



Digital Business

Evolving your digital future

WP2.1 Needs Analysis Report



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EXECUTIVE SUMMARY

In today's digital age, advanced digital skills have become vital for individuals and organisations to thrive and stay competitive. The Digital4Business project, funded by the European Commission, aims to revolutionise the digital landscape in Europe by providing advanced training programs and fostering strong industry partnerships. This project will identify the advanced digital skills needs and gaps that exist across the EU27 countries and will provide a European Master's Programme to equip individuals with the necessary expertise to excel in the digital domain, stimulate economic recovery and growth by creating new job opportunities and increasing productivity. Additionally, the Digital4Business project plays a crucial role in shaping Europe's digital transformation by promoting the adoption of advanced digital technologies and skills. By fostering a more connected and innovative Europe, the project aims to empower individuals and organisations, in particular SMEs to navigate and succeed in the digital era.

1. INTRODUCTION

In today's fast-paced and technology-driven world, digital skills have become increasingly important. From basic computer literacy to advanced knowledge in specialised areas, digital skills are crucial for individuals and organisations to thrive in the digital age. As technology continues to evolve, acquiring advanced digital skills has become essential to stay competitive and make the most of the vast opportunities presented by the digital landscape.

Digital4Business

The *Digital4Business* project is a ground-breaking initiative aimed at fostering digital transformation and upskilling in Europe for SMEs and business. Funded by the European

Commission, this EU Research Project is set to revolutionise the digital landscape by providing advanced training programs to master's level while fostering strong industry partnerships to shape the future of advanced digital skills in Europe.

Understanding Advanced Digital Skills

Advanced digital skills encompass a range of specialised competencies that go beyond basic computer literacy. While basic skills such as word processing, email communication, and internet browsing form the foundation, advanced digital skills (such as *AI, Cloud, Data Analytics and Blockchain*) build upon this foundation to empower individuals with a deeper understanding of digital tools, platforms, and concepts.

The Importance of Advanced Digital Skills

The digital revolution has transformed the way we live, work, and communicate. Organisations across various sectors are increasingly reliant on digital technologies to streamline operations, improve efficiency, and deliver innovative products and services. As a result, individuals equipped with advanced digital skills are in high demand, as they possess the ability to harness the power of technology and drive organisational success.

Research Purpose

The primary purpose of the Digital4Business project is to tackle the growing digital skills gap in Europe. As technology continues to advance at an unprecedented rate, there is an increasing demand for qualified professionals with expertise in digital technologies. The Digital4Business project aims to address this need by equipping individuals with the skills required to excel in the digital domain.

Another key objective of the Digital4Business project is to stimulate economic recovery and growth in Europe. By upskilling the workforce and fostering digital innovation, the project supports the creation of new job opportunities, increased productivity, and overall economic development.

The Digital4Business project also plays a crucial role in shaping the digital transformation of Europe's society. By collaborating with industry partners and promoting the adoption of advanced digital technologies and skills, the project fosters a more connected and innovative Europe.

2. RESEARCH METHODOLOGY

Research Objectives

The research project primarily focused on investigating advanced digital skills needs and identifying skills gaps in the 27 European Union (EU) countries. Recognising the value of capturing a broader perspective, the research extended its scope to include an additional 5 non-EU countries (Australia, Canada, Singapore, UK and USA).

By including these non-EU countries, the research aimed to uncover trends and insights that could contribute to a more comprehensive understanding of advanced digital skills requirements and skills gaps on a wider scale. This approach allowed for a comparative analysis between the EU countries and non-EU countries, enabling the identification of common patterns, differences, and emerging trends in the global digital skills landscape.

The inclusion of these non-EU countries aims to provide a more diverse perspective and enrich the findings of the research project.

The study employed a mixed-methods approach, including comprehensive desk research, survey of industry experts and professionals.

Desk Research & Data Sources

The partners conducted a comprehensive review of existing literature including:

National Governmental Publications: Official publications, reports, and whitepapers released by the national governments of the 27 EU countries to gather information on digital skills initiatives, strategies, and policies.

EU Publications: Reports, studies, and publications from the European Union were reviewed, such as those from the European Commission and OECD to understand the broader EU perspective on advanced digital skills and initiatives.

Global Publications: Reports, studies and publications from global organisations such as the World Economic Forum, The World Bank and IMF were reviewed to get a global perspective on advanced digital skills shortages and demand.

Academic Publications: Scholarly articles, research papers, and studies published by academic institutions and researchers were reviewed, focusing on digital skills requirements, training programs, and skills gaps.

Industry Publications: Reports, surveys, and publications from industry-specific associations, organisations, and research institutions at national and international level including McKinsey, Deloitte, IBM, PwC, Accenture, Salesforce and others which highlight digital skills requirements and gaps within specific industries or sectors were also examined.

Media and other Articles: Relevant articles from general media outlets and specialised publications that discuss digital skills, training programs, workforce needs, and skills gaps in each country were reviewed.

In addition, desk research was carried out for Australia, Canada, Singapore, UK and USA using the same publication categories to provide the broad global context for advanced digital skill needs and gaps.

3. DATA ANALYSIS

Data Analysis:

A systematic analysis was conducted on the data collected from the various sources which was categorised and synthesised to identify common trends, patterns, and challenges related to advanced digital skills and skills gaps by country. Qualitative analysis techniques were employed, such as thematic analysis, to extract key insights and findings.

Cross-Verification:

The information from the different sources was cross-referenced to validate the findings and ensure reliability.

To attain a comprehensive understanding of the advanced digital skills landscape in each country, the data from various sources was meticulously compared and contrasted. These sources included national governmental publications, EU publications, academic publications, industry publications, and media articles. By leveraging multiple perspectives from these diverse sources, a holistic view of the advanced digital skills landscape was achieved, enabling a thorough analysis of the subject matter.

4. LIMITATIONS AND POTENTIAL BIASES OF THE RESEARCH

Data Availability and Quality: The research heavily relied on the availability and quality of data from the various sources. Limitations in data availability or inconsistencies in data quality across different countries or sources could affect the accuracy and reliability of the findings.

Publication Bias: The reliance on published sources, such as academic and industry publications, may introduce publication bias. These sources tend to prioritise certain topics or perspectives, potentially excluding unpublished data or alternative viewpoints. This bias could influence the conclusions drawn from the research.

Generalisability: The findings may not be entirely generalisable to all organisations or industries within the selected countries or outside of them. Different sectors or regions within a country may have varying digital skills requirements and gaps, which may not be fully captured in the research.

Stringent measures were implemented to address the three limitations and biases in the research. To tackle the issues of data availability and quality, multiple sources of data were utilised to cross-validate the findings, ensuring accuracy and consistency. The credibility and reliability of the sources employed were thoroughly verified, with a preference given to reputable and authoritative publications.

To mitigate publication bias, a diverse range of publication sources, including academic, industry, and government publications, were utilised to ensure a comprehensive and well-rounded perspective. Conference proceedings and reports from relevant organisations were also incorporated to obtain additional viewpoints. By including alternative perspectives, the research aimed to minimise the potential influence of publication bias and provide a more balanced analysis.

To address the generalisation bias, a survey was administered to industry representatives from both small and medium-sized enterprises (SMEs) and multinational corporations (MNCs) across the partner countries. The purpose of the survey was to validate the key findings derived from the desk research, ensuring a more robust and representative analysis. Additionally, the review of other EU-related projects focusing on advanced digital skills demonstrated a notable level of alignment with the LeADS EU project, which had its initial research conducted by IDC (Sundblad et al., 2022).

At the partner kick-off meeting, the research scope and limitations were clearly outlined, fostering agreement on the research methodology, data collection, and the sources to be examined.

5. FINDINGS

Throughout the research process, a total of 292 documents were analysed, providing comprehensive coverage of advanced digital skills across the EU27 countries. An additional 24 documents were reviewed at a cross-European level, typically referring to advanced digital skill needs and gaps in more than one EU country.

To gain insights into the advanced digital skills needs and gaps in Australia, Canada, Singapore, the UK, and the USA, a total of 69 documents were examined. These documents encompassed

governmental reports, industry publications, academic research, media articles, and other relevant sources. The inclusion of these international sources broadened the perspective providing a more comprehensive understanding of the global landscape of advanced digital skills.

Breakdown of the Desk Research Documents:

A total of 72 national and 29 European reports were identified and reviewed, offering key information and perspectives on the skill requirements and priorities set by government entities across the 27 EU countries. These reports served as important references for understanding the digital skill needs within each country.

Additionally, 61 industry publications were examined, providing industry-specific insights into the demand for advanced digital skills. These reports highlighted the skill requirements and trends within different sectors, shedding light on the skills valued by industries in the digital era.

Academic publications played a significant role in providing scholarly research and analysis on advanced digital skills. 74 academic publications were analysed to gather evidence-based insights and deepen the understanding of advanced digital skill needs.

Furthermore, 47 media and related articles were reviewed to capture the broader discourse and public sentiment surrounding advanced digital skills. These articles provided valuable perspectives from journalists, experts, and commentators, enriching the overall analysis. In addition, 9 documents were reviewed from international sources including the organisations such as the World Bank and Organisation for Economic Co-operation and Development (OECD) providing a global perspective on advanced digital skill needs and gaps.

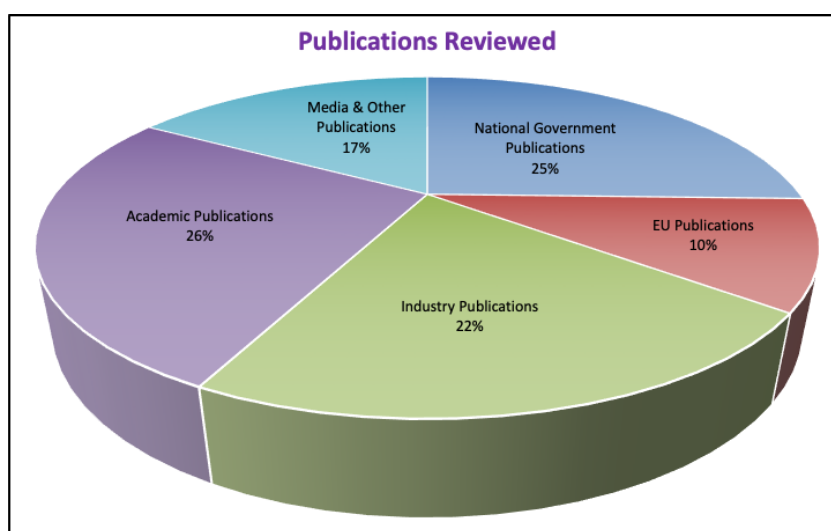


Chart 1: Publications Identified and Reviewed

The D4B research proposal cited a list of advanced digital skill areas that would be important for SMEs in business. These are:

18 Advanced Digital Skill Areas proposed for the D4B Project			
AI	Business Intelligence	Big Data & Analytics	Cloud
Cognitive Services	Cloud Infrastructure Dev Ops	Cybersecurity	Emerging Technologies
Ethics	Data Governance	Data Visualisation	Digital Transformation
Information Fusion	Machine Learning	Project Management	Programming - Python and others
Statistics Fundamentals	Research Methods		

Table 1: The 18 Skill Areas for SMEs proposed for the D4B Project

The desk research identified a broad range of advanced digital skills and related areas as identified in the word-cloud in Figure 1 below.

