



# CONSOLIDATED (EU) REPORT

Deliverable D3.1: Report on labour market needs of emerging advanced digital skills

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## Deliverable Information

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## Introduction

This report is being conducted for the **Level Up project** (LEVERaging knowLedge of training providers in UPskilling and reskilling of SMEs' managers and employees towards empowering their digital transformation).

### Updated Deliverable D3.1 - Version 2

This revised version (November 2025) of Deliverable D3.1 has been prepared to address the comments received during the European Commission's interim review and to ensure the full completion of all tasks under WP3, particularly Task 3.1 (large-scale survey) and Task 3.2 (roundtable discussions).

In its interim feedback, the European Commission highlighted two partial deviations in WP3 implementation:

- the lower-than-expected completion of the large-scale SME survey (849 responses instead of 1,400), with an uneven distribution across partner countries, and
- the pending roundtable discussions with policy makers and governmental authorities in Germany and Italy.

Since the interim review, the consortium has successfully completed the missing components and strengthened the evidence base of this deliverable. Additional survey data was collected between 2024–2025, expanding the total dataset to 650 new responses, particularly from Finland, Greece, Cyprus, and Hungary. Furthermore, the roundtable discussions in Germany and Italy have now been finalised, and their results are fully incorporated into this revised report.

This updated version of D3.1 therefore:

- integrates new quantitative and qualitative evidence gathered after 2023,
- includes the completed roundtable insights from Germany and Italy,
- consolidates all national updates to provide a complete EU-level analysis, and
- ensures alignment with the expectations set by the European Commission during the interim evaluation.

With these additions, Deliverable D3.1 now provides a comprehensive and up-to-date overview of emerging advanced digital skills needs across SMEs in all partner countries. It also offers a stronger analytical basis for the subsequent design of training curricula (WP4) and the large-scale roll-out of courses (WP5).

This enhanced evidence base ensures the deliverable's full compliance with the original WP3 objectives and supports the overall strategic coherence of the Level Up project.

## Level Up – General Information

The Level Up project is an ambitious and innovative initiative aimed at empowering European citizens through skills development and fostering lifelong learning. It is a collaborative effort among various stakeholders, including VET and higher educational institutions as well as industry partners, with the goal of equipping individuals with the necessary knowledge and competencies to thrive in the rapidly evolving digital age.

### Level Up - Objectives

Level Up aims to empower the labour force of small and medium-sized enterprises (SMEs) in Europe by equipping them with essential digital competencies.

The project achieves this by providing short- and long-term training courses that concentrate on key capacity areas crucial for one to thrive in the ever – evolving digital landscape. These capacity areas include topics in Cybersecurity, Data Literacy, Data Analytics, Artificial Intelligence (AI), Internet of Things (IoT), 3D printing and 3D modelling, as well as cloud and software programming. Leveraging knowledge from a total of seven countries with fourteen partners the project will analyse the data provided by the projects' partner countries and the consortium will then design & implement, Europe - wide, the most popular training topics in digital skills. With an emphasis on SME's business owners, job seekers and SME employees, the project aims to deliver more than one hundred innovative training topics. The Level Up project has four key objectives to address the digital skills gap and enhance the employability of European citizens:

- a) **Upskilling and Reskilling:** The project aims to provide accessible and high-quality upskilling and reskilling opportunities to individuals across Europe. It focuses on both digital and non-digital skills, acknowledging the importance of a well-rounded skill set in today's interconnected world.
- b) **Lifelong Learning:** Recognizing that learning is a continuous process, the Level Up project promotes the concept of lifelong learning. It encourages individuals to embrace learning opportunities throughout their lives, enabling them to adapt to changing job market requirements and remain competitive.
- c) **Collaboration and Partnership:** The project fosters collaboration among various stakeholders, including educational institutions, industry experts, and policymakers. By pooling resources and expertise, Level Up creates a comprehensive ecosystem for skills development and ensures the alignment of educational programs with industry needs.
- d) **Digital Transformation:** As technology rapidly transforms various industries, the Level Up project emphasizes on digital literacy and digital skills development. It equips individuals with the knowledge and abilities needed to navigate the digital landscape, fostering innovation and enabling them to leverage technology effectively.

### Level Up - Key Characteristics

The Level Up project encompasses a range of features and initiatives designed to deliver its objectives:

- a) **Online Learning Platform:** The project provides multiple online learning platforms that offers a diverse array of courses and learning materials. These resources cover a wide range of topics, including digital skills, entrepreneurship, leadership, and personal development.

- b) **Personalized Learning Paths:** Recognizing that each individual has unique learning needs, Level Up offers personalized learning paths. Through assessments and tailored recommendations, learners can access relevant content and progress at their own pace, enhancing their learning experience.
- c) **Industry Partnerships:** The project collaborates closely with industry partners to ensure the courses and programs offered are aligned with current and future job market demands. This partnership enables participants to acquire digital skills that are highly sought after by employers, increasing their employability.
- d) **Certification and Recognition:** Upon completion of courses or programs, learners receive certifications that are recognized across Europe. These certifications validate the acquired digital skills and enhance individuals' profiles, giving them a competitive edge in the job market.

### Level Up - Impact

The Level Up project has the potential to generate a significant impact on European citizens and the region's economy:

- a) **Increased Employability:** By providing accessible and relevant skills development opportunities, Level Up enhances the employability of individuals, particularly in sectors experiencing digital transformation. This, in turn, contributes to reducing unemployment rates and strengthening the overall labor market.
- b) **Economic Growth:** Equipping individuals with advanced skills and competencies fuels economic growth by promoting innovation, entrepreneurship, and productivity. The Level Up project empowers citizens to actively participate in the digital economy, fostering competitiveness on a global scale.
- c) **Social Inclusion:** The project aims to address social inequalities by making skills development accessible to all individuals, regardless of their background or geographical location. By reducing barriers to education and fostering inclusivity, Level Up contributes to creating a more equitable society.
- d) **Lifelong Learning Culture:** Through its emphasis on lifelong learning, the Level Up project instils a culture of continuous improvement and personal development. This mindset not only benefits individuals but also creates a society that is adaptable.

## Purpose of the Consolidated Report

This report has been consolidated from all the national reports developed in the seven partner countries participating in the Level Up consortium (Germany, Cyprus, Greece, Italy, Hungary, Poland and Finland). The national reports are available for review upon request by the European Commission, through the shared Google drive that the consortium has set up for project management purposes. The consolidated report will be used as the bread and butter of the consortium, as the thorough analysis of the findings of these reports will result in the co-design and implementation of the most popular training topics which will, in turn, help digitalise the workforce of SMEs in several European countries. Data generated from these reports will ensure not only the development but also the successful implementation of the training courses and the upskilling and/or reskilling of around 15,000 professionals located in Italy, Cyprus, Greece, Poland, Hungary, Germany, and Finland.



In order to determine the needs of SMEs, a large-scale online national survey was carried out in each partner country in order to map the baseline. In addition to that, a number of focus groups were conducted where jobseekers, SME directors/owners and SME employees shared their experiences, challenges and specific needs on digital skills.

Finally, 5 roundtable discussions were conducted, one in each country from the training providers (in Cyprus, Greece, Germany, Finland and Italy) for introducing the Level Up project to governmental authorities and policy makers while exploring ways of potential collaboration with them for mutual support of SMEs towards digital transformation.

Digital transformation has a positive impact on SMEs by leveraging on the digital skills gaps. The large-scale national survey and the collected national data form the state-of-the-art of the market's needs analysis, forms the latest information on companies' needs and digitalisation priorities for the implementation of the Level Up project.

## European Content

For the past few years, an ever-growing labour shortage has hindered Europe's progress with SMEs' business owners and big organisations alike facing challenges in finding skilled personnel with the Digital Economy and Society Index (DESI) reporting that only 46% of the EU population can perform basic digital tasks such as connecting to Wi-Fi or using websites.<sup>1</sup> The Commission identified the need for lifelong learning and recognised the right of all European citizens to have access to attractive, innovative, and inclusive learning programmes. Thus, drawing up on the needs of its citizens, and through important Agendas and Strategies, it provided comprehensive and ambitious plans to address these challenges. These initiatives provide a roadmap for the EU to ensure that its workforce is equipped with the necessary skills to meet the demands of the future job market.

In July 2020, the Commission introduced the European Skills Agenda for sustainable competitiveness, social fairness and resilience including a powerful statement, as a forward of the policies to come: "The best investment in our future is the investment in our people" explains President von der Leyen in the opening statement of the Agenda. "Skills and education drive Europe's competitiveness and innovation. But Europe is not yet fully ready. I will ensure that we use all the tools and funds at our disposal to redress this balance." <sup>2</sup>

In 2021, the EU revealed its plans for the following decade, dubbed **the Digital Decade**<sup>3</sup> emphasising the need to increase the basic digital skills in adults by 26% whilst ensuring that all of Europe will have access to high – speed mobile coverage. Aiming to empower business and people in a human – centered and sustainable in a forthcoming digital future, the Digital Decade is a comprehensive framework that will guide all actions related to digital. The framework encompasses a set of measurable goals in four key areas: connectivity, digital skills, digital business, and digital public services. These goals serve as targets for the respective areas and are intended to drive progress during this period of digital advancement. The objectives of the Digital Decade are designed to provide guidance to Member States in their actions and initiatives. To facilitate the achievement of the Digital Decade targets and objectives, the Digital Decade policy programme has been established. This program serves as a collaborative platform for the European Union and its Member States to work together in pursuit of the goals outlined for the Digital Decade. Additionally, the policy programme includes a mechanism for monitoring progress towards the targets by the year 2030. In order to maximize resources and promote cross-border collaboration, the Digital Decade encourages the implementation of multi-country projects. These projects allow Member States to pool their investments and launch large-scale initiatives that transcend national boundaries. By leveraging collective efforts and expertise, these cross-border projects can effectively address shared challenges and accelerate progress towards the Digital Decade targets, surpassing the capabilities of any single Member state to develop such a project independently. To initiate the process, the European Commission has compiled an initial list of multi-country projects. These projects encompass a wide range of areas for investment, including data infrastructure, low-power processors, 5G communication, high-performance computing, secure quantum communication, public administration, blockchain, digital innovation hubs, and digital skills.

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<sup>1</sup> <https://education.ec.europa.eu/focus-topics/digital-education/action-plan/action-10>

<sup>2</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0274&qid=1683103204427>

<sup>3</sup> [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030\\_en](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en)

The Commission's measurable targets include increasing the EU adult population's knowledge of basic digital skills by 26% while by 2030, everyone residing within the European Union should have access to high-speed mobile internet and all households should have gigabit network coverage. Moreover, within ten years there should be 20 million people working within the ICT sector, ensuring however the gender balance within the industry.

## DIGITAL SKILLS

### Adults with basic digital skills



### Employed ICT specialists & gender balance



## DIGITAL INFRASTRUCTURES

### Gigabit network coverage



### High-speed mobile coverage (at least 5G)

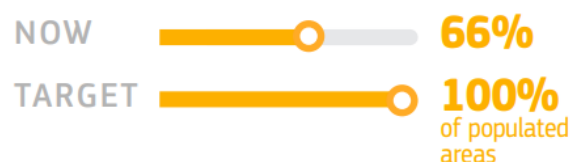


Figure 1 – European targets for digital skills by 2030

With regards to businesses, the Commission has set ambitious goals; cloud computing services should be increased by 41%, artificial intelligence by an astonishing 67% and big data by 61%.

## DIGITAL TRANSFORMATION OF BUSINESSES

### BUSINESSES USING ONE OR MORE

#### Cloud computing services



#### Big data



#### Artificial Intelligence



### SMEs with at least a basic level of digital intensity



### There are



Figure 2 – European targets for digital transformation of businesses

Continuing on its citizen - centric approach, the Commission has also set plans on enabling the European citizen and/or businesses to have access to online public services, health records and electronic IDs.

## DIGITALISATION OF PUBLIC SERVICES

**Online access to key public services** (related to career, studying, family, regular business operations, moving)



Figure 3 – European Plan for access to online public services

In September 2022, Ms von der Leyen declared 2023 as the **European Year of Skills** during her third State of the Union Address. She highlighted labour shortages across Member States with the Digital Economy and Society showing that currently, 4 out of 10 adults and every third person who works in Europe lack basic digital skills and noted the need for investment in reskilling and upskilling to ‘enable a workforce with the right skills’. The European Year of Skills 2023 is a pivotal initiative that aims to bolster skills and education within Europe whilst addressing the real needs of companies with an emphasis on the importance of lifelong learning. President von der Leyer expressed the need for strengthening the communication between companies and the EU stating that ‘we need better cooperation with companies, because they know best what they need’. Currently more than 75% of companies in the EU report difficulties in finding employees with the necessary skills, but only 37% of adults undertake training on a regular basis.<sup>4</sup> The European Year of Skills 2023 will concentrate on several critical domains, including promoting lifelong learning, enhancing digital skills, and supporting the development of green skills. Its primary aim is to sensitize individuals, organizations, and governments to the importance of investing in skill development for navigating the complexities of the contemporary economy. The lifelong learning pillar endeavours to encourage individuals to continue augmenting their skill sets throughout their lives, even after completing their formal education. It strives to foster a culture of lifelong learning and incentivize individuals to exploit the diverse array of opportunities available to them, ranging from online courses and apprenticeships to other training programs. Similarly, the European Year of Skills 2023 seeks to promote the development of digital skills, given the digital economy's centrality in contemporary times, with an emphasis on the individuals that have not had access to digital education or training in the past.<sup>5</sup>

The European Commission's priority ‘A Europe Fit for the Digital Age’<sup>6</sup> represents a bold and ambitious effort ensure that the digital transformation will work for people and businesses, while helping to achieve the union’s target of a climate-neutral Europe by 2050. The priority focuses on the Digital Services Act that works for a safe and accountable online environment, the Digital Markets Act that ensures fair and open digital

<sup>4</sup> [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_22\\_6086](https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6086)

<sup>5</sup> [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-year-skills-2023\\_en](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-year-skills-2023_en)

<sup>6</sup> [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age\\_en](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age_en)

markets, the European Chips Act that will make Europe a strong competitor in semiconductor technologies, the European Digital Identity that gives citizens full control of their information shared with third parties, Artificial Intelligence that aims to achieve better healthcare, safer and cleaner transport, more efficient manufacturing and cheaper and more sustainable energy through AI, the European Data Strategy that tackles the use, importance and safeguarding of data, the European Industrial Strategy that ensures a smooth transition towards climate neutrality and digital leadership, the enhancement of European defence and lastly, the EU-US trade and technology council. At the core of this priority are three main pillars: technology, people, and business. Under these pillars, the strategy includes a range of policies and initiatives aimed at promoting the development and uptake of digital technologies, enhancing digital skills and literacy, and supporting digital entrepreneurship and innovation. The strategy aims to ensure that digital technologies benefit individuals and enhance their quality of life. It emphasizes the importance of user-centric digital services, including improved access to high-speed internet and the development of secure and inclusive digital infrastructure. The strategy also emphasizes the need to foster digital skills among the population to bridge the digital divide and empower citizens to fully participate in the digital society. This is a critical aspect of the digital transformation, as it is essential that people have the skills and knowledge necessary to fully participate in the digital economy. It further aims to promote a fair and competitive digital economy. It seeks to establish a level playing field in the digital market by fostering innovation, promoting fair competition, and addressing the challenges posed by digital platforms. The strategy also emphasizes the importance of data governance and cybersecurity to protect the interests of individuals and businesses in the digital realm. The Commission's priority also aims to uphold democratic values and sustainability in the digital space. It focuses on ensuring that digital technologies respect fundamental rights and democratic principles, including privacy, data protection, and freedom of expression. The strategy also addresses the environmental impact of digitalization by promoting energy-efficient technologies and sustainable digital practices.

The Commission's policy areas under this priority are: Europe's Digital Decade, Cybersecurity, Digital Skills, European Research Area, Single Market, Shaping Europe's digital future, Connectivity, Education, Digital Finance and the Single Market.

