technologies:** The overwhelming majority (96%) expressed eagerness to learn how to work with new technologies: 55% agreed and 41% strongly agreed. Only 4% disagreed, and none strongly disagreed, reflecting a broadly positive mindset toward digital upskilling.
- **Confidence in technology complementing skills:** A strong majority (92%) felt confident that new technologies would complement their existing skills: 64% agreed and 28%

strongly agreed. Just 8% expressed doubt, suggesting widespread optimism about the role of technology in enhancing, not replacing, their capabilities.

- **Concerns about skill obsolescence:** Only 25% agreed that new technologies would make their current skills less valuable: 22% agreed and 3% strongly agreed. In contrast, 75% disagreed, with 55% moderately and 20% strongly disagreeing. This indicated high confidence in the continued relevance of existing expertise.
- **Perceived lack of digital skills:** Just 18% believed they lacked the skills to work with new technologies: 15% agreed and 3% strongly agreed. A strong majority (82%) disagreed, including 58% who disagreed and 24% who strongly disagreed, indicating broad self-assurance in digital readiness.

Figure 4.9 Digital Skills: Employee Experience with ADT Adoption



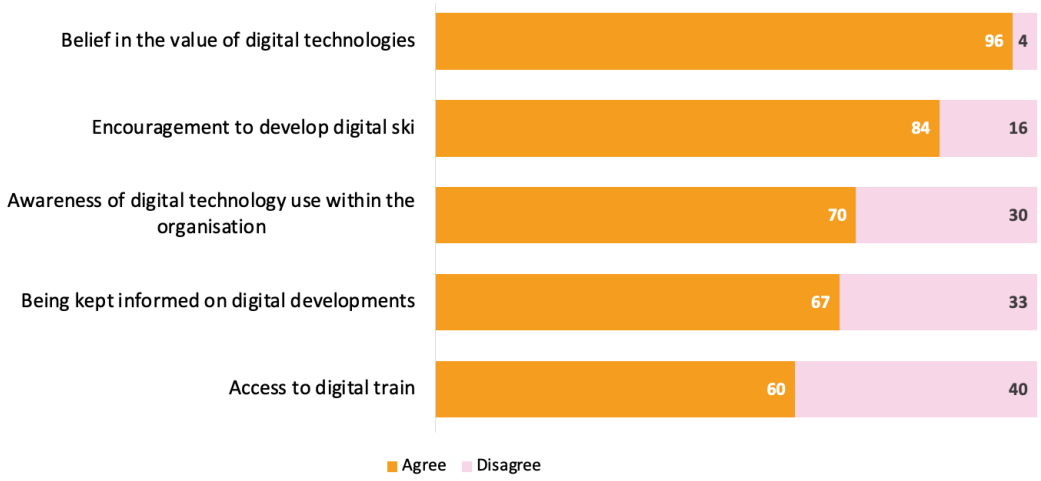
4.1.2.2.2 Employee experience with ADT implementation in the workplace

Respondents' views on how well their organizations support the actual deployment of ADTs are mixed. While most employees feel encouraged to build their digital skills and receive at least some training, a majority remain unconvinced of ADT's intrinsic value, and a substantial minority report inadequate communication about how these tools are used in practice. The results are shown in Figure 4.9.

- **Belief in the value of digital technologies:** Nearly all respondents (96%) expressed strong belief in the value of adopting digital technologies: 44% agreed and 52% strongly agreed. Only 4% disagreed, and none strongly disagreed, indicating near-universal support for digital transformation.
- **Encouragement to develop digital skills:** The majority (84%) felt encouraged to build new digital skills with 56% agreeing and 28% strongly agreeing. However, 16% did not feel the same, suggesting some variation in organisational support.
- **Awareness of digital technology use within the organisation:** Majority (70%) agreed they had heard enough about how digital technologies were being used in their company with 56% agreeing and 14% strongly agreeing. Still, 30% disagreed, pointing to gaps in visibility or internal communication.

- **Being kept informed on digital developments:** Two thirds (67%) reported being kept up to date on important digital issues with 54% agreeing and 13% strongly agreeing. A third (33%) disagreed, highlighting room for improvement in internal updates and transparency.
- **Access to digital training:** Over half (60%) agreed they received training to stay current with technological developments with 48% agreeing and 12% strongly agreeing. However, 40% disagreed, including 8% who strongly disagreed, indicating that access to upskilling opportunities was uneven or insufficient in some areas.

Figure 4.10 Digital Skills: Employee Experience with ADTs Implementation

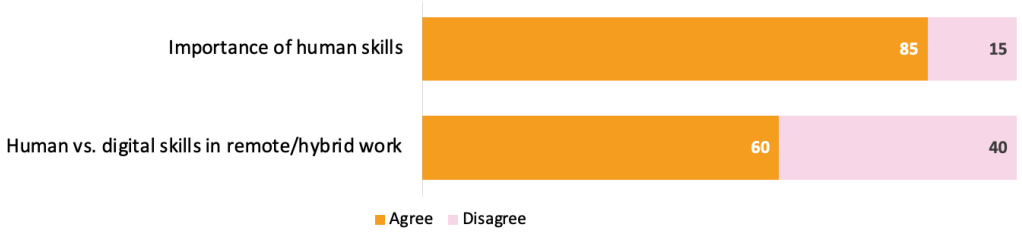


4.1.2.3 Human versus digital skills: Employee's perspective

Employees' agreement with their organization's systems for technology reveals strong support for both human and digital skill development and hybrid work options, alongside divided views on the relative importance of human versus digital skills in remote settings. The results are shown in Figure 4.11.

- **Importance of human skills:** A strong majority (85%) agreed that human skills were becoming increasingly important: 57% agreed and 28% strongly agreed. Only 15% disagreed, and none strongly disagreed, reflecting widespread recognition of the enduring value of interpersonal and cognitive abilities.
- **Human vs. digital skills in remote/hybrid work:** Over half (60%) of respondents believed that human skills were more essential than digital skills in remote or hybrid work contexts: 48% agreed and 12% strongly agreed. However, 40% disagreed, suggesting a notable divide in how employees perceived the relative value of soft versus technical skills in flexible work environments.

Figure 4.11 Employee Experience with Human versus Digital Skills



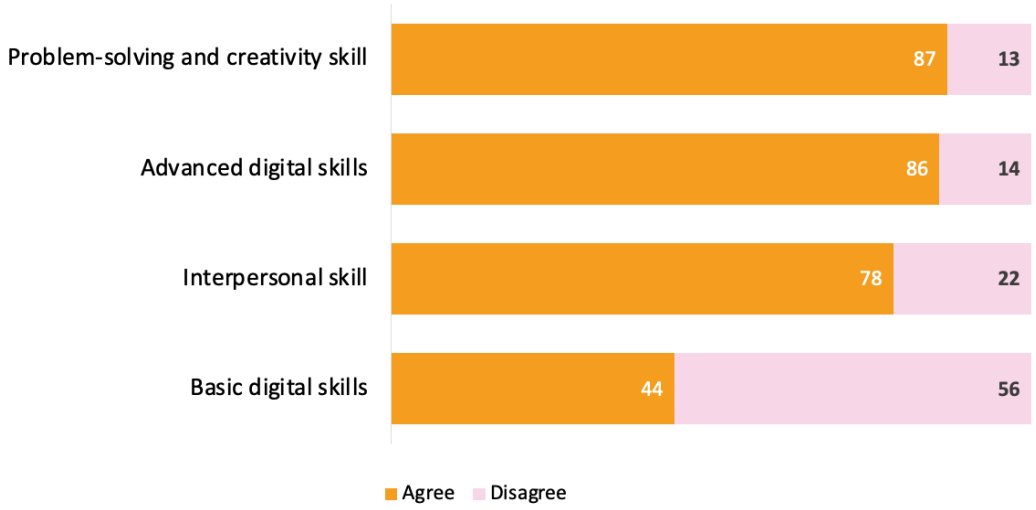
4.1.3 Employee reskilling and upskilling for complementarity

4.1.3.1 Employee human and digital skill needs

Employees were asked to identify which skills they believed would be most important for their future work. Respondents rated their agreement with the need for advanced digital skills, basic digital skills, interpersonal skills, problem-solving and creativity skills. The results are shown in Figure 4.12.

- Problem-solving and creativity skills: The vast majority (87%) agreed that creative problem-solving would become increasingly important: 68% agreed and 19% strongly agreed. Only 13% disagreed, suggesting a strong consensus around the value of these capabilities in the evolving workplace.
- Advanced digital skills: Majority (86%) believed that advanced digital competencies would be essential in the future: 58% agreed and 28% strongly agreed. Just 14% disagreed, indicating widespread recognition of the growing demand for high-level technical expertise.
- Interpersonal skills: Majority (78%) agreed that interpersonal skills would remain important: 60% agreed and 18% strongly agreed. However, 22% disagreed, suggesting that while widely valued, these skills were seen by some as less critical in digital or automated contexts.
- Basic digital skills: Only 44% agreed that basic digital skills would be important going forward: 32% agreed and 12% strongly agreed. In contrast, 56% disagreed, with 21% strongly disagreeing, signalling that foundational digital literacy may no longer be seen as a key differentiator in the future job market.

Figure 4.12 Employee Identified Future Skill Needs



4.1.3.2 Employee human and digital skill development

Skills development refers to the process of improving, enhancing, or acquiring new abilities, competencies, and knowledge that are necessary for effective performance in current or future jobs. This process can occur through formal education, training programs, on-the-job learning,

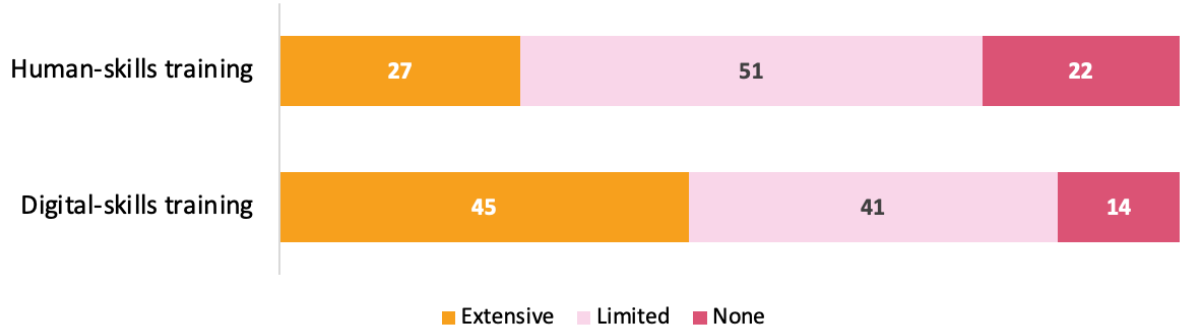
self-directed study, or experiential learning. Skills development is essential for individual career advancement, organizational growth, and adapting to changes in the labor market or technology (McGrath, 2002).

4.1.3.2.1 Employee training content: Focused on human versus digital skills

Employees were asked to assess the scope of training opportunities offered in their organisations, distinguishing between human-skills and digital-skills programs. As shown in Figure 4.13, digital-skills training was reported as both more widely available and more comprehensive than training focused on human skills.

- Human-skills training: Only 27% of respondents characterised human-skills training as extensive. A majority (51%) described it as limited in scope, while 22% stated that no such programs were offered.
- Digital-skills training: In contrast, 45% viewed digital-skills training as extensive, 41% described it as limited, and only 14% reported no access to digital-skills training.

Figure 4.13 Employee Identified Training Content Focused on Human vs. Digital Skills



When compared with earlier findings where 87% of employees emphasised the importance of problem-solving and creativity, and 78% highlighted the value of interpersonal skills: the lack of robust human-skills training revealed a significant gap. While digital skills were also deemed essential (86% for advanced skills, 44% for basic), the greater availability of digital training (86% had at least some access) pointed to a relatively smaller gap in meeting those development needs.

