Organizational Learning Challenges in e-Learning: Critical Success Factors Identified by SMEs to Ensure Economic Growth in the European Union

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Abstract. Digital skills have become a crucial point for small and medium-sized enterprises (SMEs) to ensure economic growth in Europe. This empirical digital skills study is based on total 848 SMEs' survey results, where research e-learning education needs in 7 EU countries (Finland, Germany, Greece, Cyprus, Hungary, Italy, and Poland) and gives organizational guidelines for an e-learning platform that could develop SMEs' digital skills and support employees' efficient lifelong learning. Upskilling in the European population is one of the major duties that support the European Skills Agenda 2020 and Digital Education Action Plan, which has the objectives of (1) enhancing digital skills and competencies for digital transformation while (2) fostering the development of a high-performing digital education system. Therefore, the Digital Compass and the European Pillar of Social Rights Action Plan set ambitious policy targets of reaching a minimum 80% of the population with basic skills and having 20 million ICT specialists by 2030 in Europe [1]. The research results illustrate the digital skills needs of SMEs and improve workers' engagement and motivation to understand their digital skills gaps so that their upskilling increases the success and competitiveness of SMEs in the European Union.

Keywords: Organizational Issues, E-learning, SMEs lifelong learning, Digital Skills, Dynamic capabilities, SME Business model implementation, Economic growth, European Union.

1 Introduction

In the 21st century, several challenges arose for companies and workers, as well as for society with the globalization of markets. New technologies are accelerating digital transformation and customer requirements are becoming more complex and individualized, which has required companies to develop digital skills faster. The study seeks answers to the training needs of small and medium-sized enterprises in 7 European countries from the perspective of e-learning and lifelong learning. This study highlights skills shortages and training needs, which are key to companies' success in global competition. This empirical digital skills study will also present an e-learning

ecosystem model for the deployment of new technologies and digital skills, which is key for small and medium-sized enterprises in Europe. Companies' new competitive advantages are based on the ability to identify the digital skills that are most relevant to their business and encourage all employees to develop them, for example, through e-learning platforms and lifelong learning. The term "lifelong learning" refers to these challenges and draws attention to the fact that learning is and will be a process that does not end with a diploma. [2] At the same time, companies want to take advantage of e-learning platforms for easy accessibility, regardless of place and time. Companies are forced to develop their human resources on a permanent basis. These are major challenges for lifelong learning and all companies should increase their investment in this process. E-learning has grown tremendously with technological developments, especially in the field of education, and in the integration of platforms: technology, education, and economy. [3] The form of e-learning brings with it, among other things, low costs, the division of study time between work and teaching, self-directed study by the student, and the independence and flexibility of the place of study, as long as the teaching line is uniform on standardized platforms. [4]

As companies seek to compete in global markets, it has become increasingly important to find a skilled workforce and a workforce that masters the necessary working life skills, competencies, and motivation. The use of appropriate online training and methods can lead to strong, sustainable, and balanced growth of companies. This will help create research-based suitable online trainings to address skills shortages and training needs, while enabling the exchange of experience between consultants from companies, universities, development companies, and educational organizations across Europe. Based on research, training is created to meet the needs of online education, and online trainings help to acquire the latest knowledge and skills for personal, organizational, and social development. [5]

The European Commission has carried out The Digital Economy and Society Index (DESI) report in 2022, the results of which show that most Member States are making progress in their digital transformation process, the uptake of key digital technologies such as artificial intelligence and big data by companies is still low, including among EU pioneers. Insufficient levels of digital skills undermine growth prospects, widen the digital divide, and increase the risk of digital exclusion as more and more services move online. Therefore, the level of digital skills needs to be enhanced to ensure the full roll-out of the common infrastructure present (in particular 5G). 5G enables the development of innovative services and applications, including services related to education and training. Finland, Denmark, the Netherlands, and Sweden continue to lead the way in the EU. Still, according to the 2022 DESI report, it was found that digital challenges continue to affect most frontrunners as well. [6] That's why we need more research into e-learning and lifelong learning ecosystems that enable staff to keep their digital skills up to date. We also need to recognize the digital skills and capacity gaps of our workforce in SMEs, such as seven European countries in this case. This allows us to build the right kind of short training to meet the needs of companies and maintain growth in the global market.

The general objectives of the study are defined in the research questions formulated as follows:

- What kind of digital skills does your company need now and in the future?
- What kind of digital tools employers should learn?
- How does the company utilize e-learning platforms and support lifelong learning?

In line with these research questions, this study focuses on companies' digital competence development and online learning environments and learning ecosystems. Thus, the specific objectives of this study are:

- Identify the skills and training needs of enterprises so that enterprises and educational organizations can understand and influence these needs.
- Analyze good practices in e-learning tools theoretically and propose a theoretical e-learning framework that allows understanding of e-learning.
- Propose an e-learning ecosystem solution and review and adapt the e-learning framework to guide future practices and research.