The **European Skills Agenda 2020**<sup>7</sup> is a crucial framework for the European Union to address the persistent skills gap that has been hindering the growth of the EU workforce. The agenda is designed to equip the EU workforce with the necessary skills and competencies required to meet the demands of the rapidly evolving job market of the future. The Commission has identified that a high-quality and inclusive education and training system is critical to addressing this challenge. The agenda seeks to foster social cohesion and economic growth by ensuring that individuals and employers are provided with an education and training system that responds to their needs. It is built around 12 key actions that address the needs of all stakeholders involved. One of the most notable actions is the *Pact for Skills*, which aims to promote public-private collaboration in identifying skill gaps and shortages and developing effective solutions. The EU support for vocational education and training is another key action that aims to invest more in vocational education and training to provide learners with the skills needed for the labour market. The agenda recognizes the significance of digital competences in the modern economy and proposes measures to improve digital literacy and skills among EU citizens and workers. It also focuses on improving the competitiveness of EU industries by developing a skilled workforce, particularly in emerging sectors such as green technologies and artificial intelligence. Adult learning is another critical aspect of the agenda. It aims

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<sup>7</sup> <https://ec.europa.eu/migrant-integration/sites/default/files/2020-07/SkillsAgenda.pdf>

to improve access to lifelong learning opportunities for all EU citizens, especially those who are disadvantaged or underrepresented. The European Universities initiative seeks to support higher education institutions in the EU to work together and share knowledge and resources. The agenda further aims to enhance cooperation among EU member states in the field of education and training. It recognizes that collaboration is essential to addressing the skills challenges facing Europe and ensuring that EU citizens are equipped with the skills and knowledge needed to succeed in the digital and green economy of the future.

In 2021, a conversation around micro credentials begun on a European level with the Commission defining micro credentials as a means to “certify the learning outcomes of short-term learning experiences, for example a short course or training”<sup>8</sup> that can complement, and not replace, traditional education. The Commission having identified one’s need to “continually update their knowledge, skills and competences to fill the gap between their education and training and the demands of a rapidly changing labour market”<sup>9</sup> submitted, in December 2021, a proposal which aimed at enabling people to acquire the skills and knowledge required to thrive in a post covid era amidst the transition to a green and digital economy. The proposal further aimed at encouraging individuals to create a flexible and personalised learning and career path while ensuring that all members of society would be included and be equal.<sup>10</sup> The proposal for a council recommendation set a European approach to micro – credentials highlighting the need to apply a common definition, and standards across all member states, the importance of the development of an ecosystem and to emphasize the potential of micro-credentials to support lifelong learning and employability.

Furthermore, in 2022, the Commission engaged with EU Member states and identified the lack of a whole-of-government approach to digital education and training as well as the difficulties in equipping people with the necessary digital skills. As result, the Commission adopted two proposals for a Council Recommendation in the context of the European Year of Skills, with the aim to support Member States and the education and training sector in providing high-quality, inclusive, and accessible digital education and training to develop the digital skills of European citizens.<sup>11</sup> In addition, the Commission announced the piloting phase for the European Digital Skills Certificate with the final, official certificate rolling out in 2024.

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<sup>8</sup> <https://education.ec.europa.eu/education-levels/higher-education/micro-credentials>

<sup>9</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0770>

<sup>10</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0770>

<sup>11</sup> [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_23\\_2246](https://ec.europa.eu/commission/presscorner/detail/en/ip_23_2246)

## Results from past national or regional surveys

Below a short analysis is provided of the results of past or regional surveys conducted in each of the participating country, having relevant content with the Level Up project.

### Results from Germany

A survey by the Bitkom revealed that in 2022, a total of 137,000 IT positions would remain unfilled in the German economy<sup>12</sup>. Almost every second start-up in Germany complains that the lack of skilled personnel is severely restricting them, and roughly a third of German businesses currently discuss the lack of skilled workers. On average, companies expect to take about seven months before vacancies can be filled - this has a direct impact on the international competitiveness of Germany as a location for innovation.

It is apparent that companies who invest in learning and development achieve higher retention rates than companies who are not doing enough towards this direction.<sup>13</sup> It was discovered that, DAX (40 biggest companies in Germany) companies offer their employees only 22 hours of training per year to build new skills – 24% less than average US counterpart. DAX companies may lose their competitive edge if they do not fully harness learning and development as a core lever to build and develop skills in their employees.

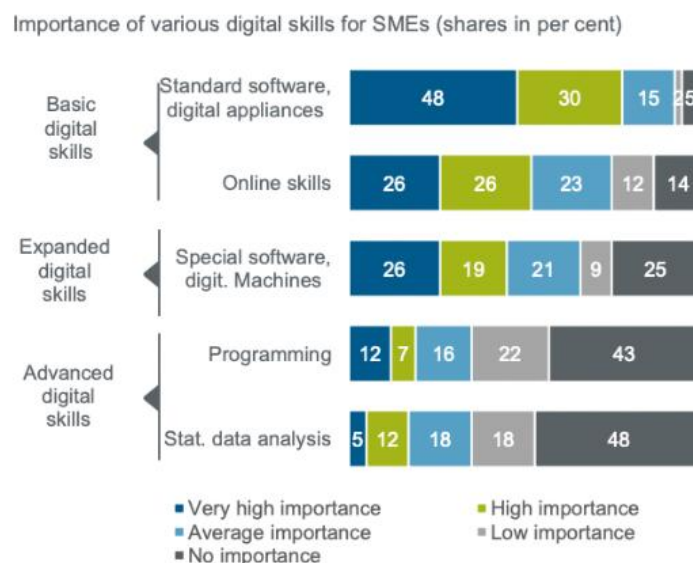


Figure 4 – Importance of various skills of SMEs in Germany

<sup>12</sup> Closing The Gap: Empfehlung für einen zukunftsfähigen IT-Fachkräftestandort Deutschland  
<https://www.bitkom.org/sites/main/files/2023-01/221214PPIT-Fachkräftegewinnung.pdf>

<sup>13</sup> McKinsey Research Institute: Closing the tech Talent Gap: Adopting the right mindset  
<https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/tech-forward/closing-the-tech-talent-gap-adopting-the-right-mindset>



Furthermore, a study by the KfW Research focused on SMEs suggests that 93% of companies actually realize the importance of basic digital skills throughout the company structure. Only 7% of the respondents see basic digital skills as low or of no importance.<sup>14</sup>

## Results from Cyprus

According to a recent survey conducted by IMR/University of Nicosia and Capacitor Partners in October 2022 and in June 2023, a majority of Cyprus-based companies have prioritized digital transformation in their strategic planning, with an emphasis on upskilling their personnel's digital skills.<sup>15</sup> The most recent survey of 2023 shows an upward trend in SMEs prioritizing digitalization, with many agreeing that transitioning to the cloud will greatly help the digitalization of their company. Cybersecurity-related measures and technologies are also high on their priority list.

A survey conducted in February 2022 by GrantXpert Consulting, the Project Coordinator of the Level Up project, shows that there is a shortage of technical skills on the island, with many companies reporting trouble finding people with a Data Analytics background, as well as Project Management and Business Analysis specialists. In terms of specialized/high level technical skills, there is a high demand for Business Analysis specialists, Windows and Linux Security experts, Azure experts, and PMP certification for Project and Product Managers, as the study conducted in January-March 2023 by the Deputy Ministry of Research, Innovation and Digital Policy and CITEA has depicted, having the participation of over 50 ICT companies from Cyprus.

In conclusion, desktop research shows that Cyprus does not offer courses within the highly desired hard skills areas or in areas anticipated to be highly desired in the future. HRDA, which subsidizes courses across various industry areas, catalogues a total of 1910 approved synchronous learning courses, but only 11% pertain to ICT skills and the majority target individuals with basic ICT skills.

## Results from Greece

According to the survey conducted by Found.ation, the areas that need improvement in Greece are the integration of digital technologies in business activities and digital public services.<sup>16</sup> The report emphasized the importance of increased investment in cutting-edge technologies and collaboration between the public and private sectors to enhance digitalization efforts in Greece.

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<sup>14</sup> KfW Research - German SMEs lack digital skills, need more training <https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-Fokus-Volkswirtschaft/Fokus-englische-Dateien/Fokus-2021-EN/Focus-No.-346-September-2021-digital-skills.pdf>

<sup>15</sup> The Cyprus Digital Survey, 2023, Capacitor Partners and IRM, <https://www.capacitorpartners.com/digitalcyprussurvey>

<sup>16</sup> Found.ation (2022). Digital Transformation in Greece 2022-2023: Reassessing Progress, Readjusting Course. <https://thefoundation.gr/2022/12/16/digital-transformation-in-greece-2022-2023-report-reassessing-progress-readjusting-course/>



Hellenic Association of Information and Communication Technology Enterprises (SEPE) in collaboration with consultancy firm Deloitte, there is a significant gap between the supply and demand for ICT specialists in Greece.<sup>17</sup> The main reasons for this gap are insufficient specialization and the emigration of young scientists abroad. To address this gap, a set of ten proposed actions has been put forth, including increasing training programs in ICT subjects, attracting and utilizing specialists from abroad, establishing new postgraduate and undergraduate ICT departments, fostering compulsory student internships and strengthening university-industry cooperation, enhancing the ICT curriculum in primary and secondary education, and promoting collaboration with foreign universities.

## Results from Poland

To support small and medium-sized enterprises (SMEs) in Poland during their digital transition and integration into specific industrial ecosystems, it is important to identify the advanced digital skills required. This comprehensive overview aims to analyze the labour market at the national level in Poland and highlights the emerging skills needs in various industries, including Healthcare, Food, Energy Intensive Industries and Renewable Energy, Agri-Food, Finance, and ICT companies. It is important to note that the specific skills required may vary based on the size and nature of the organizations within each industry. Additionally, the rapid advancement of technology means that emerging skills may evolve over time, requiring professionals to stay updated and continuously upskill themselves to meet the changing demands of the digital era.

Industry	Skills Shortages
Healthcare	1. Data Analytics 2. Health Informatics 3. Telehealth and Telemedicine 4. Artificial Intelligence (AI) in Healthcare
Food	1. Supply Chain Digitization 2. Quality Assurance Technologies 3. Precision Agriculture 4. Food Tech Innovation
Energy Intensive Industries and Renewable Energy	1. Industrial Automation 2. Energy Management Systems 3. Renewable Energy Technologies 4. Energy Storage Solutions
Agri-Food	1. Digital Farming 2. Sustainable Packaging 3. E-commerce and Direct-to-Consumer Channels 4. Traceability and Certification Systems
Finance	1. Fintech Solutions 2. Data Analysis and Risk Assessment 3. Cybersecurity and Fraud Detection 4. Regulatory Compliance
ICT Companies	1. Cloud Computing 2. Cybersecurity 3. Software Development 4. Data Science and Big Data Analytics

Table 1 – Skills to be developed in Poland by industry

## Results from Hungary

<sup>17</sup> SEPE, Deloitte (2022). Study to assess the adequacy of specific ICT in Greece. SEPE Digital Economy Forum. <https://deforum.sepe.gr/press-releases/121/meleti-apotimisis-eparkeias-eidikon-tpe-stin-ellada/>

A survey was conducted by IVSZ in early 2023. The aim of the survey was on one hand market validation and on the other hand the understanding of customer needs. A primary data collection was conducted using the online self-completion questionnaire (CAWI). The survey started in early February 2023 and ran until the end of the month. The target group of the survey were primarily SMEs and public service organisations. In order to provide the most relevant results from Level Up project's perspective, in the current report, public sector organization responses were excluded, so it reflects only the preferences of the private sector (private sector sample size is 174). Micro enterprises are represented in the highest proportion in the sample (66%). 19% of the respondents were characterized as medium-sized, 9% as small enterprises and only 5% of the respondents were characterized as large enterprises. In terms of the organizations' profile, 59% of the responding organizations were B2B, 19% were B2C service providers, 12% were manufacturer and service provider companies, and also 12% were solely manufacturing companies.<sup>18</sup>

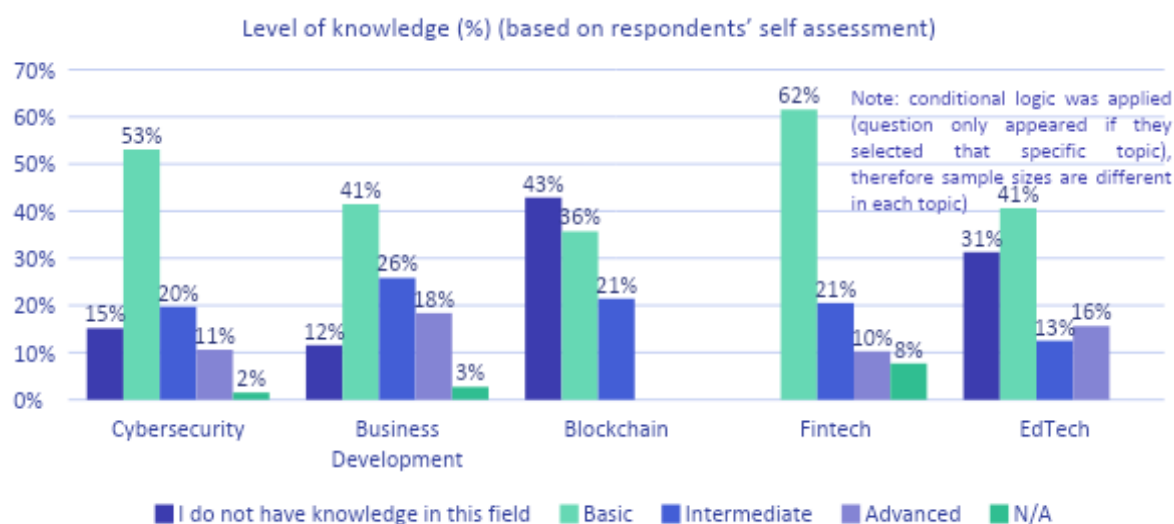


Figure 5 – Level of knowledge based on respondents in the five training areas provided by Digitaltech EDIH

In the field of Cybersecurity, 22% reported they would be interested in basic level trainings, while 40% would be interested in intermediate and 37% in advanced trainings. In terms of Business Development, intermediate (84%) and advanced (82%) trainings are the most popular. In the field of Blockchain, basic and intermediate trainings are of equal interest (38%). In terms of Fintech and EdTech, intermediate trainings seem to be the most popular (41 and 39%).<sup>19</sup>

<sup>18</sup> One of the key sectors of the Hungarian economy could be the ICT sector <https://szazadveg.hu/en/2023/03/01/one-of-the-key-sectors-of-the-hungarian-economy-could-be-the-ict-sector~n3601>

<sup>19</sup> Training needs analysis from the Digitaltech EDIH project.

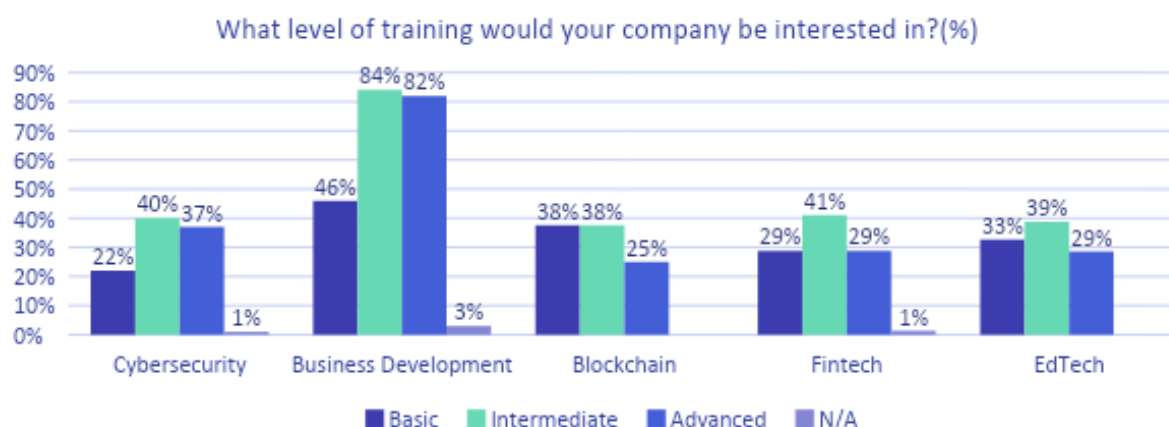


Figure 6 – Level of trainings respondents would be interested in, per training areas provided by Digitaltech EDIH.

Among the most popular trainings there are mainly Business Development trainings, such as Go-to-market strategies, Product and service development, Digital Business Models and Data-driven project efficiency; and Cybersecurity trainings, such as Cybersecurity risk assessment, Data protection risk assessment and Data protection risk assessment and impact analysis.<sup>20</sup>1 above

## Results from Italy

Italy is making significant progress in digital transformation, with improvements in connectivity, digital skills, and the integration of digital technologies. However, challenges remain in the adoption of advanced technologies, the expansion of e-commerce among SMEs, and the enhancement of cybersecurity measures. The growing environmental consciousness among Italian businesses indicates a positive trend towards sustainable digitalization practices.