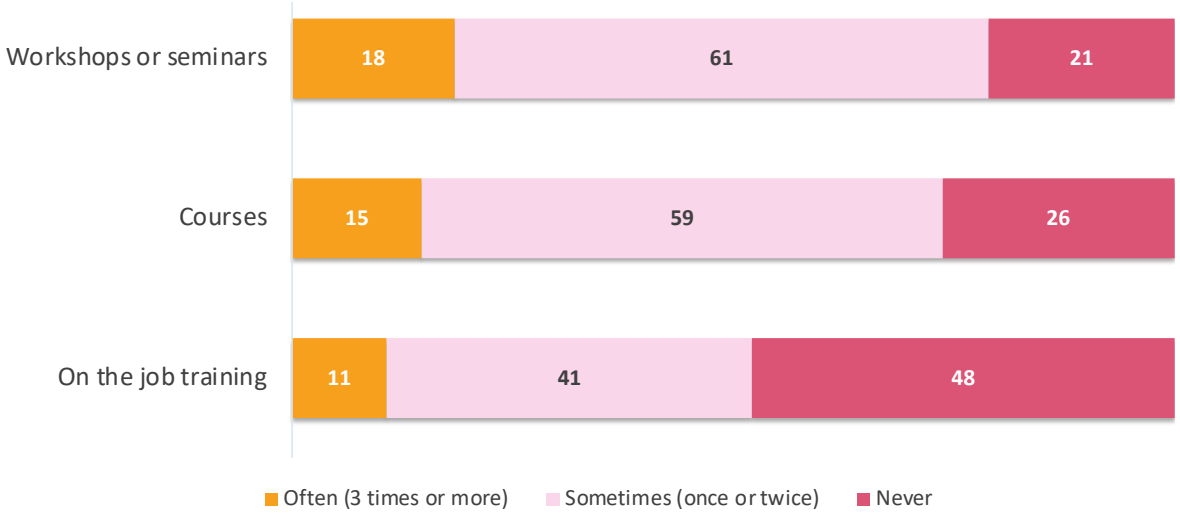
4.1.3.2.2 Employee digital skills training modalities

Most employees participated in some form of digital-skills training over the past year, though the frequency and delivery methods varied. As shown in Figure 4.14, short-form learning formats such as workshops and seminars were the most common, while structured, on-the-job training remained less prevalent.

- Workshops or seminars: Over half (61%) of respondents attended one or two sessions, while 18% participated three or more times. However, 21% reported no participation at all.
- Courses (e.g., online or classroom-based): Just over half (59%) enrolled once or twice, while 15% completed three or more courses. A significant portion (26%) had not taken any formal courses.

- On-the-job training: This was the least common format. Nearly half (48%) reported never receiving such training, 41% did so once or twice, and only 11% engaged three or more times.

Figure 4.14 Employee Digital Skills Training Modalities (Last 12 Months)

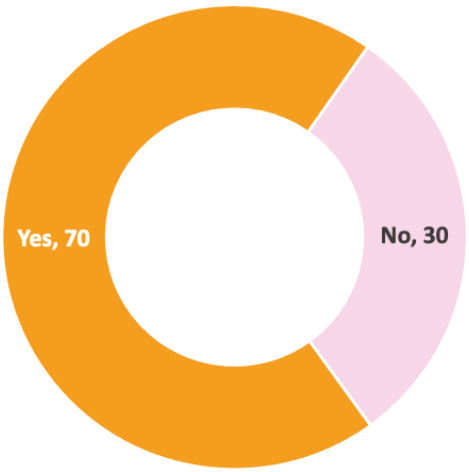


4.1.3.2.3 Employee perceived training offers: Employer Sponsorship

Employees were asked whether at least one of their digital-skills training activities in the past 12 months was either fully or partially funded by their employer or conducted during paid working time. The results are shown in Figure 4.15.

- Yes: Majority (70%) respondents reported that at least one training activity was employer-sponsored or took place during paid working hours.
- No: The rest (30%) indicated that none of their training was funded by the employer or conducted during paid time.

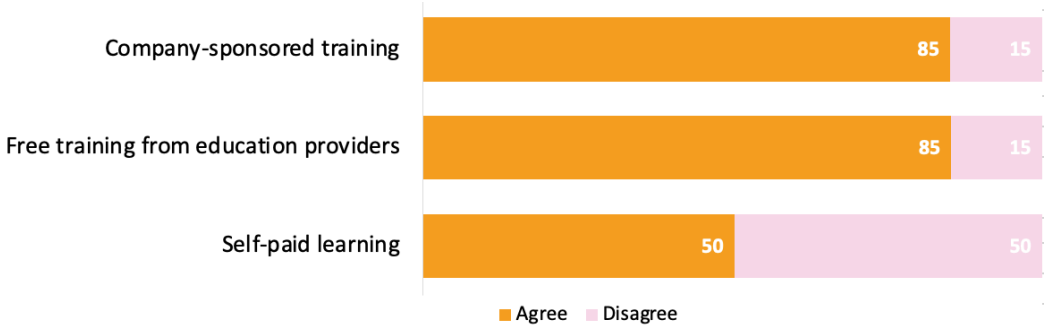
Figure 4.15 Employee-Reported Employer Sponsorship in Training



Employees were also asked how they expect their future education or training activities to learn new digital skills to be paid. The results are shown in Figure 4.16.

- **Company-sponsored training:** A vast majority (85%) expected their employer to cover training costs: 57% agreed and 28% strongly agreed. A small proportion (15%) disagreed, including 5% who strongly disagreed.
- **Free training from education providers:** Similarly, 85% anticipated participating in free training opportunities offered by educational institutions: 61% agreed and 24% strongly agreed. Fifteen percent disagreed, mirroring the company-sponsored figures.
- **Self-paid learning:** Half of the respondents (50%) expected to fund their own digital training: 45% agreed and 5% strongly agreed. The other 50% disagreed, including 19% who strongly opposed the idea of self-funding.

Figure 4.16 Employee Anticipated Funding Sources for Future Digital Skills Training



4.2 Manager Survey Findings

This section presents the key findings from the manager survey, organised into three main subsections. First, it presents the findings on how managers perceive the role of ADTs in the workplace, including their impact on firm outcomes, the resulting shifts in skill demands, and how organisations are responding to address emerging skill gaps. Then, it explores the dynamics of human–tech skill complementarity from a managerial perspective, providing an overview of current human and digital skill needs and managers' views on their relative importance. Finally, it focuses on how organisations are approaching reskilling and upskilling to support this complementarity, including strategies for human and digital skill development. Together, these findings offer a comprehensive view of how leaders are navigating talent, technology, and transformation.

4.2.1 ADTs in the workplace: Manager's perspective

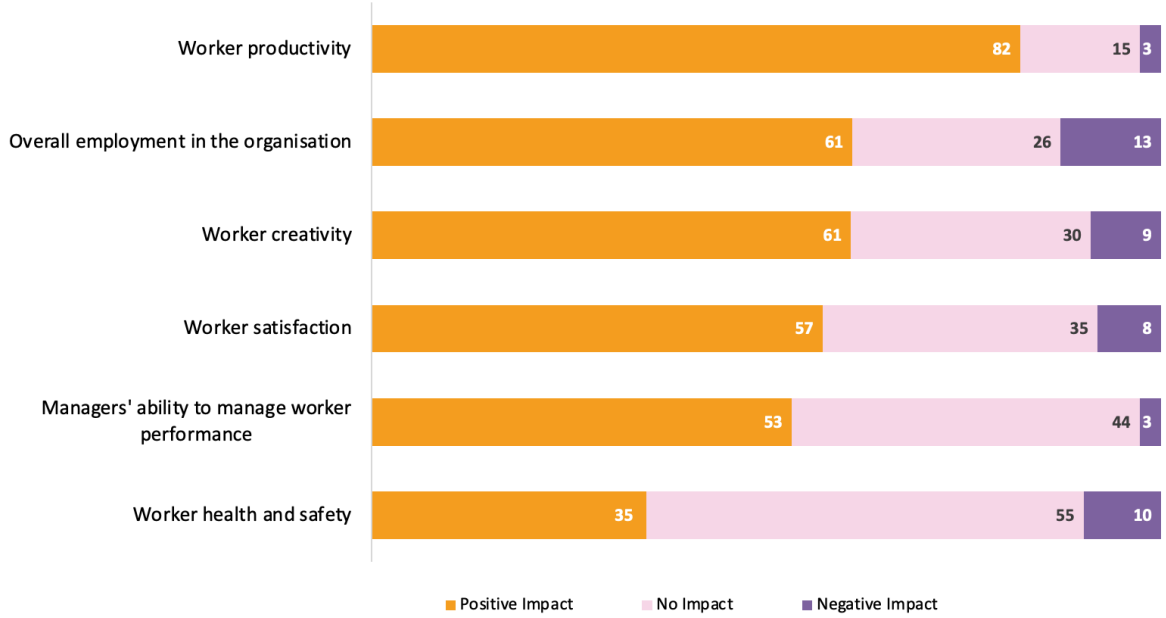
4.2.1.1 Impact of ADTs on firms' outcomes

Managers were asked to report the effects of ADTs on key workforce metrics. The results are shown in Figure 4.17.

- **Worker productivity**: Majority of managers (82%) report that ADTs increase productivity, 15% see no effect, and just 3% perceive a negative impact.

- Overall employment in the organisation: 61% of managers report a positive impact of ADTs on employment levels, 26% see no effect, and 13% observe a negative impact.
- Worker creativity: 61% of managers perceive a positive effect of ADTs on creativity, 30% see no impact, and 9% note a negative impact.
- Worker satisfaction: 57% of managers indicate that ADTs boost employee satisfaction, 35% observe no change, and 8% report a decline.
- Managers' ability to manage worker performance: 53% of respondents believe ADTs improve managerial oversight, 44% report no change, and only 3% perceive a negative effect.
- Worker health and safety: 35% of managers see a positive impact of ADTs on health and safety, 55% report no impact, and 10% note a negative effect.

Figure 4.17 Manager-Reported Impact of ADTs on Firm's Outcomes



4.2.1.2 ADTs and skills shift

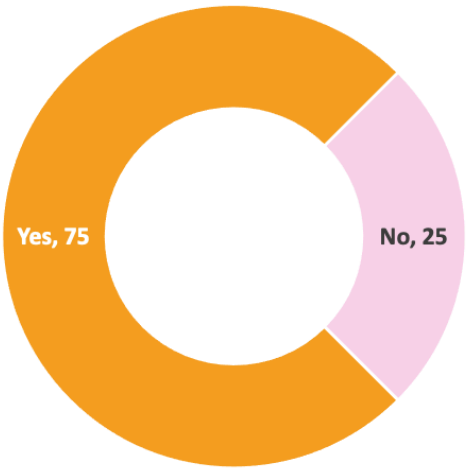
In addition, managers were asked whether ADTs have changed skill requirements in their company. The results are shown in Figure 4.18.

- Yes: 75% of managers believe that ADTs have altered the skills their workforce needs.
- No: 25% of managers report no noticeable change in required skills.

These findings reveal that three-quarters of firms recognize a tangible shift in competencies driven by digital adoption. In practice, managers in the "Yes" group often cite growing demand for data-analysis capabilities, AI and automation literacy, and proficiency with new software platforms. They also emphasize the rising importance of meta-skills: adaptability, continuous learning and cross-functional collaboration: to integrate these technologies effectively into day-to-day operations.

By contrast, the 25% of managers reporting no change tend to work in sectors where ADTs have been used only to optimize existing routines rather than transform job content. While they may have deployed new tools, the underlying tasks and skill sets remain largely intact. However, as digital technologies evolve rapidly, these organizations risk being caught unprepared: what appears as stability today may become a critical skills gap tomorrow.

Figure 4.18 Manager-Reported Influence of ADTs on Shifting Skill Requirements



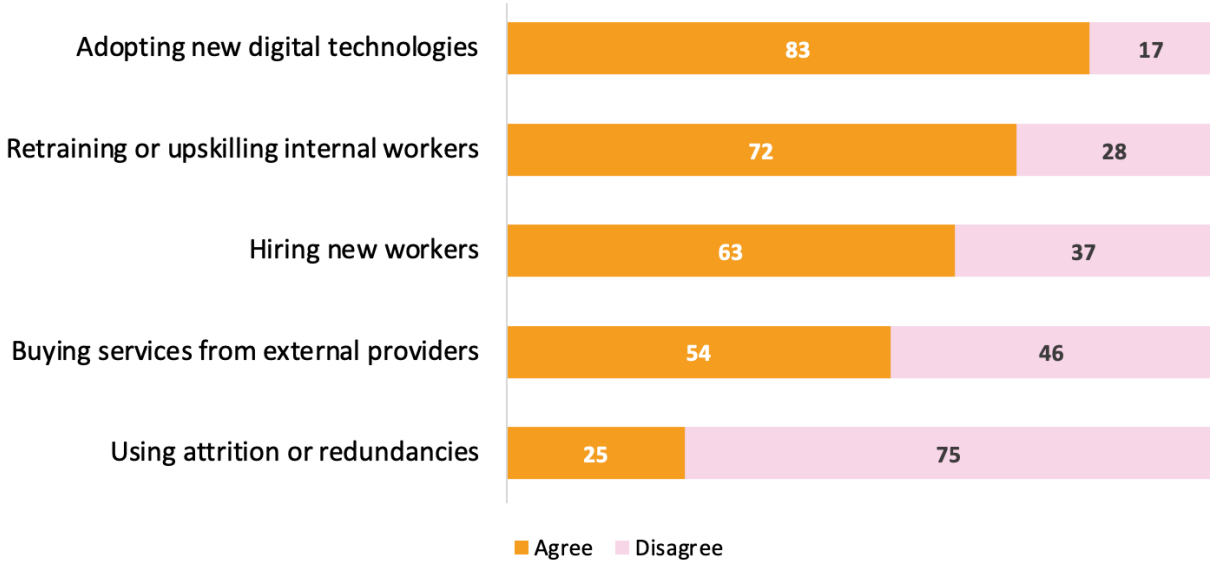
4.2.1.3 Organisation's responses to address skill shifts and gaps

Managers were asked how their organisations responded to emerging skill gaps, using strategies ranging from digital investments to staffing adjustments. As shown in Figure 4.19, adopting new technologies and retraining internal staff emerged as the most common approaches, while reducing headcount was the least preferred.