2 e-Learning and Lifelong Learning in SMEs environment

Clarke (2008) defines e-learning as "learning through and with the help of information technology." [7] Khan (2012) distinguishes the eight fundamental pillars of online learning, which are pedagogy, technology, user interface design, assessment, management, resource support, ethics, and institutional issues. In this study, online learning is also visible as online learning. [8] To address the ongoing challenge of lifelong learning and ensure learners' productivity, e-learning systems have been developed with flexibility and individuality in mind, including work-based learning. [9] Due to its flexibility and accessibility, e-learning is rightly considered an enabler of lifelong learning. E-learning has huge and far-reaching potential to change how and when employees learn. Ultimately, online learning is a catalyst for change and integration that unleashes processes that affect work and life as a whole. It must be seen as an opportunity for SMEs to improve their business and promote competitiveness in global markets. Some benefits of e-learning for SMEs have been identified in European projects such as analyses carried out by ARIEL (www.ariel-eu.net, [10], [11], as well as studies such as those commissioned by Cedefop in Austria and Italy [12]. The European Bord of Life Lifelong Learning CEC found that the lifelong development of skills, including work-based learning in general, including business competence in general, depends on the implementation of the following measures: 1) identification and anticipation of skills and competence needs, 2) identification and assessment of competences, 3) provision of information, support, and guidance, 4) acquisition of necessary resources. [2] In other words, e-learning is a learning model in which a company delivers a series of digital learning content for educational activities and learning using information technology and the Internet to help learners improve their digital skills [13,14] The development of information technology involves several different stages, so the approaches used to understand and interpret e-learning are different. Several previous studies used the term asynchronous online learning, while later studies began to describe the concept as synchronous online learning [15,16]. After

that, some researchers started using the term online learning [13,17,18]. Subsequently, some researchers began using the term e-learning [13,17,18]. Regardless of the term used, all these researchers have presented their views on the common characteristics of e-learning methods, which include their interactivity, systematics; the use of information technology equipment, the Internet and other technologies as media; and their concentration with the goal of learning [13,14,17,19,20]. In this study, these learning methods are collectively referred to as online learning.

The e-learning system is mainly used in the educational environment (schools and colleges), the corporate environment (for training business personnel) and personal training (personal development). In order to enable large-scale training of employees, the e-learning system and its systematization and automation can have a direct impact on the development of employees' skills. As a learning method in companies, e-learning uses ICT to provide training to anyone and is not limited by time and space constraints. It is currently widely used in many schools and education-related fields and is becoming increasingly popular among businesses [21]. It is not only a tool and environment that facilitates learning, but also a way to circumvent various learning limitations. Companies have started experimenting with online learning and are demanding learning and training programs that offer more scheduling and planning flexibility as well as on-the-job learning. It is no longer leisure learning, but also lifelong learning in the workplace. Companies should continuously train and improve the competence of their personnel so that the company can offer a competitive operating environment to its customers [22-24].

E-learning 2.0 is based on tools that easily combine content creation with web-based learning and collaboration. It therefore focuses on the community [25] and supports the natural non-formal learning of individuals and groups in SMEs by simplifying activities such as working and learning in groups. For example, writing for public blogs forces the writer to think about those things. Communities receive feedback from peers and help from a network of individuals. Online learning 2.0 is also impacting formal learning environments, and these are particularly useful for collaborative learning. The eLearning industry in 2.0 [26] relies on delivering content in small chunks as part of a broad process to meet SME staff's needs for faster learning in the context of their work. The eLearning Industry website explains how to learn new skills in a realistic environment where many content creators in virtual reality environments are able to solve courses that meet their business needs. Online learning platforms and virtual environments make it possible to monitor learning and return to learning materials, which makes it easier, for example, to update official work cards.

An effective and widely distributed system of lifelong learning would be acceptable, which is why, for example, large EU projects can be used to build an e-learning platform that utilizes a sustainable and holistic approach, such as the Robocoast Edufication platform. With the advent of e-learning platforms, the idea of a "learning ecosystem" [27] has emerged. A study by Chang and Guetler (2007) showed that most literature uses the term with little or no definition of its use, or explains its meaning, only linking it to other concepts [28]. Some researchers addressed specific aspects such as [29] focusing mainly on environmental aspects, [30] exploring informal learning ecosystems that emerge around multiplayer online games, [31] focusing primarily on