## Results from Finland

The Confederation of Finnish Industries has identified several opportunities offered by digitalization, data, and technologies. These opportunities include improved business processes, new ways of working, and customer-oriented business development. The technologies and phenomena with the greatest potential for business in the near future are artificial intelligence and machine learning, digital/hybrid way of working, and robotics and automation.

The key competence needs of companies based on perceived opportunities include data-driven/digital sales and marketing, improving data-driven customer understanding and experience, digital product development and management, service design, data sharing models and good practices between companies, cybersecurity and data protection, and data strategies (from creation to data enrichment, refining and knowledge management) and enabling technologies in business models (especially artificial intelligence, machine learning, robotics, automation).

<sup>20</sup> Training needs analysis from the Digitaltech EDIH project.

The project and study "Finland's future visions and key innovative growth areas and future well-being in Finland" examines Finland's future business potential as well as future technological innovations and strategic growth areas.<sup>21</sup> The study investigated the significance of the business potential of 3D-printed products or inventions, industrial use (75%) and local distribution (44%) In addition, the potential of the wellbeing services counties (53%) will be assessed. The use of industrial scale is still limited to specialty products, but large growth is expected, especially in industrial use.

## Conclusions

Companies that invest in learning and development achieve higher retention rates than those that do not. In some countries, there is a lack of courses in highly desired hard skills areas or in areas anticipated to be highly desired in the future. There is also a significant gap between the supply and demand for ICT specialists in some countries, with insufficient specialization and emigration of young scientists abroad being the main reasons for this gap.

To address these challenges, several actions have been proposed. These include increasing training programs in ICT subjects, enhancing the ICT curriculum in primary and secondary education, attracting and utilizing specialists from abroad, establishing new postgraduate and undergraduate ICT departments, fostering compulsory student internships and strengthening university-industry cooperation, promoting collaboration with foreign universities, and enhancing cybersecurity measures.

In addition to these actions, there is also a need for increased investment in cutting-edge technologies and collaboration between the public and private sectors to enhance digitalization efforts. The growing environmental consciousness among businesses indicates a positive trend towards sustainable digitalization practices.

The key needs of companies on digital skills based on perceived opportunities include data-driven/digital sales and marketing, improving data-driven customer understanding and experience, digital product development and management, service design, data sharing models and good practices between companies, cybersecurity and data protection, and data strategies (from creation to data enrichment, refining and knowledge management) and enabling technologies in business models (especially artificial intelligence, machine learning, robotics, automation).

In terms of specific training areas, there is a high interest in basic, intermediate, and advanced level training in Cybersecurity. Intermediate and advanced Cybersecurity trainings are the most popular in Business Development. In Blockchain, basic and intermediate trainings are of equal interest. Finally, Intermediate trainings are the most popular in Fintech and EdTech.

Overall, it appears that there is a need for increased investment in training programs to develop digital skills in various areas.

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<sup>21</sup> [https://ek.fi/wp-content/uploads/2022/02/EK-yrityskysely\\_data\\_teknologiaat\\_digiosaaminen\\_final2022-1.pdf](https://ek.fi/wp-content/uploads/2022/02/EK-yrityskysely_data_teknologiaat_digiosaaminen_final2022-1.pdf)

## Results from large-scale national online survey

Our aim was to identify the specific digital skills needs of SMEs in the EU level and to tailor our upskilling and reskilling programmes to meet these needs. To achieve this goal, we created a national online large scale questionnaire for business owners and managers, as well as employees, to complete. The survey took only 5 minutes to complete and was available online, through Google Forms.<sup>22</sup>

These research results will help us create tailor-made programmes that meet the specific needs of SMEs in Europe and employers to ensure that employees have the digital skills they need to succeed in today's fast-paced business environment.

### Survey in Greece

Greece received 237 replies from employees and employers of Greek SMEs. According to the survey<sup>23</sup>, the overwhelming majority of respondents recognized the importance of digital skills for companies. The primary reason for SMEs to fill in the digital skills gap is to improve their productivity and efficiency (74.4%), followed by the desire to maintain competitiveness in the market (47%). The IT department was identified as the department that requires digital skills and programming the most (62.3%), followed by Operations (49.8%) and Marketing (47.4%). The primary barriers to closing the digital skills gap in companies were identified as a lack of time for training (66.2%), absence of a training budget (48.6%), lack of access to training resources (25.7%), and difficulties in obtaining skilled trainers (20.7%).

According to the survey, the most prominent solution to address the digital skills gap is to increase the training budget (45.5%), followed by providing incentives for employees to gain new skills (41.9%), fostering a culture of continuous learning (39.6%), hiring additional staff with the required skills (38.7%), and partnering with educational institutions or training providers (36.9%). The majority of participants agreed upon the importance of the government and educational institutions supporting the development of digital skills, with on-the-job training (64.9%) and asynchronous online courses (61.7%) being identified as the most effective methods.

As per received data provided in Table 2, Python emerged as the most important programming language (45%), followed by SQL (41.4%), JavaScript (34.2%), and HTML and CSS (31.1%). The most popular digital tools among employers and managers for their employees were Microsoft Office Suite (74.5%), Zoom and Teams (42.3%), Gsuite (39.9%), Microsoft Power BI (36.5%), Mailchimp (26%), and Tableau (25.5%). The majority of respondents indicated that ICT trainings are offered “As Needed” (55.4%), while others reported that trainings are conducted on a semi-annual (18.2%), quarterly (9.5%), or annual basis (16.9%).

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<sup>22</sup> <https://forms.gle/rPrzDxDNCcKVu3xe6>

<sup>23</sup> <https://forms.gle/rPrzDxDNCcKVu3xe6>

Industry	Representation
Technology	22.6%
Retail	16.3%
Healthcare and Life Sciences	13.0%
Manufacturing	10.6%
Finance	9.1%
Education	6.3%
Entertainment/Media	6.3%
Reason for filling digital skills gap	Percentage
Improve productivity and efficiency	74.4%
Maintain competitiveness in the market	47.0%
Department requiring digital skills the most	Percentage
IT	62.3%
Operations	49.8%
Marketing	47.4%
Barrier to closing digital skills gap	Percentage
Lack of time for training	66.2%
Absence of a training budget	48.6%
Lack of access to training resources	25.7%
Difficulties in obtaining skilled trainers	20.7%
Solution to address digital skills gap	Percentage
Increase training budget	45.5%
Provide incentives for employees to gain new skills	41.9%
Foster a culture of continuous learning	39.6%
Hire additional staff with required skills	38.7%
Partner with educational institutions or training providers	36.9%

Table 2 – Responses from Greece

Effective method for developing digital skills	Percentage
On-the-job training	64.9%
Asynchronous online courses	61.7%
Important programming language	Percentage
Python	45.0%
SQL	41.4%
JavaScript	34.2%
HTML and CSS	31.1%
Popular digital tool among employers and managers	Percentage
Microsoft Office Suite	74.5%
Zoom and Teams	42.3%
Gsuite	39.9%
Microsoft Power BI	36.5%
Mailchimp	26.0%
Tableau	25.5%
Frequency of ICT trainings offered	Percentage
As needed	55.4%
Semi-annually	18.2%
Quarterly	9.5%
Annually	16.9%

## Survey in Cyprus

Cyprus received 210 replies<sup>24</sup> from employees and employers of Cypriot SMEs.

The data from Cyprus were extensive and impressively compiled. 53 micro companies, 80 small companies, 48 medium-sized and 11 large companies responded to the survey for Cyprus. Out of these respondents 47 were business owners, 41 directors, 36 top level managers, 34 middle level managers, 18 HR managers and 17 employees something that provides a clear insight to their needs in digital skill training. 58% of the companies recognize the gap in digital skills among their employees/coworkers and 75% identify lack of training time as that the major reason behind the digital skills gap in their company.

Based on the data analysis, it was observed that the largest gap is in cybersecurity with a voting percentage of 25%, advanced knowledge in excel (18%), social media marketing and analytics (17%), data analytics & artificial intelligence and machine learning (17%). The survey concludes that 40% of the participants consider programming languages to be dispensable for the training of their employees but the 60% suggests that Java, SQL and Python, HTML & CSS and JavaScript with voting percentages 32%, 28% and 20% respectively, are skills that they consider important to be learned.

Also, the survey highlights the need in training to a number of different platforms with the most popular being: Microsoft Office Suite (voting percentage 70%), Microsoft Power BI (37%), Zoom/Teams & other video conferencing tools (36%), G-Suite (35%), Salesforce (33%), Mailchimp (27%), GitHub (25%), Figma (23%), Jira,

<sup>24</sup> <https://forms.gle/rPrzDxDNCCKVu3xe6>



Trello or Asana (26%) and Dropbox (22%). Finally, 80% of SMEs in Cyprus prefer an asynchronous mode of online training which will be delivered to the employees when needed.

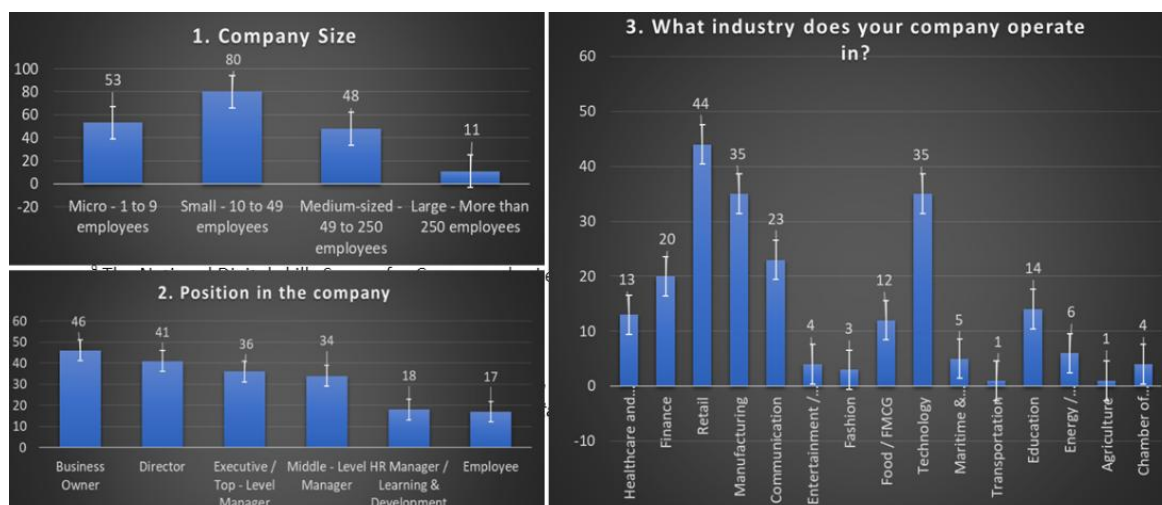


Figure 7 – Demographic Data

Digital Skills Gap	Number of Responses
Cybersecurity	37
Advanced knowledge in Excel	33
Social media marketing	32
Analytics	32
Data analytics	32
Artificial intelligence and machine learning	31
Barrier to Closing Digital Skills Gap	Number of Responses
Lack of time for training	144
Lack of training budget	74
Lack of training resources	70
Digital Platforms/Languages	Responses
Microsoft Office Suite	132
Microsoft Power BI	72
Zoom/Teams	70
G-Suite/Salesforce	67/60
Mailchimp/GitHub/Figma	53
Project Management Tools (Jira/Trello/Asana)	52
Dropbox	51
None (Programming Languages)	73
Java	59
SQL	52
Python/HTML/CSS/JavaScript	41/40
Training Methods	Responses
In-Job Training	145
Asynchronous Online Courses/Training	125
In-Class Training	97
Synchronous Online Training	85
Conferences & Mentoring Schemes	83

Table 3- Main Results from Cyprus

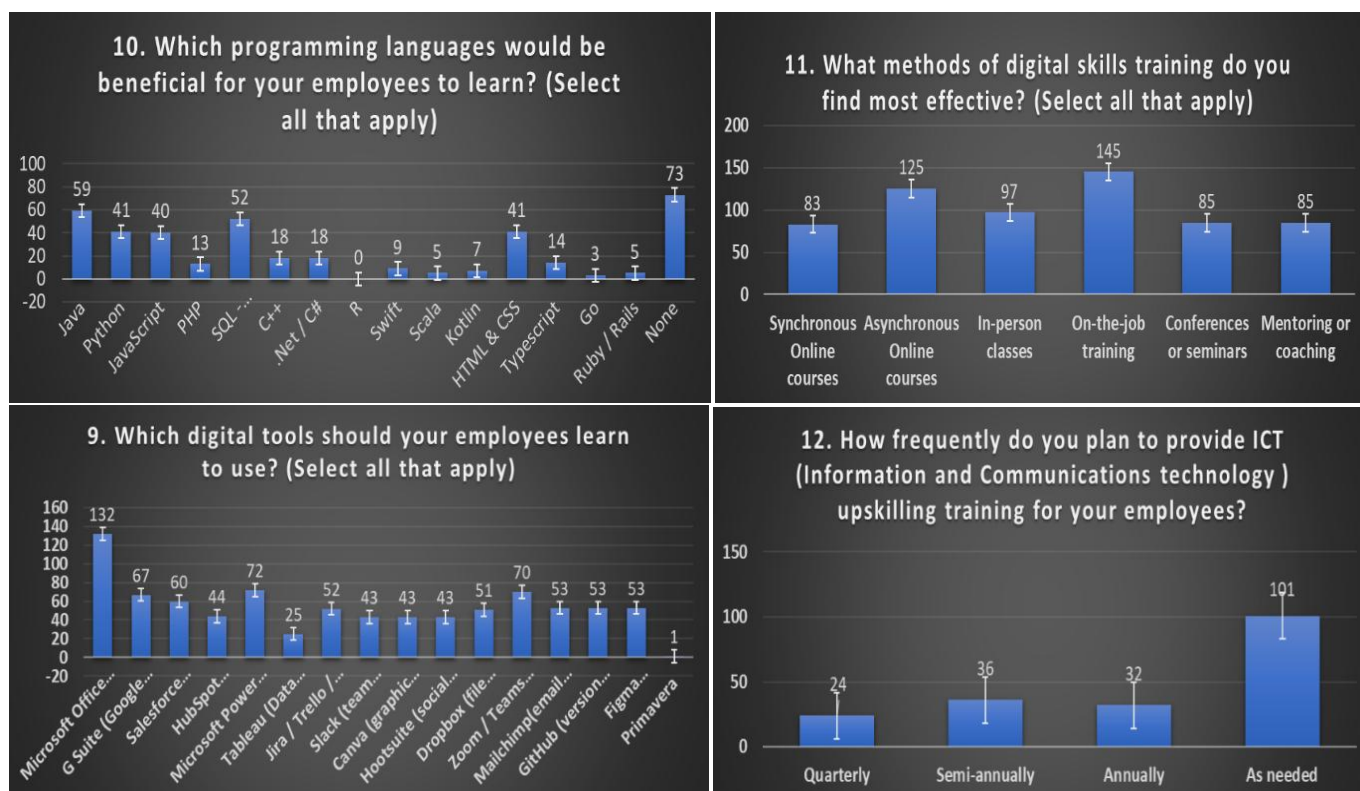


Figure 8. Digital skills training needs and preferences in training delivery methods

## Survey in Finland

**Finland received 32 replies** from employees and employers of Finnish SMEs. However, there are many reasons why a survey aimed at SMEs received fewer responses than expected. For example, the timing of the survey during the summertime, the selection of the target group, and the marketing of the survey can affect the response rate. It is possible that a lack of awareness about the importance of improving digital skills can affect the response rate. If companies do not know how digital skills can help them succeed, they may not see the need to respond to such a survey. It is important for companies to understand the significance of digital skills and how they can help them grow and succeed.



Most companies think that digital skills are very important for their business. It is essential for companies to invest in the development of these skills to stay competitive in the digital age.