- Adopting new digital technologies: A strong majority (83%) reported that their organisations were responding to skill needs by rolling out new digital tools: 66% agreed and 17% strongly agreed. Only 17% disagreed, including a small minority (4%) who strongly opposed the approach.
- Retraining or upskilling internal workers: Nearly three-quarters (72%) indicated that their companies prioritised internal development: 59% agreed and 13% strongly agreed. Around one in four (28%) disagreed, including 7% who strongly disagreed.
- Hiring new workers: Just under two-thirds (63%) said that recruiting new talent was used to close skill gaps: 49% agreed and 14% strongly agreed. Over a third (37%) disagreed, including 8% who strongly disagreed.
- Buying services from external providers: Just over half (54%) noted that their organisations brought in external expertise to meet specific skill needs: 45% agreed and 9% strongly agreed. A similar share (46%) disagreed, reflecting a fairly balanced view on outsourcing.
- Using attrition or redundancies: Only one in four (25%) supported workforce reductions as a response to skill shifts: 20% agreed and 5% strongly agreed. A clear majority (75%)

disagreed, including 13% who strongly opposed using this method, making it the least supported option.

Figure 4.19 Manager-Reported Methods Used to Address Skill Gaps



4.2.2 Human-tech skill complementarity: Manager's perspective

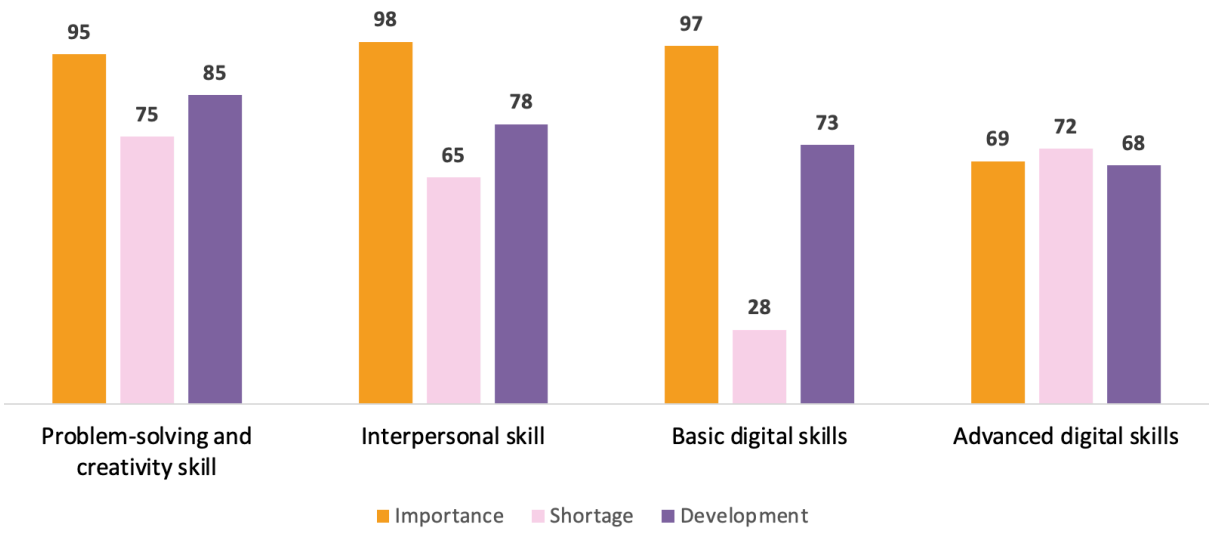
4.2.2.1 Human and digital skills: Overview

Managers were asked to evaluate both human and digital skills across three dimensions: their importance in recruitment, the extent of skill shortages, and future plans for development. This section first provides an overview of how these skill categories compare across the three dimensions, followed by a more detailed breakdown of each dimension.

Figure 4.20 provides an overview of how managers assessed four key skill categories: two human (problem-solving and creativity; and interpersonal skills) and two digital (basic and advanced digital skills) across importance in recruitment, reported shortages, and development plans.

- For human skills, there was strong alignment: both problem-solving & creativity and interpersonal skills were rated highly in importance (95% and 98%), seen as facing significant shortages (75% and 65%), and were the focus of substantial development efforts (85% and 78%). This indicates a coherent and proactive approach to addressing human skill needs.
- In contrast, digital skills showed more divergence. Basic digital skills were considered highly important (97%) but showed a low level of perceived shortage (28%) and moderate training investment (73%). Advanced digital skills revealed the most significant misalignment: despite a relatively lower importance rating (69%), they were associated with high levels of shortage (72%), yet received less development focus (68%). This suggests that organisations may be underinvesting in areas where future digital capability gaps are likely to grow.

Figure 4.20 Manager-Reported Human and Digital Skills: Importance, Shortage and Development

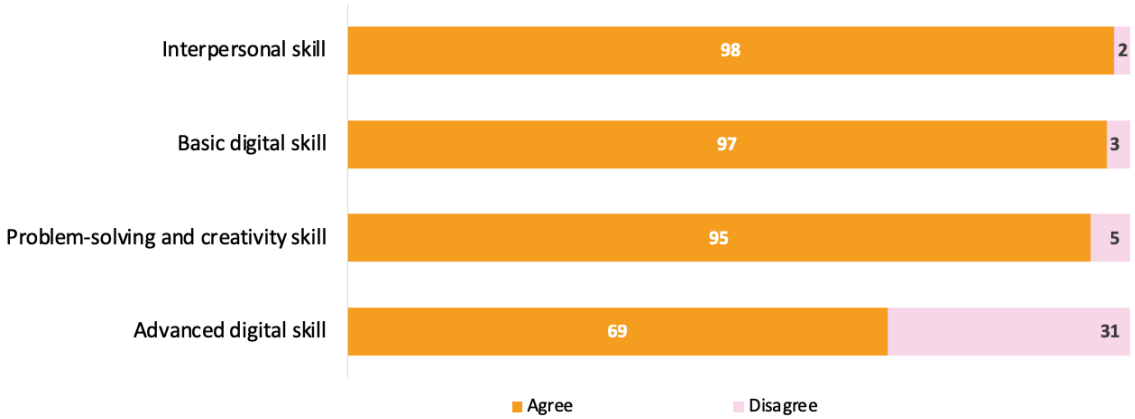


4.2.2.1.1 Human and digital skill importance

Managers were asked to assess the importance of various skill categories when recruiting new employees. As shown in Figure 4.21, higher-order cognitive and interpersonal skills topped the list, with strong support also expressed for basic digital capabilities. Advanced digital skills, while still valued, received comparatively lower emphasis.

- Interpersonal skills: Nearly all managers (98%) rated interpersonal abilities as important for recruitment, with 57% strongly agreeing. Only 2% disagreed.
- Basic digital skills: Similarly, 97% viewed basic digital literacy as essential, including 47% who strongly agreed, and just 3% disagreed.
- Problem-solving and creativity skill: These skills were also highly valued, with 95% agreement: 62% strongly and 33% moderately. Just 5% expressed disagreement.
- Advanced digital skills: While still recognised, only 69% considered advanced digital competencies important: 55% agreed and 13% strongly agreed. Nearly one-third (31%) disagreed, indicating a more divided view.

Figure 4.21 Manager-Reported Human and Digital Skills Importance in Recruitment

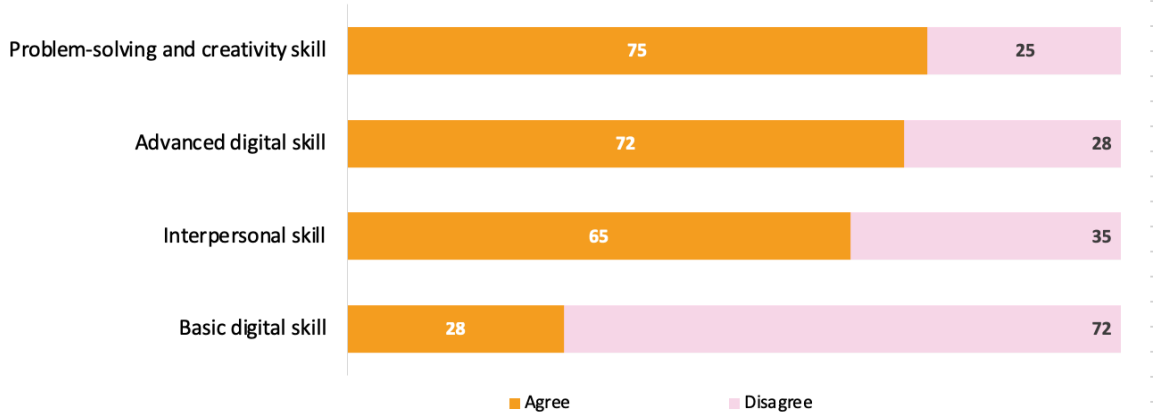


4.2.2.1.2 Human and digital skill shortage

Managers were then asked to identify perceived shortages in the same skill areas. Skill shortages can occur due to rapid technological change, shifts in labor market demand, inadequate education or training systems, or demographic factors. These shortages can hinder productivity, innovation, and economic growth (Brunello, & Wruuck, 2021). As shown in Figure 4.22, the largest gaps were reported for problem-solving and creativity skill and advanced digital skill, while shortages in interpersonal abilities were moderate and basic digital literacy was seen as largely sufficient.

- Problem-solving and creativity skill: Three in four managers (75%) believed candidates lacked these skills: 33% strongly agreed, 42% agreed. A quarter disagreed.
- Advanced digital skills: A similar concern emerged here, with 72% reporting a shortage: 27% strongly agreed and 45% agreed while 28% disagreed.
- Interpersonal skills: Almost two thirds (65%) noted gaps in interpersonal abilities, with disagreement from 35%, including 2% strongly.
- Basic digital skills: Only 28% identified a shortage in basic digital literacy. A clear majority (72%) disagreed, including 18% who strongly disagreed: suggesting this is not a pressing concern.

Figure 4.22 Manager-Reported Human and Digital Skills Shortage in Recruitment



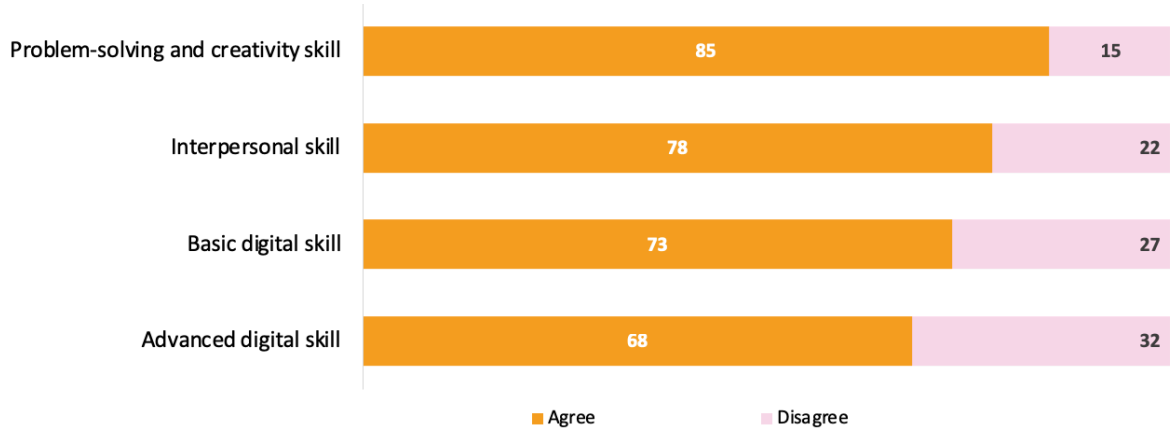
4.2.2.1.3 Human and digital skill future development

Managers also indicated which skill categories were prioritised in their training and development plans. Figure 4.23 shows a strong focus on human skill development, particularly problem-solving and interpersonal competencies. Basic digital skills received moderate attention, while advanced digital skills saw the lowest level of planned investment.