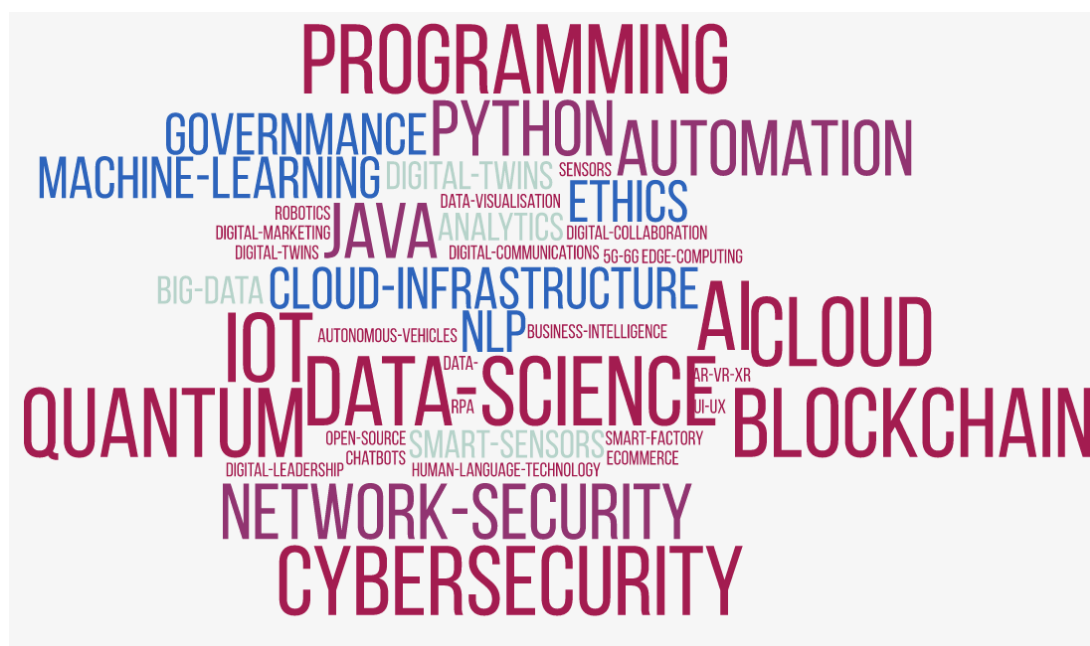


Figure 1: Word cloud of the advanced digital skills and associated areas

Having conducted a thorough analysis of the captured data, a scoring system was employed to assess the prominence of each skill. For each skill, a score of "1" was assigned if the skill was mentioned as a requirement in the materials collected for a particular country. Additionally, a score of "2" was given if the skill was mentioned two or more times in the materials collected for the respective country. This scoring methodology enabled a quantitative evaluation of the significance of each skill within the context of the collected materials for each country. The desk research reveals a fascinating landscape of skills and technologies that have garnered significant attention across the EU27 countries. These prominent areas of focus shed light on the priorities and aspirations of these nations in the realm of artificial intelligence (AI) and data-related fields. Our analysis of the data reveals a clear pattern indicating that AI is the most highly sought-after skill set in Europe, closely followed by Data Science. This observation not only underscores the significance of these two subjects or clusters but also highlights a strong correlation between them. Machine learning emerges as a key skill too that garners widespread attention in many countries. For Belgium, Cyprus, Denmark, Estonia, France, Germany, Italy, Latvia, Lithuania, Malta, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, and Sweden, machine learning's significance is indisputable. The focus on data analytics and big data is strong across multiple countries with Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden assigning it high importance. This finding suggests that organisations across Europe recognise the interdependence and complementary nature of AI and Data Science, leveraging both skill sets to drive innovation, enhance productivity, and remain competitive in their respective industries.

The analysis also sheds light on other key skill sets, such as Cyber Security, Cloud Computing, Blockchain, and Quantum. Cyber Security emerges as an important skill set for most countries in Europe, with 24 out of 27 countries citing its significance at least once. This aligns with the discussion in the previous paragraph, which emphasises the need for SMEs to address concerns regarding data security as a barrier to cloud adoption. The importance of cybersecurity is evident, attributed to it by Austria, Belgium, France, Germany, Greece, Ireland, Italy, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. Cloud computing, recognized by Austria, Belgium, Cyprus, Estonia, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden, has emerged as a critical skillset. The demand for Blockchain, and Quantum skills appears to be more specific, with 19 and 8 countries of the EU27 countries respectively acknowledging their importance.

Consequently, the following skills emerged as the most prominent in-demand skills:

The Most In Demand Advanced Digital Skills across the EU27 Countries			
AI	Automation	Blockchain	Business Intelligence
Chatbots / Robotics	Cloud	Cloud Infrastructure / Dev Ops	Cybersecurity
Data & Analytics	Data Governance	Data Visualisation	Ethics
IoT	Machine Learning	NLP	Python etc.
Quantum	Sensors	Smart Sensors	5G / 6G

Table 2: The most in demand advanced digital skills identified across the EU27

A categorisation exercise was performed to assign each advanced digital skill to its respective designated topic area, yielding the following categorisations:

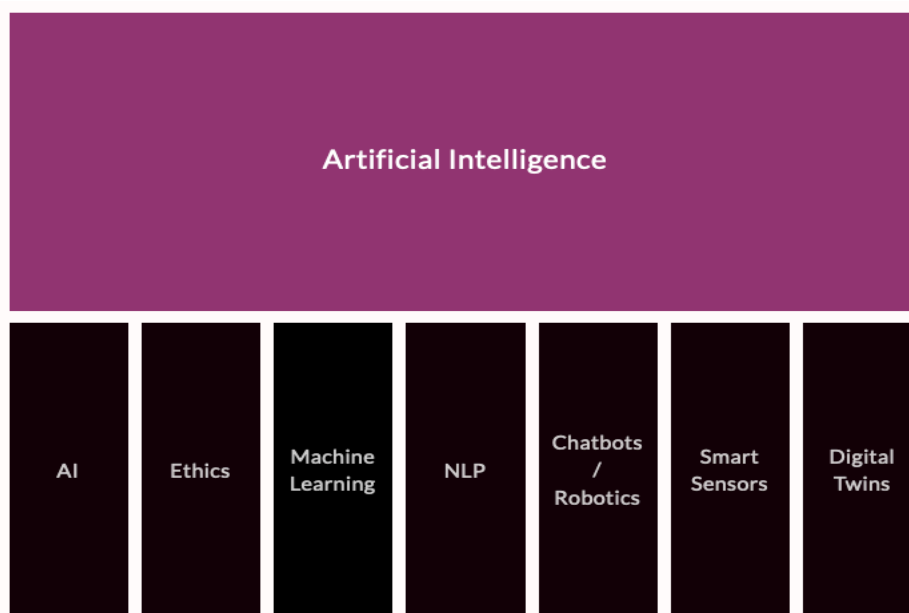


Figure 2: AI skills categorised

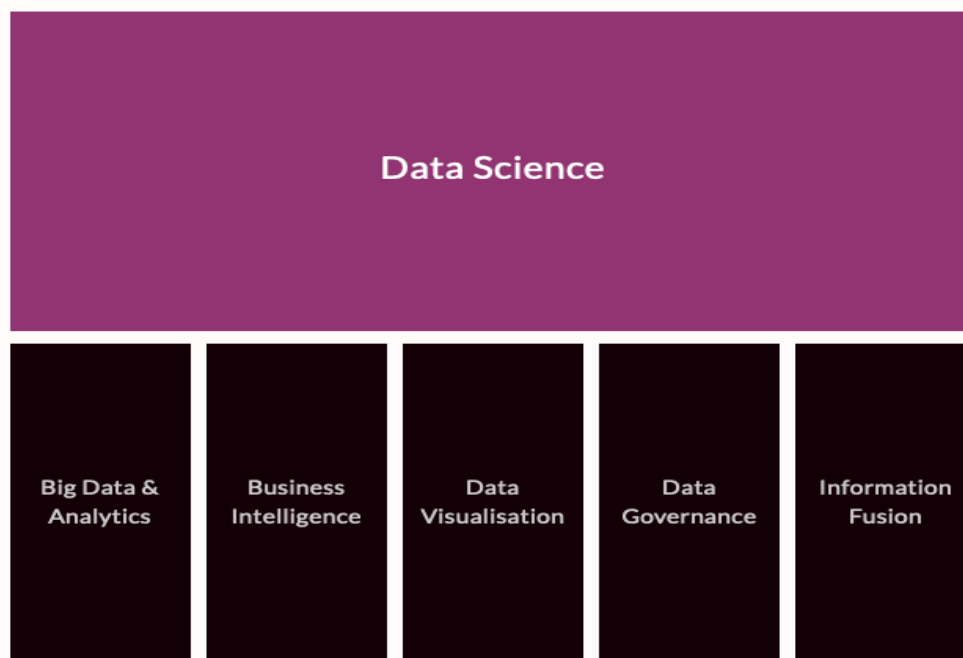


Figure 3: Data Science skills categorised

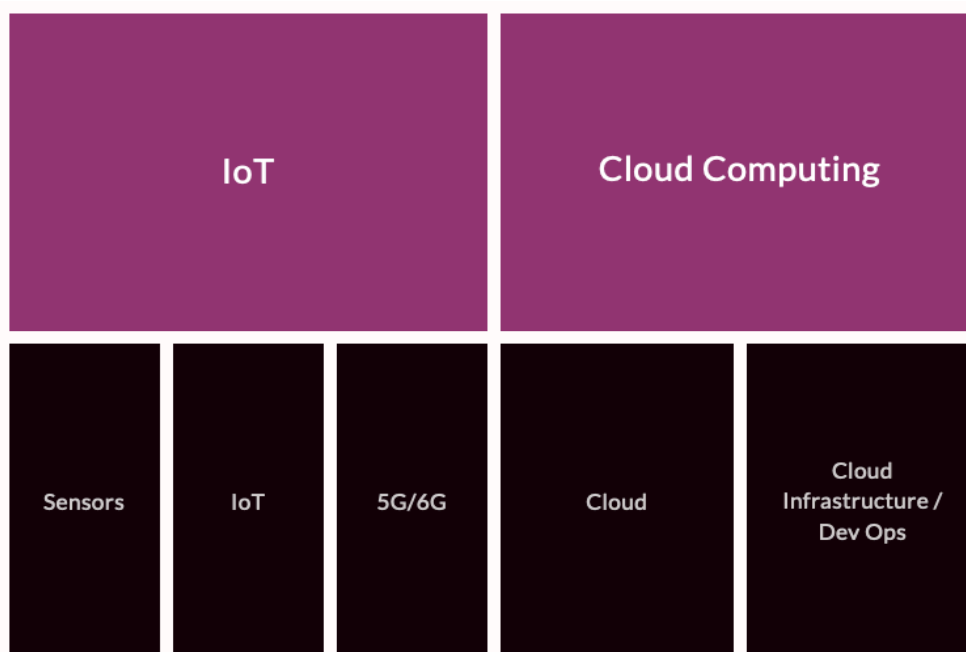


Figure 4: IoT and Cloud Computing Skills categorised

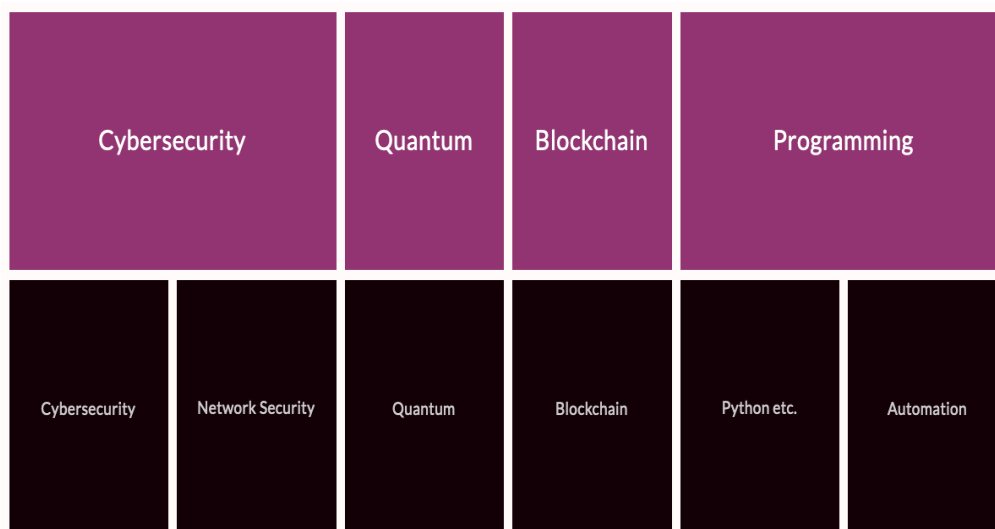


Figure 5: Cybersecurity, Quantum, Blockchain & Programming Skills Categorised

The categorisation exercise resulted in the following alignment of topics:

1. **AI:** This topic category includes AI, Ethics, Machine Learning, NLP, Chatbots/Robotics, Smart Sensors, and Digital Twins (Figure 2).
2. **Data Science:** Big Data & Analytics, Business Intelligence, Data Visualisation, Data Governance, and Information Fusion fall under the topic category of Data Science (Figure 3).
3. **Cloud:** Cloud and Cloud Infrastructure/DevOps are categorised under the topic area of Cloud (Figure 4).
4. **IoT:** Sensors, IoT, and 5G/6G are categorised under the topic area of IoT.
5. **Cybersecurity:** Cybersecurity and Network Security are categorised under the Cloud topic (Figure 5).
6. **Quantum** and **Blockchain:** These topics remain under their specific topic areas (Figure 5).
7. **Programming:** Python and Automation were categorised under the topic of Programming (Figure 5).