actors, [32] focusing on the learning process, [33] addressing the ecosystem of the evolutionary learning community and the evolutionary learning ecosystem in the context of learning discussions and design discussions, and [34] or focusing on the technology perspective and defining basic architecture. According to [35] the learning ecosystem, it was made up of different communities that interacted within and between individuals and groups, other key aspects were the environment and tools and artifacts that are treated implicitly. However, the lack of a general view of learning ecosystems in the literature has led us to propose a more general definition. Chang and Guetl's (2007) general view of the learning area was based on an abstract definition according to which an ecosystem is classified according to biotic and abiotic components and all their interrelationships within certain physical limits. Transforming it into a learning area, Chang and Guetln propose an abstract definition of a learning ecosystem (LES) made up of stakeholders that incorporate the entire learning process chain and learning assistance programs, the learning environment, within certain limits that we call the boundaries of the learning environment. [28] In this study, the learning ecosystem is seen as a separate part of the European Digital Innovation Hubs (EDIHs), where EDIH offer teaching modules for companies to increase their digital skills, which is seen as a learning ecosystem. In this case, the learning ecosystem consists of learning content produced by various stakeholders, including EDIH, and learning programmers that are published within EDIHs and distributed to SMEs. This kind of learning ecosystem is being built, for example, in the Level Up project by 7 European countries. Therefore, based on research and other research findings, we will propose an "e-learning ecosystem" solution inspired by the increasing adoption of the ecosystem model in several application areas.

3 Methodology

This article uses a mixed-methods approach, including a literature review and a survey, to examine the training needs of enterprises in 7 European countries from an e-learning and lifelong learning perspective. Our research will focus on linking empirical data skills shortages and training needs to a literature review that provides a solid and comprehensive understanding of the role of e-learning and lifelong learning in maintaining the competitiveness of European SMEs. The results of this study contribute to knowledge and provide valuable insights for SMEs, higher education institutions and educational institutions, development companies, and policymakers on European skills and training needs in the context of e-learning and lifelong learning.

3.1 Literature Review

The literature review portion of this study, reviewed in Chapter 2, included a comprehensive academic search journals, books, and online resources to identify relevant research and best practices in the field of e-learning in the context of small and medium-sized enterprises. The literature review synthesized the results of these studies and provided a comprehensive overview of the current state of the field. It was carried out with a systematic approach. The search strategy sought a relevant database, such as

Google Scholar, on e-learning practices in the context of small and medium-sized enterprises and to search for articles and publications related to lifelong learning. Articles and publications of the literature review had to be peer-reviewed, published in English and focused on e-learning and lifelong learning in the SME context. Articles that were not relevant to research questions, such as those focusing on educational organizations or non-peer-reviewed sources, were excluded. The literature review process was rigorous and transparent, following established guidelines for systematic literature reviews. The results of the literature review provided a comprehensive understanding of the current state of the field. The literature review on e-learning and lifelong learning in the context of small and medium-sized enterprises, summarized in Chapter 2, was essential for the formulation of the survey and the future development of e-learning materials.

3.2 Survey and Focus Group Discussion

In order to examine the implementation of e-learning and lifelong learning in SMEs and to support organizations such as universities, universities of applied sciences, colleges, and development companies, a quantitative research methodology was used. The data was collected through an online survey (Lyyti Event Management system and survey tool and Google docs) that was distributed to the target population through several channels, such as email, social media channels (LinkedIn, Twitter, Facebook), and seminars with relevant stakeholders. A Survey is a structured and closed survey that, is designed to collect quantitative data on companies' digital skills and competence needs. The survey is designed to be completed in approximately 5-10 minutes. Small companies tend to have low response rates. [36] Therefore, the survey was kept as short as possible because SMEs in particular find it difficult to answer longer surveys in their very busy everyday lives. The survey answers were collected between 1 March and 15 June 2023. The total number of participants was 848 SME companies. According to the European Union's definition i.e., independent registered companies with less than 250 employees. Over 80% of the responses came from a region of three countries Greece, Poland, Cyprus, and four partner countries faced challenges in getting responses to the survey, which was Hungary, Italy, Germany, and Finland, see Figure 1

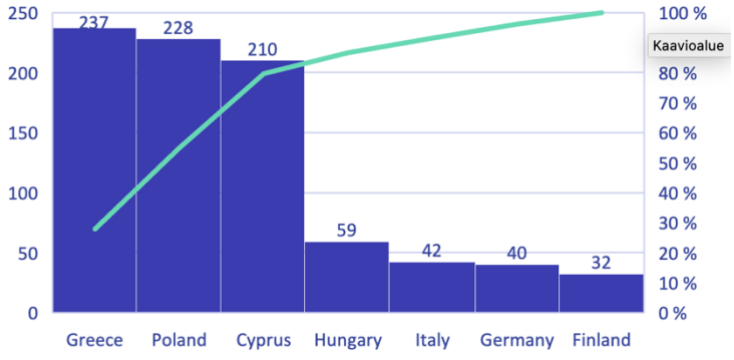

Fig. 1. Company country location of survey participants. Numbers and percentages (%).