- Problem-solving and creativity: This was the top training priority, with 85% of managers including it in development plans: 56% agreed, 29% strongly agreed.
- Interpersonal skills: Seventy-eight percent said their training programmes emphasised communication and teamwork, with 27% expressing strong agreement.
- Basic digital skills: These were included in training plans by 72% of managers, though fewer (18%) strongly agreed.

- **Advanced digital skills:** Only 68% reported development plans for advanced digital competencies: 45% agreed, and 23% strongly agreed. One-third (32%) expressed disagreement.

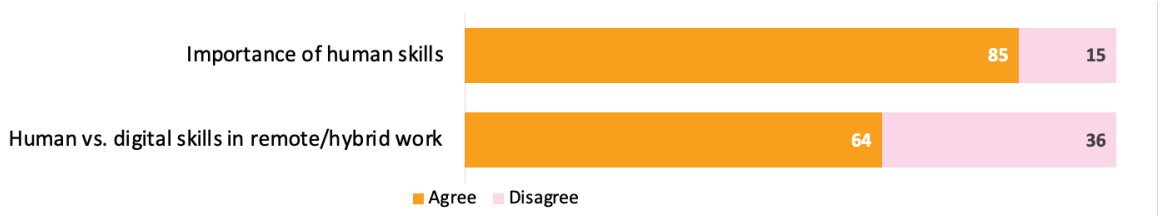
Figure 4.23 Manager-Reported Human and Digital Skills Future Development



4.2.2.2 Human versus digital skills: Manager's perspective

Managers were asked to compare the importance of human and digital skills within organisational contexts. As shown in Figure 4.24, most acknowledged the growing value of human capabilities, though digital skills were viewed as more critical in remote and hybrid work settings.

Figure 4.24 Manager Experience with Human versus Digital Skills



- **Importance of human skills:** Majority (84%) of managers agreed that interpersonal and soft skills are rising in importance: 59% agreed and 25% strongly agreed. A small proportion (16%) disagreed, with no strong disagreement reported.
- **Human vs. digital skills in remote/hybrid work:** Over half (60%) of respondents believed that human skills were more essential than digital skills in remote or hybrid work contexts: 48% agreed and 12% strongly agreed. However, 40% disagreed, suggesting a notable divide in how employees perceived the relative value of soft versus technical skills in flexible work environments.

4.2.3 Organisational reskilling and upskilling for complementarity

4.2.3.1 Organisational human and digital skill development

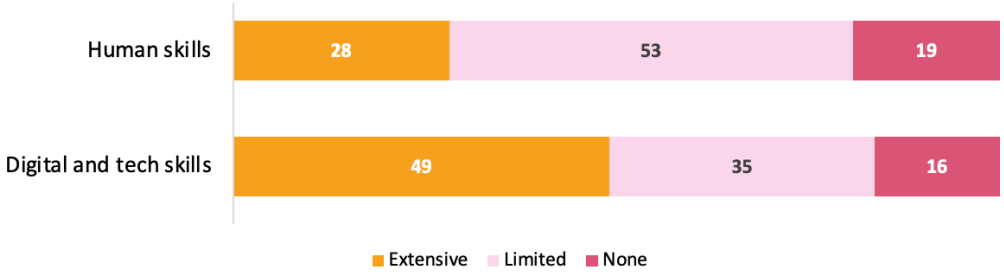
4.2.3.1.1 Organisational training content: Focused on human versus digital skills

Managers were asked to assess the focus of their organisations' training programmes in two key areas: human skills and digital or technology-related skills. As shown in Figure 4.25, digital-skills

training was more commonly described as extensive, while human-skills training was often limited in scope or entirely absent.

- **Human skills:** Over one quarter (28%) of organisations offered comprehensive training in human skills such as communication, teamwork, and leadership. A majority (53%) provided only limited training. Nineteen percent reported no formal human-skills training at all.
- **Digital and technology skills:** Almost half (49%) described their digital training as extensive, covering advanced tools, platforms, and practical application. Over one third (35%) offered limited programmes. Finally, 16% indicated no formal training in this area.

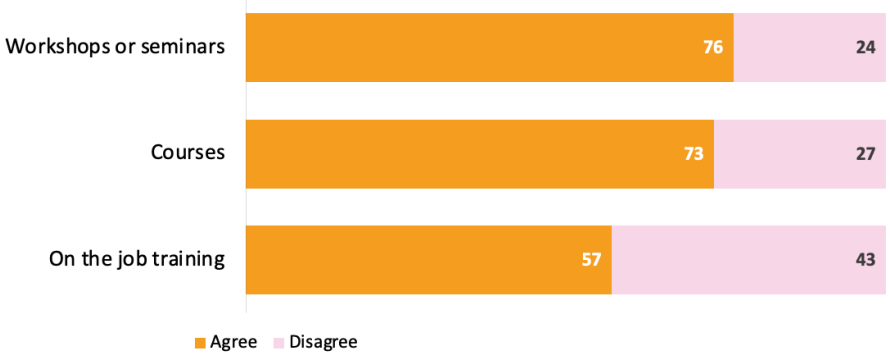
Figure 4.25 Manager Identified Training Content Focused on Human vs. Digital Skills



4.2.3.1.2 Organisational digital skills training modalities

Managers were asked which types of digital-skills training their organisations had offered or funded over the past year. As shown in Figure 4.26, formal courses and workshops were the most common formats, while structured on-the-job training was less widespread.

Figure 4.26 Manager-Reported Digital Skills Training Modalities (Last 12 Months)



- **Workshops or seminars:** Majority (76%) reported offering short-form sessions: 42% agreed and 34% strongly agreed. Twenty-four percent disagreed, including 8% who strongly disagreed, making this one of the most widely adopted training formats.
- **Courses (e.g. online or classroom-based):** Nearly three-quarters (73%) indicated that formal courses were provided: 48% agreed and 25% strongly agreed. Twenty-seven percent disagreed, including 8% who strongly disagreed.
- **On-the-job training with a designated trainer:** Just over half (57%) said their organisations offered this format: 38% agreed and 19% strongly agreed. Forty-three

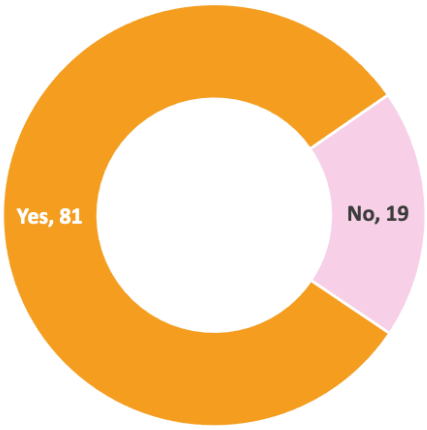
percent disagreed, including 11% who strongly disagreed, indicating more limited use of hands-on, coach-led training in the workplace.

4.2.3.1.3 Employer training offers: Employer Sponsorship

Managers were asked whether their organisations planned to expand or invest further in advanced digital-skills training. As shown in Figure 4.27, most firms indicated an intent to increase future provision.

- Yes: Majority (81%) of managers stated that their companies planned to provide or fund more advanced digital-skills training, signalling broad recognition of the growing demands of digital transformation.
- No: The rest (19%) reported no intention to expand training in this area. This group may include firms with limited digital exposure, constrained resources, or confidence in existing programmes.

Figure 4.27 Manager-Reported Employer Sponsorship in Training



4.3 Comparison Analyses

This section presents a series of comparative analyses designed to deepen understanding of regional and role-based differences in digital transformation and skills development. It is structured around three core comparisons: (1) between EU and non-EU respondents: both employees and managers, (2) between employee and manager survey results, and (3) against external benchmark survey data.

The first two subsections explore similarities and differences in the employee and manager data between EU member states and non-EU regions, focusing on key areas such as ADT usage in the workplace, human–tech skill complementarity, and reskilling and upskilling. By examining percentage distributions and mean values (for selected integrated indicators), the analysis aims to identify context-specific patterns that may reflect geographic, institutional, or policy-related influences on the adoption of ADTs and the development of relevant skills. The third subsection compares employee and manager perspectives on shared indicators: specifically contrasting employee expectations and anticipations with employer-side reports on offerings and support. Topics include workplace use of ADTs (e.g. perceived impact), skill complementarity, and

organisational reskilling strategies. Finally, the fourth subsection situates these findings within the broader evidence base by comparing selected results with those from existing large-scale surveys, including the OECD AI Survey conducted in 2022 and Cedefop's second European Skills and Jobs Survey (ESJS) conducted in 2021.

Together, these analyses offer a more nuanced and comparative view of digital readiness, helping to inform targeted policy responses and workforce development strategies across different regional and organisational contexts.

4.3.1 Employee survey results comparison: EU and non-EU employees

Table 4.1 presents the percentage scores of key survey variables for employees in EU and non-EU regions. These percentages reflect the relative position of mean scores within each variable's original scale range (e.g., 1-3 or 1–4), allowing for standardized comparison. Overall, the results indicate both similarities and notable differences between the two groups across several dimensions.

4.3.1.1 Employee reported ADTs usage in the workplace

- ADT usage and motivation: Adoption of ADTs is high across both EU and non-EU respondents, with 72% of EU and 76% of non-EU employees reporting use. Motivation to engage with these technologies was similarly strong: 72% in the EU and 75% outside the EU. These results reflect consistently high levels of digital engagement, with a modest lead in adoption and enthusiasm in non-EU contexts.
- Perceived impact of ADTs: Positive impacts were broadly reported. At the task level, 70% (EU) and 72% (non-EU) cited improvements. Job-level benefits were even more prominent, with 80% of EU and 82% of non-EU respondents reporting gains. Broader outcomes such as enhanced collaboration, creativity, and communication were acknowledged by 83% (EU) and 86% (non-EU), suggesting widespread confidence in the holistic value of ADTs, particularly outside the EU.
- Barriers to adoption: While all respondents faced challenges, the nature of concerns varied. non-EU employees were more likely to cite economic barriers: 80% identified high costs (vs. 70% in the EU), 39% noted wage impacts (vs. 25%), and 28% expressed concerns over job loss (vs. 22%). Conversely, EU respondents reported greater concern about ethical and governance issues: data usage (75% vs. 71%), impact on specific groups (52% vs. 45%), and lack of regulation (44% vs. 38%). These findings indicate a regional divide in the perceived risks of digitalisation and economic for the non-EU context, regulatory and social for the EU context.

4.3.1.2 Employee reported human-tech skill complementarity

- Human skills broadly valued: Both EU and non-EU employees emphasised the importance of human-centric capabilities. Nearly all respondents acknowledged the value of problem-solving and creativity (94% EU, 95% non-EU) as well as interpersonal skills (87% EU, 92% non-EU), reinforcing a shared belief in the enduring relevance of human strengths.

- **Digital skills still limited**: ADT-related digital capabilities were comparatively less established. Reported experience in adoption was moderate (70% EU, 73% non-EU), and implementation familiarity was slightly higher (78% EU, 77% non-EU). These relatively lower figures highlight the need to deepen digital integration alongside human skills development.
- **Human vs. digital balance**: non-EU respondents demonstrated a stronger appreciation for human–tech balance. A larger proportion rated human skills as important (92% non-EU vs. 83% EU) and emphasised the need to prioritise human capabilities in hybrid work contexts (78% non-EU vs. 56% EU). This suggests a growing awareness in non-EU regions of the need for complementarity between human and digital strengths.

Table 4.1 Comparison of Key Variables between EU and non-EU Employees

Employee survey data			Region	
			EU	non-EU
ADTs in the workplace	Employee ADTs usage		72%	76%
	Motivation for using ADTs		72%	75%
	Impact of ADTs on employee outcomes	Tasks	70%	72%
		Jobs	80%	82%
		Other outcomes	83%	86%
	Barriers for adopting ADTs*	Use of data	75%	71%
		High cost	70%	80%
		Lack of skills	66%	63%
		Impact on specific groups of workers	52%	45%
		Government regulation	44%	38%
		Impact on working conditions	33%	36%
		Impact on wages	25%	39%
		Potential job loss	22%	28%
Human-tech skill complementarity	Human skills	Problem-solving and creativity skill	94%	95%
		Interpersonal skill	87%	92%
	Digital skills	ADT adoption	70%	73%
		ADT implementation	78%	77%
	Human vs. digital skills*	Importance of human skills	83%	92%
		Human vs. digital skills in hybrid work	56%	78%
Employee reskilling and upskilling for complementarity	Skill needs	Human skills	74%	78%
		Digital skills	67%	72%
	Skill development focus	Human skills	79%	73%
		Digital skills	87%	84%
	Skill development modalities*	Workshops or seminars	76%	89%
		Courses	73%	78%
		On-the-job training	50%	63%
	Employer sponsorship on training*		70%	68%

Note: The percentages indicate where each variable's mean value falls within its respective scale range (e.g., 1-3 or 1–4) allowing for easier comparison across different scales. Those with * indicates that the actual percentage is used.