By grouping these skills and concepts into specific topic categories, it allows for a clearer organisation and understanding of the various domains within the field of advanced digital skills.

A comprehensive data analysis was undertaken on the extracted data from the desk research, delving deeper into the understanding of the geospatial distribution of digital skills across the 27 EU countries. Additionally, the analysis revealed a robust correlation between the demand for AI and Data Science skills.

Geo-Spatial Analysis

The analysis presented in this study is exclusively based on the Needs Analysis data collected by the partners and compiled for analysis. Within the Needs Analysis data, eight distinct subjects/clusters related to Advanced Digital Skills were identified, namely AI, Blockchain, Data Science, Cloud, Cybersecurity, IoT, Programming, and Quantum, in addition to basic digital skills. By studying the distribution of advanced digital skill needs across the 27 European countries included in the desk research, several metrics were identified for further examination:

- **Mode:** Subject/Cluster that has the largest number of citations in a given country
- **Coverage:** The ratio among the number of Subject/Cluster cited at least once and the total number of Subject/Clusters in a given country.
- **Subject/Cluster Relevance:** The ratio between the number of citations of a given Subject/Cluster and the total number of cited digital skills in a given country.



Figure 6: Map comprising the EU27 Countries for Reference

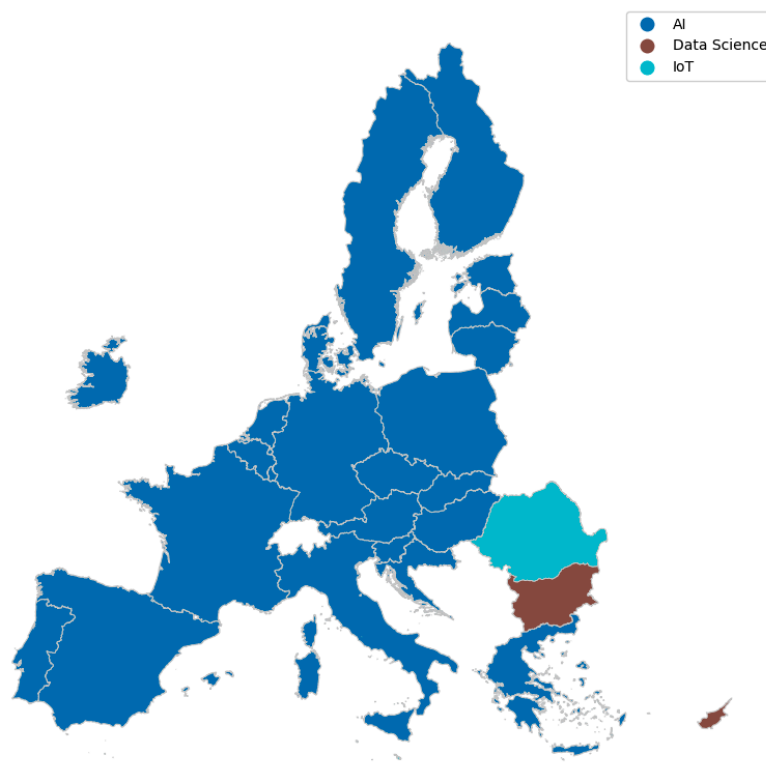


Figure 7: Colour map of Europe depicting the most frequent Subjects/Clusters of digital skills

Figure 7 illustrates the color-coded map of Europe based on the most frequently cited Subject/Cluster in the Needs data. It is evident that AI emerges as the most in-demand skill set throughout Europe, with counts often comparable to those of Data Science. The fact that they often have similar numerical counts suggests a close relationship, potentially stemming from their shared characteristics and applications in various industries. The analysis demonstrates that both AI and Data Science skills are consistently needed in every country under study. Each of the 27 countries cited these skills at least once, indicating their significance in the European digital landscape.

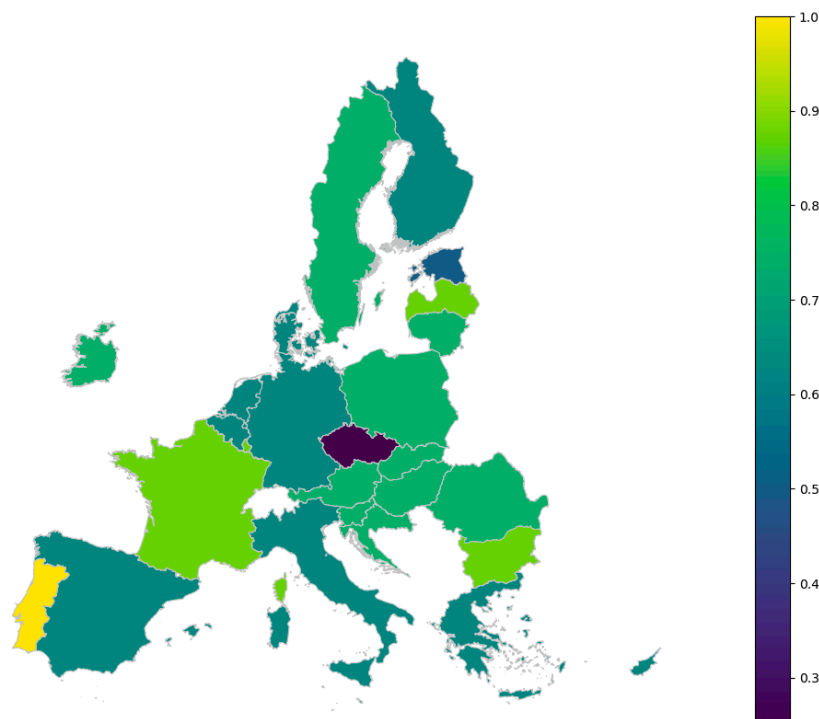


Figure 8: Heat map of Europe depicting the coverage of the Master's modules.

Higher coverage corresponds to warmer colours (in the yellows spectrum), lower coverage corresponds to colder colours (in the purple spectrum).

Figure 8 shows the coverage of the in demand advanced digital skills across the 27 EU countries included in the desk research. In particular, a higher value of coverage indicates that most modules are needed in those countries. The maximum possible value is 1 and indicates that all the Subjects/Clusters are required in that country; although, they may have different priorities. We notice that in most countries, there is significant coverage of the master's modules, with at least 5 Subjects/Clusters of skills cited at least once in each country.

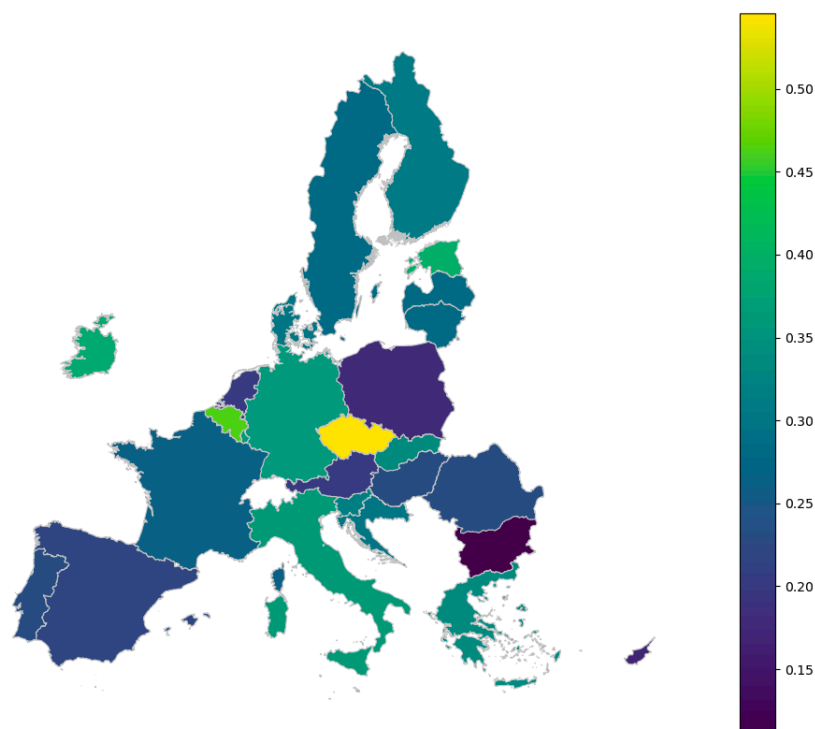


Figure 9: Relevance of AI Skills

Figure 9 shows the relevance of AI and Data Science skills with respect to the total number of digital skills cited each country. Both skills are required in every country, indeed each of the 27 countries in the desk research cited both skills at least once; and they have a similar distribution across Europe. In most countries, AI and Data Science skills make up more than 50% of the cited skills. This similar distribution of AI and Data Science skills strengthened the possibility of a correlation between them and emphasises their importance. Additionally, the joint relevance of AI and Data Science reveals that these two subjects collectively contribute to more than 50% of the cited skills in most countries. This observation provides compelling evidence of the correlation between these two subject/cluster areas.

Correlation Analysis

As illustrated in Figure 10, a robust correlation is observed between AI and Data Science skills. This correlation indicates that these subjects are closely related and suggests the possibility of merging them into the same cluster or offering them together. Additional evidence supporting this claim arises from the acknowledgment that modern Data Science heavily relies on machine learning, which is an integral component of AI.

The desk research collected a total of 293 documents. We manually analysed these documents and counted 136 documents which cited at least once, either requirements for AI or Data Science skills. Of these documents, 76 cited both the need for both AI and Data Science skills. This denotes a strong statistical correlation between the skill sets: the Pearson's correlation coefficient measured 0.56.

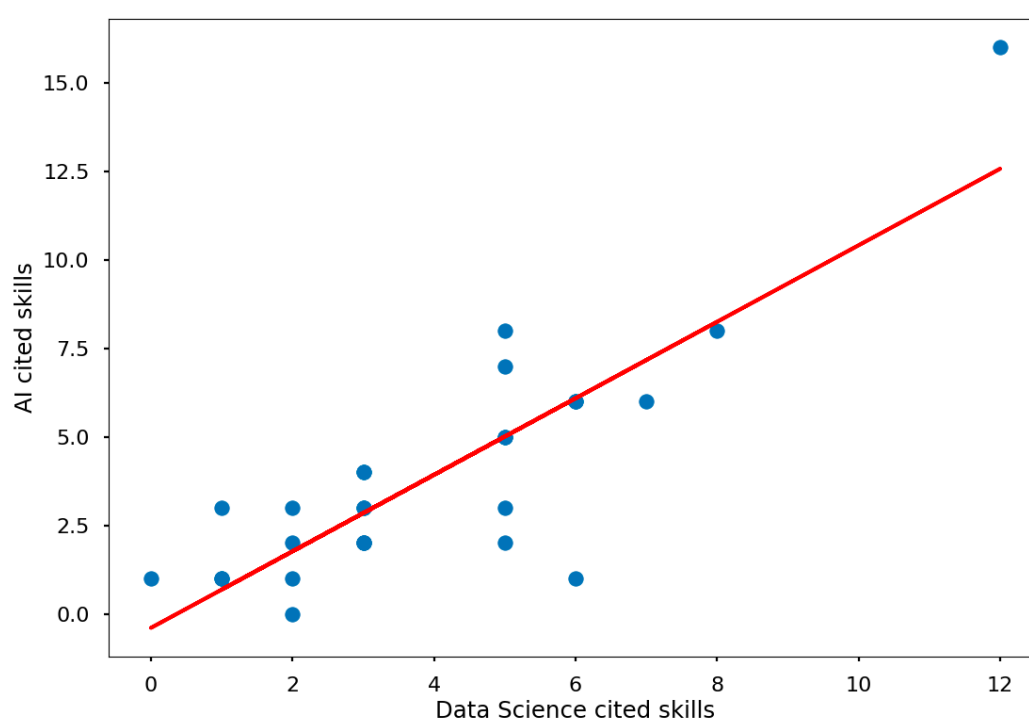


Figure 10: Correlation between AI and Data Science Skills

Figure 10 presents the absolute values of AI and Data Science skills per country. Each blue dot on the plot represents the number of times these skills were mentioned across all the documents collected during the desk research for each country. The correlation coefficient for the absolute counts is measured at 0.84, indicating a strong positive linear relationship between the analysed AI and Data Science skills. This implies that there is a tight clustering of data points around the line of best fit, demonstrating a consistent and predictable increase in the skill needs for both AI and Data Science. As the demand for AI skills rises, the need for Data Science skills also tends to increase in a relatively consistent and predictable manner.