The collection of data for the study emphasised the inclusion of SMEs in the EDIH digital skills sample should take in account, rather than the collection of country-specific data. Micro, small, and medium-sized companies represent 90% of all respondents to the survey. Special attention is given to the needs of small and medium-sized enterprises (SMEs). Particular attention should be paid to the needs of small and medium-sized enterprises (SMEs), because. in Europe, 23 million SMEs represent 98% of businesses, provide 67% of jobs, and create 85% of all new jobs. [37]

The SME digital skill survey consisted of four background questions and 14 questions aimed at gathering information on the digital skills gap in SMEs, and e-learning course needs. The aim is to collect data across Europe on the digital skills needs and skills shortages of SMEs in 7 countries so that universities, universities of applied sciences, vocational training centers, and development companies can implement e-learning and lifelong learning in SMEs to meet their needs. The questions are divided into two categories: (1) background information and (2) digital skills and competence needs, in the context of the e-learning platform and lifelong learning, where learning takes place mainly as on-the-job learning, at workplaces, and at home. The target group of the survey was SMEs and their digital skills mapping and needs across 7 European countries. Background questions include information about the location of the company (country), the size of the company, the position in the company, the industry in which the company operates. This information will be used to identify companies' digital skills in Europe and their digital skills needs in the future. From the perspective of mapping digital competence needs and utilizing e-learning platforms, the questions answered about the importance of digital skills for companies, the skills gap in the company, and the primary reason why digital skills need to be promoted in SMEs. After that, depending on the size of the company, the company's IT team or department and its software knowledge and skills were reviewed. In addition, the company's digital competence gaps and the biggest obstacles to promoting digital skills were discussed. On the other hand, the most important solutions to increase digital skills in a company. Tools that employees should learn to use, what kind of training, and how often the company should implement to raise the digital level of employees. Regarding the need for digital competences, the aim of the implementation of the questions was to collect information on the current state of digital competence in companies and the necessity of e-courses in the respondent's company. These questions included information on the level of digital learning used and the needs for the company's success in the European market.

The obstacles and opportunities related to the implementation of digital skills by utilizing the ecosystems of e-learning environments aimed to find out the reasons for implementing or not implementing digital on-the-job learning. These barriers include a lack of training, a lack of time available for training, a lack of access to educational resources, and difficulties in finding skilled trainers. In addition, (Kahnra et al. 2020) list other reasons such as, a lack of understanding of technology and course interface, difficulty tracking digital content that is often complex and full of jargon, lack of real-time interaction between students and instructors, and unreliable digital materials [38]. In connection with the questions, suggestions were given at the end for study modules

utilizing the ecosystem of e-learning environments, which were revealed in the focus group discussions, among other things.

The research data was analyzed using descriptive statistics. The figures presented aim to highlight the significant links between digital competences, digital skills gaps in business life between knowledge variables. In addition, barriers and opportunities related to the use of digital technologies and e-learning. Digital competence and willingness to raise the level of digital competence in working life were assessed in the SMEs that responded to the survey. The data collected prior to the evaluation were checked for errors to ensure that the data is accurate and usable for analysis. Finally, a report was written summarizing the results of the study. The report included an overview of research questions, methods used, results and recommendations to address the digital learning needs of SMEs. The main findings are part of this publication.

The third research method used was a focus group of discussions. The focus group discussions sought qualitative material on the skills and training needs of European companies to design e-learning courses that meet their needs in the future. The aim of this focus group research part is to identify SMEs' perceptions of their digital skills, needs and e-learning platforms by embracing technology-based education in the future. The study consists of second-phase focus group discussions, which are qualitative research. The focus groups were carried out in 3 roundtables with training providers (Cyprus, Greece, Finland) and attended by representatives of state authorities and policymakers. Three focus groups were set up, each comprising 4-17 decision-makers and the focus groups ran for an average of 90 minutes. Respondents were selected from high level policy makers and ministry. Cyprus roundtable discussion participate 17 government representative and policymakers. Finland roundtable discussion participate 4 represent positions and areas that have the leading roles of digital transformation in Finland such as Ministry of Environment/ built environment (building, land use, permits for industry), Business Finland as a leading governmental body for funding and from Dimecc Ltd a large public-private-partnership organization of manufacturing enterprises. The roundtable online meeting in Greece, participate seven and they represented Greek governmental service organizations for enterprises such as Chambers of Commerce, the Association of Informatics and Communications of Greece, and Hellenic Federation of Enterprises.

The study is part of a longitudinal study exploring at a later stage the possibilities of creating an e-centric, collaborative learning environment ecosystem to support effective data transfer. While most needs are commonly identified, there are some differences. Raising awareness of the value of digital skills in SMEs is considered a key factor for the competitiveness of European companies. In Finland, digital skills are more related to business skills than in Greece and Cyprus, solutions are related to personal competence development. Another difference that emerged was that in Finland the aim is to present digital solutions for the digital transformation of ecosystems and business value chains, while in many other countries, the focus was mainly on companies and employees.