4.3.1.3 Employee reported reskills and upskilling for complementarity

- Skill needs and training focus: Most employees identified the need for both human and digital skills: human skills (74% EU, 78% non-EU); digital skills (67% EU, 72% non-EU). When asked where training efforts were concentrated, digital skill development led in both regions: 87% (EU) and 84% (non-EU), followed by human skills: 79% (EU) and 73% (non-EU). These patterns indicate upskilling on both human and digital capabilities for human-tech skill complementarity in practice, with the EU placing slightly more emphasis on human capabilities.
- Training formats and support: non-EU respondents reported greater access to structured training formats: workshops or seminars (89% vs. 76%), formal courses (78% vs. 73%), and on-the-job training (63% vs. 50%). However, EU employees were slightly more likely to benefit from employer-sponsored training (70% vs. 68%). This suggests broader training availability in non-EU regions, while the EU may provide more institutionalised funding support.

4.3.2 Manager survey results comparison: EU and non-EU managers

Table 4.2 presents the percentage scores of key managerial variables for both EU and non-EU respondents. These percentages reflect where each variable's mean value falls within its respective scale range, allowing for a more standardized comparison across groups. The results reveal both general similarities and distinct differences in managerial perceptions and practices between EU and non-EU regions.

4.3.2.1 Manager reported ADTs usage in the workplace

- ADT impact and skills shifts: Managers across both regions reported strong perceived benefits of ADTs, though the sentiment was markedly higher in non-EU contexts. 92% of non-EU managers cited positive organisational outcomes from ADT use, compared to 81% in the EU. Similarly, 83% of non-EU managers recognised ADT-driven skills shifts versus 73% in the EU, indicating broader awareness of technology's workforce implications outside the EU.
- Organisational responses to skills gaps: In response to shifting skill demands, non-EU organisations were more active across most dimensions: adopting new technologies (91% vs. 80%), retraining existing staff (77% vs. 71%), and hiring new workers (82% vs. 59%). Notably, non-EU firms were also twice as likely to report redundancies as a response mechanism (41% vs. 21%). EU organisations, by contrast, showed a slightly higher reliance on external service procurement (56% vs. 50%).

4.3.2.2 Manager reported human-tech skill complementarity

- Skills importance and shortages: Managers in both regions emphasised the importance of human and digital skills. Human capabilities were prioritised slightly more outside the EU (93% non-EU vs. 88% EU), while digital skills were rated equally at 78%. However, EU managers reported greater shortages in human skills (76% EU vs. 67% non-EU), whereas digital skill shortages were nearly equal (64% EU, 65% non-EU).

- **Skill development priorities**: non-EU managers reported more active development in both human (81%) and digital (76%) skills, compared to 76% and 69% respectively in the EU. This points to a broader investment focus on dual-skilling outside the EU.
- **Balancing human and digital skills**: Recognition of the value of human skills was notably stronger among non-EU managers, with 96% emphasising their importance (vs. 82% EU). Similarly, 71% of non-EU respondents stressed the need to balance human and digital skills in hybrid work, compared to 62% in the EU. These results highlight a more future-focused view of skill integration beyond the EU.

Table 4.2 Comparison of Key Variables between EU and non-EU Managers

Manager survey data			Region	
			EU	non-EU
ADTs in the workplace	Impact of ADTs on firm outcomes		81%	92%
	ADTs and skills shifts*		73%	83%
	Organisational responses to skills shifts and gaps*	Adopt new tech	80%	91%
		Retraining or upskills internal workers	71%	77%
		Hiring new workers	59%	82%
		Buying external services	56%	50%
		Redundancies	21%	41%
Human-tech skill complementarity	Skills importance	Human skills	88%	93%
		Digital skills	78%	78%
	Skill shortage	Human skills	76%	67%
		Digital skills	64%	65%
	Skill development	Human skills	76%	81%
		Digital skills	69%	76%
	Human versus digital skills	Importance of human skills	82%	96%
		Human vs. digital skills in hybrid work	62%	71%
Organisational reskilling and upskilling for complementarity	Skill development focus*	Human skills	78%	96%
		Digital skills	80%	96%
	Skill development modalities*	Workshops or seminars	74%	83%
		Courses	73%	75%
		On-the-job training	55%	67%
	Employer sponsorship on training*		81%	78%

Note: The percentages indicate where each variable's mean value falls within its respective scale range (e.g., 1-3 or 1–4) allowing for easier comparison across different scales. Those with * indicates that the actual percentage is used.

4.3.2.3 Manager reported reskills and upskilling for complementarity

- **Development focus and modalities:** Non-EU organisations reported significantly higher levels of investment in both human skills (96% vs. 78%) and digital skills (96% vs. 80%). A

wider range of training formats was also noted: on-the-job training (67% non-EU vs. 55% EU), workshops/seminars (83% vs. 74%), and courses (75% vs. 73%).

- Training sponsorship: Employer-sponsored training was widespread in both contexts, with slightly higher uptake in the EU (81%) compared to non-EU (78%). Despite this, the broader reach and variety of training formats in non-EU firms suggest a more comprehensive approach to workforce development.

4.3.3 Employee and manager survey results comparison: Employees and employers

Table 4.3 presents a comparative analysis of key perceptions reported by managers and employees, based on specific employee and manager questionnaire items. Mean scores were converted into percentages (from a 3 or 4-point scale) to support a clearer interpretation.

4.3.3.1 ADTs in the workplace

- Shared views on key benefits: Both employees and employers agreed strongly on the positive impact of ADTs on productivity (82% each). There was also close alignment in perceptions of creativity (61% each) and worker health and safety (36% employees, 35% employers), indicating shared recognition of core operational gains from ADT adoption.
- Diverging perceptions on broader outcomes: Perceptions varied more widely on other outcomes. Employers viewed ADTs as more beneficial for overall employment (61% vs. 48%), potentially reflecting expectations of role evolution rather than job loss. Employees, meanwhile, reported higher satisfaction (67% vs. 57%), suggesting a more positive personal experience with ADT-enhanced environments. Conversely, employers rated improvements in management effectiveness more highly (53%) than employees (38%), perhaps due to their vantage point in overseeing operations.

4.3.3.2 Human-tech skill complementarity

- Strong consensus on human skill importance: There was clear agreement on the continued importance of human skills, with 85% of both employees and employers affirming their critical role in the digital workplace.
- Slight divergence on hybrid skill balance: When it came to balancing or complementing human and digital skills in hybrid or remote settings, a modest difference emerged: 64% of employers emphasised the need for balance, compared to 60% of employees. This suggests that managers may have slightly greater awareness of the complexity and need for complementarity of human and tech skills in evolving work models.

4.3.3.3 Reskilling and upskilling skill complementarity

- Broad support for both human and digital skilling: Both employees and employers reported high emphasis on the development of human and digital skills. Training in digital skills was prioritised by 86% of employees and 84% of employers, while human skills training was also strongly supported (78% employees, 81% employers). This reflects a broadly shared recognition of the need for dual-skilling to support human–tech complementarity.
- Training modalities show close alignment: Similar preferences emerged in training delivery methods. Workshops or seminars were reported by 79% of employees and 76%

of employers, while formal courses were used by 74% and 73%, respectively. On-the-job training showed slightly more variation, with 57% of employers versus 52% of employees reporting its use, indicating potential room to expand hands-on learning opportunities for workers.

- Gap in perceptions of employer sponsorship: A modest but noteworthy difference emerged regarding employer sponsorship: 81% of employers reported funding training, compared to 70% of employees. This gap may reflect communication or access differences and highlights an opportunity to improve transparency and engagement around training support.

Table 4.3 Comparison of Key Variables between Managers and Employees

Employee and employer survey data			Employee	Employer
ADTs in the workplace	Impact of ADTs on outcomes	Productivity	82%	82%
		Overall employment	48%	61%
		Creativity	61%	61%
		Satisfaction	67%	57%
		Management	38%	53%
		Worker health & safety	36%	35%
Human-tech skill complementarity	Human versus digital skills	Importance of human skills	85%	85%
		Human vs. digital skills in hybrid work	60%	64%
Reskilling and upskilling for complementarity	Skill development focus	Human skills	78%	81%
		Digital skills	86%	84%
	Skill development modes	Workshops or seminars	79%	76%
		Courses	74%	73%
		On-the-job training	52%	57%
	Employer sponsorship on training		70%	81%

Note: The actual percentages are reported.

4.3.4 Comparison with existing EU survey results

This section presents the comparative analysis for some shared variables between the current report (TechConnect Survey 2025) with the findings from the OECD AI Survey conducted in 2022 and the 2021 Cedefop ESJS2 survey conducted in 2022. While the surveys are not directly comparable due to differences in context, it is still valuable to highlight key similarities and differences to inform broader interpretation. The results are shown in Table 4.4.

A broad set of variables was examined during the comparative exercise, this section focuses on three key dimensions, barriers to ADT adoption, skills importance, and organisational responses to skill needs, as they reveal the most significant shifts in perceptions and practices. These selected comparisons offer critical insights into how workforce attitudes and organisational strategies have evolved in the context of accelerating digital transformation.

It is important to recognise the temporal gap between the TechConnect (2025) findings and earlier datasets from OECD (2022) and Cedefop (2021). Over this three- to four-year period, workplaces have undergone substantial shifts in technology adoption, work organisation, and skill

demands driven by the acceleration of AI, post-pandemic hybrid work, and broader digital transformation strategies. The marked increases across ADT usage, task and job-level impacts, and both human and digital skill development suggest not only growing organisational readiness but also a maturing understanding of human-tech complementarity. This temporal comparison highlights how workforce strategies are evolving in response to real-world pressures and opportunities.

4.3.4.1 ADTs usage in the workplace

- More ADT and performance-driven use in TechConnect: TechConnect reported significantly higher ADT (AI) usage (82%) compared to OECD (42% in finance /29% in manufacturing) and stronger performance motivations (88% vs. 42%/54%). TechConnect respondents also more frequently cited the use of ADTs to reduce staff costs (65%) and address skill shortages (70%), while OECD results were more modest (42%–47% and 32%–38%, respectively). Notably, health and safety improvements were mentioned by 44% in TechConnect, an increase from OECD's 24%–39%.
- Greater impact of ADTs on task and job transformation in TechConnect: Across task and job outcomes, TechConnect respondents reported significantly higher impacts. For example, 84% observed an increased pace of tasks, and 67% noted the creation of new tasks, both far above Cedefop's 29% and 36%. Similarly, 92% reported job efficiency improvements and 88% cited enhanced job quality, contrasting sharply with Cedefop's 30% and 23%. Even perceptions of job replacement were higher (70% vs. 6%).
- Cost and skill gaps as adoption barriers remain prominent: Barriers remain consistent across studies, with high cost cited by 72% of TechConnect respondents, compared to 53%/58% in OECD. Skill shortages were a concern for 65% in TechConnect, also above OECD levels (41%/43%). Concerns over government regulation (43%) and potential job loss (23%) in TechConnect were also notable, albeit less pronounced than in OECD (25%/19% and 33%/31%).

4.3.4.2 Human-tech skill complementarity

- Clear progress in both human and digital domains: TechConnect showed a marked rise in the perceived importance of both human and digital skills. Problem-solving and creativity were rated as essential by 69% (vs. 47% OECD), and interpersonal skills by 63% (vs. 36%). Digital competence, measured by ADT adoption and implementation, also improved (65% and 41%, respectively), surpassing OECD's lower baselines (16%–39%).

4.3.4.3 Reskilling and upskilling skill complementarity

- Expanded training access in TechConnect: TechConnect participants reported far greater access to skill development opportunities. Workshops (76%), formal courses (73%), and on-the-job training (57%) were all more prevalent than in Cedefop (33%–40%). However, employer sponsorship slightly declined from 76% in Cedefop to 70% in TechConnect, signalling potential concerns around sustained training investment.