Digital4Business Industry Survey

A survey was sent to a targeted Industry, Academia and Government cohort of 28 individuals which yielded 18 responses. The same survey was issued on LinkedIn by Matrix and other D4B partners which yielded 12 responses.

On analysing the results of the survey the following insights were determined:

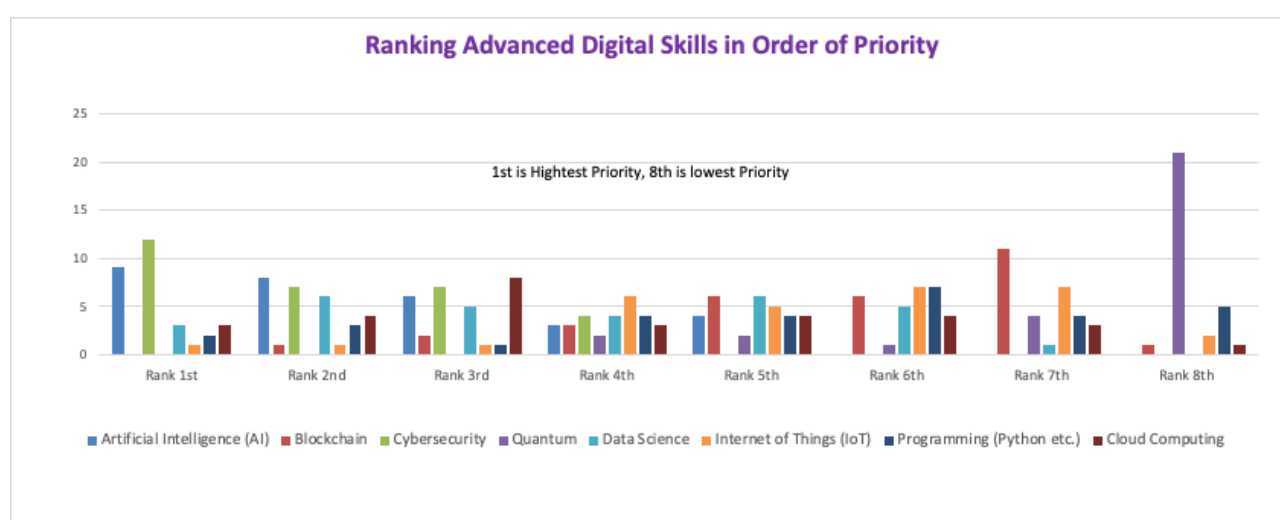


Chart 2: Ranking Advanced Digital Skills

All survey respondents were asked to rank advanced digital skills in order of priority where 1 is the highest and 8 the lowest. The results show Cybersecurity in first position followed by AI and Cloud Computing. The SME survey respondents were then asked to rank in order of priority advanced digital skills for SMEs and MNC respondents to rank advanced digital skills for MNCs. Table 3 below both SMEs and MNC respondents ranked cybersecurity in first position followed by Cloud Computing with Data Science in third position for SMEs and AI in third position for MNCs.

Position	SMEs	Position	MNCs
1 st Position	Cybersecurity	1 st Position	Cybersecurity
2 nd Position	Cloud	2 nd Position	Cloud
3 rd Position	Data Science	3 rd Position	AI
4 th Position	AI	4 th Position	Data Science
5 th Position	IoT (joint position)	5 th Position	Programming
5 th Position	Programming (joint position)	6 th Position	IoT
7 th Position	Blockchain	7 th Position	Blockchain
8 th Position	Quantum	8 th Position	Quantum

Table 3: Ranking Advanced Digital Skills for SMEs and MNCs

In response to the question “What specific skills in the above advanced digital skill areas do you believe are most crucial for SMEs and MNCs to stay competitive?”, respondents mentioned skills such as cybersecurity, data analytics, cloud computing, programming, IoT (Internet of Things), and AI as important skills along with AI ethics, and generative AI. Data science was also mentioned as a relevant skill, as was cloud computing. Some participants highlighted specific areas within cybersecurity, such as product and enterprise security as important. Additionally, there was a focus on user experience design and the importance of general digital knowledge as a foundation for new technologies. Data science, programming, and AI were emphasised as critical skills, and there was recognition of the significance of cloud technologies and strong cybersecurity frameworks. Other areas mentioned included blockchain, quantum, and machine learning. Overall, respondents acknowledged the importance of understanding and applying cybersecurity to their businesses in conjunction with advancements in technology.

Survey respondents were asked to identify the digital skills that are crucial for SMEs and businesses in general. The findings revealed that SMEs require several key industry-specific digital skills and transversal skills. Apart from the previously mentioned skills, digital marketing and social media expertise were highlighted as essential for online brand promotion and customer engagement. Due to the ever-changing digital landscape, lifelong learning is emphasised as necessary, with adaptability and continuous learning seen as vital for long-term success. The survey also revealed the importance of transversal skills such as critical and innovative thinking, teamwork, communication, self-discipline, and self-motivation. In terms of digital skills, data analytics, online communication, and digital creation skills were identified as important competencies which can be seen in Figure 11 below. The significance of security, automation, leadership skills, project management, and understanding the business impact of technologies is also recognised for SMEs. Other skills mentioned include change management, communication and mediation between technical and business teams, data protection, technology evaluation, and the power of data analytics. The relevance of DLT (Distributed Ledger Technologies), AI and quantum computing is also acknowledged. Additionally, there is a mention of low-code/no-code development, the ability to analyse specific technology needs, and the importance of understanding the implications of delivering technology to support business objectives. Overall, the survey highlights a diverse range of skills that SMEs need to thrive in the digital landscape, encompassing technical expertise, business acumen, and adaptability.



Figure 11: Transversal Skills

In response to the question “Are there any insights or issues related to Advanced Digital Skills you would like to share?” respondents touched upon several important aspects. One notable concern is the digital divide, highlighting the disparities in access to technology and digital literacy skills. Bridging this divide is crucial for ensuring equal opportunities for all individuals. Another significant issue is cybersecurity threats, emphasising the need for advanced digital skills to safeguard personal data and protect against privacy breaches. Digital literacy is also mentioned as a skill gap among different demographics, highlighting the importance of effective information use and critical thinking in the digital age. The potential impact of automation and job displacement is discussed, underscoring the necessity of adapting to changing job requirements through advanced digital skills. The importance of collaboration and communication between different skill sets, such as quantum computing and AI, is highlighted to drive effective digital transformation. The respondents also acknowledge the need to demystify advanced technologies, address basic digital literacy gaps, and involve SMEs in the digital journey. Building expertise in manipulating data and embracing technology is crucial, while recognising the significance of human interaction and intervention. The role of regulatory frameworks, practical skill training, and the need for increased numbers of developers familiar with emerging technologies are also emphasised. The evolving nature of digital advancements and the need for relevant and up-to-date courses are recognised. Overall, the responses underscore the significance of digital awareness, understanding, and skill development in various contexts, including business, education, and societal development.

Overall, the results of the survey align with the results of the desk analysis and further support the key advanced digital skills that the D4B project must focus on.

Comparing EU27 Countries with Findings Globally:

The comprehensive assessment of the in-demand advanced digital skills in the EU countries provided a solid basis for comparing them with five selected international countries (Australia, Canada, Singapore, UK, USA), revealing both commonalities and distinct skill requirements. The results indicated noteworthy similarities between the in-demand advanced digital skills of the EU countries and those sought after in the five global countries, along with a few differences. Although there was a high demand for advanced digital skills in both the EU and globally, specific skill preferences varied across regions. The findings of this research have significant implications for policymakers, educators, and industry leaders, emphasising the importance of adopting a targeted approach to skills development that considers both national and global demands. Examples are provided below:

Demand, Challenges & Unique Factors in Advanced Digital Skill Needs:

The analysis of the demand for advanced digital skills across the EU27 countries revealed similarities whilst also highlighting differences in the level of demand. These variations can be attributed to several factors. Firstly, disparities in economic development and technological advancement play a significant role. Countries with a more advanced digital infrastructure and a higher concentration of technology-driven industries exhibit a greater demand for advanced digital skills such as AI, IoT, Blockchain, Data Science, Cloud Computing, and Cybersecurity. Notable examples include France, Germany, Italy, Sweden, the Netherlands, Finland, Denmark, and Ireland. Additionally, differences in national policies, priorities, and investments in digital transformation initiatives contribute to the divergence in skill needs across countries. These factors collectively shape the unique landscape of advanced digital skills requirements in each EU27 country.

Another factor highlighted in the desk research is evidence that large enterprises are more likely to embrace new technologies compared to small and medium-sized enterprises (SMEs). This discrepancy in adoption rates of SMEs can be attributed to various factors, including lower financial resources, organisational capacity, and their reduced ability to navigate the complexities of technological implementation (Eller et al., 2020). Cloud computing for example has emerged as a game-changer for enterprises, offering scalable and cost-effective solutions for data storage, processing, and software delivery. Large enterprises in Europe are leading the way in cloud adoption, benefiting from enhanced operational efficiency and agility. However, SMEs have a lower adoption rate, indicating the existence of barriers such as limited awareness, concerns regarding data security, and a lack of resources to facilitate the transition. According to a report on StackScale's website published in 2022, examining the adoption of cloud computing in the international context, varying levels of adoption are highlighted with Sweden, Finland, Denmark, and the Netherlands, at the forefront with over 60% of enterprises purchasing sophisticated or

intermediate cloud computing services. Italy and Estonia follow closely, with adoption rates exceeding 50%. However, there are significant disparities between countries, with Bulgaria and Romania scoring below 15% in cloud adoption. Big data analytics has revolutionised the way enterprises extract insights and make data-driven decisions. The current landscape shows that large enterprises have a more significant presence in big data processing, while SMEs lag behind. This discrepancy can be attributed to the complexity of implementing big data analytics, the availability of skilled personnel, and the initial investment required. Looking at big data adoption internationally, we observe diverse patterns across countries. In Malta, nearly a third of enterprises analyse big data, indicating a relatively high adoption rate. The Netherlands and Denmark follow closely behind with adoption rates of 27%. However, countries like Romania, Slovakia, Cyprus, and Bulgaria have much lower adoption rates, ranging from 5% to 6%. These disparities reflect differences in digital readiness, infrastructure, and the availability of skilled professionals.

Artificial intelligence (AI) has gained significant attention in both the European and international contexts due to its potential to revolutionise industries, enhance productivity, and drive innovation.

The current adoption rates vary across countries and sectors. According to a report by Eurostat (2021), among the EU27, Ireland recorded the highest share of enterprises (23%) using AI applications in 2020, followed by Malta (19%), Finland (12%) and Denmark (11%). Countries such as Germany and France have made significant strides in AI adoption, with a focus on sectors like healthcare, finance, and manufacturing. These countries at the forefront of AI adoption have established AI research centres, innovation hubs, and collaborative networks to foster AI development and implementation. Despite the progress made by larger enterprises, SMEs face several challenges in adopting AI technologies. Additionally, concerns regarding the ethical implications of AI, data privacy, and security further contribute to the slower adoption rate among SMEs.

The process of digitalisation within a country facilitates the digital transformation of its society, leading to increased adoption of basic digital skills among the population, often facilitated by the availability of digital public services according to The Digital Skills Gap White Paper, (2022). The provision of efficient digital infrastructures plays a crucial role in this digitalisation process and is a key focus for several EU27 countries, as evidenced by the desk research. Countries such as Romania, Luxembourg, Lithuania, Latvia, the Czech Republic, and Bulgaria, among others, have demonstrated a priority in rolling out digital infrastructures and subsequently expanding their e-government digital services. These initiatives reflect the commitment of these countries towards enhancing their digital landscapes and promoting widespread digitalisation within their societies.

Countries that prioritise specific digital domains, such as artificial intelligence (AI) or cybersecurity, tend to witness a higher demand for the corresponding skills. Additionally, differences in educational systems and training frameworks among the EU27 countries contribute to variations in the availability and quality of digital education and skill development programs. These disparities have a direct impact on the supply of skilled professionals in advanced digital domains. The emphasis placed on specific digital areas, along with the effectiveness of educational initiatives,

significantly shape the skill landscape, professional expertise and demand for specific advanced digital skills within each country.