4 Results

Increasing digital skills and e-learning could be a solution to address the skills gap in SMEs in specific sectors, and this platform could be used as a means of reskilling the workforce. In 2021, only 55% of small and medium-sized enterprises (SMEs) achieved at least a baseline level of digital technology adoption, the DESI study found. Sweden and Finland have the most digitalised SMEs (86% and 82% respectively have a digital baseline), while Romania and Bulgaria have the lowest levels of digitalisation for SMEs. To achieve the Digital Decade target, at least 90% of EU SMEs should have a basic digital intensity by 2030. Businesses are increasingly digitalising, but the use of advanced digital technologies remains limited. While already 34% of businesses rely on cloud computing (in 2021), only 8% use AI (in 2021), and 14% use big data (in 2020). According to the proposal to move forward into the Digital Decade, at least 75% of businesses should deploy AI, cloud computing, and big data technologies by 2030. [6]

Just over 80% of our survey responses came from a region of three countries, compared with the results of four other countries. A total of 848 people responded to the survey, of which about 100 gave incomplete answers. Overall, Hungary, Italy, Germany, and Finland performed similarly to Greece, Poland and Cyprus, so it seems that the needs and perspectives of companies are quite similar in Europe. As a result of our survey, micro, small and medium-sized enterprises represent 90% of all survey respondents. The companies of the participants in this study operate mainly in the technology, engineering, manufacturing, and construction industries (see Figure 2).

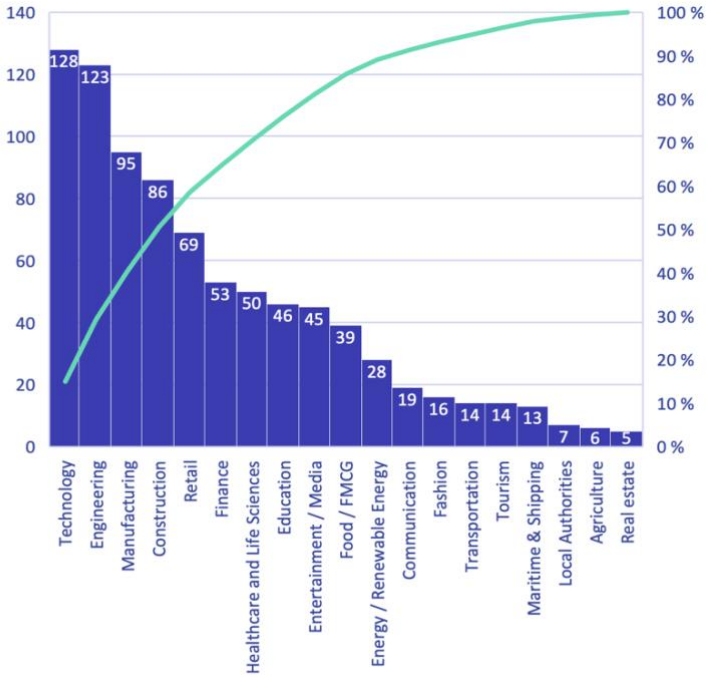

Fig. 2. Industries where companies operate in. Numbers and percentages (%)

According to the European Commission (2021), only 17% of SMEs have so far successfully integrated digital technologies into their business [39]. Governments across Europe are offering pilots to accelerate the adoption of e-commerce solutions by SMEs as the pandemic has pushed small businesses into digital business models. This is a unique opportunity as digital learning can be a driving force for raising awareness, helping businesses understand future needs, and creating the digital skills needed to make the most of the digital space. Digital learning and the digitalization and automation of work tasks could encourage SMEs to focus on innovation and market access by developing skills and knowledge through digital learning. [40] According to research results, more than 50% of companies lack digital skills. Respondents feel that lack of time and practice makes it difficult to acquire new skills, about 40% of respondents believe this. About 18 percent have not had access to training resources, which does not mean that employees have difficulty learning, but the company does not have the necessary resources, 29 percent of respondents say. On the other hand, 10% think that finding qualified trainers is not easy. (see the results Figure 3).

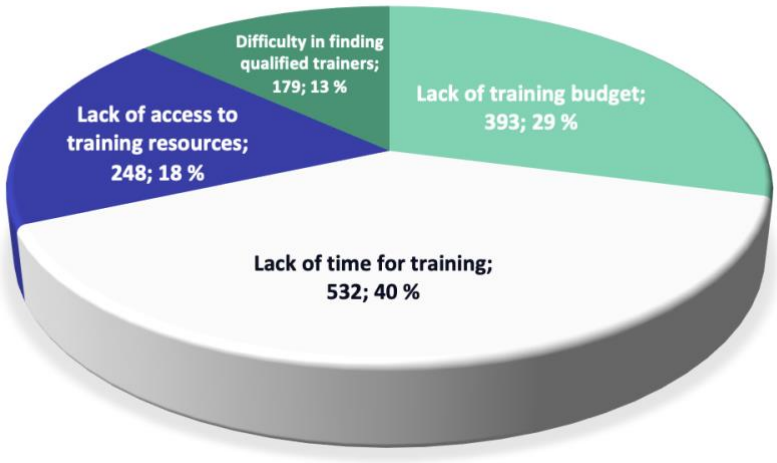

Fig. 3. The primary barriers to closing the digital skills gap in companies. Numbers and percentages (%).