Table 4.4 Comparison of TechConnect Survey Results with Existing EU Surveys

Existing and TechConnect survey data			OECD (2022)	Cedefop (2021)	TechConnect (2025)
ADTs in the workplace	Usage of AI		42%/29%		82%
	Motivation for using ADTs	Improve performance	42%/54%		88%
		Reduce staff costs	42%/47%		65%
		Address skill shortages	32%/38%		70%
		Improve health & safety	24%/39%		44%
	Impact of ADTs on outcomes	Productivity	57%/63%		82%
		Satisfaction	39%/44%		67%
		Management	32%/39%		38%
		Health & safety	26%/46%		36%
	Impact of ADTs on tasks	Increased pace in tasks		29%	84%
		New tasks		36%	67%
		Task replacement		17%	57%
	Impact of ADTs on jobs	Job efficiency		30%	92%
		Job quality		23%	88%
		Job replacement		6%	70%
	Barriers for adopting ADTs	High cost	53%/58%		72%
		Lack of skills	41%/43%		65%
		Government regulation	25%/19%		43%
		Potential job loss	33%/31%		23%
	ADTs and skills shifts		43%/52%		75%
Human-tech skill complementarity	Human skills	Problem-solving & creativity skill		47%	69%
		Interpersonal skill		36%	63%
	Digital skills	ADT adoption	16%/39%		65%
		ADT implementation	16%/30%		41%
	Human versus digital skills		49%/58%		60%
Reskilling and upskilling for complementarity	Skill development modes	Workshops or seminars		33%	76%
		Courses		40%	73%
		On-the-job training		40%	57%
	Employer sponsorship on training			76%	70%

4.4 Summary of key survey findings

This section summarizes the main findings from the employee and manager surveys, focusing on three core themes: the adoption and impact of ADTs, the evolving relationship between human and digital skills, and organisational strategies for reskilling and upskilling for complementarity.

4.4.1 ADTs in the workplace

- Prevalence of ADT adoption: Cloud computing (63%) and AI (56%) emerged as the most commonly used ADTs in employee-reported workplaces. IoT and big data followed closely (48% each), while adoption of Robotic Process Automation (21%) and quantum computing (11%) remains limited.

- Drivers of ADT implementation: Improving worker performance was the dominant motivation (88%), ahead of addressing skill shortages (70%), reducing staff costs (65%), and enhancing health and safety (44%).
- Perceived positive impact on employee outcomes: Employees reported significant gains in productivity (82%), job satisfaction (67%), and creativity (61%) through ADT use. Perceptions were more neutral or mixed regarding ADTs' effects on employment levels (48%), managerial effectiveness (38%), and health and safety (36%).
- Complementarity vs. replacement: A strong majority of employees felt that ADTs enhanced their roles, particularly through greater efficiency (62%) and improved quality (47%). Only 25% expressed concern about potential job displacement.
- Adoption barriers: Major concerns hindering broader ADT deployment included data governance and privacy (74%), high implementation costs (72%), lack of digital skills among staff (65%), regulatory uncertainty (43%), and job loss risks (23%).
- Manager alignment: Managers largely echoed these insights, with 82% highlighting productivity improvements and 75% acknowledging significant shifts in workforce skill requirements, particularly in digitally augmented or hybrid workplaces.
- Manager alignment: Managers largely echoed these insights, reporting similar views on productivity (82%) and skill shifts (75%). However, they were more optimistic than employees about ADT impacts on employment (61% vs. 48%) and management (53% vs. 38%).
- Employers prioritise upskilling over redundancies: Managers leaned toward adopting new tech (83%) and retraining staff (72%), with less emphasis on redundancies (25%), reinforcing a preference for capability-building.
- Regional differences in engagement: ADT usage and motivation were higher in non-EU workplaces. Non-EU employees and managers also reported more positive impacts on job outcomes and higher concerns about cost and job security, while EU respondents were more focused on ethics and data use.
- Temporal perspective: Compared to OECD (2022) and Cedefop (2021), TechConnect data shows significantly higher AI adoption (82% vs. <50%), stronger performance motivations (88%), and more pronounced task and job-level impacts, reflecting rapid acceleration of digital transformation.

4.4.2 Human-tech skill complementarity

- Strong employee confidence and enthusiasm: Most employees felt confident (92%) and enthusiastic (96%) about using new technologies. ADTs were widely viewed as valuable (96%), and 84% felt encouraged to build digital skills.
- High valuation of core human skills: Creativity (96%), collaboration (92%), and interpersonal skills (89%) were highlighted as essential in digital work environments.
- Shared emphasis across groups: Both employees and managers agreed on the centrality of human skills (85%), reinforcing a shared commitment to human-tech complementarity.

- **Recruitment priorities and shortages:** Managers prioritised interpersonal (98%), problem-solving (95%), and digital literacy (97%) in hiring, yet flagged persistent shortages, especially in problem-solving (75%) and advanced digital skills (72%).
- **Training delivery gap:** While human skills were valued, only 28% of managers reported extensive training in them, compared to 49% for digital skills, indicating a shortfall in practical support for human capability development.
- **Employee–manager contrast in shortages:** Employees reported high confidence in human skills, but managers saw critical gaps. This points to a perceptual mismatch and potential overestimation of readiness among employees.
- **Regional patterns:** Non-EU respondents showed higher appreciation of human-tech synergy, particularly in hybrid work (78% non-EU vs. 56% EU), mirroring higher levels of organisational readiness.
- **Time-based changes:** Compared to 2021–2022 studies, TechConnect data shows growing recognition of both human and digital skills, with stronger alignment in hybrid work expectations (60% vs. 49–58%).

4.4.3 Reskilling and upskilling for complementarity

- **Persistent human skills training gap:** Although 83% of employees highlighted a need for human-skill development, only 27% had extensive training. Manager data echoed this, with just 28% reporting comprehensive human-skills training.
- **Uneven digital skills training:** While 86% of employees prioritised digital skills, only 45% had extensive training access. Manager data confirmed similar disparities, pointing to delivery gaps in both domains.
- **Shared but limited training formats:** Workshops and courses were the most common formats (both ~75–79%), but on-the-job training was less common (52% employees; 57% managers), suggesting limited experiential learning.
- **Mismatch in perceived support:** While 81% of managers claimed to sponsor training, only 70% of employees confirmed receiving such support, indicating a perception–implementation gap.
- **Regional differences in training investment:** Non-EU organisations offered more training overall, particularly in digital skills (61% vs. 46% in EU) and human skills (52% vs. 22%), reflecting a greater commitment to workforce development.
- **Shift over time:** Compared to Cedefop (2021), TechConnect participants reported dramatically higher access to workshops (76% vs. 33%) and on-the-job learning (57% vs. 40%), showing notable growth in reskilling initiatives.

5 Qualitative Comments Analysis

The open-ended questions in this survey were designed to allow respondents to share their perspectives, practical experiences, and concrete suggestions regarding digital transformation, skills development, and the evolving workplace. Unlike closed-ended items, these open-text responses provide nuanced, context-rich insights that deepen our understanding of organisational realities and workforce expectations.

Across a range of open-ended items, participants reflected on how their organisations are responding to challenges, their views on technological advancement, the importance of different skills, and anticipated trends in digital training and talent development. Both employees and managers provided valuable, detailed input, ensuring a well-rounded qualitative perspective. Through careful review and coding, the main themes, frequently raised concerns, and representative suggestions have been synthesised below. These qualitative findings not only complement the quantitative survey results but also highlight practical opportunities for further improvement in digital skills and organisational support. The following sections present a summary of the main insights for the open-ended questions on both the opportunities and challenges for ADT adoption.

5.1 Opportunities and benefits of ADT adoption

Analysis of open-ended survey responses reveals a wealth of positive perceptions regarding the role of ADTs in the workplace. Five distinct themes stand out in the positive comments, as detailed below. Table 5.1 presents some illustrative quotes to each theme.

- Technology as an efficiency booster: Many respondents highlight that ADTs significantly improve efficiency, productivity, and overall job quality. Employees recognize that new tools: especially AI and digital platforms: make daily tasks easier and allow them to achieve better results in less time. One respondent put it succinctly: "*I think technology definitely helps us be more efficient, perhaps even do our jobs better, however, it can still yield errors that the human labor may prevent.*" Others emphasized that technology is now widely used to "*make our lives better and our jobs more efficient.*" These comments reflect the belief that digitalization is a key enabler of improved performance at both individual and organizational levels.
- Continuous upskilling: A second strong theme is the recognition that ongoing technological change drives the need for continuous learning and skill development. Many employees express a proactive attitude towards upskilling, emphasizing the importance of adaptability and lifelong learning to keep pace with evolving digital requirements. As one respondent noted, "*New technologies assume new skills. For example, writing a prompt for Copilot demands specific skills. You also need to understand for which type of work you can use an AI assistant.*" Another comment added that "*the skills associated with new technologies, cyber security, etc. is increasing, which means we need to recruit experts in these areas as well as upskill our relevant employees.*" This widespread awareness of the

need for skill development suggests that digital transformation is actively shaping training priorities within organizations.

- **AI and automation support human work:** Many positive comments focus on the role of AI and automation as supportive tools that empower employees, rather than replacing them. Respondents observe that AI enables more creativity, faster problem-solving, and allows staff to focus on higher-value tasks. For instance, one employee commented, "I *work in tech consulting and I believe AI / machine learning impacts our work positively.*" Another highlighted that "*AI-driven automation is transforming work, demanding a workforce skilled in digital literacy and AI collaboration.*" Such perspectives indicate that workers are not only open to using AI, but also see it as a catalyst for professional growth and workplace innovation.

Table 5.1 Opportunities for Adopting ADTs

Theme	Illustrative Quotes
Technology as an efficiency booster	"I think technology definitely helps us be more efficient, perhaps even do our jobs better, however, it can still yield errors that the human labor may prevent." "Technology now is being used for other purposes than making our lives better and our jobs more efficient."
Continuous upskilling	"New technologies assume new skills. For example writing a prompt for Copilot demands specific skills. You also need to understand for which type of work you can use an AI assistant." "The skills associated to new technologies, cyber security etc. is increasing which means we need to recruit experts in these areas as well as upskill our relevant employees."
AI and automation support human work	"AI-driven automation is transforming work, demanding a workforce skilled in digital literacy and AI collaboration."
Simplification of repetitive tasks	"They make mundane and boring tasks easier." "I think that AI will make the work I do easier, faster and less stressful."
Importance of human-tech skill complementarity	"I don't feel that the skills needs have been affected by the rise of advanced digital technologies, as the human skills are more important for the work we do in my company." "Human skills are really important, but in nowadays era, digital skills are becoming crucial to stay competitive in the market."

- **Simplification of repetitive tasks:** A fourth theme is the appreciation for how technology, particularly AI, helps reduce the burden of routine, repetitive, or otherwise mundane

tasks. This allows staff to direct more time and energy toward complex, creative, or strategic work. Examples from the comments include: "*They make mundane and boring tasks easier*," and "*I think that AI will make the work I do easier, faster, and less stressful.*" Several respondents also noted improvements in specific processes such as recruitment, highlighting the broad value of automation in modern work environments.

- Importance of human-tech skill complementarity: Finally, many respondents emphasize that while digital skills are now indispensable, human (or soft) skills remain equally vital. Employees consistently argue that technology should complement, rather than replace, human capabilities: especially in areas such as communication, teamwork, and creativity. One comment captures this balance: "*I don't feel that the skills needs have been affected by the rise of advanced digital technologies, as the human skills are more important for the work we do in my company.*" Others underline that "*digital skills are becoming crucial to stay competitive in the market*," but that human skills are still at the heart of successful organizations.

In summary, the comments on the opportunities suggest that employees not only embrace digital transformation but also see it as an opportunity to enhance both technological and human dimensions of work. This complementarity is seen as a foundation for future organizational success, ongoing personal growth, and greater job satisfaction.

5.2 Challenges for ADT Adoption

While many respondents expressed positive attitudes towards the adoption of ADTs, the open-ended comments also reveal a number of recurring concerns and challenges. Five key themes emerged from the analysis of negative comments, each shedding light on different aspects of employee apprehension about digital transformation. Table 5.2 presents some illustrative quotes to each theme.

- Inequality and job security concerns: A significant number of respondents are worried about the risk of growing inequality and job displacement resulting from rapid technological advancement. Many believe that while highly skilled, digitally literate workers will benefit from new opportunities, those with lower qualifications may struggle to adapt and could be left behind. As one respondent observed: "People with high digital skills will profit. People with low qualification will have difficulty to adapt new skills and deal with AI. Gap between this will therefore become even bigger and may lead to more in equality." Others echoed concerns about job losses and the uncertainty of the impact, with comments such as: "There is still a lot to be explored about many of these technologies' impacts." These reflections underscore fears of workforce polarization and the social risks associated with digitalization.
- Management and resource limitations: Another prominent theme is the challenge of insufficient management engagement and resource allocation for digital transformation. Several employees report that lack of funding, limited motivation, or inadequate support from middle management slows down the pace and effectiveness of technology adoption. For example, one respondent stated: "Due to lack of funding, we are not moving fast."

Another commented: "Lack of middle managers involvement so idea yet." These concerns suggest that organizational readiness and leadership commitment are crucial factors influencing the success of technology-driven change.