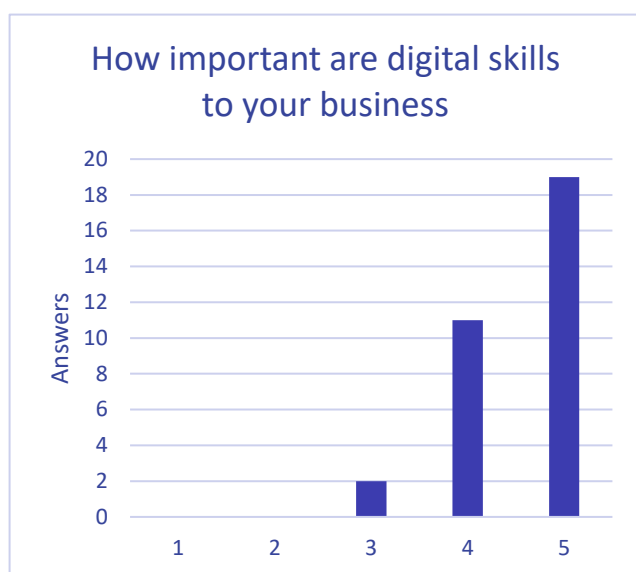


Figure 8 – Importance of Digital skills in Finland



Figure 9 – Most popular digital skills in Finland

As per Figure 10, SMEs believe that the most important digital skills that their employees lack are data literacy/analytics, cybersecurity, and knowledge in artificial intelligence.



Figure 10 – Lacking digital skills in Finland

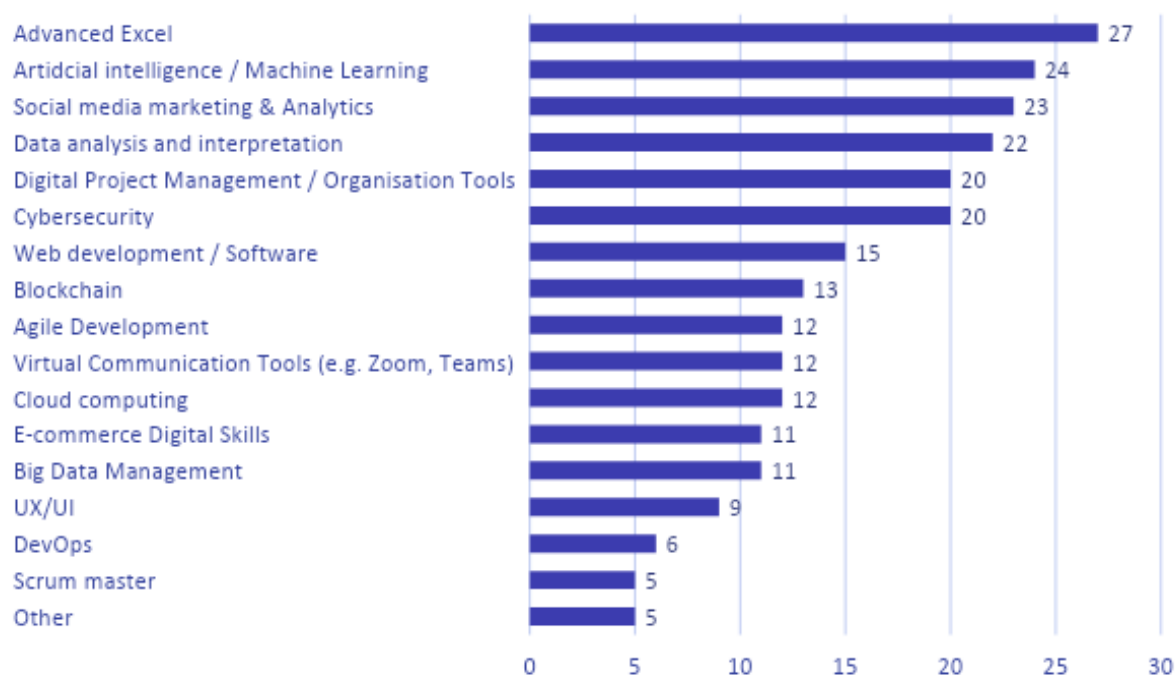
The skills deemed most necessary were foundational skills such as Microsoft Office proficiency and video conferencing services like Teams and Zoom. This supports our belief that employees should have a good grasp of the basic digital skills before being trained on more advanced and intelligent technologies.

## Survey in Hungary

Hungary received 59 replies<sup>25</sup> from employees and employers of Hungarian SMEs. The questionnaire was promoted in various channels, such as newsletter, social media posts on IVSZ's and partners' Facebook and LinkedIn channels and in relevant groups, direct emails and reminders to more than 8500 contacts and contacting personally relevant contacts. Moreover, partner organisations supported IVSZ in the promotion of the questionnaire. The sampling period was of optimal length and with the usual 5-8% completion rate in similar surveys, the required number of responses should have been reached. Despite this, the number of responses collected was 59, which is far behind the originally planned number of 200.

Some of the reasons of the low response rate are: i. at the beginning of 2023, IVSZ carried out a survey with a similar content, the questionnaire of which was sent to the same population, which caused saturation, ii. there is a trend towards an increase in the number of market research projects supported by questionnaires, which further increases saturation, with the number of questionnaires per person increasing.

### What digital skills are your employees currently lacking?



<sup>25</sup> <https://forms.gle/ufmr4pHAjKQKAHT16>

Figure 11 – Lack of digital skills in Hungary

There are several areas where employees in the respondents' organization are lacking digital skills. The skills related to advanced Excel, artificial intelligence, social media marketing and data analysis seem to be particularly prominent areas where improvement is needed.

Time constraints and the lack of training budget are the most significant barriers faced by the respondents' company when it comes to closing the digital skills gap. Additionally, finding qualified trainers and providing access to quality training resources are also crucial factors in overcoming the challenges associated with enhancing digital skills within the organization. Fostering a culture of continuous learning is considered the most important solution by all the respondents. Additionally, increasing the training budget and providing incentives for skill development are also seen as crucial steps to address the digital skills gap. Collaborating with educational institutions or training providers and hiring skilled staff are other important strategies to close the gap.<sup>26</sup>

To address these issues SMEs should invest in employees' training, adopt and support a culture of continuous learning, allocate budget for upskilling employees, and provide access to the right tools and technologies.



Figure 12 – Effective training

Among the listed methods, on-the-job training is considered the most effective, with 44 respondents selecting it as their preferred option. This approach allows employees to learn and apply digital skills in real work scenarios, facilitating hands-on experience and immediate application. Asynchronous online courses, where learners can access training materials at their own pace, and mentoring or coaching programs, which provide personalized guidance, are also highly valued methods. Synchronous online courses, in-person classes, and conferences or seminars are also regarded as effective training approaches, but they received slightly fewer responses compared to on-the-job training and mentoring/coaching.<sup>26</sup>

## Survey in Italy

Italy received 42/200 replies<sup>27</sup> from employees and employers of Italian SMEs. The survey did not receive the desired number of responses, despite continuous efforts by the CSC team. There could be many reasons why

<sup>26</sup> National Report from Hungary

<sup>27</sup> <https://forms.gle/A88KPy7R2JJiD1X77>

more companies did not respond to the survey, such as bad timing due to the summer holidays, lack of awareness about the survey, lack of interest or time, or other factors. Without more information, it is difficult to determine the exact reason.

Competence needed by employees	Percentage
Cybersecurity & Social media marketing & Analytics	42.9%
Web development / Software	40.5%
Advanced Excel	38.1%
Digital Project Management / Organisation Tools & Big Data Management	35.7%
Artificial intelligence / Machine Learning & E-commerce Digital Skills	33.3%
Cloud computing & DevOps	26.2%
Blockchain, UX/UI, Agile Development & Scrum master	23.8%
Data analysis and interpretation	21.4%
Virtual Communication Tools (e.g. Zoom, Teams)	16.7%

Table 4 – Employees' Digital skills needs

Key Information	Details
Size of companies surveyed	Majority "Micro" businesses (1-9 employees)
Respondents' positions	Majority "Company Owners"
Attitude towards digital skills	Positive, high importance for productivity, competitiveness, sales and revenues
Digital skills gap	54.8% believe there is a gap within their organization
Barriers to bridging the gap	Limited time (69%) and budgets for training (57.1%)
Solutions to bridge the gap	Promoting continuous learning (50%), increasing budget (47.6%), collaborating with educational institutions (42.9%)
Effective training methods	In-person courses, on-the-job training, mentoring or coaching, online options
Suggested programming languages	Java, JavaScript, Python, SQL, HTML/CSS
Suggested digital tools	Microsoft Office Suite, Canva, Mailchimp, G Suite
Support from government and educational institutions	Considered crucial by SMEs

Table 5 – Conclusions

As per the survey results there is a lack of digital skills among employees in Italy and based on this, the following competencies have been identified by them as the most important ones to be developed:

- Analysis and Data Interpretation, Cybersecurity, Marketing and Social Media Analysis, Blockchain, Big Data Management, UX/UI, Agile Development, Scrum Master, DevOps
- Cloud Computing
- Project Management Tools
- Advanced Excel, Virtual Communication Tools (e.g., Zoom, Teams)
- Web/Software Development, Digital Marketing, E-commerce Skills
- Artificial Intelligence/Machine Learning (AI/ML).

## Survey in Poland

Poland received 228 replies<sup>28</sup> from Polish SME employees and employers.

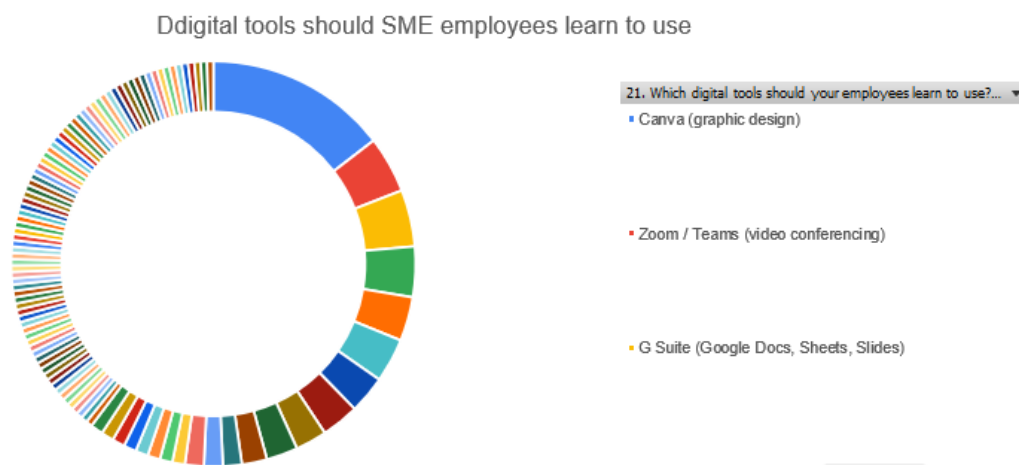


Figure 13 – Digital tools should SME employees learn to use

SME employees should learn to use various digital tools. The most popular digital tools among respondents are Canva (over 63 companies), Zoom/Teams (over 20 companies) and Gsuite (over 20 companies). The least popular is Microsoft Office Suite (Word, Excel, PowerPoint), Jira / Trello / Asana (project management), Slack (team communication), GitHub (version control for software development).

Digital Intensity and Green Action	Percentage
Polish SMEs with at least basic level of digital intensity	40 %
EU average of SMEs with at least basic level of digital intensity	55 %
Polish enterprises with medium/ high intensity of green action through ICT	60 %
EU average of enterprises with medium/ high intensity of green action through ICT	66 %
Online Commerce and Advanced Technologies	Percentage
Polish SMEs selling online	14 %
Polish SMEs selling across borders to other EU countries	5 %
Polish enterprises using cloud solutions	19 %
EU average of enterprises using cloud solutions	34 %
Polish enterprises using electronic information sharing	32 %
EU average of enterprises using electronic information sharing	38 %
Social Media and AI Technologies	Percentage
Polish enterprises actively using social media	18 %
Polish enterprises integrating AI technologies into their operations	3 %

Table 6 – Digital skills

However, it is important to note that addressing the digital skills gap and fostering the digital transformation of the economy and society remain key priorities for Poland. By investing in digital education, promoting digital skills development, and providing support and incentives for businesses, Poland can accelerate its digital transformation and contribute to the achievement of the Digital Decade targets.

<sup>28</sup> <https://forms.gle/rQmE8JTbJp8jWx458>

Indicator	Poland	EU Average
Digital intensity of SMEs	40 %	55 %
Green action through ICT	60 %	66 %
SMEs selling online	14 %	N/A
SMEs selling across borders to other EU countries	5 %	N/A
Cloud solutions usage	19 %	34 %
Electronic information sharing usage	32 %	38 %
Social media usage	18 %	N/A
AI technologies integration	3 %	N/A

Table 7 – Level of Poland digital technologies comparing to EU Average

Poland faces challenges in its digital skills, as highlighted by its low ranking in the Digital Economy and Society Index (DESI)<sup>29</sup>. The country lags behind the EU average in terms of human capital and digital skills, with low percentages of individuals possessing basic digital skills and content creation skills. The shortage of ICT specialists in the workforce and the low level of ICT graduates further hinder the integration of digital technology in businesses, particularly SMEs. Limited digital skills and a lack of investment in training hinder the country's ability to fully utilize the potential of the digital economy.

<sup>29</sup> Digital Economy and Society Index (DESI) <https://digital-strategy.ec.europa.eu/en/policies/desi-poland>

## Survey in Germany

Our German partner received 40 replies<sup>30</sup> from employees and employers of German SMEs. The national survey was distributed to Business Owners, Executives, Directors and mid-Level managers in Germany. Primarily the focus was to reach small to medium enterprises. As the main target group of the main partner from Germany (StackFuel) has a very different target group (large-scale companies, more 2500 employees), they got 40 responses and the participants represented different relevant sectors.

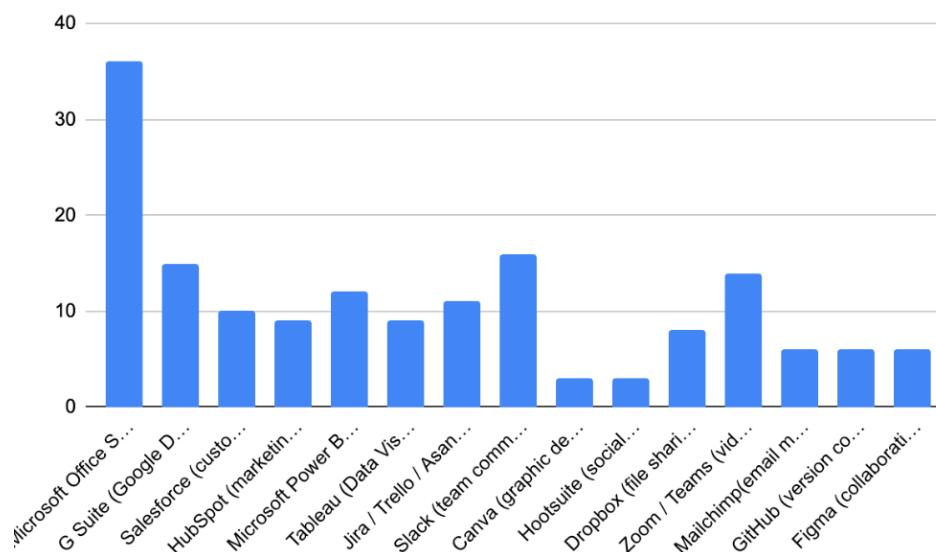


Figure 14 – Digital tools essential to SMEs' employees

Over 90% of the respondents indicated that more than one digital tool is important to their work. Microsoft Office Suite seems to be the most important one reaching 95%, and it is followed by Slack, Zoom/Teams, G Suite and Microsoft Power BI.

<sup>30</sup> <https://forms.gle/rQmE8JTbJp8jWx458>

What are the primary barriers to closing the digital skills gap in your company?

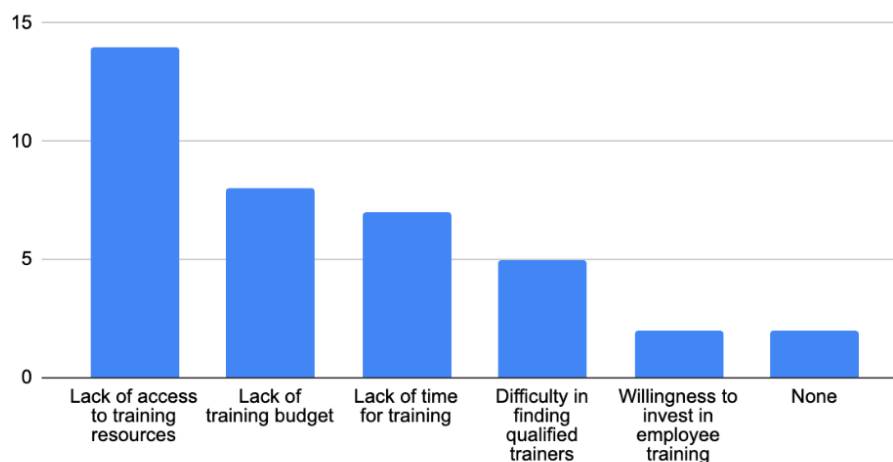


Figure 15 – Barriers for closing digital skills gap

As per Figure 15 suggests, the biggest challenges in Germany among the respondents to closing the digital skills gap is the lack of access to training resources, the lack of training budget and the lack of time for training.