The analysis presented here reveals the gaps in the use of digital technologies between small and medium enterprises in the EU (Cyprus, Greece, Germany, Finland, Italy, Hungary, Poland) with low ICT competencies in SMEs being the prime reason.

4.1 Empirical Findings and Results

It is characteristic of SMEs that ICT tools are used in all areas covered by research, but there are also many gaps in the skills of employees to use certain tools. These results are compatible with the EU DESI 2022 survey [6]. This is only a small sample of EU companies, so further research is needed in the future, focusing on a deeper examination of digital skills with extensive business data. In addition, the readiness of companies to

adopt digital tools, is a reason why mapping the level of education is also considered important. As a result of the study, it was possible to see which employees' skills are lacking and what kind of skills will be needed in SMEs in 2023. An example of this is figure 4.

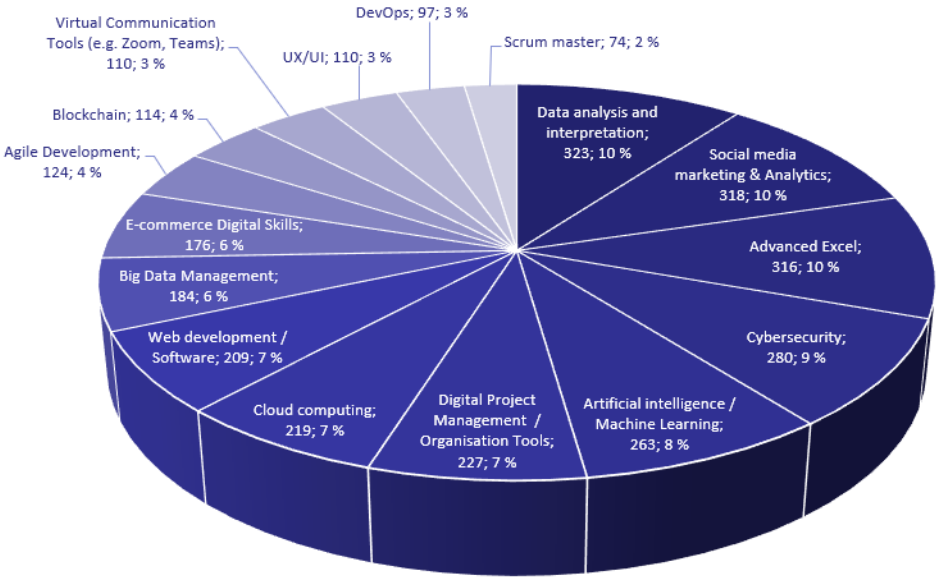

Fig. 4. Digital skills gaps for SME employees. Numbers and percentages (%).

Based on the survey responses, data analytics is one of the key competence areas in SME competence 10% of the respondents considered data analytics to be the most important competence gap. Data analytics are needed in both strategic decision-making and operations. According to the Survey of Business on the Data Economy Report 2022, at the EU level, external barriers are more common: 45% of companies do not analyze the data they store, indicating that they do not have data worth analyzing, and 31% say they are not useful analyzing it. Internal barriers preventing companies from analyzing data were also highlighted, with a lack of human resources being the most common (19%). Another internal barrier is the lack of the right business skills (15%), followed by most companies reporting that they do not have the right IT and coding skills to analyze data (9%). [41] The same 10% was achieved by social media marketing and analytics related to the company's marketing and media visibility. Also, the Advanced Excel skills level was 10%, which can be seen as a basic digital skill. After this, cybersecurity is the fourth most important 9%, which has been highlighted as one of the key development areas in the EU. The fifth most important was artificial intelligence, which has emerged as one of the key tools. Artificial intelligence is seen to emerge as a revolutionary tool like the Internet in its time. The Digital Europe Programme has strengthened its AI expertise in different countries by producing a European Digital Innovation Hub for each EU country, of which there are 151 in total.

[42] Other important digital skills gaps included: Project Management Tools and Organization Tools, Competence in utilizing digital tools for project management and organization is essential across different departments to optimize project workflows. Web/Software Development, Digital Marketing, E-commerce Skills: Departments like web/software development, digital marketing, and e-commerce require employees with expertise in website and software development, digital marketing strategies, and e-commerce practices. Big Data Management, E-commerce, Blockchain, Agile Development, Virtual Communication Tools, UX/UI, DevOps, Scrum Master: These skills are required in various departments to harness data insights, drive effective marketing campaigns, implement blockchain technology, manage big data, enhance user experience, and adopt agile development methodologies. Blockchain knowledge is essential for departments exploring blockchain solutions for various applications.