Table 5.2 Challenges for Adopting ADTs

Theme	Original Quotes
Inequality & job security concerns	"People with high digital skills will profit. People with low qualification will have difficulty to adapt new skills and deal with AI. Gap between this will therefore become even bigger and may lead to more in equality."- "While there is an issue of potential job losses... There is still a lot to be explored about many of these technologies' impacts."
Management & resource limitations	"Due to lack of funding, we are not moving fast."- "Lack of midlle managers involvement so idea yet."
Data security, privacy & ethical concerns	"There is a risk of invasion of people's privacy."- "Technological advancements will bring challenges in data security and ethical AI use."
Pressure to constantly adapt	"Technological advancement will have a negative impact on mental health, as people will have to strive to advance their human skills to stay relevant."- "Job displacement will require people to adapt to new skills quickly."
Mixed or uncertain impact on work	"In a more general sense I think technological advancement will have a negative impact on mental health, as people will have to strive to advance their human skills to stay relevant."- "We are seeing some roles that are rely on interaction and human touch being diminished."

- Data security, privacy & ethical concerns: As digital technologies proliferate, issues related to data privacy, algorithmic bias, and ethical use of technology are frequently mentioned by respondents. Employees worry that the increasing reliance on digital tools could lead to breaches of personal privacy or misuse of sensitive information. One participant noted: "There is a risk of invasion of people's privacy." Others warn that "technological advancements will bring challenges in data security and ethical AI use." These comments reflect growing awareness that the benefits of digital transformation must be balanced with careful management of ethical and legal risks.
- Pressure to constantly adapt: Some respondents express that the relentless pace of technological change creates pressure to continuously adapt, learn new skills, and stay relevant. This constant demand for upskilling can be a source of stress or anxiety, sometimes impacting mental health. As one respondent shared: "Technological advancement will have a negative impact on mental health, as people will have to strive to advance their human skills to stay relevant." Another highlighted: "Job displacement will require people to adapt to new skills quickly." These views illustrate the personal challenges that employees may face in adjusting to evolving workplace demands.

- Mixed or uncertain impact on work: Finally, some comments indicate a more nuanced or ambivalent perspective, recognizing that while technology brings potential benefits, its real impact is complex, uncertain, or even negative for certain roles or industries. For instance, one respondent remarked: "In a more general sense I think technological advancement will have a negative impact on mental health, as people will have to strive to advance their human skills to stay relevant." Another noted: "We are seeing some roles that are rely on interaction and human touch being diminished." Such feedback highlights that technological change can have uneven effects across different sectors and positions, and that ongoing monitoring and adaptation are required.

The comments on the challenges emphasize the importance of addressing social, organizational, and personal risks in the digital transformation process. Effective leadership, targeted support for vulnerable groups, and strong ethical frameworks are essential to ensure that the benefits of technology are shared broadly and sustainably across the workforce.

6 Recommendations

This study reveals widespread support for digital transformation in the workplace, particularly among employees. However, enthusiasm alone is not enough. The 2025 TechConnect data shows rapid acceleration in ADT adoption and growing awareness of related skill shifts outpacing earlier benchmarks from OECD (2022) and Cedefop (2021). Yet, underlying structural challenges persist: uneven training provision (especially in essential human skills such as creativity, collaboration, and problem-solving), limited access to experiential learning, organisational misalignment, and unresolved ethical concerns.

These gaps hinder the development of true human–tech skill complementarity which is crucial for building resilient and adaptive organisations. Addressing them requires coordinated, multi-stakeholder action. To that end, we present six evidence-based recommendations designed to bridge persistent gaps and future-proof Europe's workforce by ensuring digital innovation is inclusive, ethical, and aligned with human strengths.

6.1 Closing the Investment Gap in Human and Advanced Digital Skills

Although both employees and managers recognise the importance of creativity, collaboration, and problem-solving, the investment in training for these human capabilities lags behind digital upskilling initiatives. Moreover, while demand for advanced digital capabilities, such as AI and data analytics, is rising, these skills remain underprioritized in recruitment and development strategies.

Quantitative data reveals that only 28% of managers describe their human-skills training as extensive, compared to 49% for digital skills. The comparative data also highlights regional disparities, with non-EU organisations investing more consistently in both digital and human-skills development than their EU counterparts, underscoring the urgency of action particularly within the EU context. Qualitative findings (see Table 5.1) confirm this gap, with employees highlighting limited access to structured support for non-technical skill development. To enable effective human–tech collaboration, stakeholders must ensure balanced, sustained investment across both domains. Table 6.1 outlines specific actions for employers, funding agencies, and policymakers.

Table 6.1 Closing the Investment Gap in Human and Advanced Digital Skills

Stakeholders	Recommended Actions
Employers	Rebalance training portfolios to include structured human-skills programmes alongside technical upskilling.
Funding agencies	Provide incentives for integrated human–digital capability development initiatives.
Policymakers	Adapt national skills strategies to reflect hybrid (technical + human) role requirements.

Drawing on the findings, employers are encouraged to rebalance training portfolios by increasing structured, ongoing programmes in human-centred skills, not just technical proficiencies.

Funders and public skills agencies should incentivise dual-skilling initiatives that support both digital fluency and core human capabilities. Policy frameworks must evolve to reflect hybrid skill demands, e.g., adapting national reskilling strategies to prioritise both cognitive and interpersonal competencies.

6.2 Expanding Access to Experiential and Embedded Learning

Survey and qualitative data reveal a strong reliance on passive learning formats (e.g., workshops and seminars), while more applied, experiential modes such as digital simulations or job-embedded coaching, remain underused. This represents a missed opportunity to translate training into practical skills that align with real workplace needs.

This gap is not just logistical but perceptual, employees increasingly favour hands-on learning, with recent survey comments underscoring the need for immersive and role-relevant formats. In particular, only 52% of employees reported access to on-the-job learning, and only half of managers (57%) described providing hands-on training opportunities. Comments from open-ended survey responses reinforce this shortfall, with several employees noting a desire for more practical, tailored, and engaging development experiences.

Table 6.2 presents targeted recommendations. Employers and managers should integrate mentoring, coaching, and immersive learning into employee development pathways. Higher education and training providers are encouraged to partner with industry to design applied microcredentials tailored to workplace contexts. Funding bodies can support scalable, practice-based models in digitally intensive sectors.

Table 6.2 Expending Access to Experiential and Embedded Learning

Stakeholders	Recommended Actions
Business leaders and managers	Implement job-embedded training (e.g., coaching, digital simulations, shadowing).
Higher education / training providers	Co-design applied microcredentials and stackable modules with employers.
Funding agencies	Pilot scalable, experiential learning models targeting transformation-intensive sectors.

6.3 Align Organisational Intent with Employee Experience

While 81% of managers claim they intend to expand digital training, only 70% of employees report receiving such support, highlighting a disconnect between policy and practice. This implementation gap threatens employee trust and undermines skill-building efforts. Even in high-investment environments such as non-EU organisations, misalignments between managerial intent and employee experience persist, pointing to the need for transparent tracking and inclusive communication. The qualitative comments also suggest this gap is especially acute among digitally hesitant staff or those in non-core roles. Respondents cite poor communication

and lack of awareness as barriers to uptake. Without better internal visibility and accountability, training investments risk being underutilised or inequitably distributed.

To address this, Table 6.3 proposes that employers and HR leaders strengthen communication channels and track uptake by demographic and role. Meanwhile, policymakers can explore formalising training rights or linking support to reporting mechanisms such as ESG metrics or social audits to ensure follow-through.

Table 6.3 Aligning Organisational Intent with Employee Experience

Stakeholders	Recommended Actions
Employers and HR leaders	Ensure transparent communication of training offerings and track uptake across workforce segments.
Policymakers	Explore minimum training entitlements or ESG-aligned reporting mechanisms including employee experience with digitalization of work.

6.4 Ensuring Ethical, Inclusive and Resilient ADT Adoption

While employees broadly welcome ADTs as tools to improve productivity and creativity, they also express significant concerns about ethical risks, digital inequality, and psychological stress. For example, 74% of employees cited data privacy as a barrier to adoption. The cross-regional comparisons show that ethical and governance concerns such as data use and regulatory gaps are more prominent in the EU, while economic insecurity is a stronger concern outside the EU. The open-ended feedback also highlights fear of job displacement, digital exclusion, and mental health strain (see Table 5.1).

These concerns need to be proactively addressed. Table 6.4 outlines actions for employers, technology providers, regulators, and worker representatives. Employers should embed ethical principles such as fairness, explainability, and human oversight into all AI and automation rollouts. Policymakers must update governance frameworks to protect workers' rights and wellbeing in increasingly automated environments. Unions and employee forums should co-develop inclusive tech strategies and transition support systems.

Table 6.4 Ensuring Ethical, Inclusive and Resilient ADT Adoption

Stakeholders	Recommended Actions
Employers and tech providers	Embed fairness, explainability, and human oversight in ADT rollouts.
Policymakers and regulators	Update employment, data governance, and occupational safety regulations to account for AI and automation.
Unions and social Partners	Engage in co-design of inclusive tech adoption strategies and support mechanisms.

6.5 Strengthening Education–Industry Partnerships for Future Skills

The rapid pace of digitalisation requires stronger alignment between the education system and labour market. Yet, evidence from our findings suggests fragmentation: training offers often lack relevance, while curricula do not adequately reflect workplace realities. Employee survey responses frequently cited the disconnect between available training and actual workplace needs, underscoring the urgency of co-designed, sector-specific curriculum development. Qualitative responses (Table 5.2) show high enthusiasm for continuous learning, but call for more targeted, job-relevant opportunities. Employers and education providers must move beyond transactional partnerships toward deeper collaboration in curriculum design, delivery, and assessment.

As shown in Table 6.5, universities and training institutions should develop hybrid curricula that embed both human and technical skillsets. Employers can act as co-designers and test-beds for these new models. National and regional funders should enable and scale cross-sector initiatives, particularly in digitally underserved sectors or communities.

Table 6.5 Strengthening Education–Industry Partnerships for Future Skills

Stakeholders	Recommended Actions
Universities / Providers	Develop hybrid curricula combining foundational human and technical skills.
Employers	Act as co-designers and test-beds for future-ready learning models.
Funders / Innovation Agencies	Support cross-sector collaborations, particularly in digitally underserved regions and sectors.

6.6 Leveraging EU-Funded Training Programmes and Public Resources

Findings from both the survey and qualitative responses show that a significant proportion of employees (85%) are interested in attending free provider programmes to develop their digital skills. This appetite presents a critical opportunity to harness existing EU-funded resources that are designed to support exactly this type of upskilling.

One such opportunity is through projects funded under the Digital Europe Programme, particularly LEADS and LEADSx2030 (https://advancedskills.eu/). The LEADS project mapped challenges and best practices in advancing digital capabilities across Europe, while LEADSx2030 builds on these insights by creating pathways for inclusive access to specialised training programmes such as free or subsidised Bachelor's, Master's, and lifelong learning courses.

As ADT adoption accelerates (see Section 4.1.1) and skills mismatches persist across both human and digital domains (see Sections 4.3.2 and 4.3.3), connecting employees and managers to these publicly available resources becomes an immediate and practical solution. Despite the availability of EU-funded programmes such as LEADSx2030, uptake remains uneven, often due to low awareness. Improving visibility and integration into organisational HR systems can unlock their full potential.

Table 6.6 outlines actions for employers, employees, higher education providers, and policymakers to increase visibility and uptake of such programmes. These measures can bridge current provision gaps and empower workforces to proactively engage with future skill needs. They also strengthen the existing set by connecting organisational training needs with high-quality, already funded European initiatives, addressing both equity and efficiency in digital skill development.

Table 6.6 Leveraging EU-Funded Training Programmes and Public Resources

Stakeholders	Recommended Actions
Employers	Actively promote employee participation in EU-funded digital skills programmes; integrate into HR strategies.
Employees and the public	Seek out publicly funded or subsidised training opportunities to develop both basic and advanced digital skills.
Higher education and training providers	Link institutional offerings to datasets and opportunities arising from LEADSx2030 and similar EU projects.
Policymakers and funding agencies	Promote national-level access to EU datasets on specialised training and lifelong learning; ensure alignment with digital and human skills policy.

By implementing the six recommendations outlined in this section, stakeholders can take meaningful steps to ensure digital transformation is inclusive, ethical, and aligned with human strengths. Advancing human–tech skill complementarity requires more than technical upskilling; it demands balanced investment in cognitive, interpersonal, and experiential learning, stronger alignment between organisational intent and employee experience, and effective use of publicly available training resources. If pursued seriously, these actions can help ensure that digital innovation empowers rather than marginalises workers, creating a more resilient, adaptable, inclusive, and future-ready workforce across sectors.