Despite the relatively low sample size, Stackfuel collected viable information on the status quo of the German digital skills environment. Participants clearly see the need for constant adaptation to the technological environment via digital skill initiatives. However, there are certain barriers for businesses and employees, which are very much in line with findings from past national reports. It seems that there should be more cooperation efforts between the government, training providers and businesses, in order to give everyone the opportunity to enhance their digital skills set.



## Analysis of the Consolidated Data of the large-scale survey

The large-scale national survey was successfully implemented from 1.3.2023 to 15.7.2023 in full in three countries, Greece, Poland and Cyprus. Four partner countries (Hungary, Italy, Germany, Finland) faced challenges in getting responses to the survey.

Just over 80% of the responses came from three countries Greece, Poland and Cyprus. In total 848 people from Greece, Poland, Cyprus, Hungary, Italy, Germany and Finland responded to the survey. About 100 gave an incomplete answer or provided their contact information in order to receive press releases and updates/news about the upcoming training courses of the Level Up consortium. Overall, the results of Hungary, Italy, Germany and Finland were similar to those of Greece, Poland and Cyprus, so it seems that the needs and perspectives of companies are fairly similar in Europe.

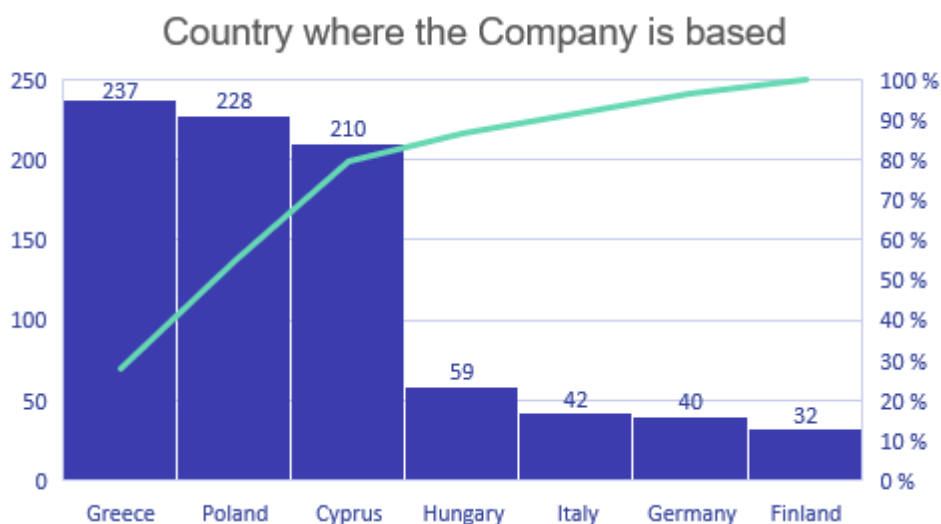


Figure 16 – Survey responses per partner country

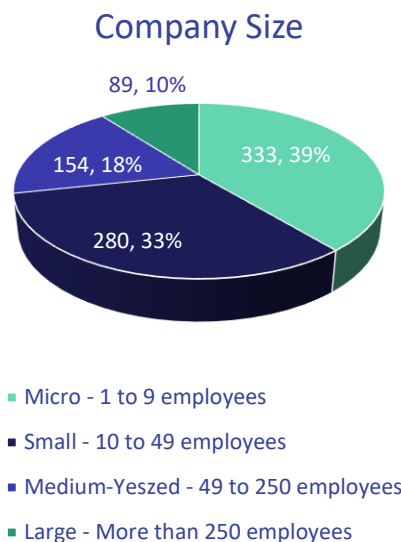
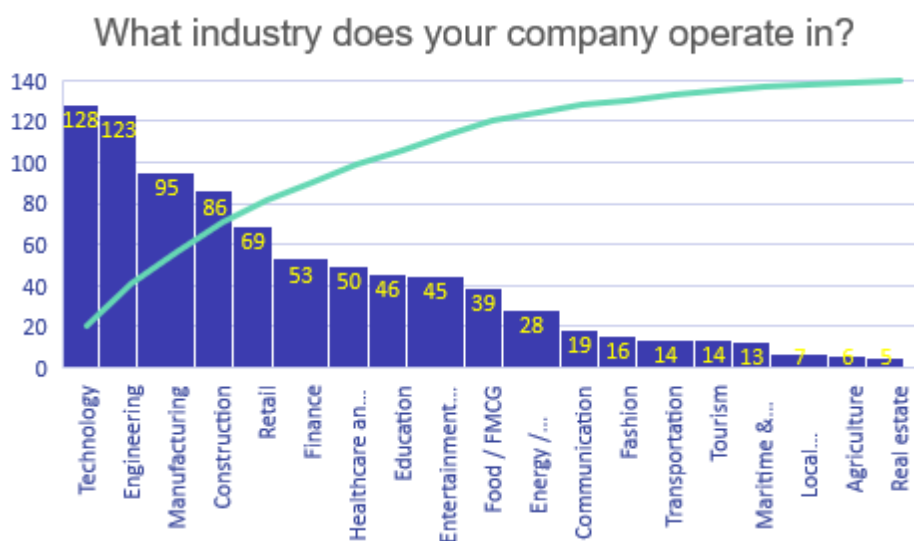


Figure 17 – Company's size

Small to medium-sized businesses are the backbone of Europe's economy, and account for 99% of all businesses in the EU. They are therefore key to the EU's twin ambition to create a sustainable and digital economy.<sup>31</sup>

Micro, small and medium-sized companies represent 90% of all respondents of the survey. Micro and small enterprises are overrepresented in terms of number, number of employees and value added related to EU statistics.<sup>32</sup>



<sup>31</sup> [https://european-union.europa.eu/live-work-study/doing-business-eu\\_en](https://european-union.europa.eu/live-work-study/doing-business-eu_en)

<sup>32</sup> [ec.europa.eu/eurostat](https://ec.europa.eu/eurostat)

Figure 18 – No of Companies per Industry

Technology and Engineering industry manufacturing and construction industry were the most active responders. For digitalisation point of view it is desired result. It is commonly know that those are the leading industries and have a big potential to benefit of digitalization.

There are digital skills gaps in over 50% of the companies. Respondents feel that it is the lack of time and training budget that makes it difficult to acquire new skills. Almost 1/5 of the total number of companies have lack of access to training resources, only 10% feel that cannot find easily qualified trainers.

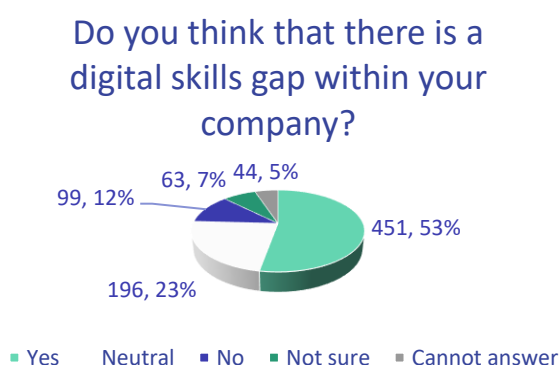


Figure 19 – Digital skills gap within the company

What are the primary barriers to closing the digital skills gap in your company?

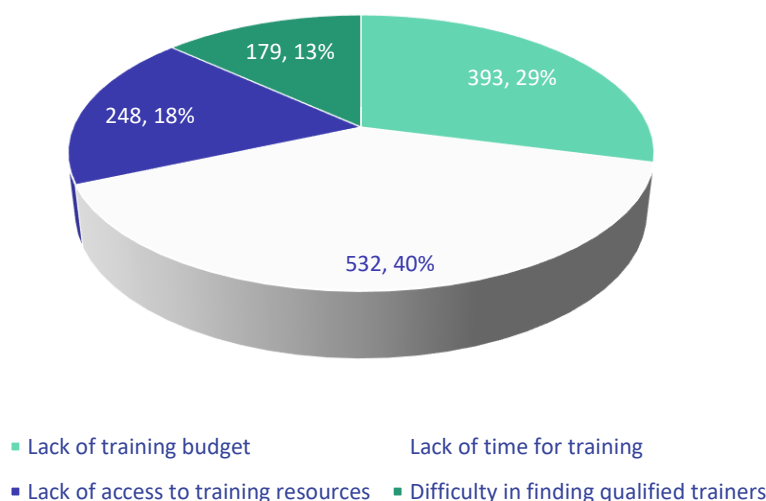


Figure 20 – Barriers for closing digital skills gap

The responses reveal the primary barriers hindering the closing of the digital skills gap within the company. The following are the key obstacles identified and most selected among the respondents:

- Lack of time for training (40%): Employees' busy schedules and heavy workloads leave little room for dedicating time to participate in training programs.
- Lack of budget for training (29%): The company faces financial constraints that hinder allocating resources for employee training and skill development (
- Lack of access to training resources (18%): The company lacks adequate access to training materials, courses, or platforms, limiting employees' opportunities for skill enhancement.
- Difficulty in finding qualified trainers (13%): The company faces challenges in finding skilled and qualified trainers who can effectively deliver digital training programs.

These barriers collectively impact the company's ability to bridge the digital skills gap among its workforces. To address these challenges, the company may need to consider investing in training and development initiatives, ensuring adequate time and resources are allocated for skill enhancement. Additionally, finding suitable trainers and addressing employees' reluctance to change can contribute significantly to narrowing the digital skills gap, leading to improved digital readiness and competitiveness within the company.

## What digital skills are your employees currently lacking?

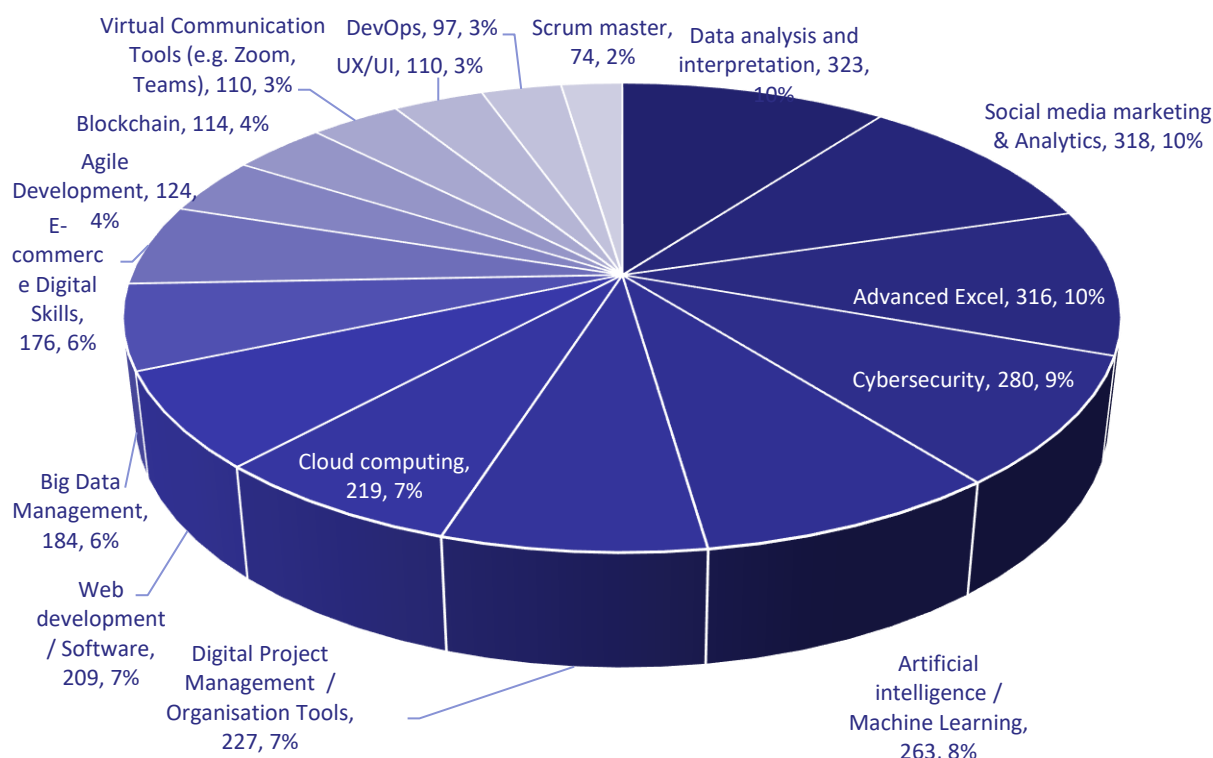


Figure 21 – Lack of Digital skills

The responses on the digital tools were pretty diverse. These digital tools are diverse and cater to different aspects of work, including project management, design, marketing, data analysis, and communication. Organisations should consider providing training and resources for these tools to enhance their employees' digital skills and productivity. Additionally, promoting a culture of continuous learning and skill development can further empower employees to leverage these tools effectively in their role. Some of the key areas in terms of digital skills that were included in the national survey were the following:

- **Data Analysis and Interpretation, Cybersecurity, Social media marketing & Analytics, Big Data Management, UX/UI, Agile Development, Scrum Master, DevOps:** These skills are required in various departments to harness data insights, ensure cybersecurity, drive effective marketing campaigns, implement blockchain technology, manage big data, enhance user experience, and adopt agile development methodologies. Blockchain knowledge is essential for departments exploring blockchain solutions for various applications.
- **Project Management Tools:** Competence in utilizing digital tools for project management and organization is essential across different departments to optimize project workflows.
- **Advanced Excel, Virtual Communication Tools (e.g., Zoom, Teams):** Proficiency in advanced Excel functions and virtual communication tools is vital for data analysis and effective team communication.
- **Web/Software Development, Digital Marketing, E-commerce Skills:** Departments like web/software development, digital marketing, and e-commerce require employees with expertise in website and software development, digital marketing strategies, and e-commerce practices.

- **Cloud Computing:** Cloud computing skills are in demand to efficiently manage and utilize cloud-based resources.
- **Artificial Intelligence/Machine Learning (AI/ML):** Departments seeking to implement AI and ML technologies need employees with expertise in these areas.
- **Blockchain:** Blockchain knowledge is essential for departments exploring blockchain solutions for various applications.