6. DISCUSSION

The demand for advanced digital skills in the areas of AI, Data Science, Cybersecurity, IoT, Blockchain, Cloud, Programming, and Quantum across the EU27 countries has the potential to drive digital transformation and reshape business models and workforce dynamics. We can interpret several key insights from the literature gathered during the desk research and relevant theories.

Demand reflects the ongoing technological advancements and the growing significance of digital transformation across various industries. Organisations recognise the potential of these technologies to enhance efficiency, security, and innovation.

The findings suggest that the workforce needs to evolve to keep pace with technological advancements. This evolution involves acquiring new skills and competencies related to emerging technologies. Professionals who can effectively leverage these advanced digital skills will likely have a competitive advantage in the job market.

The research findings highlight the interdisciplinary nature of emerging technologies (Akter et al., 2020). Proficiency in AI, Data Science, Cybersecurity, IoT, Blockchain, Cloud, Programming, and Quantum often requires a combination of technical skills, analytical thinking, domain knowledge, and problem-solving abilities. This indicates the importance of fostering collaboration and interdisciplinary education to meet the skills demands.

The emphasis on cybersecurity, data privacy, and ethics within the context of AI, Data Science, IoT, Blockchain, and Quantum indicates the growing awareness of the ethical and legal implications associated with these technologies (Kendal, 2022). Learning in these areas could include ethical frameworks, governance models, and regulations to ensure responsible and accountable use of these technologies.

The rapid evolution of technology necessitates a mindset of lifelong learning and adaptability. Professionals in these domains should be prepared to continuously update their skills and knowledge to stay relevant (Dennison, 2023). The findings suggest the need for flexible educational models and professional development programs to support individuals in upskilling or reskilling.

The demand for skills in these emerging technology areas reflects their potential economic and societal impact. These advanced digital skills have the potential to drive innovation, improve efficiency, and address complex challenges across sectors such as healthcare, finance,

transportation, and energy. Policymakers, educators, and industry leaders should consider the broader implications of these technologies when designing strategies and initiatives, (OECD, n.d).

Implications of the Advanced Digital Skills Needs and Gaps

In today's digital economy, businesses that lack advanced digital skills may struggle to remain competitive. Digital transformation is reshaping industries and creating new business models. Companies without skilled professionals in advanced digital skills may find it challenging to adopt and implement these technologies effectively, potentially leading to decreased competitiveness. According to Yvanovich, 2023 this is especially true for SMEs, who may struggle to fully embrace digital transformation. As a result, they may have limited capacity to adopt and implement technologies such as AI, Data Science, Cybersecurity, IoT, Blockchain, Cloud, Programming, and Quantum. This can limit their competitiveness and growth potential, causing SMEs to miss out on opportunities to enhance operational efficiency, reach new markets, and innovate their products and services (Laker, 2023)

The digital skill shortage across EU27 countries can create recruitment challenges and intensify competition for skilled individuals, particularly in high-demand areas such as AI and cybersecurity, leading to higher labour costs. SMEs face additional obstacles in attracting and retaining qualified professionals due to competition from larger firms and limited resources. Advanced digital skill gaps further compound the issue, making it even more challenging for SMEs to find suitable talent. To address this, SMEs may need to invest more in talent acquisition or outsource digital tasks, which can increase recruitment difficulties and labour costs. While outsourcing can be helpful, excessive reliance may lead to increased expenses and reduced control over critical digital processes. Identifying reliable and affordable partners can be a challenge for SMEs, potentially affecting their ability to respond rapidly to evolving digital demands (Colback, 2023).

Advanced digital skills are crucial for driving innovation and productivity gains within businesses, enabling them to improve processes, make data-driven decisions, and develop innovative products and services. However, without access to skilled individuals, SMEs and businesses in general may struggle to leverage these technologies to their full potential, hindering innovation and productivity growth. The shortage of skilled professionals with advanced digital skills across the EU27 countries can lead to recruitment challenges, increased competition for qualified individuals, and higher labour costs, particularly in high-demand areas like AI and cybersecurity (ILO, n.d). This can create additional obstacles for SMEs in attracting and retaining qualified professionals, due to competition from larger firms and limited resources.

In the EU27 countries, the digital skills gap can significantly impact overall economic growth and development. Regions and countries that effectively address their skill needs and reduce the gap

are more likely to experience stronger economic growth, primarily driven by digital industries. Conversely, areas with persistent skill gaps may experience a digital divide, where certain regions or segments of society lag behind in terms of digital capabilities, leading to significant economic disparities. Therefore, addressing the digital skills gap is vital for bridging the digital divide and promoting inclusive economic growth (WorldskillsUK.org, 2021).

The importance of cybersecurity skills has increased significantly with the growing reliance of businesses on digital technologies. The absence of these skills can make businesses susceptible to cyber threats and attacks, putting sensitive data, digital infrastructures, and reputation at risk (Burt, 2023). SMEs are particularly vulnerable due to their perceived weakness, making advanced digital skills, particularly in cybersecurity, essential for their survival. Failure to address the digital skills gap can lead to financial losses, reputational damage, and legal implications, emphasising the critical need for businesses to prioritise digital skill development (Haddad & Binder, 2019).

The existence of digital skills gaps emphasises the importance of implementing specialised upskilling and reskilling initiatives in the EU27 nations. To address these gaps, it is necessary for businesses and governments to invest in programs that provide training and educational opportunities. These initiatives can bridge the skill gaps and equip individuals with the necessary competencies, thereby enhancing their employability and supporting businesses in meeting their digital skill needs. This can also contribute to overall economic growth and competitiveness. Providing targeted support mechanisms is crucial in addressing the digital skill needs and gaps among SMEs (Wiley, n.d).

It is important for SMEs to establish collaborative partnerships with other SMEs, universities, research institutions, or industry clusters. These partnerships can enable the exchange of expertise, best practices, and resources, which can be used to navigate the complexities of digital transformation more effectively. Collaborative initiatives can help SMEs pool their resources and access shared knowledge, leading to improved outcomes and sustained growth. Industry clusters, play a key role in facilitating knowledge-sharing and resource exchange, making them an essential partner for SMEs looking to upskill or reskill their workforce. These clusters can also raise awareness of the implications and consequences of digital skill needs and gaps for businesses and economies in the studied regions (OECD n.d).

Based on Cedefop's data, the most affected functional areas in terms of future employment growth in the EU27 from 2022 to 2035 are administrative services, finance and insurance, ICT services, and professional services.

These occupational areas cover a wide range of sectors and indicate the need for skilled individuals in technology, legal and administrative roles. It is evident that professionals working in these areas will require diverse skill sets and expertise. Across various job profiles in administration, project management, legal, HR, sales, and supply chain management, the integration of new technologies is of utmost importance. Embracing these technologies not only improves operational efficiency

but also provides opportunities for innovation and growth. Professionals who possess digital literacy, adaptability, and a willingness to upskill themselves in new and advanced digital technologies will be well-positioned to thrive in the changing landscape of work and contribute to the success of their respective functional areas.

The desk research further analysed several roles in these areas to provide guidance for professionals in SMEs and MNCs of how their role will likely change with the adoption of these advanced digital technologies in organisations. These are included in Appendix A of this document.

7. RECOMMENDATIONS

Flexible and Accessible Education Models

The research has shown demand for advanced digital skills in the areas of AI, Data Science, Cybersecurity, IoT, Blockchain, Cloud, Programming, and Quantum across the EU27 countries. Bridging this EU digital skills gap requires promoting flexible and accessible education and training models that cater to individuals of all backgrounds and career stages, including those in SMEs. This can be achieved through initiatives such as online courses, micro-credentialing, and lifelong learning. In addition, fostering international cooperation between academic institutions can provide a platform for flexible and accessible education and training, particularly aimed at SMEs. Such cooperation can help promote knowledge exchange on digital skill development, enabling SMEs to learn from best practices implemented in other countries and collaborate on joint initiatives, research projects, and standardisation efforts.

AI and Data Science Modules

Based on the correlation between AI and Data Science, we will consider providing both of these learning areas as core modules or as a combined module. According to the recently published Global Skills Report by Coursera (2023), “European learners are more likely to invest in data science skills, including artificial neural networks (1.24x) and deep learning (1.18x), supporting the emerging AI market.”

Collaboration

It is also necessary to foster collaboration among policymakers, educational institutions, businesses, industry associations, and SME networks; working together in promoting accessible and flexible education and training models that cater to the unique needs of all learners, particularly SMEs. Highlighting the significance of lifelong learning and providing resources that enable SMEs to continually upskill their workforce is also very important. According to The Digital Skills Gap White Paper (2022, p38), “*digital competence development necessitates an “all-*

government” strategy that encompasses digital competence development in areas such as employment, the labour market, education and training, social services, and economic growth. Governments, industry, education and training providers must team up together and share information about current and future needs for digital talent.”

Diversity and Inclusion

It is also necessary to be mindful of diversity and inclusion in digital skill development programmes. It is essential to provide equal opportunities for training and educational resources to individuals from diverse backgrounds, such as women, minorities, and individuals with disabilities. Additionally, promoting diversity in hiring practices can lead to innovation and bring different perspectives to the digital workforce. The D4B project should ensure that D4B marketing campaigns are targeted at associations who support SMEs, Women in Business and other recognised target groups to help ensure that those who will benefit from Advanced Digital Skills learning get the information regarding D4B from trusted sources.

8. CONCLUSION

The findings of the research have significant implications for policymakers, educators, and industry leaders. It is crucial to adopt a targeted approach to skills development that considers both national and European demands. This includes promoting flexible and accessible education and training models and micro-credentialing, to cater to individuals of all backgrounds and career stages. To assist with this challenge the research team at Akkodis have created a range of key business areas that will be impacted by digital transformation and advanced digital technologies. These are documented in Appendix A and will form a critical resource for professionals and businesses to identify the advanced digital skills that are and will become relevant in areas such as HR, Sales, Risk and Compliance, and Law.

Collaboration among policymakers, educational institutions, businesses, industry associations, and SME networks is essential to promote accessible and flexible education and training models. Lifelong learning should be emphasised, and resources should be provided to enable SMEs to continuously upskill their workforce. It is also important to prioritise diversity and inclusion in digital skill development programs to provide equal opportunities for individuals from all backgrounds.

Future Directions for Research

While this research has provided valuable insights into the digital skills needs and gaps in the EU27 countries, there are still areas that warrant further exploration. Future research could focus on

the specific digital skill requirements and gaps within different industries or sectors. Additionally, research on the effectiveness of different upskilling and reskilling initiatives in addressing the digital skills gap would be beneficial for policymakers and educators.

In the next phase of the Needs Analysis the curriculum will be defined. Each advanced digital skill area will be elaborated on to determine the learning outcomes and topics which should make up each module. See Figure 12 which provides an example of advanced digital skills within the AI Skills Area.