7 Conclusion

This report offers robust and evidence-based insights into the evolving demands of a digitally transformed workforce, grounded in a rigorous research process. Drawing on an extensive literature review, careful instrument development, and a mixed-method data collection strategy, the findings are based on a large and diverse sample of over 300 valid responses. The sample reflects a wide range of sectors, roles, and geographies across the EU and beyond, ensuring both relevance and generalisability of the conclusions drawn.

The analysis reveals that while enthusiasm for ADTs is widespread, particularly among employees, there remains a substantial gap in how organisations are supporting the development of complementary human capabilities such as creativity, collaboration, and problem-solving. This imbalance, coupled with uneven access to experiential learning and persistent concerns around data governance, equity, and psychological wellbeing, highlights the need for a more coordinated response.

The recommendations in this report span training investment, workplace learning, policy alignment, ethical tech adoption, cross-sector partnerships, and access to EU-funded programmes. They form a coherent roadmap for enabling inclusive, future-ready transformation. They are not aspirational ideals, but actionable strategies grounded in lived workforce experience and validated by data.

Looking ahead, Europe stands at a critical juncture in shaping a digitally advanced yet human-centred future of work. With the right investments and partnerships, organisations can move beyond fragmented efforts and toward an integrated skills agenda. By advancing human–tech skill complementarity in both policy and practice, Europe can build a labour market that is not only digitally capable but also deeply human, one where innovation and inclusion reinforce rather than compete with each other. Achieving this vision will require commitment, coordination, and the courage to reimagine how we prepare for the jobs of tomorrow.

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Annex I Survey Instrument

The survey has three sections: (1) demographic information for all participants; (2) worker experience for all participants (employee survey); and (3) organizational management for managers only (manager survey).

Section 1: Demographic Information

Variables	Survey questions	Survey answers	Source
Region	In which region is your usual place of residence?	List of the 27 EU member states Other country -> specify	Cedefop
Employment Status	What is your current employment status?	- I am employed - I am self-employed - I am currently not employed -> screen out	OECD
Firm sector	What sector do you work in?	- Private sector - Public sector - Non-for-profit - Other, please specify	Cedefop
Industry type	What industry do you work in?	- Agriculture forestry and fishing - Arts, entertainment, and other services - Construction - Distribution, transport, hotels and restaurants - Industry - Information and communication - Financial and insurance activities - Real estate activities - Professional, administration, and support services - Public administration, education and health	NACE Economic Activity Sector
Firm size	How many people work at your workplace? This includes part-time and full-time employees. Please provide your best estimate.	- 1-10 - 11-49 - 50-249 - 250-499 - 500+ - Don't know	Cedefop

Funded by the European Union

Occupation	Which of the following categories best describes your current (main) job?	- Managers, directors and senior officials (ESCO 1) - Professionals (e.g., IT specialists, engineers, accountants, analysts, scientists, doctors, etc.) (ESCO 2) - Associate professionals and technicians (e.g., counsellors, paramedics, designers, QA technicians, etc.) (ESCO 3) - Elementary (e.g., porters, poster workers, kitchen and catering assistants, etc.) (ESCO 9) - Sales, customer or personal service (e.g. cooks, waiters, health care assistants, etc.) (ESCO 4) - Clerical support worker (e.g., administrative and secretarial) (ESCO 5) - Skilled agricultural (ESCO 6) - Crafts and related trades (ESCO 7) - Plant and machine operatives (ESCO 8) - Employed in a military capacity by the Armed Forces (ESCO 10) -> (screen out)	Cedefop - ESCO
Age	Please indicate your birth year (yyyy):		
Gender	How would you describe yourself?	- Male - Female - Non-binary - Another option not listed (please specify):	
Employee tenure	How long have you been working in your current company or organisation?	- Less than 1 year - 1-2 years - 3- 4 years - 5+ years	
Contract	Which of the following best describes the duration of your employment contract in your main job?	- Open-ended / indefinite/ permanent - Fixed-term/temporary - No contract - Other (please specify):	
Education	What is the highest level of education you have completed?	- No completed formal education or below primary education - Primary education (ISCED 1) - Lower secondary education (ISCED 2) (a) - Upper secondary education – general (ISCED 34) - Upper secondary education – vocational (ISCED 35) - Post-secondary non-tertiary education – general (ISCED 44) - Post-secondary non-tertiary education – vocational (ISCED 45) - Short-cycle tertiary education (ISCED 5) - Bachelor's or equivalent level (ISCED 6)	Cedefop

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		- Master's or equivalent level (ISCED 7) - Doctoral or equivalent level (ISCED 8)	
Position/role	What position do you hold?	- Senior manager -> employee survey + manager survey - Middle manager -> employee survey + manager survey - Line manager -> employee survey + manager survey - Employee without managerial responsibility	
Function	What business function are you working in?	- Corporate Strategy & Governance - Customer Service & Support - Finance & Accounting - Human Resources (HR) - Information Technology (IT) - Legal & Compliance- Manufacturing/production - Marketing - Operations - Research & Development (R&D) - Sales - Supply Chain Management/logistics	LEADS

Section 2: Employee Survey

Variables		Survey Questions	Survey Answers	Scale	Source
ADTs in the workplace: Employee's perspective	ADT usage	To the best of your knowledge, does your company use following advanced technologies? Please think of all areas within your company as well as the area you work in.	AI Cloud computing Quantum computing Robotic process automation Big data Internet of things Other	1 = never to 5 = always	OECD AI Survey (revised)
	Motivation for using ADTs	To the best of your knowledge, were any of the following motivations for your company adopting advanced technologies?	To improve worker performance To reduce staff costs To address skill shortages To improve workers' health and safety	1 = SD to 4 = SA	OECD AI Survey

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	Impact of ADTs on individual workers	Impact of ADTs on tasks: Change in job tasks: By adopting the advanced digital technologies	I now do not do some tasks I did before. I now do some different or new tasks I now do some of my tasks at a faster pace than before.	1 = SD to 4 = SA	Cedefop
		Impact of ADTs on jobs: To what extent do you think the advanced digital technologies:	can or will do part or all of my main job (job displacement) improve the speed of my work (job efficiency) improve the quality of my work (job quality)	1 = Not at all to 4 = Great extent	Cedefop
		Impact of ADTs on employee outcomes: What impact have these advanced technologies had on:	my productivity my creativity my satisfaction my health and safety my managers' ability to manage my performance overall employment in your organisation	1 = negative impact 2 = no impact 3 = positive impact	OECD AI Survey (revised)
	Barriers for adopting ADTs	What are the barriers for your company to adopt the advanced technologies?	High cost Lack of skills Government regulation Potential job loss Impact on wages Impact on working conditions Use of data Impact on specific groups of workers	1 = SD to 4 = SA	OECD AI Survey
		How is your company trying to address these challenges?	Open comment		New question
Human-tech skill complementarity: Employee's perspective	**Human skill:** Problem-solving and creativity skill	How often did you do any of the following activities as part of your main job in the last month?	searched for relevant information or documentation, for instance in books or on the web, to solve problems; got input from colleagues or others to solve problems; tried out new ideas to solve problems; tried to develop or create new or improved products or services; tried to develop new or improved ways of doing your work	1 = never to 5 = always	Cedefop

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Human-tech skill complementarity: Employee's perspective	**Human skill:** Interpersonal job-skill	How often did you do any of the following activities as part of your main job in the last month?	provide advice or counselling to people; provide presentations of present, services or ideas linked to your work; deal with people who do not work in your company or organisation, for instance customers or clients; teach or train people; provide emotional support or personal care to others; try to convince people to do or buy something; work in a team i.e. together with a group of people who plan their work to achieve shared objectives.	1 = never to 5 = always	Cedefop
	Digital skill: Employee experience with ADT adoption	In your company, how were these advanced digital technologies were implemented?	I heard enough about how these digital technologies are used in my company. I was adequately kept up to date about important issues about digital technologies. I am encouraged to develop new digital skills. I receive training to keep me up to date with developments in technologies. I believe in the value of adopting digital technologies.	1 = SD to 4 = SA	VBBA & HR studies
	Digital skill: Employee experience with ADT implementation	Do you agree or disagree with the following statements?	I do not have the skills to work with new technologies. New technologies will make my existing skills less valuable. I feel confident that new technologies will complement my existing skills. I am enthusiastic to learn how to work with new technologies.	1 = SD to 4 = SA	OECD
	Human versus digital skills: Employee's perspective	To what extent do you agree with following statements? (2 questions)	Human skills are more essential than digital skills in a remote/hybrid work setting. Human skills are becoming increasingly important.	1 = SD to 4 = SA	Deloitte 2024 Global Workforce Trends OECD

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Employee reskilling and upskilling for complementarity	Employee human and digital skill needs	Do you need to further develop following skills to do your main job even better?	Problem-solving and creativity skill Interpersonal skill Basic digital skills (e.g. use of computers; office software etc.) Advanced digital skills (e.g., using AI, big data etc.) Other, please specify _____	1 = SD to 4 = SA	New question
	Employee human and digital skill development	In the last 12 months, have you participated in any of the following education or training activities to learn new digital skills?	Courses Workshops or seminars On the job training with the support of a designated trainer.	1 = SD to 4 = SA	Cedefop
		Was at least one of these education or training activities fully or partly paid by your current employer or done during paid working time?		Yes/no	Cedefop
		For the training offered, how would you describe the extent of programs focused on:	Human skills Digital skills	1 = None, 2 = Limited, 3= Extensive	Adapted from OECD
		In the future, how do you anticipate your education or training activities to learn new digital skills to be paid?	Sponsored by company Self-paid learning Attending free training offered by education providers on ADS Other, please specify:	1 = SD to 4 = SA	New question
Open questions	What impacts do you expect technological advancements to have in the next 5 to 10 years? If you have any suggestions on how various stakeholders, policymakers, employers, tech providers, employees, and/or their associations can enhance human-technology interaction and integration, please share them in the space below.				

Note: SD = strongly disagree; DA = strongly agree

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Section 3: Manager Survey

Variables		Survey Questions	Survey Answers	Scale	Source
ADTs in the workplace: Manager's perspective	Impact of ADTs on firms' outcomes	What impact have these advanced technologies had on:	worker productivity worker creativity worker satisfaction worker health and safety managers' ability to manage worker performance overall employment	1 = negative impact 2 = no impact 3 = positive impact	OECD AI Survey (revised)
	Impact of ADTs on skills shift	Do you think that advanced digital technologies has changed skill needs in your company?		Yes/No	OECD
		Would you please elaborate a bit on your answer for the above question?		Open comment	
	Organisation's responses to skill development	Has your company addressed these changing skill needs in any of the following ways?	by retraining or upskilling internal workers by hiring new workers by buying services from external companies by attribution or redundancies by adopting new digital technologies	1 = SD to 4 = SA	ECS; OECD
Human-tech skill complementarity: Manager's perspective	Human and digital skill importance	When recruiting new employees, how important are the following four types of skills	Problem-solving and creativity skill Interpersonal skill Basic digital skills (e.g. use of computers; office software etc.) Advanced digital skills (e.g., using AI, big data etc.) Other, please specify _____	1 = SD to 4 = SA	New question
	Human and digital skill shortage	In the current market, do you find it more challenging to hire candidates with:	Problem-solving and creativity skill Interpersonal skill Basic digital skills (e.g. use of computers; office software etc.) Advanced digital skills (e.g., using AI, big data etc.) Other, please specify _____	1 = SD to 4 = SA	New question

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Human-tech skill complementarity: Manager's perspective	Human and digital skill development	In your employee training plans, what skills will you be focusing on?	Problem-solving and creativity skill Interpersonal skill Basic digital skills (e.g. use of computers; office software etc.) Advanced digital skills (e.g., using AI, big data etc.) Other, please specify _____	1 = SD to 4 = SA	New question
	Human and digital skills: Manager's perspective	To what extent do you agree with following statements?	Human skills are more essential than digital skills in a remote/hybrid work setting. Human skills are becoming increasingly important.	1 = SD to 4 = SA	Deloitte 2024 Global Workforce Trends
Organisational reskilling and upskilling for complementarity	Organisational human and digital skill development	In the last 12 months, my company has provided the following education or training activities for employees to learn new digital skills.	Courses Workshops or seminars On the job training with the support of a designated trainer.	1 = SD to 4 = SA	Cedefop
		For the training offered, how would you describe the extent of programs focused on:	Human skills Digital skills	1 = None, 2 = Limited, 3= Extensive	Adapted from OECD
		In the future, will your company provide or fund more training on the advanced digital skills?		Yes/no	New question
Open question	Please briefly indicate the trends and changes in new technologies and their impact on work, workforce, and workplace dynamics in your organisation.				

Note: SD = strongly disagree; DA = strongly agree

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