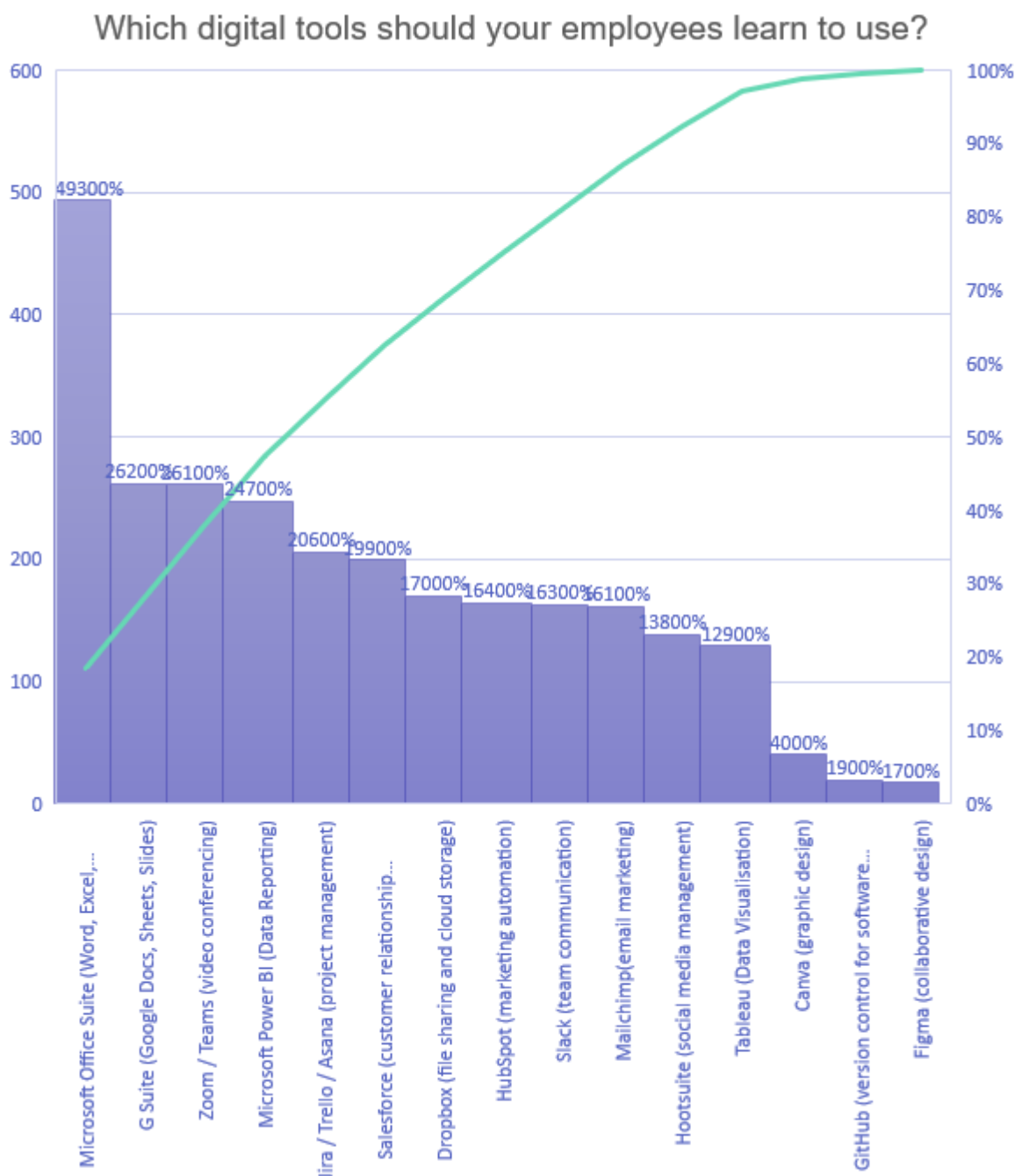


Figure 22 – Popular Digital tools as per SME employers

The most popular digital tools among employers and managers for their employees were Microsoft Office Suite (493), G-suite (262), Zoom/Teams (261), Microsoft Power BI (247) and Jira / Trello / Asana (296), as per Figure 22.

Figure 23 shows that it is important for SME employees to master a wide range of digital tools to perform their tasks effectively. Microsoft Office Suite and Gsuite are popular office suites that provide versatile tools for creating documents, spreadsheets, and presentations. Zoom and Teams are popular video conferencing software that enable remote work and remote meetings. Microsoft Power BI is a powerful data visualization and analysis tool that helps companies better understand their business. Jira, Trello, and Asana are popular project management software that helps companies manage their projects effectively.

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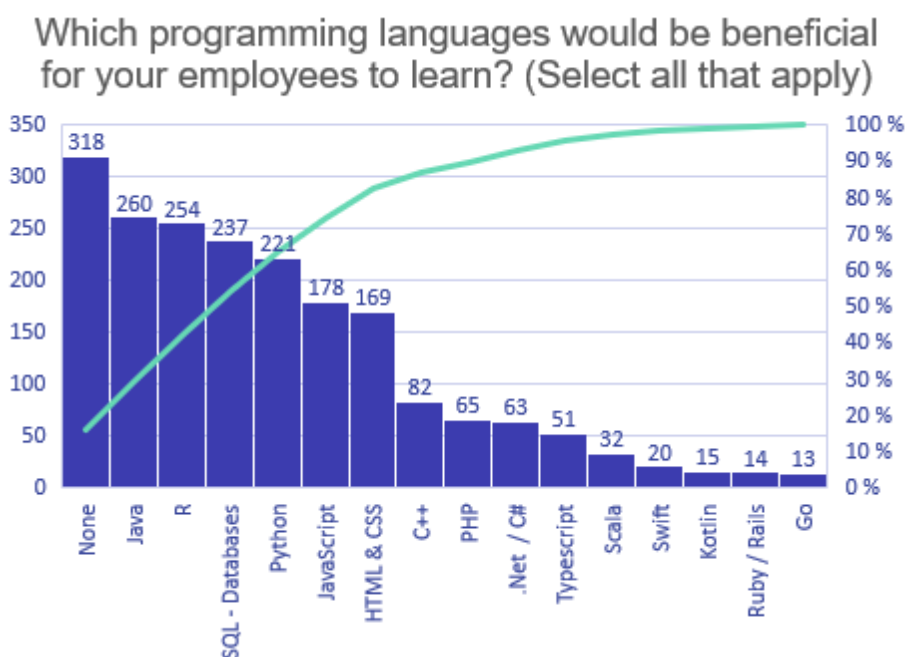


Figure 23 – Desired Programming languages

According to the survey, Java emerged as the most important programming language followed by R, SQL, Python, JavaScript, HTML & CSS.

### How frequently do you plan to provide ICT (Information and Communications technology ) upskilling training for your employees?

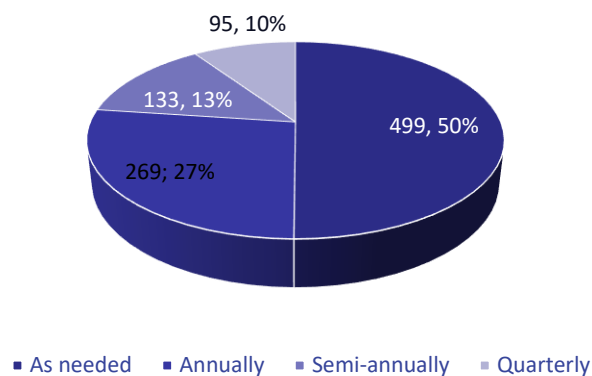


Figure 24 – Frequency of Employees training

The majority of respondents (50%) indicated that ICT trainings are offered “As Needed” (499) while others reported that trainings are conducted on an annual basis (269 or 27%), semi-annually (133 or 13%) and quarterly (95 or 10%).

### What methods of digital skills training do you find most effective?

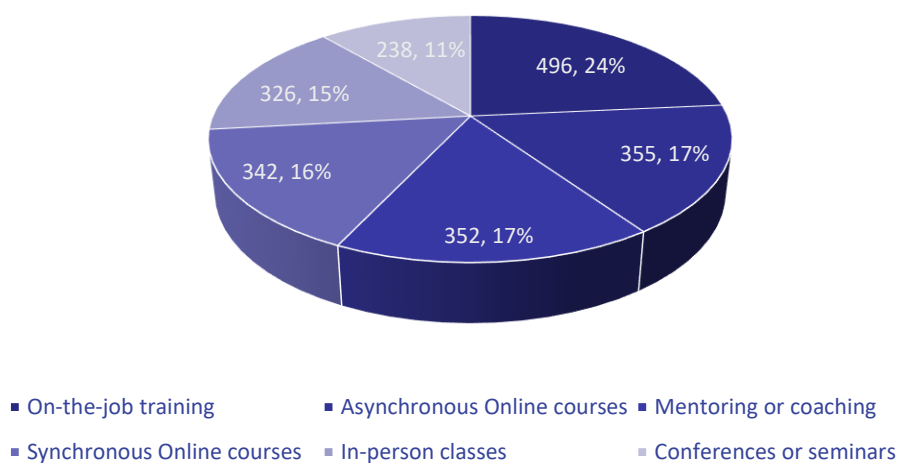


Figure 25 – Preferred training methods

According to the National reports it is clear that on-the-job training method is preferred. There are also many who want to have mentoring, synchronous or asynchronous online courses, while conferences and seminars are not quite popular.



## Conclusions from large-scale survey

In total 848 people responded to the survey from Greece, Poland and Cyprus, Hungary, Italy, Germany and Finland and most of them work in the technology and engineering industry, as well as the manufacturing and construction industry.

Small and medium-sized businesses are the backbone of Europe's economy and account for 99% of all businesses in the EU. Micro, small and medium-sized companies represent 90% of all respondents to the survey. Over 50% of companies reported a lack of digital skills. Respondents felt that the lack of time and training budget made are the most crucial barriers for acquiring new skills.

**As per the large-scale online survey the most desired digital skills are:**

- ✓ **data analysis and interpretation**
- ✓ **cybersecurity**
- ✓ **social media marketing and analytics**
- ✓ **blockchain technology**
- ✓ **big data management**
- ✓ **user experience enhancement and**
- ✓ **agile development methodologies.**

The most popular digital tools among employers and managers for their employees were Microsoft Office Suite (493), G-Suite (262), Zoom/Teams (261), Microsoft Power BI (247) and Jira/Trello/Asana (296). Also the project management tools are essential across different departments to ensure the smooth running of projects. These results show that it is important for SME employees to master a wide range of digital tools to perform their tasks effectively.

Java emerged as the most important programming language in the survey, followed by R, SQL, Python, JavaScript, HTML & CSS. The majority of respondents indicated that ICT training is offered "as needed" (499), while others reported that training is conducted on an annual basis (269), semi-annually (133) and quarterly (95).

Finally as per the national reports, on-the-job training would be the most preferred type of course attendance. There are also many who want mentoring, synchronous or asynchronous online courses while conferences and seminars are not very popular.

## Focus Groups

This section summarises the primary findings from focus group interviews performed in Cyprus, Finland, Germany, Greece and Italy, to identify and categorise the most significant advanced digital skills required in the labor market. The focus groups were implemented only in the countries that are categorized as training providers therefore Poland and Hungary did not have to implement focus groups. Two focus group interviews were conducted per country, one for SME managers/leaders and another for employees. A focus group with job seekers was also held by the European University Cyprus to acquire insight into their thoughts on essential digital skills for university graduates.

The primary objective of these focus groups was to better understand current demand and trends for advanced digital skills, as well as to identify any gaps that needed to be filled. This examination is broken into two main sections.

The first section presents a brief review of each country's national findings, emphasizing the distinctive insights received from SMEs, employees, and job searchers. The second section combines and consolidates the findings from the participating nations to uncover common trends and major variances in the digital skills required by the job market.

### Focus Groups in Cyprus

Cyprus conducted three focus groups, one for employers, one for employees and one for job seekers.

The employer focus group, was conducted on the 8th of June 2023 at the European University Cyprus in a face – to – face mode. The 2-hour focus group included 7 SME employers, owners and senior managers.

In the employer of SME's focus group, participants unanimously acknowledged that the rapid technological progress, accelerated by the Covid-19 pandemic, had significantly affected their businesses. While some were prepared, others had to adapt quickly to the digitalization trend. They noted the constant need to stay updated with software/system changes, requiring specialized knowledge and expertise.

In terms of crucial digital skills, participants mentioned data analytics, logistics, virtual reality, proficiency in specific software such as CRM and Microsoft 365, cybersecurity, gamification in training, programming (Python / Java), digital marketing, artificial intelligence, and digital logistics. They saw these skills as pivotal in the current digital age and rated the role of digital skills as '5' (Very Important) for their organizational development.

However, there were significant challenges related to personnel training. The lack of time was a primary concern, with employers often resorting to online courses that are shorter and more to the point. The high employee turnover rate, especially among younger employees, also discouraged investment in training, with government subsidies playing a significant role in their decisions. Concerns were also raised regarding the quality of training and the need for it to be industry-specific.

The participants suggested solutions like offering customized training, certification/accreditation of courses, industry-specific advertising, workshops rather than theory-based seminars, and introducing webinars with C-level executives. They also mentioned the value of integrating training with consultation services or offering a free service related to the trainer's expertise.

A focus group with SME employees was also led by representatives from GrantXpert Consulting. The focus group was conducted on the 8th of June 2023 at the European University Cyprus in a face – to – face mode. The 2-hour focus group included 10 SME employees.

The discussion explored their experiences with digital skills training and the importance of such skills for their career development. Seven out of ten participants had attended digital skills training in the past 1-2 years, with topics ranging from cybersecurity to business intelligence and social media marketing. However, aside from the customized business intelligence training, the other courses were deemed not useful due to a lack of new knowledge gained.

In terms of important digital skills for career advancement, participants identified cybersecurity, data analytics, video editing, data automation with ERP & CRM systems, basic ICT skills, proficiency in Excel, Word, and Canvas, and tools for creating social media marketing content and evaluating employees' digital skills level.

The challenges faced in learning these new digital skills included poorly structured courses and training material not correlating with the trainees' level. However, participants agreed that the acquisition of these digital skills - notably in cybersecurity, e-commerce, ERP, and Excel - has improved their performance and efficiency, and will significantly enhance their career advancement over the next 18-36 months.

SMEs were advised to better support their employees by identifying specific digital skill needs per department, organizing face-to-face customized training during working hours, conducting ongoing evaluations of employees' digital skill needs, and integrating continuous learning into the company culture and strategic planning. They also stressed the importance of employers establishing trust with their employees regarding the recognition of their digital skills needs.

For attracting and retaining employees with strong digital skills, participants suggested SMEs offer competitive salaries or performance-based rewards, flexible work schedules, and workplaces. The barriers to developing digital skills in the workplace were identified as a lack of training time during work hours, insufficient training budget, inadequate evaluation of employees' digital skills, a lack of training planning, absence of internal trainers, and a lack of continuous learning culture.

Lastly, the third implemented focus group, the one for job seekers. The focus group was conducted on the 9th of June 2023 in an online mode. The 2-hour focus group included 6 EUC alumni.

The last focus group provided highlights the current state of digital skills training and development among a group of attendees. Key digital skills identified for career development include Data Visualization, Data Analytics, Computational Genomics, Artificial Intelligence, and Cloud and Software Programming. Resources like code hosting platforms (e.g., GitHub) are found helpful, and no specific challenges were mentioned in learning new skills. The attendees believe that digital skills will positively impact career

opportunities and efficiency in the next 18-36 months. They also emphasized the role of SMEs in supporting digital skill development through access to online platforms, practical training, and financial support. Barriers to developing digital skills in the workplace were identified as lack of time, budget, access to training resources, qualified trainers, and resistance to change in the use of new digital tools.

## Focus Groups in Finland

The two focus group interviews were conducted in Finland, focusing on the role and importance of digital skills in small businesses and the perspectives of employees/students on digital skills and education.

The first focus group represents small business owners in various industries such as Food, Healthcare, Manufacturing, ICT, and sports. The SME Owners focus group was held on July 4th, 2023, in a face to face meeting and 6 CEO's participated in the focus group.

They acknowledged the significance of digitalization for small businesses' growth. Finnish company ecosystems play a crucial role in facilitating growth and research and development activities for small businesses, but being a part of these ecosystems requires digital skills. Participants started acquiring digital understanding even before Covid, but the pandemic accelerated the use of digital tools in their everyday businesses. However, lack of resources, time, and budget, hinder the digitalization process. There is a strong need for effective, independent training that accommodates the specific needs of small companies and allows them to learn at their own pace without simplified tests and reports.

The focus group highlights several essential digital skills for businesses, such as data analytics, e-commerce, online communication tools, and office tools. AI and the need to integrate different solutions and platforms have also gained importance. The Finnish Tax office's digital service platform has positively impacted digitalization progress in participant companies, underscoring the role of the public sector in facilitating digital transformation.

Despite the importance of digital skills, there are gaps in digital competence, and cost-effective training tailored to small companies is lacking. The owners recognize the significance of digital skills for their employees' development but struggle to provide comprehensive training due to time and resource constraints. They express the need for knowledge of best practices, outsourcing opportunities, and effective data utilization in their businesses.

The second focus group consisted of employees aged 20-30 who were also completing their studies. The focus group was held on May 9th, 2023 in a face-to-face meeting and there were 8 participants, 3 employees and 5 working students.

They stressed the importance of various digital skills, including data analytics, artificial intelligence, cloud services, cyber security, 3D printing, IoT, systems understanding, and digital equality. Digital skills are crucial for career growth, especially in managerial positions. However, students noted that the university lacks proper training on using digital tools, impacting their capabilities. They feel that practical work and courses taught by experienced professionals are most helpful in preparing for the workforce.

The participants also discussed how companies can support the development of digital skills through face-to-face training and qualified trainers during internships. SMEs can attract and retain employees with

strong digital skills by valuing and supporting their development. Digital competence opens up diverse work opportunities and is a competitive factor in the job market.

## Focus Groups in Germany

The SMEs Managers and Leaders Focus Group of Germany, comprised five business owners or managers from IT, Finance, Retail, and Food sectors. It was held online and it took place on the 26th of June 2023. During the focus group, participants emphasized the importance of embracing new digital technologies to enhance efficiency and competitiveness. The level of technology adoption often depends on factors such as company size and industry, with smaller companies usually being more cautious and waiting for technology to gain industry approval. Nonetheless, all participants recognized the significance of digital skills among their employees for reasons like efficiency, competitiveness, and adaptability.