According to the survey, the most popular digital tools for employers and managers for their employees were Microsoft Office Suite (493), Gsuite (262), Zoom/Teams (261), Microsoft Power BI (247), and Jira/Trello/Asana (296). These results show that it is important for SME employees to master a wide range of digital tools to perform their tasks effectively. Microsoft Office Suite and Gsuite are popular office suites that provide versatile tools for creating documents, spreadsheets, and presentations. Zoom and Teams are popular video conferencing software that enables remote work and remote meetings. Microsoft Power BI is a powerful data visualization and analysis tool that helps businesses better understand their business. Jira, Trello, and Asana are popular project management software that helps companies manage their projects effectively. See the results in Figure 5.

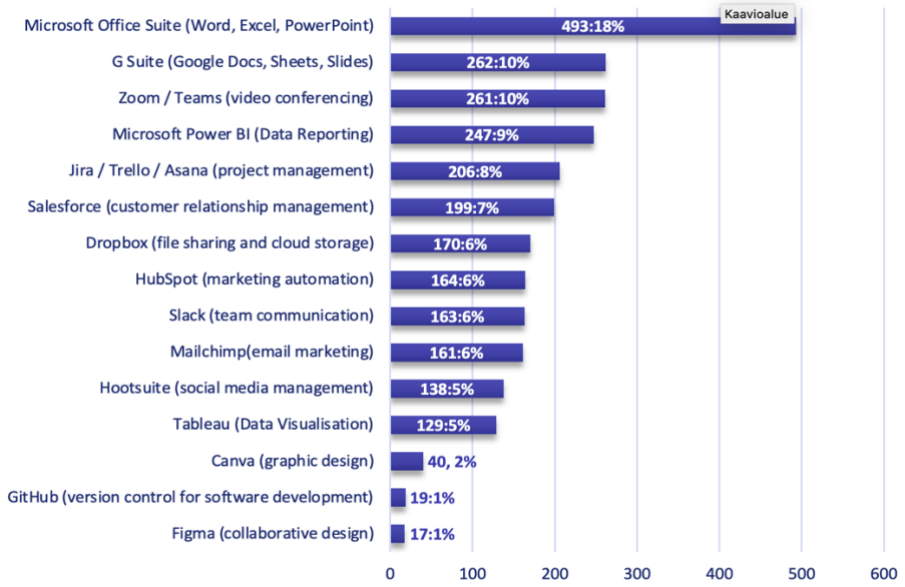

Fig. 5. Digital tools employees should learn. Numbers and percentages (%).

This study explored the digital skills SMEs need now and in the future in European countries. The study answered the questions of what kind of digital tools employees should learn, in addition, skills and training needs were identified so that companies and training organizations can understand and influence these needs.

4.2 Applying E-Learning Ecosystem Platform for SMEs'

The study examined the provision of digital ICT training and how often training is provided to employees. The majority of companies responded that they provide 50% of ICT training as needed (499 respondents), while some respondents said they deliver annually (269 respondents), the rest semi-annually (133 respondents) and quarterly (95 respondents). From this, it can be concluded that ICT training is provided as needed, and of course, it can also be asked whether the results of the skills of the participants are measured and whether the results are monitored systematically in companies. However, as the study revealed, there were many shortcomings in basic IT skills (e.g. advance excel course). The result shows that e-learning platforms, asynchronous online courses and synchronous online courses, and work-based learning are the most interesting ways to learn digital skills (see Figure 6).

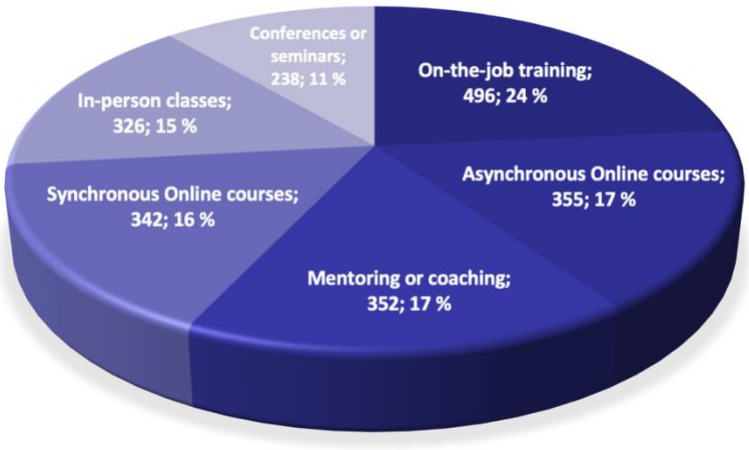

Fig. 6. Most effective digital skills training. Numbers and percentages (%).