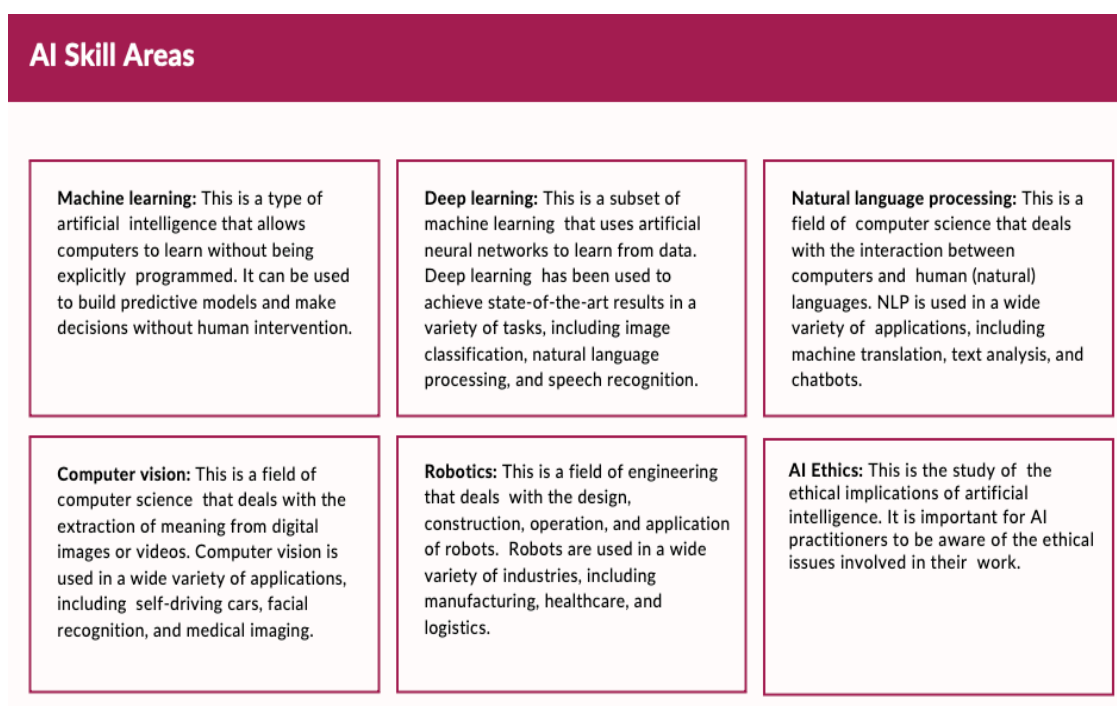


Figure 12: Example: AI Skill Areas to Inform Curriculum

Final Remarks and Concluding Thoughts

In conclusion, advanced digital skills are essential for individuals and organisations to thrive in the digital age. The Digital4Business project is at the forefront of revolutionising digital transformation and upskilling in Europe. By addressing the digital skills gap and fostering collaboration between industry and academia, the project aims to shape the future of advanced digital skills in Europe and promote economic growth and innovation.

To stay competitive in the digital age, individuals must continuously update their skills and embrace lifelong learning. Policymakers, educators, and industry leaders must work together to

provide accessible and flexible education and training opportunities that cater to the diverse needs of learners. By doing so, we can ensure that individuals and organisations are equipped with the advanced digital skills necessary to succeed in the digital landscape.

Overall, the research findings underscore the transformative potential of AI, Data Science, Cybersecurity, IoT, Blockchain, Cloud, Programming, and Quantum. They highlight the need for individuals, organisations, and society to adapt, collaborate, and embrace lifelong learning to fully leverage the benefits of these emerging technologies while addressing the associated challenges.

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APPENDIX A

Impact of Advanced Digital Technologies on Job Roles

The integration of advanced digital technologies in various job role profiles, such as administration, project management, legal, HR, sales, and supply chain management, has become indispensable for enhancing operational efficiency and unlocking new opportunities for growth. In this era of technological revolution, professionals who possess advanced digital skills are well-positioned to thrive in the ever-changing landscape of work. This section explores the impacts and adoption trends of technology in a range of sample job roles, uncovering the benefits and implications of gaining competence in, and adopting advanced digital technologies such as data analytics, cloud computing, artificial intelligence (AI), Internet of Things (IoT), and more. It delves into the expected adoption rates and potential impact on employment within these sectors, providing insights into the changing dynamics of the labour market. By understanding the transformative power of these technologies and the implications for job roles, professionals can navigate this digital revolution and equip themselves with the necessary skills and knowledge to succeed in the future of work.

Programme	DIGITAL4BUSINESS
Work Package	WP2.1 Needs Analysis – Role Profiles
Functional Area	Management
Profiles names	Business Services and Administration Managers
Example of Advanced Digital Skill Needs	AI, Data Analytics, Cloud, Collaborative Systems (VR & Metaverse)

Introduction
<p>Business Services and Administration Managers are responsible for overseeing the efficient operation of administrative functions within an organisation. They develop and implement strategies, manage budgets, coordinate resources, and ensure compliance with policies and regulations, contributing to the overall success and profitability of the organization.</p> <p>New technologies, such as analytics, artificial intelligence (AI), and cloud-based applications, could significantly impact the role of Business Services and Administration Managers. AI and big data analytics enable effective data analysis, offering valuable insights for decision-making. Cloud-based tools and virtual collaboration platforms have transformed communication and collaboration, enhancing connectivity and optimizing resource access. Embracing these technologies is essential for administrators to stay ahead in this dynamic landscape.</p>
New technologies involved in their upskilling process
<p>DATA ANALYTICS & ARTIFICIAL INTELLIGENCE</p> <p>In our analysis of the impact of technology on the role of an administration manager, it is evident that technology, particularly AI and big data, plays a crucial role in driving organisational profitability. The ability to effectively analyse and make sense of large volumes of data is a highly sought-after skill that is increasingly in demand.</p> <p>According to recent surveys, only 56 percent of organizations reported adopting AI in at least one function, indicating that significant barriers still exist, particularly when it comes to scaling its implementation across multiple functions. Limited data availability and the limited usefulness of available data are recurring obstacles for many organisations.</p> <p>To address these challenges, companies can employ up to four strategies, either individually or in combination, to generate reliable outputs in data-light environments. The first strategy involves selecting the most appropriate AI algorithm based on the quantity and quality of available data. Machine-learning models can be utilized to test and validate multiple algorithms, minimising the need for human intervention. Data-smoothing and augmentation techniques represent another viable strategy. This approach proves useful when a specific time period within a time series does not</p>

accurately represent the overall data trends. For example, sales data during the COVID-19 pandemic often exhibited anomalous patterns and seasonality that required careful handling.

In conclusion, the analysis highlights the significant impact of technology, specifically AI and big data, on the role of an administration manager. While challenges persist, adopting appropriate AI algorithms, leveraging data-smoothing techniques, preparing for prediction uncertainties, and incorporating external data sources can mitigate these obstacles and pave the way for more efficient and profitable administration management practices.

CLOUD BASED APP & VIRTUAL TEAMS (VR/Metaverses)

As businesses increasingly transition to cloud computing, the dynamics of collaboration within and outside organisations have undergone a remarkable transformation. By adeptly navigating and integrating cloud-based tools into our repertoire, we have not only enhanced our connectivity but also optimised our access to essential resources.

The advent of communication and document sharing platforms has revolutionized the way employees collaborate. With these tools, team members can seamlessly work together, irrespective of their physical locations. Furthermore, virtual-conferencing software has empowered us to engage in real-time collaboration, eliminating the limitations imposed by geographical boundaries. Now, regardless of where we are situated, we can actively contribute to projects and engage with clients and colleagues alike.

Notably, technology has extended its influence even to field-service organizations. These entities are piloting virtual-reality solutions that enable remote experts to guide on-site maintenance teams in resolving issues. Through virtual support, experts can efficiently provide guidance and oversee maintenance activities, eliminating the need for extensive travel. Consequently, basic tasks can now be completed without the constraints of time and distance.

In conclusion, the impact of technology on the role of an administration manager is undeniable. Embracing cloud-based tools, virtual collaboration platforms, and innovative approaches like time zone stacking and collaboratories has revolutionized our ability to connect, collaborate, and drive organisational success. As technology continues to evolve, it is crucial for administration managers to remain adaptive, continuously exploring new tools and strategies to stay at the forefront of this dynamic landscape.

Programme	DIGITAL4BUSINESS
Work Package	WP2.1 Needs Analysis – Role Profiles
Functional Area	Human Resources
Profile names	Human Resources Leaders, Human Resources Specialists
Example of Advanced Digital Skill Needs	AI, Machine Learning, Blockchain, Cloud Technologies

Introduction

Human Resources Leaders and Specialists are professionals who play a critical role in managing and optimising the workforce within an organization. They employ their expertise in talent acquisition, employee relations, performance management, and compliance to ensure effective human resource strategies and practices are implemented. HR Specialists utilize their knowledge of employment laws, organisational policies, and industry best practices to support employee development, resolve conflicts, and foster a positive work environment.

The impact of new technologies, particularly Artificial Intelligence (AI), Machine Learning (ML), Blockchain, and Cloud Technology, on the role of Human Resources (HR) Leaders and Specialists is significant. These technologies provide valuable tools for HR professionals to streamline processes, enhance decision-making, optimize talent management, and address critical challenges. Embracing these disruptive technologies enables HR teams to become more strategic, efficient, and valuable contributors to organizational success, while ensuring a harmonious integration of human expertise and machine capabilities.

New technologies involved in their upskilling process

Artificial Intelligence

In our analysis, we examined the profound impact of technology on the profiles of human resources leaders and specialists. Specifically, we focused on the disruptive potential of artificial intelligence (AI) within the HR and recruiting industry. As organisations face increasing employee turnovers and navigate the digital transformation of the workforce, the adoption of technology has become imperative to meet HR and recruitment needs. Projections indicate significant growth in the global human resource technology market, with a particular emphasis on AI investments to optimise processes and drive cost reduction.

The integration of AI in HR teams offers substantial value by accurately predicting talent requirements within specific company departments. Leveraging its ability to collect and analyse data, AI facilitates informed decision-making by assisting HR teams in prioritizing hiring needs. By utilising AI-powered tools, HR professionals can streamline candidate sourcing through customised advertisements and more efficiently track potential candidates, surpassing the limitations of traditional manual processes. Additionally, AI systems can automate application tracking, resume scoring, ranking, and even aid in assessing technical skills.

Another area where AI proves beneficial is in enhancing employee engagement. Through data collection, AI-based employee engagement tools enable employers to gain insights into the factors influencing employee turnover. By conducting sentiment analysis and identifying dissatisfaction or unmet needs, HR teams can address these issues effectively. Furthermore, AI empowers HR leaders and specialists to determine training requirements, develop reskilling opportunities, and automate repetitive tasks, thus freeing up valuable time for employees to focus on more stimulating and creative endeavours.

It is important to note that the future of AI-powered HR necessitates a harmonious integration of human expertise and machine capabilities to ensure unbiased decision-making and the effective utilisation of technology. HR professionals must embrace AI and actively seek out innovative applications to unlock its full potential. By harnessing the power of AI, HR teams can become a vital "talent insights engine," enabling the creation of productive and dedicated teams within organisations.

Machine Learning

Our analysis highlights the profound impact of technology on the profile of human resources leaders and specialists. Machine Learning (ML), as a subset of Artificial Intelligence (AI), has emerged as a powerful tool in this domain. Through ML algorithms, HR professionals can leverage historical hiring data to identify crucial attributes and qualifications of successful candidates. This data-driven approach enables informed decision-making during the recruitment process. Furthermore, ML models can predict employee performance, turnover risk, and skill gaps, empowering organisations to address talent-related challenges proactively. By embracing ML, HR teams can optimise decision-making, enhance workforce planning, and cultivate a more strategic approach to talent management.

Blockchain

Our research observed that the impact of technology, specifically blockchain, on the profile of human resources leaders and specialists is highly significant. Blockchain technology presents an array of advantages that can revolutionise HR processes, particularly in terms of data security, verification, and trust. As HR professionals, we can leverage blockchain to securely store and share sensitive employee data in a decentralised and tamper-proof manner. This eliminates the need for manual verification procedures, streamlining recruitment and background checking tasks. The implementation of blockchain also facilitates the creation of smart contracts, automating and enforcing HR policies, thereby ensuring compliance, and reducing administrative burdens. The inherent transparency and immutability of blockchain instil trust among employees and

stakeholders, elevating the integrity of HR operations and fostering a more secure and efficient HR ecosystem.

Cloud Technology

For HR there is a significant transformation brought about by cloud technology. This powerful tool has revolutionised talent management, presenting HR leaders and CIOs with solutions to critical challenges. The findings from the PwC US Cloud Business Survey indicated that cloud solutions have the potential to reshape the way employees work, with a majority (55%) of human capital leaders (HR leaders) recognising the profound impact of cloud technology on processes and work methodologies.

By collaborating with CHROs, CIOs have the opportunity to leverage existing technology, streamlining and automating HR processes. The PwC HR tech survey highlights the concrete steps that talent leaders can take to capitalise on cloud transformation and other technological investments. Transitioning HR content and applications to the cloud has yielded positive outcomes for organisations, including increased employee satisfaction and productivity.

Moreover, cloud technology plays a crucial role in addressing key HR concerns, such as talent development, remote work management, and employee well-being. Numerous vendors offer cloud based learning platforms that aid employees in developing new skills, while technology assists in identifying skills gaps and providing relevant learning opportunities. Organisations are also prioritising the employee experience by focusing on well-being, flexibility, and personalised work arrangements.