Given the constantly shifting digital landscape, the focus group emphasized the importance of continuous learning and upskilling to remain adaptable and competitive. Artificial Intelligence & Machine Learning, Big Data & Analytics, Basic Software Tools (e.g., Microsoft Excel, Slack), and Cybersecurity were identified as critical areas of importance.

Challenges among their staff were noted as fear of change and time constraints. Employees were more likely to participate in training if they saw direct benefits, and incentives and rewards for completing training successfully were considered crucial. Participants suggested that government initiatives should encourage employees to enhance their digital skills, and there should be subsidies for training budgets to alleviate the training time burden on employers.

The Employee Focus Group included five young professionals from IT & Finance sectors. It was held online and it took place on the 29th of June 2023. They expressed positive experiences with training courses, preferring blended learning structures that combine in-person and online components. Participants recognized the need to continuously acquire and adapt to digital skills as technology reshapes the workplace. Key digital skill training topics were identified as Basic Digital Literacy, Digital Communication/Collaboration Skills, Data Analysis, Programming & Coding, and Digital Marketing. The participants faced challenges in finding time for training due to their busy work schedules. Other constraints mentioned included inadequate learning resources, lack of company support, and training costs. To foster a supportive learning environment, employees suggested creating a culture that encourages learning.

All participants acknowledged the importance of digital skills for personal career development and staying relevant in the job market. They expressed concern about international competitors who might have more experience in technology-driven work environments. Employers were encouraged to set an example by embracing technology-driven practices to support their employees' adaptation to new technologies.

## Focus Groups in Greece

Greece facilitated focus groups for employees and employers as well.

The Employers focus group was held on May 29th, 2023 at 2.00 p.m. The total of 13 participants operated in the Food, Healthcare and Life Sciences, Manufacturing, ICT, Finance, and Tourism industries. The focus group lasted one hour and thirty minutes and was conducted online using the Microsoft Teams Platform, and all the participants completed an online consent form.

The employer focus group shed light on the most in-demand digital skills for companies, as well as the shortages they face and the importance of digital skills for future competitiveness. Participants unanimously agreed on the significance of in-house knowledge and the need for dedicated in-house IT departments. Programming skills in various languages and frameworks were highlighted as vital for developing and maintaining software applications, websites, and digital solutions. Working with cloud platforms and services was also identified as a critical skill.

Artificial Intelligence and Machine Learning skills were deemed highly valuable for leveraging data-driven insights and automating processes. However, there was a shortage of educated employees in these areas, leading to the potential for AI to cover vacant positions.

Regarding future competitiveness, all participants acknowledged the importance of digital skills for their businesses. Specific shortages in DevOps practices, bridging the gap between technology and business strategies, and cybersecurity professionals were identified. The scarcity of expertise in data privacy and security, automation technologies, and data management and analysis was also a significant concern.

Continuous learning and skill development were recognized as essential to adapt to evolving technologies effectively. The focus group highlighted the value of on-the-job trainings when implementing new technologies to provide hands-on experience and practical knowledge.

The Employees Focus Group in Greece comprised of 4 participants from the ICT and Manufacturing industries. The Employee's focus group was held on May 30th at 2.00 p.m. The focus group lasted one hour and was conducted online using the Microsoft Teams Platform.

All employees had undergone digital skills training, either provided by their company or self-funded. For their career development, they emphasized data reporting, python, and cybersecurity as essential skills. Data visualization techniques, advanced Excel reporting, and data-driven decision-making processes were seen as crucial.

Python's versatility and widespread use across various domains, including data analysis and machine learning, were recognized as valuable for productivity and innovative solutions. Cybersecurity skills were seen as increasingly important in today's digital landscape, given the constant evolution of cybersecurity threats.

AI applications were seen as promising and likely to change workloads in the near future, making everyday tasks more manageable.

To support employees in developing digital skills, companies were encouraged to offer economic incentives, challenging projects, and opportunities for continuous learning. Rewards for skill development, challenging assignments, and a culture of ongoing learning were identified as key factors

to enhance digital skills. However, barriers such as employers not recognizing the need for growth, time constraints, and limited training funds were also noted.

## Focus Groups in Italy

The focus groups that were implemented in Italy, were carried out online. Given the difficulty of reaching people, both focus groups were conducted with two participants at a time. All sessions took place on three separate days.

The SMEs Managers and Leaders Focus Group revealed that digital skills are of utmost importance within the organization. The owners expressed a strong ambition to stay competitive through continuous access to new digital competencies. They predicted the growing importance of digital skills, especially with the prevalence of Generation Z, and acknowledged the critical role these skills play in their organization's future growth. Cloud computing and programming software were identified as crucial for success in the current business landscape. While the organization had a strong digital infrastructure, they identified potential gaps in graphic design skills.

The employees demonstrated a willingness to embrace digital tools and policies, and the organization had invested in digital skills training even before the pandemic, with annual update courses. The SME owner expressed confidence in their organization's high level of digital competencies compared to competitors. For future hires, they desired candidates with competencies in cloud computing and management systems, emphasizing digital skills during recruitment.

In the Employees Focus Group, the 6 participants highlighted the importance of data reporting, Python, and cybersecurity for their career development. They recognized the need for diverse examples in video training and the potential impact of AI applications on their workload. Participants stressed the significance of economic incentives, challenging projects, and a culture of continuous learning for employee support in developing digital skills. Challenges included finding candidates proficient in Microsoft Office, marketing, social media, cybersecurity, and cloud computing.

The focus group revealed the organization's proactive approach to digital skills development and its commitment to aligning skills with strategic objectives. Strategies for ensuring relevant and engaging digital skills training were not explicitly mentioned. Long-term support and development were intended through partnerships with external organizations and experts, although specific details were not provided.

The Employees Focus Group shed light on diverse experiences with digital training and the importance of Excel, cloud storage tools, and AI for career development. Participants preferred resources like United Nations manuals, online tutorials, and smaller-sized courses. Challenges included time constraints, digital illiteracy, and a need for more familiarity with digital skills. Participants anticipated the significant impact of digital skills on career advancement.

To support digital skills development in SMEs, participants suggested hiring external specialists, providing accessible content, offering mentoring programs, and investing in online courses. Attracting and retaining



employees with strong digital skills could be achieved through competitive salaries, recognition, flexibility, and a growth-oriented work environment. Main barriers to digital skills development included lack of resources and time, cultural resistance, budget constraints, and inadequate technical support.

In conclusion, both focus groups emphasized the importance of digital skills for organizational success and employee career development. The SME owner demonstrated a proactive approach to developing digital competencies and aligning skills with strategic goals. Participants in the Employees Focus Group shared their experiences, challenges, and suggestions for enhancing digital skills. For SMEs to thrive in the technology-driven era, they should consider the recommendations made by participants and foster a digitally proficient workforce.

## Conclusions from focus groups

The focus group interviews conducted in Cyprus, Finland, Germany, Greece, and Italy revealed several similarities in the most important digital skills required in the labor market. Here's a summary of the findings:

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### Cyprus

Participants identified ***data analytics, logistics, virtual reality, proficiency in specific software such as CRM and Microsoft 365, cybersecurity, gamification in training, programming (Python / Java), digital marketing, artificial intelligence, and digital logistics*** as crucial digital skills. They rated the role of digital skills as '5' (Very Important) for their organizational development.

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### Finland

The focus group highlighted several essential digital skills for businesses, such as ***data analytics, e-commerce, online communication tools, and office tools***. AI and the need to integrate different solutions and platforms have also gained importance. Employees aged 20-30 stressed the importance of various digital skills, including ***data analytics, artificial intelligence, cloud services, cybersecurity, 3D printing, IoT, systems understanding, and digital equality***.

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### Greece

The focus groups in Greece revealed a strong demand for digital skills, with ***programming, AI, and cybersecurity*** standing out as crucial areas. Continuous learning and support from companies were highlighted as essential for employees to thrive in the rapidly evolving digital landscape. By addressing the identified skill shortages and fostering a culture of digital upskilling, businesses can strengthen their competitiveness and meet the challenges of the digital age head-on.

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### Italy

The SMEs Managers and Leaders Focus Group revealed that digital skills are of utmost importance within the organization. **Cloud computing and programming software** were identified as crucial for success in the current business landscape. Employees highlighted the importance of **data reporting, Python, and cybersecurity** for their career development.

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## Germany

**Artificial Intelligence & Machine Learning, Big Data & Analytics, Basic Software Tools** (e.g., Microsoft Excel, Slack), and Cybersecurity were identified as critical areas of importance. Key digital skill training topics were identified as Basic Digital Literacy, Digital Communication/Collaboration Skills, Data Analysis, Programming & Coding, and Digital Marketing.

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## Similarities and Differences

Despite cultural and economic variations, several common themes emerged from the focus group interviews in the five countries. **Data analytics, artificial intelligence, and cybersecurity were consistently identified as critical digital skills** across all nations. Employers and employees alike acknowledged the growing significance of these competencies to drive innovation, enhance decision-making, and safeguard against cyber threats.

Furthermore, proficiency in specific software tools, such as **CRM and Microsoft 365**, emerged as a shared priority in Cyprus and Italy. These tools are recognized as essential for streamlining business processes and enhancing organizational productivity.

**Digital marketing also featured prominently** in the discussions of all countries, emphasizing the growing importance of online presence and engagement to stay competitive in today's digital-centric marketplace.

While there were similarities, the focus group interviews also revealed unique digital skills needs in each country. For instance, Finland emphasized the importance of **e-commerce and online communication tools**, reflecting the country's progressive approach to digitalization in business operations.

Greece placed significant emphasis on **big data analytics**, underscoring the country's recognition of the power of data-driven insights for informed decision-making and business growth.

In Germany, **cloud computing** was identified as a crucial skill, illustrating the nation's focus on leveraging cloud technologies to improve efficiency and scalability.

Italy highlighted the value of **programming software and data reporting**, showcasing the country's emphasis on harnessing data for strategic planning and competitive advantage.

In summary, the most important digital skills that emerged from the results of each country's focus group include **data analytics, artificial intelligence, cybersecurity, programming (Python/Java), digital marketing, and proficiency in specific software such as CRM and Microsoft 365**. It's also worth noting that all countries emphasized the importance of continuous learning and upskilling to stay competitive in the market.



## Roundtable discussions with governmental officials and policy makers

5 roundtables were implemented, one in each partner country of training providers (Cyprus, Greece, Germany, Finland, Italy) involving representatives from governmental authorities and policy makers.

The aim of those roundtables is to establish a dialogue between training providers (the consortium) and policy makers and local authorities and explore ways in which governmental authorities can support initiatives, such as the Level Up, in enhancing the advanced digital skills of the labour market.

Efforts of policy makers implemented along the same lines will be discussed and ways to join forces so as to maximize impact, e.g., integrating and promoting the Level Up courses in the e-learning platforms with courses in digital skills, coordinated by governmental authorities.

In this chapter the results from the roundtable discussion are summarized as per the partners national reports.

### Roundtable in Cyprus

The roundtable discussion with 17 government representative and policymakers was held in person on the 13<sup>th</sup> of June 2023, at Bottega Amaro in Nicosia, Cyprus. The roundtable discussion was organised by GrantXpert Consulting Ltd, the European University Cyprus, the Cyprus Information Technologies Enterprises Association (CITEA) & the Nicosia Chamber of Commerce and Industry (NCCI). The duration of the meeting was three hours.

Roundtable discussion brought up many key points for Level Up project to focus and implement as they are in the table below.

Question	Key Points
<b>1. Benefits of the project</b>	Filling the gap between current and required digital skills, addressing the need for 350,000 cybersecurity experts in Europe, addressing mismatching of skills in the EU and Cyprus, reducing the cost of bringing labor force from 3rd countries, encouraging women to choose ICT professions
<b>2. Fit with national policies</b>	Various national programs and surveys are running in Cyprus for supporting and promoting SMEs' digital development, but they focus more on general ICT skills rather than specific knowledge areas
Examples of active national programs	National training programs under the European Year of skills for 100,000 participants, National programs for over 55 years old people from low socioeconomic areas for basic ICT skills, Graduate Tracking program, Euro Tracking program, National Survey for employees
Collaboration with Level Up	Inclusion in the e-Gnosis platform of Cyprus Productivity Centre, use of Level Up consortium training providers in national programs, provision of results to Level Up for developing training programs that fill in the gaps in digital skills of SMEs in Cyprus, provision of material for the Digital Competences (DigComp 2.2) under the e-platform of CEF - CONNECTING EUROPE FACILITY
<b>3. Suggestions for future courses</b>	Develop training programs in high demand areas such as Cybersecurity, AI, Data Analytics and cloud, and provide them to SMEs with a fee
<b>4. Additions to meet project target</b>	Raise awareness of the value of digital skills among SMEs in Cyprus, make Level Up programs practical, customized, and cover different levels of the same knowledge area
<b>5. Initiatives/actions for long term impact</b>	Update and modernize the educational framework of Cyprus, change the legal framework in Cyprus University of Technology to allow short courses, develop digital skills in specialized subjects like Cloud, cybersecurity, AI, Data analytics as a vital component of Cypriot national programs for SMEs' digital transformation, provide executive courses to businesses/companies for digital transformation, include 'Innovation, digitization and technological upgrading of industry' in the Industrial Policy 2019-2030
<b>6. National/regional platforms for Level Up courses</b>	e-Gnosis platform of Cyprus Productivity Centre, Digital Competences (DigComp 2.2) under the e-platform of CEF - CONNECTING EUROPE FACILITY, potential extension of the national program for digital transformation

Table 8 – Roundtable discussion outcomes in Cyprus

## Conclusion

There is a lack of national training programmes for upskilling and reskilling in digital skills, and Level Up can fill in this gap by providing tailored and practical training programmes in specific subject areas such as cloud, cybersecurity, AI, and data analytics. Level Up can be incorporated into national programmes such as the e-Gnosis platform of the Cyprus Productivity Centre and the Connecting Europe Facility. Raising awareness of the value of digital skills in SMEs is considered a key element for the viability of the Level Up project.

## Roundtable in Finland

The roundtable discussion was held on June 30th, 2023 at University Consortium of Pori, and it lasted one and half hour. The four participants who joined the discussion represent positions and areas that have the leading roles of digital transformation in Finland such as Ministry of Environment/ built environment (building, land use, permits for industry), Business Finland as leading governmental body for funding and from Dimecc Oy a large public-private-partnership organisation of manufacturing enterprises.

In the discussion participants agreed that the objectives of the Level Up - project support national policies. Business Finland is open for cooperation with Level Up project. It could have a role in activating SMEs to ecosystems that Business Finland has chosen through evaluation process. To align future courses with the governmental/policy perspective on digital transformation, roundtable participants suggested to allocate

resources for acquiring digital skills and raise awareness among CEOs about the importance of digitalization in business.

During the discussion, it was highlighted that the following aspects need to be taken into account in the long-term future:

- Understanding the potential of generative AI in leveraging large volumes of data and increasing productivity.
- Promoting data value trading by acquiring and sharing data effectively.
- Integration of digital twin and augmented reality technologies into the construction value chain, replacing traditional tools and transforming building supervision methods from new construction to renovation.

These points emerged as critical considerations for future planning and implementation in order to stay at the forefront of advancements in the industry.

### Conclusion

According to governmental officials the objectives of Level-UP support national policies. Level Up - Project could have a role in activating SMEs to ecosystems chosen by Business Finland.

Suggestions for future courses: Guide information and training on the use of digital skills to corporate management in order to allocate resources to acquiring digital skills. The focus of the courses should be on innovation and development of digital solutions and their integration into the company's business. Special attention must be paid to skills and development related to data sharing. Other key topics include augmented reality, XR, digital twin, etc. Training and updates to (adult) additional education, which should be built from the perspective of digitalisation, not alongside digitalisation, should be organised regardless of time and place.

Project additions: Level Up could identify business ecosystems where data is a commodity. Promoting understanding of the potential of generative AI for leveraging large amounts of data would increase productivity. Level Up project could join the ecosystems which are exploring the use of the digital twin and augmented reality for example in construction value chains. The aim is to showcase practical digital solutions for digital transformation.

## **Roundtable in Greece**

The roundtable online meeting was held on the 15<sup>th</sup> of June for 1.5 hour. The seven participants represented Greek governmental service organizations for enterprises such as Chambers of commerces, Association of Informatics and Communications of Greece and Hellenic Federation of Enterprises.