The survey results show that SMEs are interested in asynchronized and synchronized online courses and that teaching also takes place in the workplace.

When defining an ecosystem, physical boundaries define the physical and logical boundaries of a learning system. One of the common features of the system is defined as the conditions of the learning environment. especial e-leaning environment (asynchronized and synchronized online learning environments). These conditions are determined by external and internal influences such as current knowledge and development, educational objectives, learning missions, cultural and sociological aspects, and expectations of social, industrial, and business organizations, government,

public service, and non-profit organizations. Finally, in order to define a concrete model [31], it is necessary to define the system, scope and temporal and spatial scale. The E-learning Ecosystem (ELES) is divided into (A) specificities of learning communities and other stakeholders, (B) more specific learning assistance programs, and (C) more limited learning ecosystem conditions. As can be seen in the definition of ecosystem, learning ecosystem and e-learning ecosystem, it can be summarized that the idea of ecosystem can be applied to any learning and e-learning ecosystem; and as shown here, the SME e-learning ecosystem. [28]

With this insight, this article aims to highlight the online learning ecosystem with a strong emphasis on a holistic approach to developing more effective learning environments. As the results of the study showed, the EU has defined European Digital Innovation Hubs, which are ecosystems in themselves, to raise companies' digital skills and thus develop training to develop digital skills. To achieve this, the strategy for developing a more efficient online learning environment is to continuously improve the entire ecosystem. In practice, the eLearning ecosystem will be implemented by incorporating user-centered collaborative learning, pedagogical aspects, content and learning design, technological innovation, as well as sustainable development principles, and environmental aspects, such as social and cultural factors that help learners respond to new and uncertain circumstances. By looking at human aspirations in an ecosystem-based e-learning environment, we get closer to understanding the ways in which communicating an e-learning system within an ecosystem can improve learning, knowledge building, and social and cultural development.

5 Reflections and Future Work Challenges

Evaluation of the literature has shown that there have been many studies on e-learning and lifelong learning in at least the last 20 years, with more studies coming from digital learning and workplace learning in e-learning environments as well as virtual environments. However, research is needed to promote the digital skills of SMEs, as not all digital skills are at a basic level, as research results have shown.

E-learning is seen as a training tool and a means to improve continuous learning for SME employees. To manage this, e-learning Facilitation and infrastructure must be included in workplace learning. SMEs will also need to study knowledge, skills, and codes of conduct for workplace e-learning and apply the skills acquired through e-learning activities to work-life practices. Effective Pedagogy with reliable materials and resources plays an important role in the e-learning environment and ecosystem creation of SMEs. It is also important to measure the learning outcomes of employees, as well as teaching materials. This study will help our consortium develop the training needed in the EU using e-learning platforms.

Digital learning and e-learning platforms are critical to the success of SMEs in today's fast-paced business environment, where digital skills have emerged as a competitive factor or even dynamic capabilities [43]. SMEs can empower and develop new skills, improve job performance, and drive innovation and growth within the company by adopting digital tools and learning environments both in the workplace and at home. In addition, work-based lifelong learning and digital learning can help

SMEs keep up with fast-growing technological breakthroughs and be competitive in the market.

6 Conclusions

The study revealed that SMEs had a lack of digital skills among their employees. Of these, the three main deficiencies were (1) data analytics, (2) social media marketing and analytics, and (3) Advanced Excel skills, which are, however, basic digital skills. The results are not surprising in themselves, as the level of digital skills in the EU has not yet reached 55% of SMEs. The Focus Group interviews highlighted the attractiveness of e-learning platforms and virtual learning environments, which were hoped to be part of on-the-job learning. The research is limited because we only went through e-learning and online learning on a general level and did not delve into it in depth. However, the use of e-learning environments and virtual learning environments and their utilization were seen as important and part of the work community in the future.

E-learning and lifelong learning can give SMEs a competitive advantage in recruiting staff and maintaining their skills. Overall, e-learning, and lifelong learning are key to the long-term success of SMEs, even globally indispensable due to rapidly evolving digital tools and environments. SMEs should therefore prioritize investments to maintain staff training and must remain competitive and agile in the ever-changing digital business environment.

ACKNOWLEDGEMENT

We wish to express our gratitude to the participating in our study. This study has been partly funded by Digital Europe Programme supported project the LEVEraging knowledge of training providers in Upskilling and reskilling of SME's managers and employees towards empowering their digital transformation, (Level Up) project ID 101100679. Dr Jari Kaivo-oja wishes to thank also the Finnish Strategic Research Council (the Academy of Finland) for providing funding for the project Manufacturing 4.0 (Grant agreement 313395). During the finalization phase of the manuscript, the research and development project was co-financed by the ERDF project "ProDigy" in the Satakunta region, Finland. We would like to thank the reviewers of the FICC 2024 conference for their professional comments.

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