Although cloud migration presents challenges, such as security and skills gaps, robust cloud-based Human Capital Management (HCM) platforms, coupled with updated policies and processes, help overcome these obstacles. HR professionals can utilise cloud technology as a catalyst for implementing other disruptive technologies, such as AI, automation, and blockchain. By gradually integrating and demonstrating the value of these technologies, HR can present a compelling business case and lead the way in driving further investment and success.

In conclusion, the analysis confirms that advanced digital technologies, particularly cloud technology, has had a profound impact on the profile of HR Leaders and HR specialists. It has and will continue to revolutionise talent management, empowered employees through self-service access, addressed critical HR concerns, and provided opportunities for integrating additional disruptive technologies. Embracing cloud-based solutions enables HR to enhance their effectiveness, streamline processes, and contribute to the overall success of the organisation.

Programme	DIGITAL4BUSINESS
Work Package	2.1 Needs Analysis – Role Profiles
Functional Area	Legal
Profile name	Legal Professionals
Example of Advanced Digital Skill Needs	Cybersecurity, Document Automation - Contract Management - Legal Searches - Digital Identity and Signatures, Cloud Storage, AI, Smart Contracts & Blockchain

Potential changes forecasted in the short period due to new technologies

A legal professional engages in the practice of law, providing legal advice, representing clients, and ensuring compliance with legal regulations. They possess expertise in various areas of law, such as corporate, criminal, intellectual property, or civil law, and employ their knowledge to protect the rights and interests of individuals, organisations, or governments.

The legal profession is witnessing the impact of new technologies, including cybersecurity, document automation, cloud storage, artificial intelligence (AI), and smart contracts with blockchain. These advancements have the potential to revolutionise legal processes, improve efficiency, and mitigate security risks. With the growing importance of technology in the legal sector, legal professional must adapt and embrace these innovations to remain competitive and provide effective legal services.

New technologies involved in their upskilling process

Cybersecurity

Analysis of the impact of technology on the legal profile, focused on the findings presented in the 2021 report by the American Bar Association (ABA). The report revealed that 29% of lawyers encountered cybersecurity attacks within their firms during that year. Such attacks encompassed various forms, including computer or smartphone loss or theft, pirating, intrusion, and compromised websites. This percentage signifies a notable increase compared to the preceding year, highlighting the growing significance of cybersecurity as a legal tech trend. The repercussions of these attacks extend to a firm's reputation, client relationships, and financial gains. Although most incidents did not directly impede overall firm performance, 37% of respondents reported revenue loss resulting from these security breaches.

Document Automation - Contract Management - Legal Searches - Digital Identity and Signatures

Analysis of the impact of advanced digital technologies in the legal profile, focused on the creation, analysis, and management of legal documents. It is evident that a significant portion of a legal professional's time is dedicated to these tasks, and the potential for automation is substantial. According to a study conducted by McKinsey & Company, up to 25% of this time could be effectively automated through the implementation of appropriate legal tech solutions.

Recognising the need for greater efficiency in the legal sector, the analysis explored the implications of technology and findings identify the concerns expressed by lawyers in a Wolters Kluwer survey, where 72% of respondents expressed worry regarding the escalating complexity and volume of documents requiring analysis.

As a result, the incorporation of software solutions facilitating document automation, contract management, legal searches, digital identity and signatures has gained widespread acceptance within the legal community. This shift towards automation has notably enhanced the efficiency of legal professionals by relieving them of repetitive tasks and enabling them to focus on more critical aspects of their profession.

Cloud Storage

There has been a significant impact of cloud technology on the legal profession. As legal practitioners, legal specialists now effectively oversee and control their proceedings through online platforms, utilizing various mobile devices and computers, irrespective of geographical location. Notably, according to the ABA's report, a substantial shift towards cloud migration is anticipated, with 71% of legal departments and 75% of firms projected to adopt cloud-based data storage by 2026. Moreover, these advancements will enable them to streamline their in-house procedures by leveraging integrated document management services provided by the software.

Artificial intelligence

Through the utilisation of artificial intelligence tools, law firms and legal departments can enhance their efficiency by leveraging algorithms to identify patterns in data management. We anticipate a rise in investment within this field. Currently, these tools serve as invaluable aids, empowering lawyers to streamline repetitive tasks. Leveraging machine-learning algorithms, the software can review documents and extract pertinent information, enabling lawyers to make well-informed decisions. Although AI has not yet reached its full potential in the industry, we anticipate its increasing adoption for specific tasks, such as contract lifecycle management.

Smart Contracts & Blockchain

The analysis indicates a significant impact of technology, particularly smart contracts and blockchain, on legal profiles. The ability of these technologies to offer secure digital confirmation is highly advantageous in this sector. Although widespread adoption may not occur, the legal industry should remain vigilant of the increasing number of businesses embracing this technology. Notable cases such as Bit2Me, a successful Spanish enterprise, and the digital identity model developed by Alastria highlight the emergence of new legal advisory requirements that many firms are already acknowledging.

Programme	DIGITAL4BUSINESS
Work Package	WP2.1 Needs Analysis – Role Profiles
Functional Area	Business and Financial Operations
Profile Name	Project Managers
Example of Advanced Digital Skill Needs	AI, IoT, Cloud Computing

Introduction
<p>A project manager is a professional responsible for overseeing the planning, execution, and successful completion of projects. They utilise their expertise to effectively coordinate resources, manage timelines, and ensure project objectives are met within budgetary constraints. They possess strong organisational, communication, and leadership skills, enabling them to drive project teams towards achieving desired outcomes.</p> <p>Technological advancements, such as Artificial Intelligence (AI), Internet of Things (IoT), and cloud computing, could significantly impact the role of project managers. AI-powered software enables real-time data analysis, optimising resource deployment and automating administrative tasks. Machine learning algorithms facilitate data-driven decision-making, while IoT integration enhances communication and decision-making processes. Cloud computing simplifies data storage, collaboration, and promotes flexibility.</p>

New technologies involved in their upskilling process
<p>Artificial Intelligence</p> <p>In our analysis, we have observed the significant impact of technology on the profile of project managers. The utilisation of AI-powered software has proven to be highly effective in parsing real-time data, enabling improved resource deployment within projects, regardless of their complexity. Furthermore, technology has played a crucial role in automating daily administrative tasks, streamlining the initial stages of project management. This automation empowers project leaders to focus on high-level strategies, minimising wastage of valuable time and resources.</p> <p>As projects mature, the precise allocation and optimisation of available resources becomes increasingly challenging for project leaders. To address this, machine learning algorithms have emerged as valuable tools for project managers, enabling them to easily analyse real-time data. By efficiently evaluating the outcomes of these analyses, project managers can identify emerging trends and determine the optimal allocation of resources. This strategic approach ensures the maximum</p>

value is extracted from projects in the pipeline. Overall, technology has revolutionised the project manager profile, enhancing their ability to make data-driven decisions and drive successful project outcomes.

Internet of Things

A review of the impact of technology on the profile of project managers, focusing specifically on the integration of IoT (Internet of Things) in project management software. IoT, comprising interconnected physical devices on a shared wireless network, has emerged as a crucial catalyst in the continuous advancement of project management practices. By leveraging IoT, project managers are empowered to create a cohesive network of interconnected devices, seamlessly integrating their digital infrastructure with physical resources such as equipment and machinery. This interconnected ecosystem enables efficient communication and real-time data exchange among devices, facilitating improved decision-making processes.

Cloud Computing

Advanced digital technologies are having a significant impact on project management roles. Previously, project managers faced numerous challenges in organising and managing a large volume of physical files and documents within their cabinets. However, the emergence of cloud computing has revolutionised this aspect. Through cloud software, project managers can now effortlessly store and access all crucial information they require. Furthermore, they can easily share this information with their colleagues and team members, promoting seamless collaboration. The utilisation of cloud storage ensures enhanced data security. It is evident that project managers must adapt to these advancements, becoming more responsive and flexible in order to effectively leverage these technologies for precise employee supervision and gain a competitive advantage.

Programme	DIGITAL4BUSINESS
Work Package	WP2.1 Needs Analysis – Role Profiles
Functional Area	Business and Financial Operations
Profile name	Risk Management Specialists
Example of Advanced Digital Skill Needs	AI, Cybersecurity, IoT, Cloud Computing, Big Data, AR/VR

Introduction

Risk Management Specialists are professionals responsible for identifying, analysing, and mitigating risks within organisations. They utilize their expertise to assess potential threats, develop risk management strategies, and ensure compliance with regulations. These specialists play a crucial role in protecting businesses from financial, operational, and reputational risks by implementing effective risk mitigation measures.

Technological advancements, particularly in Artificial Intelligence (AI), Cybersecurity, Internet of Things (IoT), Cloud Computing, Big Data, and Virtual Reality/Augmented Reality (VR/AR), could significantly impact the role of Risk Management Specialists. AI enables advanced analytics for risk assessment and fraud detection. Cybersecurity ensures protection against unauthorised access and system breaches. IoT allows real-time data collection for proactive risk management. Cloud Computing offers flexible and cost-effective Governance, Risk, and Compliance (GRC) solutions. Big Data integration and analytics provide valuable insights for risk analysis. VR/AR enhance training and risk assessment processes in various industries

New technologies involved in their upskilling process

Artificial Intelligence

Analysis observed a significant impact of technology on the profile of risk management specialists. The rising prominence of AI in risk management is evident, as indicated by the projected reliance of over 40% of privacy compliance technology on AI. Across diverse industries, AI is proving instrumental in risk mitigation efforts. Specifically, in contract management, AI analytics offer invaluable assistance by identifying ambiguous passages, omissions, and standard deviations, enabling informed decision-making. Moreover, AI plays a crucial role in fraud detection, swiftly analysing extensive data sets to identify suspicious logins, identity theft, and fraudulent transactions in real-time. Additionally, AI empowers threat intelligence by efficiently sifting through data, promptly detecting and eliminating potential threats, thereby facilitating rapid response to breaches. The evolving presence of AI in risk management is poised to reshape business practices, ensuring enhanced protection and compliance.

Cybersecurity

A profound impact of technology was observed on the profile of risk management specialists. The field of cybersecurity, encompassing advanced technologies, processes, and practices, plays a crucial

role in protecting networks, computers, programs, and data from unauthorised access and potential harm. As professionals, Risk Management Specialists recognise the importance of relying on industry-leading cybersecurity companies to stay updated on the latest information regarding threats, malware, and system breaches. This knowledge empowers them to make informed decisions, select suitable security defences, and remain vigilant about the potential risks associated with technology usage. Given the ever-evolving nature of security risks, a risk management specialists' role demands a shift from the conventional approach of focusing solely on critical system components and known threats to adopting a more comprehensive defence strategy.

IoT

The analysis highlights the significant impact of technology on the profile of risk management specialists. The emergence of the Internet of Things (IoT) has provided professionals in this field with a powerful resource. By leveraging IoT devices and sensors, organisations can access real-time data, enhancing their ability to effectively manage risks and generate business value. For example, the use of RFID tagging through IoT enables the monitoring of equipment service intervals and fuel levels. This technological advancement empowers decision-makers to identify patterns, adapt to market dynamics, and enhance their risk management strategies. The application of IoT spans across diverse industries such as retail, healthcare, start-ups, and construction, facilitating the collection and analysis of vast data volumes from multiple sources to proactively mitigate risks.

Cloud Computing

The research underscores the profound impact cloud-based IT environments has had on the field of Governance, Risk, and Compliance (GRC) applications. Cloud-based solutions enable convenient access to GRC software as a service (SaaS), capitalising on the virtualisation capabilities of platform-based operating systems and associated middleware software. This approach eliminates the need for organisations to invest in costly in-house GRC applications, as cloud-based options offer flexible usage and pricing models. Moreover, cloud-hosted applications can cater to multiple tenant organisations, optimising efficiency through economies of scale.

Big Data

With the utilisation of data integration and analytics tools such as electronic data warehouses (EDWs), "Big Data," and business intelligence (BI) applications, professionals in the Risk Management field are able to extract valuable insights from existing databases. The implementation of data extraction, transformation, and loading (ETL) technologies further enhances their ability to extract crucial information from complex data files. The integration of Big Data analytics has revolutionised market risk analysis by improving fraud management, credit management, money laundering detection, and operational risk control. Moreover, it enables integrated risk management and market and commercial loan simulations. Data mining techniques aid in predicting component failure, identifying fraud, and optimising company profits. Open data initiatives have also fostered the availability and accessibility of data without restrictions, while real-time data feeds from financial news providers empower organisations to monitor risks and make informed decisions. With advanced business intelligence systems, risk management specialists are equipped to make intelligent decisions and effectively monitor performance. In conclusion, technology has reshaped the risk

management landscape, providing professionals with powerful tools to mitigate risks and drive informed decision-making processes.