According to the roundtable with Greek governmental officials and policy makers, the key challenges faced by Greek businesses in the technology sector are the employee shortage and difficulty in finding workers with the required technical knowledge and competence. There is also a significant brain drain as educated individuals leave Greece in search of better prospects overseas.

To address these challenges, there is a need for extensive education and training programs to provide people with the necessary skills for the technology sector, as well as investment in reskilling and upskilling staff. Collaboration between the government, businesses, and educational institutions was emphasized as important to promote innovation and support initiatives for digital transformation. Essential digital skills identified by the focus group include cloud computing and AI data analytics.

According to the roundtable, key skills that are required include proficiency in Structured Query Language (SQL) for efficient database management and manipulation, cybersecurity expertise to safeguard digital assets and reduce risks, and website construction and administration expertise to create an online presence and interact with clients in the digital sphere. The roundtable participants emphasized the importance of practical skills for university students and recommended making internships mandatory to provide students with hands-on experience.

The focus group also suggested making short, reasonably priced courses available. It was determined that 50% of Greek businesses needed to modernize their digital presence to fulfill customer expectations. Investing in employee upskilling and reskilling was advised, as well as encouraging cooperation between the government, industry, and educational institutions and recognizing the value of credentials.

### Conclusion

According to the roundtable with Greek government representatives and policy makers, the main challenges faced by Greek IT companies in the digital transformation of their workforces are obtaining talented personnel and the phenomenon of brain drain. To address these challenges, the importance of thorough education and training programs was emphasized.

Based on the research activities conducted in Greece several key areas have been identified that require attention when designing Level Up trainings. These areas include Cloud computing, AI data analytics, proficiency in structured query language (SQL), cybersecurity expertise, website development and management skills, and proficiency in big data analysis. By focusing on the development of these advanced digital skills, the Level Up project can effectively address the evolving needs of the Greek workforce and equip individuals with the expertise necessary for success in the digital age. It was determined that 50% of Greek businesses needed to modernize their digital presence to fulfill customer expectations.

## Roundtable in Germany

StackFuel GmbH, project's partner from Germany, was not able to gather the necessary political parties to conduct a roundtable interview. Due to the busy schedules and the summer holiday season, it was not possible to find a synchronized time for the parties to come together. However, during the planning of the roundtable Stackfuel contacted the following bodies and at least were able to collect some impressions on the topic:

- Industrie und Handelskammern (Chamber of Commerce)
- Federal Ministry of Education and Research
- Innovationszentren (Centres of Innovations)
- Bildungswerk Bayerischen Wirtschaft & Bildungswerk Baden-Württemberg.



The discussions with the individual parties shared their interest for future collaboration with Level Up project. Furthermore, StackFuel GmbH hope to conduct a roundtable discussion after summer break, to get more relevant insights and support by the governmental authorities.

## Roundtable in Italy

Centro Sviluppo Creativo Danilo Dolci “CSC”, the Italian project partner, was unable to secure political decision-makers’ availability. CSC made multiple attempts to contact the following organizations through email and phone:

- Ministry of Made in Italy
- Regional Government of Sicily; Department of Labor Policies and Digitalization,
- Municipal Administration, specifically the Office of Digital Innovation,

We also reached out to National representative organizations of small and medium-sized enterprises, such as Confcommercio (<https://www.confcommercio.it/>), Confartigianato (<https://www.confartigianato.it/>), and Sicindustria (<https://www.sicindustria.eu/>).

Given the summer months, the holidays, and the amount of work the organizations had already planned at that time, the full involvement of the decision-makers was really difficult to achieve. However, they are interested in the initiative of the project and that they could be available for this type of meeting with CSC in the months to come.

## Conclusions from roundtable discussions

One of tasks of the Level Up project was to produce a roundtable discussion in five countries. Due to the circumstances, this report includes the results of the discussions between three countries Cyprus, Greece and Finland as in Italy and in Germany the roundtable discussions were not able to be carried out.

### Summary of the Courses

There are a lot of common needs even though the level of digitalization of the countries differs. Finland has been a frontrunner in digitalization but in national level strategy still focuses to the same basic topics as in those countries where digitalization is not as widespread issue. The national level experts suggest paying attention to **Cloud computing, AI, Data analytics, proficiency in structured query language (SQL), cybersecurity expertise, website development and management skills, and proficiency in big data analysis**. Level Up can support that by providing tailored and practical training programmes.

### Summary of Differences

Although most needs are commonly identified, there are some differences. Raising awareness of the value of digital skills in SMEs is considered a key element for the viability of the Level Up project, but in Finland digital skills are more related to business expertise and solution than in Greek and Cyprus where the needs are noticed more from personal skills point of view. Another difference is that in Finland the aim is to showcase practical digital solutions for digital transformation for ecosystems and to business value chain than in many other countries in which the enterprises and their employees are the main target.

The end result and the goal, i.e. raising the level of the employee's digital competence, are the same, but in Finland the ecosystems of companies are activated to carry out collaborative work, for the benefit of personnel, whereas the usual model in Europe focuses to the direct investment of the company's personnel.

Finally, the roundtable discussions raised a common concern about the availability of skilled labour and the availability of up-to-date training that can be offered in multiple modes. In Greece, the outflow of digital talent is causing challenges to SMEs in the same way as in Cyprus. In addition to that, the changes in operating methods in enterprises are rapid and new digital skills are needed in an agile manner. In Finland, digitalization of the ecosystems of the companies is the direction that the governmental authorities and policy-makers support.

## Overall Conclusions

### Purpose of the Consolidated Report

The consolidated report is derived from national reports from partner countries and will be used to co-design and implement popular training topics to help digitalize the workforce in several European countries. The goal is to upskill and/or reskill at least 15,000 citizens in Italy, Cyprus, Greece, Poland, Hungary, Germany, and Finland. The report includes data from desk research, large-scale national surveys, focus groups, and roundtable discussions with governmental authorities and policymakers.

### European Content and Challenges

Europe faces a growing labour shortage, with challenges in finding skilled personnel in the digital domain. The Digital Economy and Society Index (DESI) reported that only 46% of the EU population can perform basic digital tasks. The Commission has identified the need for lifelong learning and has introduced comprehensive plans to address this challenge.

The Level Up project has laid a robust foundation for achieving digital transformation across European SMEs. By focusing on emerging digital skills, the project aims to bridge the gap between current workforce capabilities and the rapidly evolving digital landscape.

The emphasis on lifelong learning and continuous skill development ensures that individuals are not only equipped for current roles but are also prepared for future changes in the job market. The personalized learning paths and industry partnerships further align the training with real-world demands.

By making skills development accessible to all individuals, the project contributes to social inclusion and equality. The upskilling and reskilling of thousands of citizens have the potential to fuel economic growth by promoting innovation, entrepreneurship, and productivity.

The collaboration with governmental authorities, policymakers, and industry experts ensures that the project's objectives are aligned with national and European strategies. The roundtable discussions and focus groups provide valuable insights into the needs and priorities of the market. While the project has made significant strides, the ongoing labour shortage and the need for basic digital skills among the EU population present challenges that require concerted efforts. The success of the Level Up project sets a precedent for future initiatives, emphasizing the importance of adaptability, collaboration, and a focus on real-world applicability.

In conclusion, the Level Up project represents a vital step towards empowering the European workforce with advanced digital skills. Its comprehensive approach, alignment with European strategies, and focus on real-world applicability make it a model for future initiatives in the field of digital education and skill development.

## ADDENDUM 1: Updates on Roundtable Discussions (Germany and Italy)

This addendum has been prepared in response to the comments from the European Commission during the interim review. It provides updated information regarding the completion of the roundtable discussions in Germany and Italy, ensuring full coverage of Task 3.2 as originally foreseen in WP3. These additional consultations enrich and validate the consortium's understanding of SME digital skills needs and reinforce the evidence base used for WP4 and WP5.

### Roundtable in Germany

The German roundtable discussion, organised by StackFuel GmbH, took place on **12 June 2025** with representatives from the **Berlin Senate Department for Economic Affairs, Energy and Public Enterprises** and the **Wirtschaftsförderung Land Brandenburg GmbH (WFBB)**.

Participants confirmed that the thematic areas addressed by the Level Up project are highly relevant to current regional and national priorities. SMEs in Germany—particularly micro and small firms—struggle with the organisational and workflow changes associated with rapid digitalisation. Stakeholders stressed that training must not only address the technical use of tools but also support structural and cultural adaptation within companies.

The Level Up survey findings were considered valuable input for ongoing policy formulation, particularly within initiatives such as “Digitalagentur Berlin” and “Zukunftszentren.”

#### Training Recommendations:

- Strategic implementation of AI and digital tools in SMEs
- Change management and cultural adaptation to digital working environments
- Understanding risks, boundaries, and process-optimising capabilities of AI tools

### Roundtable in Italy

The Italian roundtable, coordinated by Centro Sviluppo Creativo Danilo Dolci (CSC), took place on **19 November 2024**. Participants included the **Innovation & Digital Promoter from the Chamber of Commerce of Turin**, the **Head of InformaGiovani**, the **President of the Federation of Small and Medium Enterprises (FPMI)**, and representatives from the third sector (CESIE ETS).

Discussions highlighted a persistent gap between national initiatives (Industry 4.0, New Skills Fund) and the real accessibility of these programmes for smaller, less-structured enterprises—particularly in Southern Italy. Bureaucracy, limited awareness, and insufficient guidance remain structural barriers.

#### Training Recommendations:

- **Foundational level:** short, hands-on courses in online branding, social media, basic digital literacy and essential online tools, ensuring no business is left behind.
- **Advanced level:** AI, data analytics, and e-commerce skills for more digitally mature SMEs seeking competitiveness and market expansion.

## ADDENDUM 2: Updated Consolidated Conclusions

The five completed roundtable discussions in **Cyprus, Finland, Greece, Germany, and Italy** confirm a strong European alignment in the digital capacity areas SMEs need most urgently. Across all countries, policymakers converged on a clear set of priorities: **cloud computing, AI (including generative AI), data analytics and big data, cybersecurity, SQL/database management, change management, and strategic digital adoption**. These topics directly informed the refinement of the Level Up training portfolio implemented under WP4 and WP5.

### Summary of the Courses

Across all roundtables, policymakers repeatedly emphasised the need for practical, flexible, and industry-aligned training that responds to both current and emerging digital demands. The core priorities identified consistently were:

- ✓ **Cloud computing** and migration strategies
- ✓ **Artificial intelligence**, including generative AI applications for SMEs
- ✓ **Data analytics**, big data, and SQL/database management
- ✓ **Cybersecurity** and data protection
- ✓ **Change management** in digital environments
- ✓ **Strategic adoption of digital tools**, not only technical usage

Country-specific priorities also emerged:

- **Greece & Italy:** website development, online presence, e-commerce, digital branding
- **Finland & Germany:** augmented reality/XR, digital twins, data-sharing models, and ecosystem-level innovation

Policymakers stressed that training should be:

- short and practical
- affordable or free
- available in multiple formats (online, blended, in-person)
- measurable and accompanied by recognised certification

### Summary of Differences

While priority skills show strong convergence across all countries, the depth and context of needs differ according to each country's digital maturity and economic structure.

**Northern/Central digital ecosystems (Finland, Germany):**

- Focus on ecosystem activation rather than individual training
- Emphasis on leadership-level understanding of digital transformation
- Interest in advanced, cutting-edge topics such as generative AI, digital twins, XR, and data value trading
- Expectation that SMEs integrate digital solutions across entire supply chains

**Southern and less-digitalised regions (Greece, Cyprus, Italy):**

- Greater emphasis on closing basic to intermediate digital skills gaps
- Need to ensure access for micro-enterprises and individuals with low digital literacy
- Focus on practical skills such as websites, online branding, social media, and basic digital tools
- Structural barriers such as bureaucracy, awareness gaps, and high levels of brain drain.

## Key Performance Indicators (KPIs)

### KPI 1 – Focus Groups with SMEs and Relevant Stakeholders

Objective	KPI as defined in the Grant Agreement	Work Package / Responsible Partner	Target value in GA	Value achieved (Nov 2025)	Status
O1 Coordination & evidence base for skills needs	– 7 focus groups with SMEs and relevant stakeholders (1 in each country)	WP3 Workearly (WP leader) & national training providers	– ≥ 7 focus group & interviews	9 focus groups with SMEs, employees and other key stakeholders in 5 training provider countries (CY – 3, GR – 2, FI – 2, DE – 1, IT – 1)	<b>Exceeded</b>

### Narrative explanation and justification

The Grant Agreement foresees “**7 focus groups with SMEs and relevant stakeholders (1 in each country)**” as a core KPI for WP3.

In practice, the implementation of Task 3.1 followed the structure of the training provider countries (Cyprus, Greece, Finland, Germany, Italy), while Poland and Hungary were not required to organise focus groups, as they do not deliver training courses in WP4–WP5.

Within this framework, the consortium organised **nine focus group interviews** involving SME owners/managers, employees and jobseekers:

- **Cyprus:** 3 focus groups (employers, employees, jobseekers)
- **Greece:** 2 focus groups (employers and employees)
- **Finland:** 2 focus groups (SME owners and employees/students)
- **Germany:** 1 focus group with SME managers/leaders and employees
- **Italy:** 1 focus group with SME managers/leaders and employees

These discussions provided in-depth qualitative insights on emerging advanced digital skills, training needs, barriers to participation and preferred delivery modes. The original KPI of 7 focus groups is therefore **exceeded**, while still remaining aligned with the WP3 task descriptions and the project’s focus

on training providers. The results are fully reflected in the sections *Focus Groups* and *Conclusions from focus groups* of this deliverable.

## KPI 2 – Roundtable Discussions with Governmental Authorities and Policy Makers

Objective	KPI as defined in the Grant Agreement	Work Package / Responsible Partner	Target value in GA	Revised interpretation for WP3	Value achieved (Nov 2025)	Status
O1 – Coordination & evidence base for skills needs	10 round-tables with representatives from experts in digital transformation and governmental authorities and policy makers	WP3 – Workearly (WP leader) & training providers	10 project-level roundtables	5 roundtables (one per training provider country, as specified in Task 3.2)	5 completed roundtables (CY, FI, GR, DE, IT)	<b>Achieved for WP3</b>

### Narrative explanation and justification

The Grant Agreement includes “**10 round-tables with representatives from relevant experts in digital transformation and governmental authorities and policy makers**” under Objective O1.

However, the description of **Task 3.2** specifies that **one roundtable per training provider country** (Cyprus, Greece, Germany, Finland, Italy) should be organised under WP3. D3.1 therefore reports on these **five WP3 roundtables**, while any additional roundtables at project level are covered by other work packages.

In the **initial version (August 2023)** of D3.1, three national roundtables had been completed (Cyprus, Finland, Greece). Following the European Commission’s interim review, the consortium finalised the remaining two roundtables in **Germany (12 June 2025)** and **Italy (19 November 2024)**, which are fully integrated in **Addendum 1: Updates on Roundtable Discussions (Germany and Italy)**.

Overall, WP3 has now delivered:



- **Cyprus:** Roundtable with 17 government representatives and policy makers (13 June 2023, Nicosia)
- **Finland:** Roundtable with representatives from key national bodies for digital transformation (30 June 2023, Pori)
- **Greece:** National roundtable with chambers, sectoral associations and business federations (15 June 2023, online)
- **Germany:** Roundtable with Berlin and Brandenburg economic development authorities (12 June 2025)
- **Italy:** Roundtable with chamber of commerce, SME federation and third-sector organisations (19 November 2024)

These five roundtables **fully achieve the WP3 KPI** as described in the work plan, and respond to the interim review request to complete the pending consultations in Germany and Italy. The findings have been used to refine the project's understanding of SME digital skills needs, validate the survey and focus group results, and feed into the consolidated EU-level conclusions presented in *Conclusions from roundtable discussions*, *ADDENDUM 1* and *ADDENDUM 2* of this deliverable.

## Overall Conclusion

Despite contextual differences, all countries share the same overarching objective: **rapidly improving SME digital competence in a way that is inclusive, practical, and aligned with real business needs**. The additional roundtable discussions have strengthened the evidence base of WP3, ensuring that Deliverables **D3.1** and **D3.2** are now **fully complete, representative, and in line with the EC's expectations**.

## Disclaimer

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Views and opinions expressed are however those of the author(s) only and do not necessarily reflect

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### Coordinator



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### Partners



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