AR/VR

Augmented reality (AR) and virtual reality (VR), are having an impact on the role of risk management specialists. AR and VR are revolutionising risk management processes by offering unique applications that enhance various industries.

VR technology has proven to be highly effective in providing experiential learning and training opportunities. Through immersive experiences, users retain a significant amount of information, making VR simulations invaluable for training employees to handling emergency situations. Industries that are technology-heavy and hazardous, such as the industrial sector, can utilize VR to simulate catastrophic events like nuclear reactor meltdowns, preparing employees without endangering their lives. In the civil context, VR can replicate emergency response strategies for different catastrophic disasters, improving preparedness and response.,

AR excels in asset maintenance and risk assessments. By overlaying digital information onto the real world, AR enhances an engineers' ability to identify equipment anomalies such as faulty connections or abnormal temperature levels. AR-embedded devices with thermographic capabilities allow engineers to detect temperature differences within equipment without physical contact, significantly reducing the risk of workplace injuries.

In conclusion, the integration of VR and AR technologies is greatly transforming the role of risk management specialists, equipping them with powerful tools to mitigate risks effectively and enhance overall safety in various industries.

Programme	DIGITAL4BUSINESS
Work Package	WP2.1 Needs Analysis - Role Profiles
Functional Area	Business and Financial Operations
Profile names	Sales and Marketing Professionals
Example of Advanced Digital Skill Needs	AI, Cloud, Blockchain

Introduction

Sales and Marketing Professionals specialise in promoting and selling products or services to customers. They employ strategic tactics to reach target audiences, analyse market trends, build customer relationships, and drive revenue growth.

The implementation of new advanced digital technologies, particularly AI, cloud computing, and blockchain, could revolutionise the role of Sales and Marketing Professionals. AI-guided selling enhances sales effectiveness through predictive analytics, lead prioritisation, and automation. Cloud computing empowers flexible workflows, data accessibility, and cost savings. Blockchain offers transparent and efficient sales incentive programs. These advancements enable sales specialists to optimise processes, improve outcomes, and adapt to evolving market dynamics.

New technologies involved in their upskilling process

AI

The analysis highlights the profound impact of technology on sales specialists' profiles, particularly through the adoption of AI-guided selling. This approach utilises machine learning/generated advice within CRM and software platforms to assist salespeople in adapting to evolving customer needs and markets. By prioritising leads, organising tasks, and identifying target customers, AI-guided selling enhances sales effectiveness and provides sales specialists with more time for revenue-generating activities. Furthermore, predictive sales AI harnesses statistical models and algorithms to analyse extensive datasets and predict outcomes. Its applications span streamlining the sales cycle, optimising lead scoring, providing timely messaging information, and identifying cross-selling and upselling opportunities. AI tools from a range of vendors including Google Cloud AI, Cortex, Hubspot, Veroxy, and Drift enhance sales processes, while sales automation software automates repetitive tasks. By leveraging AI in sales prospecting, geolocation, and forecasting, organisations gain valuable insights and optimise their sales efforts. AI technology, coupled with strategic considerations, empowers sales specialists to achieve improved sales outcomes, streamline operations, and focus on revenue generation.

AI can analyse vast amounts of customer data and identify patterns and trends to segment audiences effectively. By understanding customer preferences, behaviour, and demographics, marketing professionals can personalise marketing messages, offers, and experiences to target specific customer segments, leading to improved engagement and higher conversion rates. In addition AI-

powered predictive analytics enables marketing professionals to forecast customer behaviour, identify trends, and anticipate market demands. By leveraging historical data and machine learning algorithms, AI can provide insights into customer purchasing patterns, preferences, and likelihood to churn. These predictions help marketers optimise their strategies, improve campaign effectiveness, and make data-driven decisions. AI algorithms can also generate personalised product descriptions, blog posts, social media content, and email campaigns based on predefined templates and data inputs. This helps marketing professionals streamline content creation processes and ensure consistent messaging across multiple channels

Cloud

Analysis reveals a significant and transformative impact of technology, specifically cloud computing, on the profile of sales specialists. Cloud technology revolutionises the sales process by offering cost savings through reduced hardware reliance. Access to valuable data is improved, freeing up internal resources for more productive tasks. Field-based sales teams benefit from software as a service (SaaS) applications, enabling easy data access, efficient processes, and enhanced security. Office-based teams experience improved speed, customer experience, cost savings on infrastructure, and secure off-site data storage for business continuity. Sales-based businesses can adopt cloud technology incrementally, starting with SaaS applications, to reap these advantages without major disruptions. Overall, cloud computing empowers sales specialists with flexibility, streamlined workflows, and increased productivity, transforming the way sales teams operate and achieve success.

Cloud-based marketing solutions often offer integration capabilities with other software systems and marketing platforms. This allows marketing professionals to streamline workflows, automate repetitive tasks, and connect different tools seamlessly, enhancing productivity and efficiency. Cloud-based tools and applications enable marketing teams to collaborate seamlessly, regardless of their location. Team members can access shared documents, project management platforms, and communication tools, facilitating real-time collaboration, file sharing, and updates. This is especially valuable for remote or distributed teams.

Blockchain

Analysis reveals the potential of blockchain to revolutionise these programs cannot be overstated. By incorporating elements such as shared ledger, cryptography, consensus, and shared contracts, blockchain offers unprecedented efficiency and transparency. Through the use of smart contracts, all stakeholders, including the sales force, sales managers, compliance teams, HR, and finance, can be seamlessly connected, ensuring a cohesive and expedited workflow.

The benefits of adopting blockchain in sales incentive programs are abundant. Faster incentive payments, increased transparency through a systematic workflow, reduced transaction fees, and enhanced motivation and satisfaction among the sales force are just a few of the advantages. The future holds immense possibilities for the integration of blockchain technology in the realm of sales.

Marketing professionals can leverage blockchain to ensure the integrity and security of customer data, transaction records, and digital assets. This helps prevent data breaches, fraud, and

unauthorised tampering. Additionally, blockchain's transparent nature allows stakeholders to verify the authenticity and provenance of data, building trust between brands and customers. Blockchain can address challenges related to ad fraud and lack of transparency in digital advertising. By utilising blockchain-based ad platforms, marketing professionals can track and verify ad impressions, clicks, and conversions, ensuring that advertisers receive accurate data and that budgets are used effectively. Blockchain can also enable micropayments for ad views and interactions, incentivising users to engage with ads and providing more transparency in the advertising ecosystem.

Project	DIGITAL4BUSINESS
Work Package	WP2.1 Needs Analysis – Role Profiles
Functional Area	Transportation and Logistics
Profile names	Supply Chain and Logistics Specialists
Example of Advanced Digital Skill Needs	AI & Machine Learning, Blockchain, Smart Supply Chains, 3D Printing, Digital Twins

Introduction

Supply Chain and Logistics Specialists are professionals responsible for managing and optimising the flow of goods, information, and resources in a supply chain network. They utilise their expertise in areas such as demand forecasting, inventory management, transportation, and strategic decision-making to ensure efficient operations and meet customer demands.

The integration of new technologies such as AI and machine learning, blockchain, smart supply chains, 3D printing, and digital twins is changing the role of Supply Chain and Logistics Specialists. These technologies enhance operational efficiency, improve decision-making, increase transparency, enable real-time tracking, address supply chain constraints, and proactively identify and mitigate disruptions. Embracing these advancements is crucial for staying competitive in the evolving industry.

New technologies involved in their upskilling process

AI & Machine Learning

The impact of technology in the field of Supply Chain and Logistics has been significant. The introduction of Artificial Intelligence (AI) is evolving the role of specialists in this domain. AI automation capabilities have streamlined repetitive tasks such as demand forecasting, inventory management, and optimisation. This automation allows supply chain managers to focus on strategic decision-making, improving overall operational efficiency.

While concerns about job loss persist, AI is expected to create new positions that require different skill sets. AI improves efficiency, reduces costs, and increases accuracy in areas like demand forecasting, inventory management, and optimisation. Supply chain managers play a crucial role in leveraging AI capabilities and interpreting data for informed decision-making.

Machine learning algorithms have improved supply chain planning by analysing large datasets, optimising delivery, and reducing human error. Warehouse management has been revolutionised by AI-powered algorithms that quickly analyse data, automate tasks like barcode reading, and enhance inventory control. AI enables better prediction of customer needs based on historical data, increasing supply chain efficiency. It can also improve shipping routes, reduce transit times, and forecast peak hours in logistics centres.

AI and machine learning simplify organisational strategy, improve human resource management, and enhance back-office processes through automation. Autonomous vehicles offer cost-effective and

efficient transportation solutions. AI aids marketing operations and dynamic pricing, while computer vision enables damage detection and prevention.

In conclusion, the adoption of AI and machine learning in logistics revamps operations, improves decision-making, and drives business growth. Despite challenges such as data quality and implementation costs, embracing these advancements is crucial for Supply Chain and Logistics specialists to stay competitive in an evolving industry.

Blockchain

The research identified that technology, particularly blockchain, has had a significant impact on the profile of Supply Chain and Logistics specialists. The introduction of blockchain technology has enhancing supply chain transparency through end-to-end asset tracking and reducing fraudulent activities, especially in the case of high-value goods. The adoption of blockchain also brings forth several advantages, including improved control over outsourced manufacturing, streamlined administrative processes, and enhanced credibility and public trust. It is essential for companies to closely monitor the progress of blockchain within the industry and explore the development of their own blockchain prototypes to capitalise on its benefits. Blockchain serves as a secure platform for validating, recording, and distributing transactions through encrypted ledgers. The dynamic nature of the technology landscape necessitates a proactive approach in leveraging blockchain's potential to optimise supply chain and logistics operations.

Smart Supply Chains

Through the integration of the Internet of Things, mobile private networks, and 5G, smart supply chains are reforming supply chains. These advancements enable automatic rescheduling and rerouting of shipments, providing real-time updates to customers. Furthermore, the utilisation of customer demand data allows for continuous forecasting and planning, ensuring all stakeholders are well-informed and coordinated.

3D Printing

The surge in consumer demand coupled with persistent supply chain constraints necessitates the adoption of emerging technologies like 3D printing. These technologies not only alleviate shortages and mitigate disruptions but also offer scalable and sustainable solutions to address evolving consumer requirements driven by the pandemic.

Digital Twins

The integration of strategic digital twin technologies has emerged as a crucial solution for addressing persistent bottlenecks and shortages in the supply chain. By adopting the digital twins approach, coupled with business insights and industry best practices, companies are now able to proactively identify and tackle supply chain anomalies and disruptions. This advancement has led to notable enhancements in the planning and management of the entire supply chain, elevating the role and capabilities of specialists in this field.

Summary:

Across the various role profiles in administration, project management, legal, HR, sales, and supply chain management, the integration of advanced digital technologies is of utmost importance. Embracing these technologies not only improves operational efficiency but also provides opportunities for innovation and growth. Professionals who possess these advanced digital skills, adaptability, and a willingness to upskill themselves will be well-positioned to thrive in the changing landscape of work and contribute to the success of their respective functional areas.

QUALITY SUMMARY

Work Package No/Name	WP2 Needs Analysis
Deliverable Name	D4B Needs Analysis Report
Partners involvement	Technology Ireland ICT Skillnet & Akkodis
Submission Deadline (As per Annual Work Plan)	31-05-2023

Rate	1	2	3	4	5
Quality Parameter	very low/strongly disagree	low/disagree	moderate/neither nor	high/agree	very high/strongly agree
1. The work performed corresponds to the requirements and methodological standards of the project.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Insert text here...Insert text here...					
2. The drafting and structuring of each deliverable include the contribution of all relevant experts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Insert text here...Insert text here...					
3. Deliverables use clear and easily understandable language in the text and the design is professional and in line with the project brand identity, guidelines, and document template.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Insert text here...Insert text here...					
4. The output is in line with the standards adopted by the European Commission.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Insert text here...Insert text here...					
Name of the WP Leader	Carmel.somers@ICTSkillnet.ie				
Submission Date	30/06/2023				

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